Cogitare Enfermagem

ORIGINAL ARTICLE

Informal recycling and social protection: waste pickers' perceptions of legislation and occupational health

HIGHLIGHTS

1. Waste pickers perceive significant occupational risks.
2. Their work has environmental value, but their protection is limited.
3. Institutional training in preventive occupational health was insufficient.
4. Access to rights under national legislation remains limited.

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ABSTRACT

Objective: To analyze the perceptions of waste pickers in the province of Chota, Cajamarca, Peru, regarding their labor rights, protective legislation, and occupational health and safety conditions. **Method:** A qualitative study conducted from April 2023 to December 2025 with waste pickers from six districts. Data were collected through focus groups and subjected to content analysis. **Results:** The following were found: high exposure to physical and biological hazards (cuts, puncture wounds from sharps, and contact with contaminated waste); limited use of personal protective equipment; self-taught training, with a predominance of informal learning; and a gap between the rights provided for by law and their implementation in work practice, despite legal recognition. **Final Considerations:** Waste pickers' perceptions reveal that occupational risks are present and that legislation offers protection, but there is a gap between formally recognized rights and their application in practical work settings, which calls for intersectoral coordination.

DESCRIPTORS: Waste Pickers; Occupational Health Program; Legislation, Labor; Informal Sector; Nursing.

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INTRODUCTION

Solid waste recycling is one of the central strategies for environmental sustainability and for mitigating the impacts of growing consumption and rapid urbanization. By enabling the reuse of discarded materials and reducing the volume sent to open dumps and sanitary landfills, recycling contributes directly to the conservation of natural resources, the reduction of pollution, and the strengthening of economic models based on the circular economy[1-2]. Global estimates indicate that waste generation will continue to increase in the coming decades, especially in low- and middle-income countries, which heightens the challenges related to environmental management and public health[1].

In this context, waste pickers play a fundamental role as environmental agents, working in the collection, sorting, and reintegration of waste into the production chain. However, they constitute an undervalued occupational group that is often rendered invisible in formal waste management systems[3-4].

In Latin American countries, recycling is often marked by informality and sustained by workers in precarious conditions with limited access to social and labor protection policies[4-5]. In Peru, the activity of waste pickers is of growing relevance, especially in urban centers where solid waste management poses a structural challenge for municipalities. Studies conducted in Lima and Cajamarca have already pointed to important vulnerabilities related to environmental culture, working conditions, and the occupational health of these workers, reinforcing the persistence of informality in the sector[6-7]. In addition, international evidence shows that waste pickers and informal waste collectors are exposed to biological, chemical, physical, and psychosocial hazards, including sharps injuries, occupational illness, and psychological distress[3,8-9].

Over the past decades, the Peruvian State has made progress in building legal frameworks for the proper management of solid waste and the socio-productive inclusion of waste pickers. Law No. 29419 formally recognizes the activity of waste pickers and establishes guidelines for their organization and social recognition[10-11].

In parallel, Law No. 29783 and its regulations, Supreme Decree (DS) No. 005-2012-TR, set out fundamental principles of occupational safety and health, which should also cover workers in vulnerable production chains, such as informal recycling[12-13]. Furthermore, national environmental policies reinforce the need for environmentally safe and sustainable solid waste management[14-15].

However, the effectiveness of these policies depends, among other factors, on waste pickers' own knowledge of their rights and of the legislation that protects them[9].

Even with this legal framework in place, waste pickers' perceptions of their rights, protective legislation, and occupational health and safety conditions have received little attention in the Latin American literature, especially in rural settings and in small and medium-sized Andean cities, where informality is compounded by barriers to accessing health services, weak municipal oversight structures, and the economic unsustainability of the activity. Most studies focus on characterizing the working conditions and occupational risks of these workers without considering the extent to which they understand, appropriate, or reinterpret, based on their everyday experience, the legal provisions that protect them; this constitutes the knowledge gap addressed in this study.

