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STUDIA ECOLOGIAE ET BIOETHICAE



21/2 (2023)

Rag-Pickers as Benefactors and Beneficiaries of the Sustainable Development Goals: A Brief Literature Review

Zbieracze szmat jako benefaktorzy i beneficjenci Celów Zrównoważonego Rozwoju: Krótki przegląd literatury

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Received: 12 Jan, 2023; Revised: 28 Feb, 2023; Accepted: 02 Mar, 2023

Abstract: Ragpickers have long led a marginalised, subliminal and deprived existence, and have silently gone about contributing to 'informal waste recycling', diverting in many cities and towns, over half of the recyclable wastes from dumpsites to the technosphere. The reviewer has based this paper on 60 peer-reviewed publications spanning a time period of 28 years – from 1995 – 2022, originating from over a dozen different countries, and encompassing the social, economic and environmental dimensions of sustainability. The discussion has been structured around the six question words – Where/Wherefrom, When, How, What, Why and Who/Whom. While there is no claim of any addition *per se* being made to the extant body of knowledge, the reviewer would like to describe this as an attempt to simply collate existing knowledge to serve the practical purpose of highlighting the plight of our impoverished, malnourished, oppressed brethren, to elicit appreciation, understanding and support for them, from policymakers in government, CSR personnel from the corporate world, journalists in the media, and most importantly, from the common urban denizens. All these entities can work shoulder to shoulder with the NGOs who have been relentlessly striving to help the rag-pickers to 'stay afloat'. The reviewer fondly hopes that this will motivate more concerted transdisciplinary applied research, predicated on the Sustainable Development Goals – a collaboration among the disciplines of healthcare, sociology, psychology, urban planning, sustainable development, environmental engineering, and even art and poetry.

Keywords: environment, rag-picker/ragpicker, rag-picking/ragpicking, urban metabolism, waste management

Streszczenie: Zbieracze szmat, którzy od dawna prowadzą swoją marginalizowaną, niedostrzeganą przez społeczeństwo i pozbawioną perspektyw egzystencję, po cichu przyczyniają się do "nieformalnego recyklingu odpadów", odzyskując z wysypisk śmieci wielkich i małych miast ponad połowę materiałów nadających się do recyklingu i w ten sposób wprowadzając je ponownie do technosfery. Niniejszy artykuł bazuje na 60 recenzowanych publikacjach obejmujących okres 28 lat – od 1995 do 2022 r., pochodzących z kilkunastu różnych krajów i podejmujących tematykę z zakresu zrównoważonego rozwoju w wymiarze społecznym, ekonomicznym i środowiskowym. Poruszone kwestie zostały w niniejszym artykule przedstawione w formie odpowiedzi na sześć kluczowych pytań – Gdzie/Skąd, Kiedy, Jak, Co, Dlaczego i Kto/Kogo. Chociaż wydaje się, że artykuł nie wnosi nowych elementów do już istniejącej wiedzy w tym obszarze, a jedynie dokonuje zestawienia informacji z już istniejących źródeł, autor ma nadzieję, że taki sposób przedstawienia tej problematyki będzie służyć praktycznemu celowi, jakim jest podkreślenie trudnej sytuacji naszych ubogich, niedożywionych, uciskanych braci i tym samym pomoże uzyskać dla nich uznanie, zrozumienie i wsparcie ze strony decydentów, pracowników odpowiedzialnych za obszar społecznej odpowiedzialności biznesu, dziennikarzy, a co najważniejsze, zwykłych mieszkańców miast.

Wszystkie te podmioty mogą współpracować z organizacjami pozarządowymi, które dokonują wszelkich starań, aby zapewnić zbieraczom szmat środki niezbędne do przeżycia. Autor ma nadzieję, że przedstawiona tematyka będzie stanowić motywację do podjęcia bardziej skoordynowanych interdyscyplinarnych badań, opartych na celach zrównoważonego rozwoju – współpracy między dyscyplinami opieki zdrowotnej, socjologii, psychologii, urbanistyki, zrównoważonego rozwoju, inżynierii środowiska, a nawet sztuki i poezji.

Słowa kluczowe: środowisko, zbieracze szmat, zbieranie szmat, miejski metabolizm, gospodarka odpadami

Introduction and motivation

Urban metabolism is sustained by a wide variety of stakeholders, comprising of upstream producers/manufacturers/suppliers, mid-stream consumers and downstream waste management entities (which in turn, is composed of a swathe of actors – street sweepers, waste collectors and transporters, recyclers, sewage treatment personnel, landfill operators, etc.) An important though marginalised, subliminal (and unfortunately also taken-for-granted) and deprived group of city-dwellers constitutes a part of the ‘downstream’ in the cities of the developing world. Known very commonly as rag-pickers (ragpickers, rag pickers), they are also referred to variously as gleaners, *catadores* in Portuguese and *Lumpensammler* in German (Moll 2020), waste-pickers and rag-rakers (Craig 2019), rag-collectors, and *chiffonniers* in French (Bielecki 2009; Moll 2020), *zabbālīn* in Arabic (Florin 2015), and quite condescendingly as scavengers too (Craig 2019). The term ‘rag-picker’ etymologically refers to collectors of recyclable disposed linen rags in medieval England (Craig 2019). They sold the rags to the paper mills where they were subsequently recycled to paper. While that historic term for this category of downtrodden urban dwellers has stood the ‘test of centuries’, so to write, rag-pickers of today segregate recyclables of value – plastics, metals, paper, glass, electronic wastes etc. and also inert wastes and biodegradables in some instances (Johnson et al 2022) – from dumpsites and landfills, and sell them forward to middlemen who are unavoidable

‘value-extracting’ nodes in the recycling supply-chain.

Thanks to researchers, social workers and journalists in the developing-world cities, who are, after all their fellow-citizens, the long-unappreciated and underestimated contribution to ‘informal waste management’ of these ‘icons of poverty in the Global South’ (Hillenbrand 2019), ‘the most provocative figures of human misery’ (le Roy 2017), ‘figures of the abject, mired in dead and rotting matter’ (Bielecki 2009), ‘urban miners’ (label assigned by this reviewer), and ‘soldiers of the Green Brigade’ (Rajendiran et al 2022), has gained importance of late. The ‘Leave-No-One-Behind’ (LNOB) recommendation of the United Nations Sustainable Development Goals (United Nations Sustainable Development Group 2015) has also proved to be a shot in the arm, a stimulus to this hitherto-withheld recognition. In this review paper, the author, a citizen of the developing world (India), who is currently based in Sweden, revisits the publications of the aforesaid researchers (and also of some in the developed world) to understand the past and present of ragpickers therefrom. This paper is also motivated by the author’s decision to contribute to the desired sustainable future of our disadvantaged brethren who occupy the bottom of Maslow’s pyramid and suffer the ignominy of the pariah status accorded to them, even though they perform a vital role in the metabolism of developing-world cities and towns, silently, in the background.

