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Dynamics of value and power: Organization of the informal e-waste sector in Ghana and its health impacts

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Abstract

Background: Ghana's informal e-waste sector sits at the intersection of global waste and recycling value chains and is central to circular economy narratives. The sector faces severe environmental and health risks, and policy approaches to regulate these risks differ. This study investigates decision-making processes in Ghana's e-waste sector, focusing specifically on the power dynamics that shape policy and its effects on workers' health. **Methods:** Fourteen semi-structured interviews with representatives from non-governmental, governmental, and private actors, as well as informal sector associations and collectors, were conducted in Ghana in February and March 2025. A descriptive analysis was performed, and systemic and episodic theories of power were operationalized. The data was coded and analyzed using NVivo. Observations from field visits and photography enriched the results. **Results:** The case study showcases the potential for the sustainable transformation of the Ghanaian e-waste sector within a multi-stakeholder landscape. E-waste workers are returning to the scrapyard Agbogbloshie in 2025 after its destruction in 2021, highlighting resistance to coercive, top-down approaches. The inclusion and recognition of informal e-waste workers influence environmental policy compliance and health outcomes. **Conclusion:** Informal e-waste workers' health can be positively impacted by a strengthened multi-stakeholder e-waste management system that addresses workers' needs. By strengthening workers' associations and increasing the willingness of workers to join these, the participation and reach of collectors can be ensured. To organize the system in Ghana sustainably, donor dependency must be decreased, potentially by expanding national recycling capacities. General awareness of e-waste as a problem, along with its environmental and health effects, must be improved.

Key words: E-waste; Ghana; Informal sector; Sustainable transformation; Circular economy; Stakeholder dynamics.

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List of Abbreviations

EEE	Electrical and Electronic Equipment
EPA	Environmental Protection Agency (Ghana)
GASDA	Ghanaian Greater Accra Scrap Dealers Association
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation)
HoC	Handover Center
HICs	High-Income Countries
IO	International Organization
KFW	Kreditanstalt für Wiederaufbau (German Development Bank)
LMICs	Low- and Middle-Income Countries
MEST	Ministry of Environment, Science, and Technology (Ghana)
MESTI-PIU	Project Implementation Unit of MESTI
MMDA	Metropolitan, Municipal, and District Assemblies
MRI	Mountain Research Institute
NGO	Non-Governmental Organization
NYA	National Youth Authority
OHS	Occupational Health and Safety
PM	Particulate Matter
PPE	Personal Protective Equipment
SMIDO	Suame Magazine Industrial Development Organization
SRI	Sustainable Recycling Industries
UNIDO	United Nations Industrial Development Organization
UPOPs	Unintentional Persistent Organic Pollutants

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Main contribution

This master's thesis explores the organization of the informal e-waste sector in Ghana and related stakeholder dynamics, power relations, and policy strategies. I investigate the impact of policy approaches and the stated dynamics on workers' and communities' health, mostly through environmental pollution.

Three reasons for you to read this piece:

First, the study presents unique and timely insights. The results complement the literature gap on the policy landscape of Ghana's e-waste sector after 2021. The literature fails to lay out that the workers returned after the destruction of Agbogbloshie, one of the most famous e-waste scrapyards, in 2021. Nor does existing literature describe the novel approach to organization implemented in Ghana. These two events give insights into, on the one hand, the impacts of a coercive policy approach and, on the other hand, the potential of an approach that recognizes informal workers. Policy strategies changed after the failed intervention of 2021 and shifted towards systemic forms of governance and cooperative narratives. Exploring the multi-stakeholder landscape in Ghana, the dynamics between and perspectives of stakeholders are presented and analyzed.

Second, the study's qualitative methodology entails planning and executing field research in Ghana and fourteen interviews. I went to Ghana for two weeks in February 2025, where I got specific insights from some of the sector's most relevant stakeholders, visited informal workers, and met with the Minister of Environment. This analysis captures the full spectrum of decision-making and various hierarchical levels involved in Ghana's e-waste governance. You will find pictures complementing the analysis.

Third, I provide a challenging theoretical perspective. I connect the theoretical underpinning of transition theory and power to layers of policy impacting health. Beyond the exploration of dynamics between stakeholders, power, norms, and our assumptions behind policies, connecting the global to the national and the local is provided. I link sustainable transition to the citizens and the transformation of a global view, reciprocally impacting each other. In this manner, this in-depth case study brings insightful perspectives for a larger application in the field of policy making.

In this thesis, I am questioning the narrative of 'green transition' as a solution. I am critical, I do not assume that the term 'sustainability' means positive change. I present realities that must be considered in policy making, and aim to observe, present, set in context, and reflect. This topic concerns you, reading, potentially on your electronic device, and potentially opting for environmental protection, inclusion, and circularity. I hope that my answers lead to more critical questions.