Accordingly, the aim of this study was to analyze the perceptions of waste pickers in the province of Chota, Cajamarca, Peru, regarding their labor rights, protective legislation, and occupational health and safety conditions.

METHOD

This was a qualitative study[16] conducted with 20 waste pickers who carry out their activities without institutional support, a condition often associated with job precarity and low social protection.

The study was carried out between April 2023 and December 2025 with Mining Canon (*Canon Minero*) funds approved by Organizing Committee Resolution No. 005-2023-UNACH. The study population consisted of informal-sector waste pickers in the province of Chota, Cajamarca, Peru.

Non-probability purposive sampling was adopted, including all waste pickers identified, given the absence of formal records and the predominance of informality in this type of occupation[17]. In total, 20 waste pickers from six districts were invited and agreed to participate in the study, distributed as follows: four from Chota, three from Cochabamba, five from Huambos, two from Lajas, three from Tacabamba, and three from Chalamarca. This sample covers the main districts of the province, identified through field visits and direct observation[18], given the lack of consolidated institutional databases on informal waste pickers in the region. Including participants from all six districts aimed to represent the geographic diversity of the study area[19].

There are no consolidated official records of the total number of informal waste pickers working in the province of Chota, which reflects the institutional invisibility of this occupational group. The 20 participants represented all the waste pickers identified and located by the researchers in the six districts studied through field mapping and direct observation. Moreover, registering waste pickers in rural areas helps give visibility to this segment of informal work.

The inclusion criteria were: being an informal waste picker, of either sex, working in the selected districts, and not enrolled in formal regulated recycling programs. Waste pickers were invited to participate in the study through direct contact by the authors, in accordance with the principles of free and informed consent.

The focus groups were conducted using a discussion guide consisting of four guiding questions, developed by the authors based on pre-existing instruments in the literature on occupational health and informal work in recycling[20]. The instrument was previously validated by five experts affiliated with the educational intervention program on environmental health promotion and occupational safety for waste pickers.

Validation took place over three rounds of consultation with the experts, ensuring that the proposed items and dimensions were appropriate to the defined theoretical constructs. Linguistic clarity, comprehension of the questions, and the relevance of the response options for the target population were also assessed. Instrument validity was established through expert judgment, and the results were subjected to a hypothesis test for a proportion to verify whether Aiken's *V* coefficient was significantly greater than 0.50.

Next, the questionnaire was piloted with waste pickers who did not take part in the study. Internal consistency was assessed using Cronbach's alpha coefficient, which yielded a value of 0.82. Three focus groups (FG1, FG2, and FG3) were held, in which the same question guide was applied, to explore participants' perceptions qualitatively in greater depth. FG1 had five participants; FG2, six; and FG3, nine.

The three focus group sessions were audio-recorded, each lasting approximately 35 to 40 minutes, and were subsequently transcribed verbatim by the researchers.

The sessions took place in a specific, secluded, and private location and were conducted by the researchers in accordance with ethical and methodological recommendations for qualitative research with vulnerable populations and informal

workers[16]. Participants' individuality was respected, as was the integrity of the families and institutions involved.

Content analysis[21] was used to analyze the qualitative data obtained from the focus groups in order to go beyond the manifest content and systematize the meanings attributed by the waste pickers, which were organized into categories.

The statements were coded independently by two researchers: both read the focus group transcripts inductively and separately, iteratively identifying and naming the emerging themes and categories; the codings were then compared, and the level of agreement between them was verified.

All participants signed the Informed Consent Form (ICF), ensuring voluntary, ethical, and safe participation with anonymity preserved. For the participant under 18 years of age, an assent form and the consent of the legal guardian were obtained. The project was approved by the Ethics Committee of the *Universidad Nacional Autónoma de Chota*, Peru, under number 001-2023-UNACH.

RESULTS

Twenty waste pickers participated in the study, of whom 13 (65%) were male, 13 (65%) were aged 18 to 43 years, and 3 (15%) had completed higher education, as shown in Table 1.