1. Methodology in brief and the outcome

Considering that the term ‘ragpickers’ (rag-pickers/rag pickers) is used very commonly to represent the urban inhabitants at the ‘bottom-of-the-pyramid’, the author decided to search for peer-reviewed articles, reviews, conference presentations, editorials and book chapters containing any of the terms referred to, in their titles, abstracts or keywords. This search was conducted in the first week of September 2022, and the author would thereby like to point out that there may well have been some additions to the literature base over the last 5 months. Bearing in mind that the reference may be to the singular form – rag-picker – or the act – rag-picking, as shown in Figure 1, ‘ragpick* OR rag-pick* OR rag pick*’ was used in Scopus to extract all types of publications, without restricting the search to any limited time-frame. The basic premise for availing of Scopus was the well-known fact that it is the largest database in vogue, and therefore, there is a likelihood of most (if not all) publications related to known fields of research like ragpickers / rag-picking, being accessible. Of course, there may be some journals and therefore publications which may tend to get excluded, but this may account for a very small, and what can thereby be assumed to be, a negligible, fraction. A claim of comprehensiveness is therefore not being made here. It must also be pointed out that publications which have used any of the other synonyms for ‘rag-picking’ or ‘rag-pickers’ instead of these words, will end up being excluded from this review (a limitation which the author acknowledges at the outset). The range is certainly limited by the choice of the source and the rationale behind it. Scopus, however, accounts for 14,000 journal titles from 4000 publishers (Elsevier 2022), and hence, it was considered safe to rely on it for this review paper.

A total of 126 publications – a mix of all the types referred to – was unearthed by the search. By reading the abstracts first, 26 of these were set aside as irrelevant to the review. Though the term ‘rag-pickers’

was used *en passant* in the abstracts of these 26, the authors thereof had not discussed anything in particular about rag-pickers. Of the remaining 100, seven were classified as ‘middling’, being indirectly relevant. That left the author with 93 relevant publications. Fifty-six of the 100 could be downloaded directly through the university library (Karlstad University). Of the remaining 44, the author could locate the corresponding authors of 32 on ResearchGate or by other means, and write to them. Only four of them responded, taking the total tally of readable PDFs to 60. Twelve of them were not locatable (Figure 1).

Motivated by Rudyard Kipling’s lines – *I keep six honest serving-men/They taught me all I knew/their names are What and Why and When/And How and Where and Who*, the discussion (section 2) has been divided into five sub-sections (sub-sections 2.1 to 2.5). Sub-section 2.4 is further subdivided into the three dimensions of sustainability – social, economic and environmental, with the former being sub-divided in

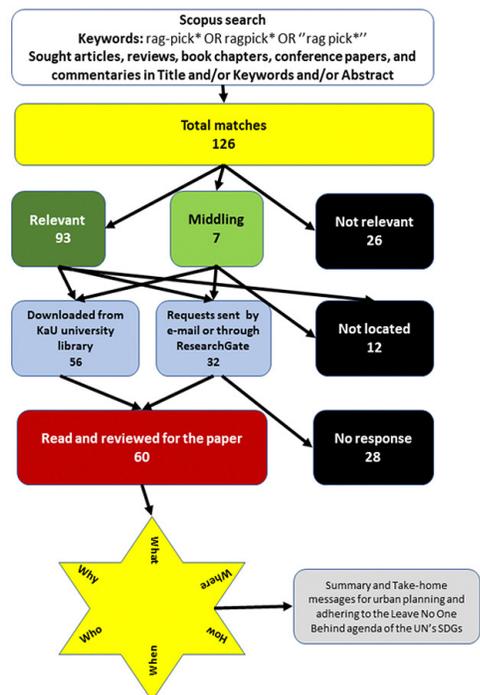


Figure 1. The methodology illustrated

turn into three aspects – health/well-being/safety, education and culture/heritage/religion. The question words ‘Who’ and ‘Why’ are addressed together in sub-section 2.5, as the primary motive of the authors is to convey messages to, and inform specific categories of readers. The review ends with a brief summary of take-home messages, which point to the long-overdue measures that need to be undertaken to improve the welfare of the silently-suffering, misunderstood ragpickers around the world. The reviewer does not make any claim to adding anything new to this body of diverse knowledge, but simply attempts to collate existing knowledge published in scientific journal publications (and as conference proceedings), accessible to him for review.

This collation serves the purpose of highlighting the plight of a marginalised group of urban residents in the developing world, and thereby elicit appreciation, understanding and support for them, from policymakers in government, CSR (corporate social responsibility) personnel from the corporate world, journalists in the media, and most importantly, from the common urban denizens, all of whom can work shoulder to shoulder with the non-governmental organisations (NGOs) which have been relentlessly striving to help the rag-pickers to ‘stay afloat’.

2. Discussion - the ‘gleanings’

2.1. Locational - Where/Wherefrom?

The question ‘Where?’ (rather ‘Wherefrom?’) implies the country of origin based on the university-affiliation of the first author of each publication (as depicted in Figure 2). This choice has been made to identify and accredit the sources (universities the respective first authors are affiliated to, and the countries these universities are based in, in other words) the articles have originated from. Not surprisingly, India dominates the lot and accounts for 60% of the 60 publications. This does not come as a surprise as India, a developing country, happens to be the largest democracy in the world, with

several big cities and towns to which jobless migrants flock in search of a means of livelihood. It will, reportedly, also be the most populous by April this year. The rapid rate of urbanisation and the concomitant burgeoning of a consumerist culture over the last few decades, thanks to a mushrooming middle class, presents these migrants with opportunities for rag-picking. The other developing world countries figuring among the 14 shown in Figure 2, are Brazil (South America), Nepal, Indonesia, Pakistan, Iraq (all from Asia) and Nigeria (Africa). Those originating from the developed world can be attributed to researchers based abroad and affiliated to universities there, who are interested in looking into the plight of the rag-pickers and contributing to the related body of knowledge, and also to historians and art-critics who seek inspiration from the ragpicker and find interesting analogies between his/her profession and the creative pursuits of writers, poets and painters. It must be mentioned here that the reviewer spotted publications originating from some other developing countries (Sri Lanka for instance), which unfortunately could not be accessed.