1. Introduction

The products driving global electrification are inherently temporary, yet their environmental and health impacts can be long-lasting. Electronic waste (e-waste) is generated when electrical and electronic equipment (EEE) reaches the end of its life cycle. In 2022 alone, approximately 62 billion kilograms of e-waste were produced globally – a figure that continues to rise. The growing demand for raw materials such as aluminum, cobalt, copper, lithium, iron, and rare earth elements to manufacture EEE has fueled a surge in extractive industries (Baldé et al., 2024; Orisakwe et al., 2019). At the same time, the concept of 'urban mining' – recovering valuable resources from electronic waste – has emerged as a potential alternative (Abalansa et al., 2021). When the value chain of an EEE ends, another begins: the recycling of materials for reuse in new electronic products. This process reflects the principles of the circular economy, which aims to reduce raw material extraction, minimize waste, and align production with ecological and human rights goals. However, the global value chain of electronics is deeply asymmetrical. While most EEE products are consumed in high-income countries (HICs), both the disposal and parts of the recovery processes often take place in low- and middle-income countries (LMICs), such as Ivory Coast, Nigeria, Ghana, and Benin (Fivaz et al., 2024). Circular economy frameworks are primarily promoted by actors in the Global North, and countries in the Global South are only slowly engaging with these narratives shaping their own green transitions (Abalansa et al., 2021; Barrie et al., 2022; Fivaz et al., 2024; Grant et al., 2024). This study presents insights from interviews and field visits conducted in Ghana in 2025, shedding light on the country's e-waste management approaches and the politics of policy, analyzing stakeholder dynamics.

Ghana is one of the primary destinations for e-waste, much of which arrives through a secondhand market of often repairable electronic products with a short life span. These secondhand imports allow accessing EEE at affordable prices. For example, a repaired phone may be reused by a Ghanaian for a relatively short period, often only several months, before becoming e-waste once it is no longer repairable. However, not all imported electronics are functional; some are beyond repair and enter directly into the waste stream. Despite being classified as waste, these products possess significant value due to their recycling potential, giving rise to a thriving sector that employs thousands of people in Ghana (Canavati et al., 2022; Lebbie et al., 2021).

E-waste recovery in Ghana began in the early 2000s and has grown steadily, largely driven by informal sector workers (Canavati et al., 2022). Reliable data on the number of individuals engaged in this work is limited. The most recent estimates, from 2012, suggest that approximately 6,000 people were directly involved in e-waste work in Accra, with around 200,000 people economically dependent on the sector (Grant & Oteng-Ababio, 2012). Workers in Ghana's e-waste sector are exposed to severe health risks. They often operate under precarious conditions, earning a low income of about USD1.25 per day (Canavati et al., 2022). Many rely on artisanal and informal recycling practices that put both their health and the environment at risk (Parvez et al., 2021). The sector's informality poses significant challenges to monitoring and regulation. The perception of workers of the health and environmental

effects does not reflect the severity of the issue; rather, priorities lie in economic viability (Agyei-Mensah & Oteng-Ababio, 2012). Nonetheless, this informal labor is deeply embedded within the global e-waste value chain, and there is growing recognition that sustainable solutions must include, rather than exclude, these workers (Heacock et al., 2018).

Sectoral policy at the national level in Ghana, aimed at mitigating the health and environmental impacts of e-waste, is evolving and presents an interesting case study of policy action. This study provides insights for a broader policy discourse on transformative processes where both economic inclusion and health protection coexist. It highlights the differences between policy intentions and actual outcomes, emphasizing the necessity of evaluating environmental and health protection measures by including voices through qualitative analysis, critically questioning global narratives, and understanding underlying dynamics.

Global attention on the working conditions and the environmental impact of this work is growing and peaked around 2020 when media coverage spotlighted Agbogbloshie, which was then one of the world's largest e-waste dumpsites (Grant et al., 2024; Manhart et al., 2020). In 2021, the Ghanaian government at the time demolished the site in an effort to reduce pollution. This intervention sparked a public uproar, as affected workers were not informed in advance. The informal recycling of e-waste, however, did not stop but rather dispersed after this recent intervention, leading to new challenges (Grant et al., 2024). In contrast to this top-down approach, a pilot project implemented in Ghana between 2018 and 2019 took a more inclusive direction. To reduce pollution, workers are paid to bring the fractions of waste that are usually burned to established collection centers (Manhart et al., 2020). These contrasting strategies illustrate the complex interplay of motivations and outcomes in Ghana's e-waste governance.