Table 1. Sociodemographic characteristics of waste pickers (N=20). Chota, Cajamarca, Peru, 2025

(continue)

Characteristics	n	%
Sex		
Male	13	65
Female	7	35
Age group (years)		
Under 18	1	5
18 - 30	7	35
31 - 43	6	30
44 - 56	3	15
57 - 69	2	10
70 or older	1	5
Marital status		
Married	3	15
Single	9	45
Cohabiting	8	40
Education level		
Complete primary education	3	15
Incomplete primary education	4	20
Complete secondary education	5	25
Incomplete secondary education	4	20
Complete higher education	3	15
No formal education	1	5

Table 1. Sociodemographic characteristics of waste pickers (N=20). Chota, Cajamarca, Peru, 2025

(conclusion)

Characteristics	n	%
Time working as a waste picker		
Less than 1 year	6	30
1 - 5 years	7	35
6 - 10 years	4	20
11 - 15 years	2	10
21 years or more	1	5

Source: The authors (2025).

After the sociodemographic characterization, participants took part in three focus groups (FG1, FG2, and FG3), in which they discussed aspects related to their daily work, risk perception, use of protective equipment, knowledge of rights and legislation, as well as training experiences and future expectations.

The thematic synthesis of the statements is presented in Chart 1.

Chart 1. Emerging themes from the focus groups. Chota, Cajamarca, Peru, 2025

(continue)

Themes	Description of main findings	Examples of representative statements
1.Perception of frequent occupational risks	[Waste pickers reported constant exposure to physical and biological hazards in waste handling, including cuts, puncture wounds from nails and needles, and contact with glass and contaminated materials].	*... we can catch diseases, because there may be infected syringes.* (FG1) *... a coworker cut himself on glass and it took more than a month to heal.* (FG2)
2. Occupational accidents and makeshift wound management	[Moderate and severe accidents were described, sometimes treated informally, without immediately seeking health care, revealing poor occupational health assistance].	*... a nail went right through my sneaker... I treated it with alcohol and disinfectants.* (FG1) *... I pulled it out myself with tweezers and didn't go to the health center.* (FG3)
3. Insufficient or irregular use of PPE	[Although they recognize the importance of gloves, masks, and boots, many participants reported not wearing them consistently, whether due to discomfort, habit, or lack of access].	*... they give us gloves, but we take them off to work faster.* (FG3) *... we'd need boots, because the nails go through our sneakers.* (FG1)
4. Demands for institutional support and public policies	[Participants expressed the need for greater institutional support, especially the provision of PPE, educational campaigns, and the expansion of selective waste collection].	*... I hope the municipalities will provide us with gloves, boots, and equipment.* (FG2) *... that they encourage people to put out their trash at the right time.* (FG1)
5. Environmental education as a transformative axis	[Education was identified as a central element for cultural change, both at school and at home, with an emphasis on education from childhood].	*... it all starts with education at home and at school.* (FG3) *... I'm going to teach my daughter to recycle and not throw trash on the ground.* (FG1)

Chart 1. Emerging themes from the focus groups. Chota, Cajamarca, Peru, 2025

(conclusion)

Themes	Description of main findings	Examples of representative statements
6. Collective identity and symbolic appreciation of work	[Many waste pickers expressed pride in their activity, calling themselves "saviors of the planet," which reinforces social belonging and the environmental relevance of their work].	*... we will no longer be just waste pickers; we will be saviors of the planet.* (FG3) *... we work to keep the planet healthy.* (FG3)
7. Little formal training and self-directed learning	[Most reported a lack of structured institutional training; learning took place on the job or through informal experiences. Few had attended courses offered by companies and other organizations].	*... I had never received any training before.* (FG2) *... I trained myself; I learned by working as a laborer.* (FG3)
8. Future expectations: formalization and improved working conditions	[Waste pickers expressed future plans focused on expanding recycling, creating support centers, and contributing to a healthier city].	*... I hope to have a collection center with more people.* (FG1) *... to work so that the environment stays clean.* (FG3)

Note: PPE = Personal protective equipment.