This site-specific question (Where?) can also be interpreted as the probing of the locations of the case studies presented in the publications. Of the 36 accessible publications originating from India, the reviewer was able to understand different aspects of the rag-picking profession from Myanmar (eastern neighbour of India), and practically the length and breadth of India – the States of Andhra Pradesh/Telangana, Assam, Delhi, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Tamil Nadu and West Bengal (shown as blue circles in Figure 3); and the cities/towns of Ahmedabad, Bhopal, Chandigarh, Chennai, Dehradun, Hyderabad, Jammu, Kolkata, Lucknow, Mirzapur, Mumbai, New Delhi, Rishikesh, and Trichy (shown in Figure 3 as red triangles). The French capital city Paris (of the 19th century), Nazi Germany, Dharan and Kathmandu (both from Nepal),

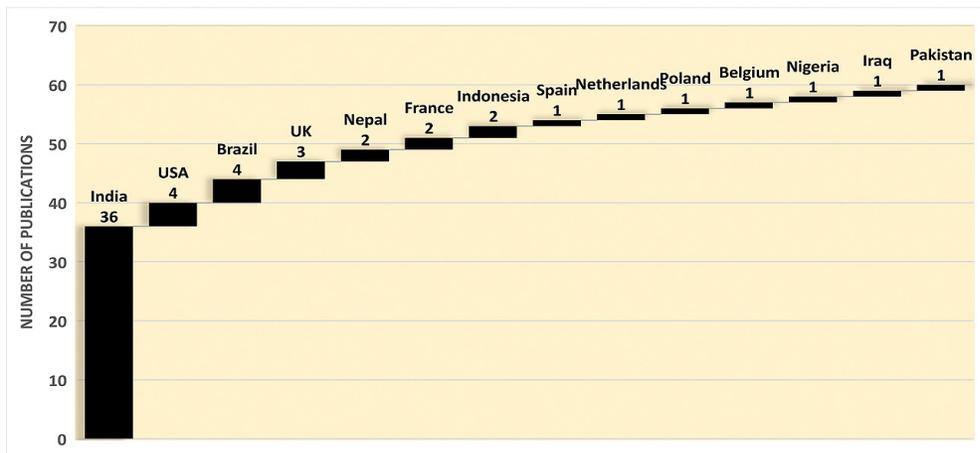


Figure 2. Countries of origin, based on the university-affiliation of the first author of each publication

Karachi (Pakistan), Port Harcourt (Nigeria), the Diyala governorate (Iraq), Curitiba (southern Brazil), Cairo (Egypt) and Yogyakarta (Java, Indonesia) are the other places one comes across, among the 24 publications not originating from India. The locations of the Nepalese and Pakistani cities have also been shown in Figure 3.

2.2. Temporal - When?

Figure 4 shows the temporal distribution of the 60 publications reviewed. It must be reiterated here that these are merely the publications which the reviewer could access. Thereby, the reviewer will refrain from attempting to look beyond the numbers for 'stories'. However, it must be mentioned at this juncture that the LNOB aspect of the SDGs (United Nations Sustainable Development Group 2015), will motivate many researchers – from urban planning, sociological, environmental and healthcare disciplines, *inter alia* – to accord prominence to the problems, challenges, aspirations and hopes of ragpickers, and the important role played by them in urban metabolism. In other words, one can expect many more publications focusing on ragpickers, in the future.

Apart from the year of publication, the temporality of the data analysed, findings reported, surveys carried out and

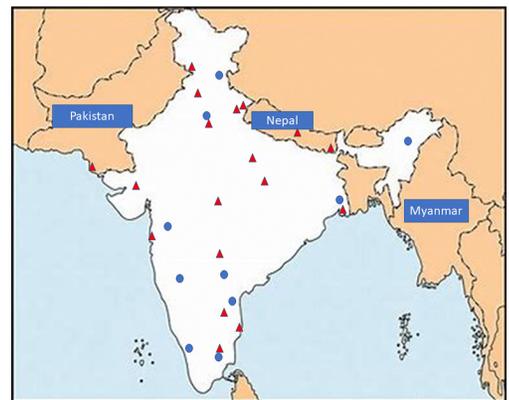


Figure 3. Cities/towns (shown as red triangles) and States (blue circles) in India, encompassed by the case-studies in India-focused publications. Also shown in the map are Myanmar, Nepal and Pakistan, and the cities in Nepal and Pakistan which figure among the case studies

models developed, is also encompassed by the question-word 'When?'. Table 1 divides the 60 publications into three groups based on this temporality. In some cases – Aricat et al (2020) for instance – the projects began more than 5 years before, and lasted till the year before the respective journal papers were published; and the authors of some of them availed of a mix of data from older sources and from surveys carried out closer to the year of publication. Some – like Venkiteela (2020) and Masood

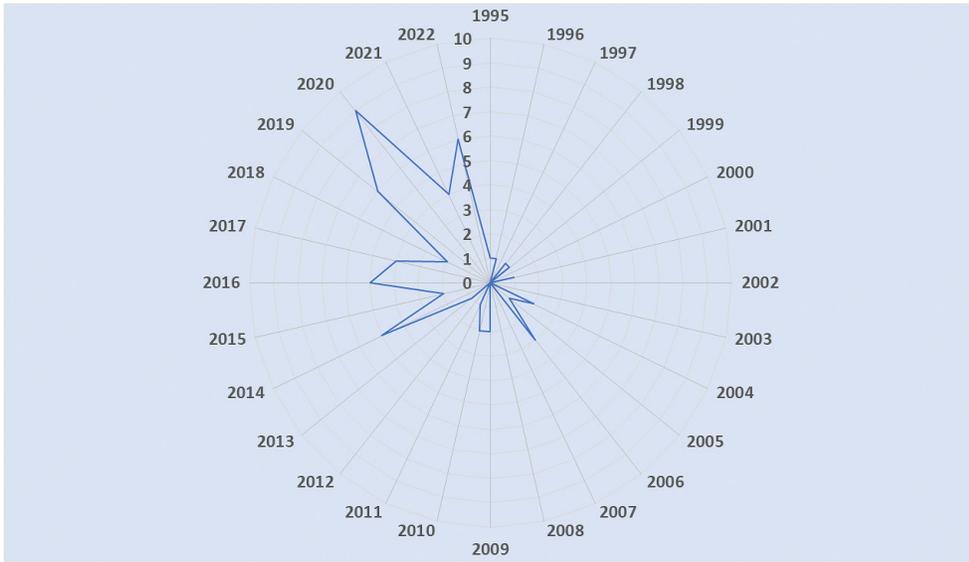


Figure 4. Temporal spread of the 60 reviewed publications

Table 1. Categorisation on the basis of temporality of data analysed (italicisation used as identifier of publications belonging to more than group)

Time gap (in years, on the left) between year of publication, and data analysed/surveys carried out/findings reported/models developed	
0-5	Chakraborty et al (2022), Narayanswamy et al (2022), Johnson et al (2022), <i>Coledam et al (2022)</i> , Behera (2021), Gupta and Tripathi (2021), Govind et al (2021), <i>Prihandoko et al (2021)</i> , Fulwani et al (2020), Yadav et al (2020), <i>Aricat et al (2020)</i> , Gautam et al (2020), Jumaha et al (2020), Masood et al (2020), Shankar Balu et al (2020), Saikumar (2019), Khoironi et al (2019), Rawat et al (2018), Thakur et al (2018), Agarwalla et al (2017), Mondal et al (2017), Mondal et al (2016), Ravindra et al (2016), Suthar et al (2016), Murthy (2016), <i>Florin (2015)</i> , Etcheverry et al (2014), Gothoskar (2014), <i>Gigengack (2014)</i> , Ojha et al (2014), Kandasamy et al (2013), <i>Kulshrestha (2011)</i> , Chandramohan et al (2010), Wachukwu et al (2010), Thapa et al (2009), da Silva et al (2006a), da Silva et al (2006b), Gupta and Boojh (2006), da Silva et al (2005), Ray et al (2004), Purohit et al (2001), Joshi, S (1998), Singh (1999), Sharma (1995)
5-20	<i>Coledam et al (2022)</i> , Rajendiran et al (2022), <i>Prihandoko et al (2021)</i> , <i>Venkiteela (2020)</i> , Yadav (2020), <i>Aricat et al (2020)</i> , <i>Hillenbrand (2019)</i> , Khatoon et al (2019), Saikia (2019), Joshi et al (2016), <i>Florin (2015)</i> , Uplap et al (2014), <i>Gigengack (2014)</i> , <i>Kulshrestha (2011)</i> , Malik et al (2002)
>20	Moll (2020), <i>Venkiteela (2020)</i> , <i>Hillenbrand (2019)</i> , Sainsbury (2019), Craig (2019), Le Roy (2017), Berg (2015), <i>Florin (2015)</i> , Bielecki (2009), Faure (1996)