The e-waste sector in Ghana comprises a complex network of formal and informal, public and private actors. National and international priorities intersect within an interdependent system of import and export structures. Individuals' health is influenced by interconnected environmental, political, and economic systems shaped by dominant discourses and power structures (Gilmore et al., 2023; Lacy-Nichols et al., 2023). While existing literature has documented the environmental and health consequences of e-waste exposure, it often fails to adequately connect these outcomes to the underlying political and commercial drivers. Moreover, there is a lack of published research analyzing the state of e-waste management and policy following the demolition of Agbogbloshie in 2021. As a result, important stakeholder perspectives and dynamics remain underexplored.

Therefore, this thesis investigates decision-making processes in Ghana's e-waste sector with a particular focus on the power dynamics that shape policy and its effects on workers' health. The analysis centers on the period following the 2021 demolition of Agbogbloshie, a turning point in the country's e-waste governance. The objective of the study is to respond to three central questions:

1. *What are the outcomes of the demolition of Agbogbloshie in 2021?*
2. *What are the critical barriers to sustainably transforming Ghana's e-waste sector, particularly through incentive-based policy mechanisms?*

3. *How do policy strategies, stakeholder dynamics, and power relations influence Ghana's e-waste management system, particularly in addressing health and environmental risks?*

The study updates the literature on the current state of Ghana's e-waste sector and analyzes the political dynamics behind policy success or failure, offering nuanced perspectives. Understanding the dynamics between stakeholders that influence health and the environment is crucial for identifying the factors that impact public health. Interviews with stakeholders were conducted and analyzed, and field visits were performed.

The key findings reveal that after Agbogbloshie's demolition in 2021, workers began returning following a governmental change in December 2024, highlighting unintended consequences such as inadequate stakeholder engagement, insufficient provision of alternative workspaces, and unresolved territorial conflicts. Simultaneously, a novel incentive-based management approach, supported by international funding partners, is being introduced to sustainably handle negative fractions (non-valuable, polluting materials), demonstrating transformative potential despite significant implementation challenges. The findings suggest that workers' compliance with environmental and health regulations significantly depends on recognizing their contributions. Stakeholder dynamics emphasize the necessity of strengthening worker associations and local governance bodies. Implementing agencies play crucial intermediary roles between workers and the government, with trust emerging as a decisive factor. If properly executed, these governance arrangements hold substantial promise for improving environmental conditions and worker health.

This analysis can inform future policy decisions and stakeholder interactions while shedding light on complex relationships. The findings are particularly relevant to policymakers and implementing agencies working in, but not limited to, the fields of circular economy, e-waste management, environmental policy, and international development – both in Ghana and globally.

This study is structured into several sections. A literature review will provide detailed insights into existing empirical work on e-waste in Ghana and related policy; the theoretical framework will be introduced. The methodology for conducting the fieldwork and analyzing results will be described. Results will then be presented in three parts, focusing first on informing the reader about the e-waste sector in Ghana, second on transitioning to dynamics by presenting the stakeholders and their impact on health and the environment, and third on presenting dynamics between stakeholders in an analysis of needs, resources, strategies, and relations. Finally, the results obtained will be discussed, and their implications for public policies will be drawn.

1.1. Definitions

1.1.1. E-waste

Electronic waste, commonly known as e-waste, refers to discarded electrical and electronic equipment (EEE) that have reached the end of their functional life or are obsolete. E-waste encompasses a wide array of products, including computers, mobile phones, televisions, refrigerators, and other consumer electronics (see Fig. *1*) (C. Baldé et al., 2024).

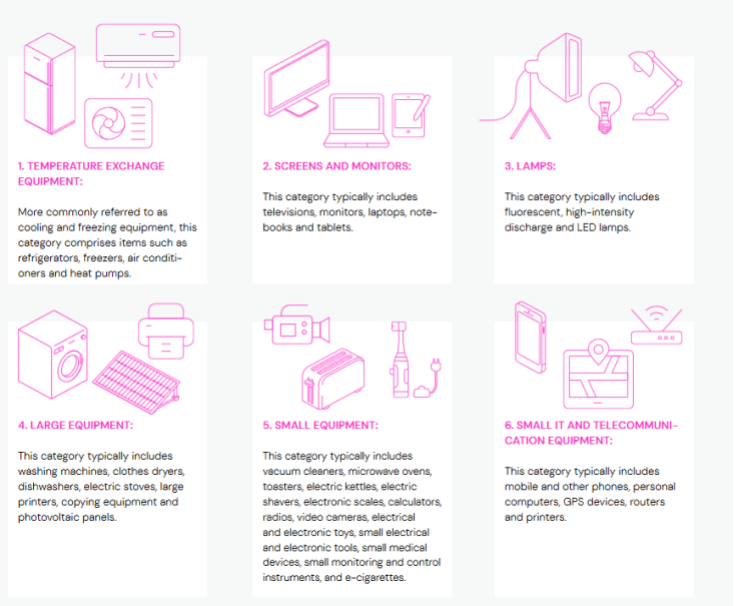

Fig. 1. E-waste equipment categories

Source: Baldé et al. (2024)