Source: The authors (2025).

The analysis of the focus groups revealed relevant perceptions related to occupational risks, working conditions, institutional demands, and the construction of waste pickers' identity in the context of informal recycling.

Overall, participants reported frequent exposure to physical and biological hazards while handling solid waste, especially cuts on the hands, puncture wounds from nails, and contact with potentially contaminated materials, such as improperly discarded syringes. These risks were described as an everyday part of the work, reinforcing the occupational vulnerability and lack of institutional protection of these workers.

In addition, several statements revealed the occurrence of moderate and severe accidents, often managed in makeshift ways, without immediate assistance from health services. Some participants reported home remedies, such as the use of alcohol and manual removal of piercing objects, indicating gaps in access to formal occupational health care.

Another recurring aspect was the insufficient or irregular use of personal protective equipment (PPE). Although gloves, masks, and boots were recognized as essential, many waste pickers admitted not using them consistently, whether due to discomfort, lack of habit, or scarce resources.

The groups also expressed expectations of greater institutional support and effective public policies, calling for municipalities to provide PPE, expand educational campaigns, and strengthen selective waste collection. Environmental education was identified as a central transformative axis that should begin at home and be reinforced in schools from childhood onward.

A relevant symbolic element emerged in the identity construction of the waste pickers, who often referred to themselves as "saviors of the planet," expressing pride in and appreciation of the environmental role they play.

Finally, little structured formal training was observed. Most reported an absence of institutional training, having acquired knowledge mainly through self-teaching or informal experiences. Nevertheless, the waste pickers expressed future plans focused

on formalization, the creation of support centers, and the promotion of cleaner and more sustainable cities.

DISCUSSION

This study shows that waste pickers in Chota, Cajamarca, Peru, recognize the environmental relevance of their work and identify significant occupational risks in waste handling. However, their accounts reveal a scenario of persistent vulnerability and informality, in which the protection of health and labor rights does not always materialize, despite the existence of national legal frameworks aimed at the formalization and safeguarding of waste pickers[15].

Participants reported daily exposure to physical and biological hazards, such as cuts, puncture wounds from nails and needles, contact with glass, associated with improper disposal and insufficient source separation. These findings are consistent with the international literature, which describes informal recycling as a high-risk activity, often accompanied by accidents and adverse health outcomes, particularly in the absence of adequate equipment, safety protocols, and occupational health surveillance[3-4,8].

From a regulatory standpoint, Peru has specific instruments that recognize waste pickers as relevant actors in environmental management. Law No. 29419 establishes a framework for the protection, training, and promotion of the social and labor development of recycling workers, encouraging formalization and association[10]. The law's regulations (DS No. 005-2010-MINAM) detail operational aspects and responsibilities, reinforcing the need for safe working conditions and continuous promotion and training actions[11]. In parallel, Legislative Decree (DL) No. 1278 enacts the Law on Integrated Solid Waste Management, defining the obligations of public authorities and society to ensure environmentally sound management and efficiency in the use of materials; this legislative decree is regulated by DS No. 014-2017-MINAM[14-15].

Despite this framework, the statements reveal a recurring gap between the "law on the books" and the "law in action." Even with regulations that point toward protection and formalization, waste pickers report the absence or irregular provision of PPE, little formal training, and makeshift wound management, suggesting incomplete municipal implementation, weak enforcement mechanisms, and fragile administrative and financial support[6-8]. In terms of rights, this means that regulatory recognition does not always translate into an effective guarantee of safe work and integration with health services.

The lack of protection is also evident in post-accident care. Some participants reported removing sharp objects themselves, using alcohol and disinfectants as the main course of action, and sometimes not seeking health services. Similar practices have been described in other informal recycling contexts, in which workers face access barriers, low social protection coverage, and institutional invisibility[5,9,14].