et al (2020) for instance – availed of data from the past, to forecast the future. Italics has been used in Table 1, to identify the publications belonging to more than one group. Moll (2020), Hillenbrand (2019), Sainsbury (2019), Craig (2019), Berg (2015), Le Roy (2017), Bielecki (2009), Faure (1996), and Florin (2015), go further back in time to France/Germany/England/Egypt; the first eight presenting the ragpicker as a ‘muse’

for the writer, poet and artist, personifying the ‘waste as wealth’ paradigm which the ragpickers have been silently upholding.

2.3. Methodological - How?

The reviewer identified medical examinations, interviews with rag-pickers and other actors in the waste-recycling value chain, surveys and field work, personal observations and experiences, modelling, reviews

(of either status at the time of publication, or historical accounts) as the methods adopted by the different authors in the papers reviewed (refer to the pie-chart in Figure 5 which depicts the distribution of the methods adopted). In some cases, a mixed-methods approach was adopted (using two or more of the aforementioned ones), and thereby the numbers shown in Figure 5 add up to 67 (which is 7 more than the total number of papers reviewed).

The publications based on personal experiences highlight, *inter alia*, the obstacles to, and the desirability of educating rag pickers' children and thus contributing to progress towards the attainment of the Sustainable Development Goals – SDGs 4 and 5 (Murthy 2016; Yadav 2020). Artificial Neural Networks and bootstrapping are availed of, by Johnson et al (2022), to understand both the supportive and obstructive factors influencing the performance of rag-pickers, while Environmental Fate Modelling helped Yadav et al (2020) to understand the dispersion of plastic wastes from dumpsites to the different environmental media (and the modifying effect that rag-pickers can have on the same). The diversity of standard medical-examination methods adopted

by pathologists and health-professionals, to profile the health of ragpickers (a connection to SDG 3) can be gleaned from 16 of the 60 publications reviewed, and these include, *inter alia*, haematology, sputum cytology, urinalysis, spirometry and pulmonary function tests, analysis and assessment of lymphocyte and monocyte sub-types, platelet activation, oxidation stress, platelet aggregation, estimation of blood lead levels, serum Immunoglobulin E determination, and body-mass index determination.

Interviews with ragpickers and their children (and other players higher up the waste recycling value chain they interact with – as in Aricat et al (2020) for example), field observations of how ragpickers go about their daily rigmarole (which are documented with the aid of photographs taken in-situ), availing of historical data and prognosticating the future on the basis of the same (Venketeela (2020), for instance), are the other approaches adopted by researchers, to understand, inform, motivate and educate.

2.4. Topical - What?

While ragpickers contribute to the progress towards the attainment of some SDGs (associated with resource management and

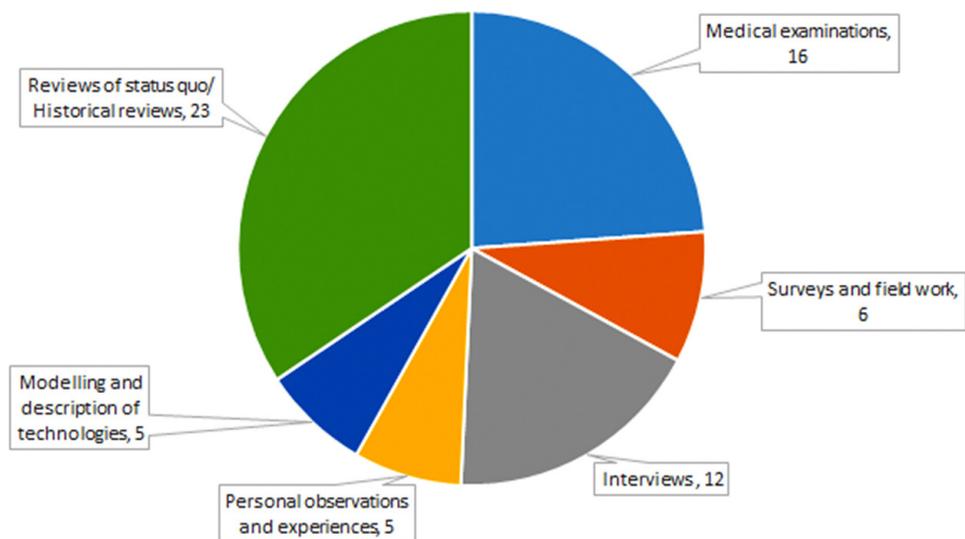


Figure 5. The six different methods adopted by the authors of the papers reviewed

the environmental media – SDGs 13, 14 and 15), true progress in some others entails investments of time, money and resources in improving their lot. In other words, as the title of this paper suggests, rag-pickers ought to be both benefactors for, and beneficiaries of, the attainment of the SDGs. The SDGs (17 in all) can be categorised into Social (5), Economic (1), Environmental (3), Socio-economic (2), Economic-environmental (1), Socio-environmental (1), Governance/Political (2) and one SDG encompassing all the three dimensions [as theorised in Venkatesh (2021)]. This section is sub-divided into the three ‘spheres’ – Society (2.4.1), Economy (2.4.2) and Environment (2.4.3) – with Society being sub-divided in turn to ‘Health, Safety and Well-being’ [SDG 3], ‘Education’ [SDG 4] and ‘Culture, Heritage and Religion’ [a part of SDG 11, which aims at making cities inclusive, safe, resilient and sustainable]. These, implicitly, are also forward-linked to Gender Equality [SDG 5] and Reduction of Inequalities [SDG 10] and situated in the LNOB agenda (referred to earlier in section “Introduction and motivation”), as both male and female ragpickers; and their sons and daughters, deserve the same consideration. There is a backward linkage (implicit again) to No Poverty [SDG 1; categorised as a socio-economic SDG in Venkatesh (2021)], Zero Hunger [SDG 2], Clean water and sanitation [SDG 6] and Affordable and Clean energy [SDG 7], all four of which, can be enablers for SDGs 3 and 4.

2.4.1. Society

2.4.1.1. Health, safety and well-being

‘Health and well-being’ need to be interpreted correctly and understood holistically. It includes the physical, mental/emotional and psychological aspects of salubrity. The psychosomatic nature of ill-health is quite well understood nowadays by the medical fraternity and the healthcare sector in general. In this respect, da Silva and colleagues (2005, 2006a, 2006b) had put up a strong case in defence of ragpickers in Brazil, and by extension to other developing

countries. Constant exposure to biological, chemical and safety hazards at the dumpsites, posed by discarded medicines, bandages, blood, diapers, sanitary napkins, and used needles (Gupta et al 2006), dead animals, razor blades, batteries etc., owing to the disuse of facemasks, gloves and proper footwear (Malik et al 2002; da Silva et al 2005; Kandasamy et al 2013; Uplap et al 2014; Agarwalla et al 2017; Gautam et al 2020), makes them vulnerable to a host of ailments, musculoskeletal pain being an inevitable one (da Silva et al 2006b). The disuse referred to above, may be because of force of habit and/or lack of awareness and/or not having the means to purchase the protective equipment referred to. The biological hazards are posed by a variety of bacteria and fungi in the biodegradable organic content in the landfills/dumpsites, the air and the soil in their vicinity, and common genera of these microorganisms were identified by Chandramohan et al (2010) in south India and Wachukwu et al (2010) in Nigeria.

Feeling discriminated against and compelled to work as ragpickers to earn their livelihoods, and enduring monotony and repetitiveness on-the-job in addition to pain, bruises, lacerations, abrasions, burns, sprains, headaches, breathlessness, fever (Ojha et al 2014; Thakur et al 2018), whooping cough and asthma (Chandramohan et al 2010), tinnitus, diarrhoea, constipation and anorexia (Thapa et al 2019), sinusitis and leucocytosis (Ray et al 2004), and scabies (Khatoon et al 2019) amplifies the risk of psychiatric disorders (da Silva et al 2006a; Etcheverry et al 2014). It is very much understandable that both adults and adolescents (and even children at times) enduring these travails day in and day out easily fall prey to alcohol and tobacco (Thapa et al 2009; Uplap et al 2014), drugs and inhalants like toluene-containing typewriter fluid (Gigenack 2014; Yadav 2020), which provide them with a temporary reprieve from their suffering, while leading them down a perilous, health-damaging trail. If one adds in the harassment which ragpickers are subjected to,

at the hands of local goons, corrupt police-persons and municipal workers (Uplap et al 2014; Chakraborty et al 2022), the plight of ragpickers has verily reached a tipping point, and it cannot, must not, and hopefully will not be overlooked.

While most of the papers focusing on health have examined both male and female ragpickers, Mondal et al (2016, 2017), Fulwani et al (2020) and Uplap et al (2014) have focused only on the latter. Mondal et al (2016, 2017) have noted that the health of malnourished female ragpickers in Kolkata (and in general, anywhere in the world) who have been diagnosed with oxidative stress, inflammation, blood platelet hyperactivity, genotoxicity and anaemia, is further exacerbated if they avail of wood, dung or charcoal as cooking fuel. Fulwani et al (2020) and Kandasamy et al (2013) have pointed out that a majority of the ragpickers (male and female) can often afford just one meal every day. Malnutrition among ragpickers, which Thapa et al (2009) have shed light on, in their case study from Nepal, has been a problem which has been swept under the carpet for long (Sharma, 1995). 'Zero Hunger' which is being targeted by SDG 2 seems very far away at the time of writing. Some authors have also noted that it is not just about not being able to eat two square meals a day, but also finding it difficult to access safe drinking water or avail of sanitation facilities. Whether and how these challenges will be tackled, in the context of LNOB applied to SDG 6 and SDG 7, remains to be seen.

Health insurance has been a politically-sensitive issue in many countries of the world – both developed and developing. In an incisive commentary, Gothoskar (2014) highlighted the sorry fact that the most vulnerable migrant ragpickers in India – children and women especially – were excluded from the health benefits offered by the 'half-baked' (the reviewer's choice of adjective) insurance schemes, which at the time of publication of that paper, were pitted against each other. In a democracy like India, instances of the central

government working at cross-purposes with the provincial/state governments are usually rife. While the commentary referred to was published 8 years ago, the reviewer has not tried to find out about the current status – quality and extent – of health coverage offered to ragpickers in India.

2.4.1.2. Education

Education, in the context of ragpickers and their children, comprises of both formal primary education, literacy and numeracy, generating awareness about health issues and the need for safety (a link to the previous sub-section, and thereby SDG 3), sustainability and environmental issues, and imparting training to enable ragpickers to develop new skills so as to be able to find alternate, safer employment opportunities in the urban economy. The aforesaid nexus between education and health & well-being can be substantiated by referring to Yadav (2020), in which the author has recounted his experience as a counsellor-educator of ragpickers' children in Mumbai. Listening to their concerns intently, patiently impressing upon them the importance of practices like washing hands carefully prior to eating, using protective equipment like gloves and facemasks while rag-picking, and dissuading them from their addictive habits of smoking and inhalant-use, enabled him to bring about a perceptible change in their lives. According to Yadav (2020), just the process of learning and acquiring knowledge is extremely empowering and therapeutic, and can combat depressive tendencies in youngsters, which Murthy (2016) and Thapa et al (2004) also emphasized earlier. All these authors have remarked on the high dropout rates of ragpickers' children from schools, and labelled that as a key challenge to be overcome by educators. Education has been, is, and will continue to be, as Nelson Mandela remarked, 'the most powerful weapon which one can use to change the world,' and in this case, to change the futures of ragpickers' children for the better, progressively and irreversibly. According to Yadav (2020),

who worked as a social work trainee educating rag-pickers' children in Mumbai in 2014, education may very well be the only way this change can be wrought.

Applying ANNs in a multifactorial analysis of ragpickers' productivity, Johnson et al (2022) could decipher the importance of literacy (thanks to either schooling or special training acquired from NGOs) in improving productivity. While labelling it as a 'valuable intangible resource', the authors concluded that literate ragpickers tend to segregate more of the recyclables to augment their daily income, and ignore the biodegradables (which if collected, could be repurposed to compost, instead of being left to rot and commence a 'parasite-vector-disease' cycle). This, however, should not be interpreted as placing literacy in an unfavourable light. Literacy (or education in other words) will always be a necessary condition to generate greater awareness, be that among children or adults. When it comes to children, the prevalence of child labour in general, and rag-picking by children in particular – which tends to become a familial occupation (Malik et al 2002; Murthy 2016; Saikumar 2019), in the absence of interventions – deprives children of their rights to get at least a good primary education. The magnitude of the anticipated change is immense when one considers that 90% of ragpickers in Delhi (Ravindra et al 2016), 58% in Chandigarh in north India (Thakur et al 2018), and over 75% of those interviewed in south India by Chakraborty et al (2022), are illiterate.