Regarding PPE use, the accounts revealed a pattern of insufficient or irregular adherence: although gloves, masks, and boots were recognized as essential, many waste pickers reported removing them during work, mainly due to discomfort, lack of habit, or difficulty obtaining these items on a regular basis. This finding is consistent with international evidence on workers in the informal recycling sector, among whom adherence to PPE use is a multifactorial phenomenon associated not only with equipment availability but also with ergonomic and cultural factors and work routines[8,2]. This pattern suggests that isolated strategies for supplying PPE tend to be insufficient unless they are accompanied by measures addressing equipment comfort and ongoing awareness of occupational risks.

Another important axis was the explicit demand for institutional support, especially from municipalities: distribution of gloves, boots, helmets, and masks; regular training;

and educational actions so that the population separates waste and disposes of sharps safely. These demands are consistent with the integrated management approach of DL No. 1278 and DS No. 014-2017-MINAM, under which local governments play a central role in organizing the system and promoting appropriate practices[14-15]. Comparative studies of waste picker organizations indicate that institutional support and social innovation are decisive factors in strengthening formalization and reducing occupational vulnerabilities[7].

Environmental education emerged as a structuring strategy for reducing risks and strengthening rights. The waste pickers emphasized that change should begin at home and be consolidated at school, which aligns with international recommendations on source separation and hazard minimization. This is particularly relevant given the disposal of health care waste, which increases the risk of sharps injuries and infections[9]. In the authors' interpretation, this educational process, starting in the family setting, may also foster the empowerment and professionalization of waste pickers themselves.

A finding of social relevance was the positive identity construction: "saviors of the planet." This self-designation indicates a moral appreciation of the work and collective cohesion, countering the stigma often associated with handling garbage. However, this symbolic appreciation needs to be accompanied by material and institutional guarantees. Recognizing waste pickers as environmental agents, as Law No. 29419 does, must entail guaranteeing decent working conditions, health protection, and real pathways to formalization[10].

Finally, the limited formal training identified, with few reports of structured training by companies, municipalities, or organizations, reveals a major bottleneck for the effectiveness of the legislation. International evidence shows that regular training and the provision of adequate PPE can reduce accidents and improve occupational safety among waste sector workers[2].

The weak implementation of public policies identified in this study is related to a broader social and institutional invisibility of waste pickers, who have historically had no representation in municipal planning and oversight processes.

This invisibility reinforces the link between informality and exclusion from health care: because they are not formally linked to labor and health protection systems, waste pickers are left out of occupational health surveillance programs, routine vaccination, and post-accident care. This perpetuates a cycle of vulnerability that also exposes the community to indirect risks, such as the unsafe handling of health care waste. At the regional level, structural constraints such as the geographic dispersion of the six districts studied, the scarcity of municipal technical resources, the lack of formal records of this occupational group, and economic unsustainability hinder oversight and continuous health planning. This extends the impact of the problem beyond the individual worker and affects public health and environmental sustainability in the region.

In this context, the future plans mentioned by the waste pickers, aimed at formalization, the creation of collective support centers, and contributing to cleaner cities, point to a potential for community leadership that, if linked to consistent intersectoral policies, could transform current vulnerability into safer, more dignified, and socially recognized forms of work.

Thus, the results reinforce that Peru has a relevant regulatory framework for the rights and health of waste pickers but faces challenges in local implementation. Overcoming these challenges requires more robust municipal governance, a culture of health prevention, intersectoral action, and funding, so that recognized rights translate into concrete protection in daily work and a guaranteed comprehensive health approach.

One limitation of this study is the absence of formal verification of theoretical saturation, since data collection ended once the sessions of the three planned focus groups had been completed.

FINAL CONSIDERATIONS

The results indicate that waste pickers in Chota perceive significant occupational risks and attribute great environmental value to their activity but face limitations in protection, evidenced by reports of low intersectoral interest in preventive health and citizenship, as well as by limited access to the rights provided for in national legislation.