2.4.1.3. Culture, heritage and religion

Leaving No One Behind (LNOB), as defined by the United Nations Sustainable Development Group (2015), is 'the central, transformative promise of the 2030 Agenda and its SDGs, to reach the furthest behind first'. If this is followed by every developing country in letter and spirit, the rag-pickers – 'the furthest behind in urban habitats' – ought to get the attention which is long

overdue, in order to make these habitats 'inclusive' (SDG 11).

Religions advocate humaneness, and preach and promote the concepts of fraternity and brotherhood. Art, music and literature have long been instruments used for this purpose. The ragpicker takes on an entirely different persona in the eyes of artists, painters, poets and writers. He/She is instantly transmogrified from an object of scorn to a subject of mystique, through the power of the pen, pencil and paintbrush. Hands which sift through garbage to unearth items of value, are honoured by hands wielding pen and brush on paper and canvas. While Craig (2019) emphasizes the importance of foregrounding the contribution of ragpickers as a vital part of several cultures and heritages, readers will agree that they must be credited for extracting life out of detritus which symbolises doom (Berg 2015) and repurposing (valorising) what to many thoughtless urbanites belonging to the higher socio-economic echelon, have lost their purpose (value) (le Roy 2017). A ragpicker, for le Roy (2017), is a 'collector and cataloguer' as opposed to a scavenger, and is in principle not very different from rich art-collectors. Hillenbrand (2019) concurs and labels the ragpicker's enterprise as the 'appropriate, aesthetic, alchemical stewardship of objects' in a culture which, as Moll (2020) observes, is grounded in the socioeconomic cult of disposability, prodigality and excessive consumption on the part of the wealthy and privileged.

Religious tolerance is indispensable for the inclusivity targeted by SDG 11, as well as for the reduction of inequalities targeted by SDG 10. Chakraborty et al (2022), in their interactions with ragpickers in southern India, found that the locals were earning more than the migrants from eastern India; and the Hindus more than the Muslims. The latter felt discriminated against, presumably on religious/linguistic grounds, as was also observed by Murthy (2016) in northern India. In a similar vein, the ragpickers in Cairo who are Coptic Christians

and who rear pigs (on the organic wastes collected from landfills and dumpsites), are shunned by the Muslim majority in the city (Florin 2015). While religion has been divisive in these instances, it has been an enabler in Brazil, helping people in general to find hope even in times of despair. In this backdrop, Etcheverry et al (2014) had written that depressive behaviour among adolescent ragpickers in Brazil, can be allayed by regular church attendance.

2.4.2. Economy

Whenever new demands have arisen in economies, owing to exigencies imposed by natural catastrophes, commodity shortages, rise in standards of living of the upper and middle classes, the unemployed have 'by choice or compulsion', availed of the opportunity to fulfil them by donning the mantle of suppliers. Most of them have been (and are) poor people from rural areas who have migrated to urban centres, as mentioned by several authors, while there have been some who have even taken to rag-picking voluntarily, out of a strong desire for being 'entrepreneurial' and independent. Florin (2015) quotes an Egyptian ragpicker from Cairo as claiming that ragpickers are 'not (dependent) garbage men, but (independent) garbage businessmen'. Uplap and co-authors (2014), in their conversations with female ragpickers in Mumbai identified 'ease of entry', 'flexibility of timing', and 'no requirement of special skills' as other reasons for taking up rag-picking as a profession. This, in brief, is the story of ragpickers, both in the western world of the past, and the developing world at the time of writing.

As Craig (2019) writes, papermaking in England [France (Bielecki 2009), and the western world in general] depended largely on 'weak, tattered rags' supplied to the mills by rag-pickers (which is how they got their name, in the first place). Many 'volunteer' ragpickers emerged in Nazi Germany, and by dedicating themselves to closing the energy cycle by meticulously collecting paper, rags, bones, bottles, metal etc.,

they extended the resource base of the autarkic Third Reich, and warded off the inevitable undersupply (Berg 2015). Bielecki (2019) referring to earlier works, points out that the rag-picker ought to be looked upon as an 'agent of recycling and repurposing, feeding waste into the jaws of an omnivorous industry' in the much-vaunted (and wanted) circular economies of the 21st century.

SDG 9 – Industry, Innovation and Infrastructure – can very well be Janus-faced, with respect to ragpickers, if efforts are not made to magnify the complementarities and minimise the trade-offs. If such efforts are made, innovation and infrastructure development in the waste management sector need not threaten the livelihoods of the ragpickers, as suggested by Prihandoko et al (2021). It will, on the other hand, contribute to an increase in their income by training and motivating them to become so-called 'wastepreneurs' by expanding their activities to composting and logistics for energy-recovery for incineration plants. Repair shops which have mushroomed in the developing world, are important infrastructural entities (Govind et al, 2021), but whether ragpickers can be integrated into the 'repair culture' and benefit therefrom is not very clear. The privatisation of waste collections and transportation is directly antagonistic to the ragpickers' livelihoods as observed by some authors (Florin 2015; Govind et al 2021), unless some kind of public-private-NGO partnership can be conceived to arrive at the best-possible, sustainable compromise. Automating waste segregation (Shankar Balu 2020; Gupta 2021; Narayanaswamy 2022) and displacing the ragpickers altogether is inadvisable for developing world economies. If segregation is carried out to enable ragpickers to work safely and effectively; while improving their productivity (which can be measured as the value of recyclables collected and sold to middlemen per day), that would be a win-win for the ragpickers, the economy and the environment. However, these three papers have not explicitly adopted

a 'Design-for-the-benefit-of-the-ragpickers' approach.

The daily earnings of ragpickers vary depending not only on what and how much they collect, but also on the market price of the recyclables at the time of sale to the middlemen, and the bargaining power of the ragpickers (Kulshrestha 2011; Aricat et al 2020). Figure 6 compares the daily earnings reported in some publications (for different cities). They are expressed in terms of approximate equivalent annual average values in US dollars in the respective years of publication, calculated by referring to a time series of exchange rates from the website of the International Monetary Fund (IMF). It can be surmised that individually, ragpickers keep oscillating between being 'below the extreme poverty line' and 'above the poverty line', with the reported average values masking these periodic fluctuations. The daily earnings shown in orange in Figure 6 are those of children (Malik et al 2022) and adolescents (Sharma 1995) who supplement the daily earnings of their parents. However, as Johnson et al (2022) have predicted, by availing of ANN and studying ragpickers in an area in Delhi in India, per-capita daily earnings can increase by as much as 5 USD, if all the enabling factors – access to technology/equipment, literacy, receptiveness to advice and support from NGOs and optimal sizing of groups formed during dumpsite/landfill-mining – act in unison and complement each other.

2.4.3. Environment

Ragpickers, by collecting about 5-10 kilograms per-capita daily (Ray et al 2004; Mondal et al 2017) divert huge quantities of recyclable waste [80% in Cairo (Florin 2015); 35% in Delhi (Govind et al 2021); 32% in Bengaluru (Chakraborty et al 2022); 80% in Coimbatore in the southern Indian state of Tamil Nadu (Rajendiran et al 2022), 5% in Jammu city in northern India (Masood et al 2020); 24% in Bhopal in central India (Kulshrestha 2011); close to 100% in Pondicherry and 20% on average in Indian cities (Joshi et al 2016)]

from landfills and dumpsites. This translates to significant environmental benefits, positively impacting a host of environmental impact categories. Dumpsites have held alarming quantities of single-use plastic items in cities of the developing world, and as Khoironi et al (2019) report about Indonesia, it is often the ragpickers who make sure that these plastics wend their way back into the technosphere. At this juncture, it will be apt to refer to a very recent LinkedIn post by the World Economic Forum (WEF 2022), which informs that Indonesia is spending close to 1 billion USD to shrink its plastic waste pile by 70% by 2025, a part of which is being paid to fishermen to recover waste plastics jettisoned intentionally or otherwise in the Indian Ocean. One wishes that the role played by ragpickers in aborting the journey of plastic wastes to the ocean, will also be recognised and rewarded. In a small north Indian city like Dehra Dun for instance, they divert close to 50 tons of plastic wastes to recycling every month (Suthar et al 2016). Plastic wastes dumped irresponsibly, are dispersed into the ecosphere (environmental media and natural ecosystems) by the action of wind, water and animals/birds; and eventually impact biodiversity and human health (two of the so-called end-point indicators in an environmental life-cycle analysis). Yadav and colleagues (2020) have pointed out how ragpickers, by focusing only on collecting the recyclable plastics, tend to expose the non-recyclable plastics to the forces of nature (wind and rain), and catalyse the dispersion of the same into the ecosphere. Perhaps, with a little training and awareness generation by NGOs who work closely with them, they may be willing to modify their approaches to sifting and collection and thereby abate the dispersion referred to. However, how the non-recyclable plastics will thereafter be handled, will also be an important determinant. Here, the recommendation of Prihandoko et al (2021) to motivate Indonesian ragpickers in Yogyakarta to integrate and evolve into wastepreneurs [in the spirit of the Egyptian

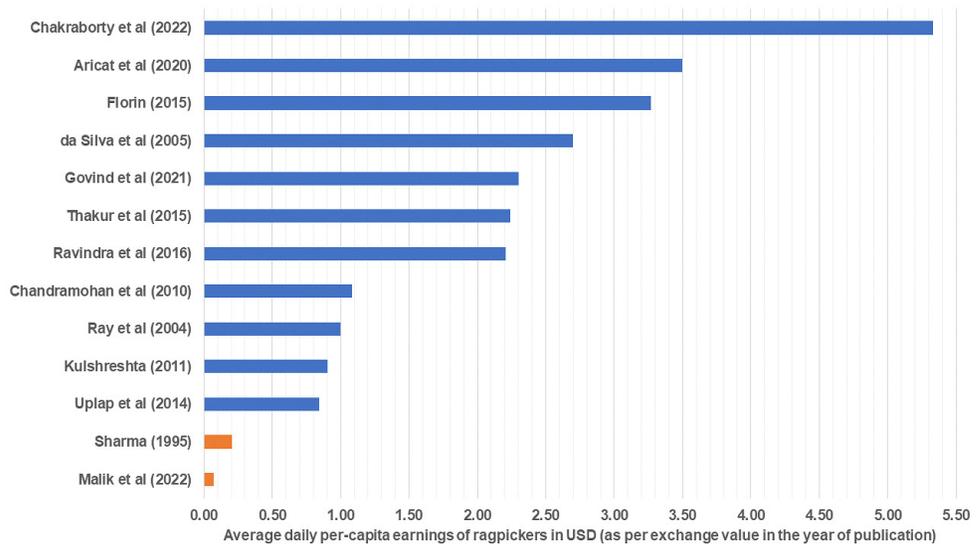


Figure 6. Reported average daily earnings of ragpickers (in equivalent USD, using average annual exchange rates)

ragpicker quoted in Florin (2015)] and profitably handle both the recyclable and non-recyclable plastics, is worth noting.

2.5. Who are being addressed, and why?

Researchers are communicators and they intend to get across messages to specific categories of people through their publications. These are predicated on and justified by the surveys conducted, experiments and analyses carried out, and reviews done. This sub-section is a synthesis of some such messages. Rag-pickers belong to the so-called 'bottom of Maslow's pyramid', and are oppressed by all sections of people who occupy its upper portion. It is amidst the piles of wastes generated by these sections that the rag-pickers spend most of their waking hours.

NGOs have been active in working closely with rag-pickers in different parts of the developing world. However, a lot more needs to be done. Many authors, while appreciating the contribution of the NGOs, have exhorted them to sustain their efforts to form organised cooperatives of rag-pickers (Suthar et al 2016; Venkiteela 2020; Johnson et al 2022), educate their children

(Murthy 2016; Yadav 2020), train and impart basic environmental education and other useful skills to make rag-pickers employable elsewhere (Kulshrestha 2011; Gautam et al 2020), arrange for the provision of protective equipment like gloves and masks (Agarwalla et al 2017), and spread awareness about health issues like AIDS (Purohit 2001). However, all the onuses must not be passed onto the NGOs. Rather, the noble work they are undertaking with financial support from philanthropists, must be backed up by both the public sector (local, provincial and national governments) and the private sector (industries desirous of improving their social footprint by supporting NGOs working with rag-pickers, as part of their CSR initiatives), as Uplap et al (2014) have pointed out in the past.

NGOs come in, either when governments fail; and/or the public sector cannot find solutions to all the modern-day urban challenges on its own. However, the role of NGOs is to make sure that 'wounds do not fester', to use a metaphor. It is up to the governments at all levels eventually to redress grievances on a continuous basis, through effective, long-overdue policy

changes (Chandramohan et al 2010; Ravindra et al 2016; Rawat et al 2018; Masood et al 2020; Chakraborty et al 2022).

Florin (2015), by highlighting the efforts taken by the Egyptian government to recognise the important role played by rag-pickers in the country's socio-economic development, has indirectly signalled to the governments of other countries in the developing world to follow suit, by at least having a good social protection system in place for migrant/itinerant rag-pickers [emphasized by Chakraborty et al (2022) in their study of Bengali migrant workers in south India]. Indeed, there is never any silver-bullet solution, and oftentimes, policies which are in place at local levels, may not be implemented religiously. While there are trendsetters, one also finds laggards who cannot be easily motivated to follow suit. This can explain why similar messages are conveyed repeatedly in publications which are spaced by over a decade. While NGOs can equip rag-pickers with skillsets to make them employable elsewhere, and even provide vocational training to their children (Saikumar, 2014; Murthy, 2016), it is after all up to the governments (at all levels), and the private sector (social entrepreneurs, especially) to generate employment opportunities for them, as Wachukwu et al (2010) had pointed out in their Nigerian case study. Here, the insistence of Prihandoko et al (2021) to motivate rag-pickers to evolve into 'wastepreneurs' themselves with the support of civic bodies in Indonesia, can be reiterated.