Accordingly, the findings confirm that waste pickers' perceptions of their labor rights, protective legislation, and occupational health and safety conditions reveal a discrepancy between the formal recognition of these rights and their practical application in everyday working life, which addresses the objective of this study. Although Peru has a specific legal framework and an integrated waste management system, as mentioned above, implementation at the local level remains insufficient, particularly with regard to the regular provision of PPE, periodic training, and coordination with occupational health initiatives.

As a contribution to society, this study provides, based on the waste pickers' statements, empirical data to improve municipal occupational health and formalization policies and reinforces, for Nursing and other health professions, the importance of occupational health surveillance actions aimed at this historically overlooked population. The results may also guide public managers in prioritizing strategies for the provision of PPE and continuous training, thereby helping to narrow the gap between formally recognized rights and their application in everyday work practice.

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REFERENCES

1. United Nations Environment Programme (UNEP). Global Waste Management Outlook 2024: Beyond an Age of Waste - Turning Rubbish into a Resource [Internet]. Nairobi: UNEP; 2024 [cited 2026 Aug 2]. 116 p. Available from: https://wedocs.unep.org/items/36e16872-2f02-4447-a3c1-c939bf50ea92

2. Dada OT, Faniran GB, Ojo DB, Taiwo AO. Waste pickers' perceptions of occupational risks and wellbeing in a Nigerian megacity. Int J Environ Stud [Internet]. 2023 [cited 2026 Aug 2];80(4):933-47. Available from: https://doi.org/10.1080/00207233.2022.2055344

3. Lasso VR, Valencia MA, Ordoñez CA, Salazar LG. Condiciones y percepción laboral de recicladores de oficio de Santiago de Cali. Diálogos Saberes [Internet]. 2023 [cited 2026 Aug 2];(59):50-63. Available from: https://doi.org/10.18041/0124-0021/dialogos.59.2023.11648

4. Lissah SY, Ayanore MA, Krugu JK, Aberese-Ako M, Ruiter RAC. "Our work, our health, no one's concern": domestic waste collectors' perceptions of occupational safety and self-reported health issues in an Urban Town in Ghana. Int J Environ Res Public Health [Internet]. 2022 [cited 2026 Aug 2];19(11):6539.

Available from: https://doi.org/10.3390/ijerph19116539

5. Lissah SY, Ayanore MA, Krugu JK, Aberese-Ako M, Ruiter RAC. Managing urban solid waste in Ghana: Perspectives and experiences of municipal waste company managers and supervisors in an urban municipality. PLoS One [Internet]. 2021 [cited 2026 Aug 2];16(3):e0248392. Available from: https://doi.org/10.1371/journal.pone.0248392

6. Nikiema J, Asiedu Z. A review of the cost and effectiveness of solutions to address plastic pollution. Environ Sci Pollut Res Int [Internet]. 2022 [cited 2026 Aug 2];29:24547-73. Available from: https://doi.org/10.1007/s11356-021-18038-5

7. Kain JH, Zapata P, de Azevedo AMM, Carenzo S, Charles G, Gutberlet J, et al. Characteristics, challenges and innovations of waste picker organizations: A comparative perspective between Latin American and East African countries. PLoS One [Internet]. 2022 [cited 2026 Aug 2];17(7):e0265889. Available from: https://doi.org/10.1371/journal.pone.0265889

8. Alam MU, Sharior F, Shoaib DM, Hasan M, Tabassum KF, Ferdous S, et al. Hygiene knowledge and practices and determinants of occupational safety among waste and sanitation workers in Bangladesh during the COVID-19 pandemic. Hyg Environ Health Adv [Internet]. 2022 [cited 2026 Aug 2];4:100022. Available from: https://doi.org/10.1016/j.heha.2022.100022

9. Schulte PA, Iavicoli I, Fontana L, Leka S, Dollard MF, Salmen-Navarro A, et al. Occupational Safety and Health Staging Framework for Decent Work. Int J Environ Res Public Health [Internet]. 2022 [cited 2026 Aug 2];19(17):10842. Available from: https://doi.org/10.3390/ijerph191710842