The developing world is still far away from embracing the paradigm of gender parity. Female rag-pickers – girls and women – lead an extremely challenging existence and some authors have focused on them in their research (Joshi 1998; Mondal et al 2016; Mondal et al 2017; Saikia 2019; Fulwani et al 2020), and urged municipal/private health-care agencies to monitor their health on a regular basis and provide adequate advice. Focusing on the well-being of women in general is verily a lynchpin for sustainable development; and attaining the SDGs.

Murthy (2016) has blamed the government-sponsored schools in India from shirking their responsibility when it comes to educating rag-pickers' children (who themselves are also following in their parents' footsteps). Teachers must understand that there is a yawning gap between rag-pickers' children and their classmates from well-to-do middle-class households, which needs to be bridged with patience and perseverance. Thapa et al (2009) exhorted NGOs in Nepal to work in unison to improve the access of ragpickers' children to vocational training, education, recreation and healthcare, while Gigengack (2014) appealed to policymakers to design treatment and employment opportunities for those addicted to inhalants and drugs. In Brazil, da Silva et al (2005) and Etcheverry et al (2014) highlighted depressive disorders in young rag-picking adults, and while both have emphasized the important role counsellors and psychologists could play in improving their mental health, the former also hinted at the importance of improving the economic prospects of the ragpickers so that they would be able to encourage their children to attend school.

The media – be that print, online or audio-visual, or even for that matter film and theatre – play a key role in disseminating information and generating awareness. Gupta and Boojh (2006) had appealed to the media to bridge the gap of ignorance (wherever that was the case) and dismantle the wall of callousness, separating the marginalised existence of rag-pickers from the comfort and luxury of the other denizens of urban society. Joshi et al (2016) and Rajendiran et al (2020) hope that the latter may one day be convinced to pay more for waste management services, which would include those of the rag-pickers also. Many other authors have also addressed the waste-generating households in society, attempting to educate them about three important R's of the waste management hierarchy – Reduce, Repair and Reuse – which will go a long way in decreasing the quantities of wastes in the dumpsites and landfills (Govind et al

2021; Khoironi et al 2019). However, it is not clear to this reviewer how that will positively impact the livelihoods of ragpickers, if more and more of them are not simultaneously being trained and readied for alternative occupations.

Berg (2015) targets history-enthusiasts keen on understanding the ‘untold stories within stories’ related to the second world war, while Craig (2019) and Le Roy (2017) have an implicit message to all readers, to correct all historical misdeeds, the ones committed against rag-pickers included. While Hillenbrand (2019) appeals to the aesthetic sense inherent in almost all of us, to recognise the role played by rag-pickers as something valuable, beautiful and vivifying, Faure (1996), Bielecki (2009) and Sainsbury (2017) herald the rag-picker as a silently-striving, stoic protagonist who does not seek any appreciation for what s/he is doing, and thereby deserves it all the more from us, instead of being looked down upon as ‘sordid and dangerous’.

Conclusion and take-home messages

The ‘question-words’ approach has taught this reviewer ‘all that he now knows’ at the time of writing about the lives and work of ragpickers. Needless to say, this is not all that can and should be known. On the basis of the 60 publications (1995 – 2022) read and reviewed, some take-home messages can be listed hereunder:

- Rag-pickers have long been a marginalised, ‘oppressed, suppressed and depressed’ group of city-dwellers, whose contributions to ‘informal waste management’ and thereby the environment [SDGs 13-15] have been unappreciated and underestimated.
- Subsisting just above the poverty line [SDG 1] in many parts of the developing world, they are often malnourished [SDG 2] and endure a variety of physical and psychological health problems, without having the wherewithal to pay for adequate healthcare [SDG 3]. They are often victimised by harassment by the policepersons and local hoodlums likewise [SDG 16].
- By force of habit, most of them do not see the need for facemasks, gloves and proper footwear, while ‘mining’ for recyclables in the dumpsites.
- Children of ragpickers are deprived for a variety of reasons of their right to attend school [SDG 4 and SDG 10], are ostracised, and get addicted to alcohol, drugs and tobacco at a young age
- Ragpickers often do not have access to safe drinking water and sanitation facilities [SDG 6]. The women more often than not, have to rely on wood, dung and charcoal to cook meals, and exposure to the toxic products of combustion exacerbates their health [SDG 7].
- In many parts of the world, an absence of inclusivity in urban planning leads to privatisation of waste management which impacts ragpickers adversely [SDG 11]. There is a need to first equip ragpickers with skillsets which will enable them to seek other means of livelihood [SDG 8]. It is imperative to eradicate child labour, and this will only be possible if the children (both girls and boys) of ragpickers are educated [SDG 4 & SDG 5], and made aware of the contributions they and their parents have been making to social welfare, economic growth and environmental management [SDGs 13-15].
- Everyone addressed and appealed to, by the authors (sub-section 2.5), ought to reflect upon the exceedingly difficult conditions the ragpickers live in, lend an ear to their problems and grievances, and do their bit to pull them up from ‘the bottom of Maslow’s pyramid’. Murthy (2016) must be referred to here as an inspiring example – a do-gooder trendsetters who has been striving hard to educate the ragpickers’ children in a north-Indian city.
- The fourth estate can educate the callous and unconcerned urban residents, by featuring articles and stories about rag-pickers in the print, online and audio-visual

media. University researchers must consider this section of urban society as a field of applied research.

- While public-private partnerships are essentially top-down initiatives which can only go so far and accomplish so much, bottom-up endeavours of NGOs and ordinary citizens are indispensable [SDG 17], if historical wrongs have to be corrected (Craig 2019).
- Just like the Brazilians have done (da Silva et al 2005), rag-picking must be recognised as a profession, and rag-pickers accorded a respectable status as the Green Brigade, as recommended very recently by Rajendiran et al (2022).

Figure 7, which can double up as a graphical abstract for this paper, depicts the rag-pickers in relation to the SDGs. SDG 9, as referred to earlier in the text, can very well be Janus-faced (depending on the presence or otherwise of inclusivity in urban infrastructural planning). Progress towards the other goals – with arrows pointing away and towards the image of the woman at the dumpsite, who represents all the rag-pickers of the world – can very well have a positive impact on the well-being of these ‘urban miners of the Green Brigade.’ The SDGs on the right are the ones to which

the ragpickers have been silently contributing, most of them being unaware of the fact all the time.

This review, the author hopes, will motivate more concerted transdisciplinary applied research, predicated on the SDGs (Figure 7). It at once makes it evident that researchers from a wide variety of disciplines [as also recommended in Uplap et al (2014)] – healthcare, sociology, psychology, urban planning, sustainable development, environmental engineering, and even art and poetry – can collaborate in the years to come, in international research projects which could involve all the methodologies referred to in sub-section 2.3.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

Acknowledgements: The author would like to dedicate this article to his late wife, Varshita, who generously tried to help rag-pickers and their children in India, in whatever way she could. Thanks also to all the authors who responded to this reviewer’s request for their publications, and to the three reviewers for their constructive and motivating comments.



Figure 7. SDGs – The supporting and the supported

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