10. Perú. Ley N.° 29419. Ley que regula la actividad de los recicladores [Internet]. Lima: El Peruano; 2009 Oct 7 [cited 2026 Aug 2]. 5 p. Available from: https://www.gob.pe/institucion/minam/normas-legales/3601-29419

11. Ministerio del Ambiente (PE). Decreto Supremo N.° 005-2010-MINAM. Reglamento de la Ley N.° 29419, Ley que Regula la Actividad de los Recicladores [Internet]. Lima: El Peruano; 2010 Jun 2 [cited 2026 Aug 2]. 9 p. Available from: https://www.minam.gob.pe/disposiciones/decreto-supremo-n-005-2010-minam/

12. Perú. Ley N.° 29783. Ley de Seguridad y Salud en el Trabajo [Internet]. Lima: El Peruano; 2011 Aug 20 [cited 2026 Aug 2]. 13 p. Available from: https://www.gob.pe/institucion/congreso-de-la-republica/normas-legales/462576-29783

13. Ministerio de Trabajo y Promoción del Empleo (PE). Decreto Supremo N.° 005-2012-TR. Reglamento de la Ley N.° 29783, Ley de Seguridad y Salud en el Trabajo [Internet]. Lima: El Peruano; 2012 Apr 25 [cited 2026 Aug 2]. 36 p. Available from: https://www.gob.pe/institucion/presidencia/normas-legales/462577-005-2012-tr

14. Perú. Decreto Legislativo N.° 1278. Decreto Legislativo que Aprueba la Ley de Gestión Integral de Residuos Sólidos [Internet]. Lima: El Peruano; 2016 Dec 23 [cited 2026 Aug 2]. 35 p. Available from: https://www.minam.gob.pe/disposiciones/decreto-legislativo-n-1278/

15. Ministerio del Ambiente (PE). Decreto Supremo N.° 014-2017-MINAM. Reglamento del Decreto Legislativo N.° 1278, Ley de Gestión Integral de Residuos Sólidos [Internet]. Lima: El Peruano; 2017 Dec 21 [cited 2026 Aug 2]. 32 p. Available from: https://www.minam.gob.pe/disposiciones/decreto-supremo-n-014-2017-minam/

16. Minayo MCS. La artesanía de la investigación cualitativa. Buenos Aires: Lugar Editorial; 2009. 334 p.

17. Veludo-de-Oliveira TM. Amostragem não probabilística: adequação de situações para uso e limitações de amostras por conveniência, julgamento e quotas. Administração On Line [Internet]. 2001 [cited 2026 Aug 2];2(3). Available from: https://pesquisa-eaesp.fgv.br/sites/gvpesquisa.fgv.br/files/arquivos/veludo_-_amostragem_nao_probabilistica_adequacao_de_situacoes_para_uso_e_limitacoes_de_amostras_por_conveniencia.pdf

18. Anguera MT, Portell M, Chacón-Moscoso S, Sanduvete-Chaves S. Indirect observation in everyday contexts: concepts and methodological guidelines within a mixed methods framework. Front Psychol

[Internet]. 2018 [cited 2026 Aug 2];9:13. Available from: https://doi.org/10.3389/fpsyg.2018.00013

19. Paixão LGS, de Oliveira FR. Vulnerability in informal work: health risks in a recycling cooperative. O Social em Questão [Internet]. 2024 [cited 2026 Aug 2];(59):391-410. Available from: http://doi.org/10.17771/PUCRio.OSQ.66385

20. Costa AM Avaliação da Sustentabilidade do Ciclo de Vida do setor informal de reciclagem: um estudo de caso. [thesis on the Internet]. São Paulo: Universidade Estadual de São Paulo; 2023 [cited 2026 Aug 2]. 129 p. Available from: https://repositorio.unesp.br/entities/publication/e1e6be0d-38f9-47e6-852f-b562b8e42db3

21. Bardin L. El análisis de contenido [Internet]. 1st ed. Madrid: Akal; 1986. 92 p.

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