1.1.2. Formal and informal work

For further analysis, the phrases around *informal* and *formal*, *organized* and *unorganized* work must be clarified. In this paper, *formal* refers to structures registered with the Environmental Protection Agency (EPA), whereas *informal* structures are the workers and collectors that act without an official regulatory framework. Informal work is characterized by crude, often artisanal working methods (Issah et al., 2022). The phrases *organized* and *unorganized* will not be used to describe either of these two sectors. Nevertheless, are the e-waste management structures, the "novel approach" described below, a concept of *organized* functioning. The phrase *organized* will, hence, refers to this structural idea presented below, not implying contradictory characteristics of other parts of the system.

2. Interdisciplinary state of knowledge

A narrative literature review provides an interdisciplinary overview of e-waste in Ghana, with a focus on the informal sector and the social and political determinants of health. The aim is to offer background knowledge that helps contextualize and interpret new findings from field research. The review progresses from individual health impacts to environmental conditions, national policies, and international perspectives. It covers topics such as health hazards, labor groups, political participation, and the national and international regulation of e-waste. Most of the available literature focuses on Ghana, particularly on Agbogbloshie, where research has primarily examined working and living conditions. However, since conditions in Agbogbloshie are constantly evolving, there is a pressing need for updated, peer-reviewed research that analyzes recent developments and identifies factors that have changed.

2.1. Health hazards and consequences

E-waste workers in Ghana are exposed to a variety of health hazards. Exposure to toxic metals, unintentional persistent organic pollutants (UPOPs), as well as the risk of injuries, noise, air pollution, and particulate matter (PM) exposure, is high. In informal settings, workers are directly exposed to toxins such as lead, mercury, cadmium, and lithium through practices like mechanical shredding, manual dismantling, sorting, and open burning. Plastics are burned to dispose of, e.g., computers. Through this burning process, UPOPs are released, affecting the respiratory system (World Health Organization, 2024), and strong acids can be used to extract metals (e.g., from circuit boards). Soil, water, and air pollution directly expose humans and animals (Lebbie et al., 2021; Parvez et al., 2021). Following the exposure to this toxic cocktail of substances, cardiovascular, respiratory, and neurological illnesses occur. Furthermore, individuals show an increased risk of gastroenteritis, liver and kidney damage, and cancer. Children are especially vulnerable to these exposures as their bodies are highly susceptible when they are still developing, with physical growth indicators being affected (Heacock et al., 2018; Parvez et al., 2021). In addition, gender inequalities are evident in the sector, as women are largely excluded from formal roles, face structural marginalization, and remain uninformed about health risks from indirect exposure (Andeobu et al., 2023; Baldé et al., 2024; Sovacool et al., 2020). Nearby communities are often indirectly exposed through ingestion, inhalation, and dermal absorption (Andeobu et al., 2023; Awasthi et al., 2016; Orisakwe et al., 2019). A study by Fischer et al. (2020) shows that not only workers but also those working and living on and near the scrapyards show elevated blood levels of toxic chemicals. Workers' levels are, however, particularly increased. The health consequences for workers and affected communities occur after long-term exposure and are not observed immediately. The challenge is, hence, to acknowledge these risks whilst recognizing the short-term need to sustain an income (Heacock et al., 2018).

2.2. Labor groups

2.2.1. Informal

E-waste recycling practices in sub-Saharan African countries, such as Ghana, occur mainly in informal settings, leading to challenges in its management whilst, at the same time, providing a source of livelihood for workers and communities (Baldé et al., 2024; Heacock et al., 2018; Parvez et al., 2021). In Ghana, more than 80-97% of e-waste activities are considered informal (Owusu-Sekyere & Aladago, 2023; Püschel et al., 2024). Informality and formality are concepts that overlap along the value chain of e-waste recycling, constructing sometimes blurred interfaces.

Activities can take place either in concentrated areas or in more dispersed settings, where individuals or small groups work independently. In both settings, the workplace and the living space frequently merge, exposing communities to the risk of being in contact with hazardous practices and substances (Agyei-Mensah & Oteng-Ababio, 2012; Püschel et al., 2024). Occupational health and safety (OHS) of e-waste workers is negatively impacted by the usage of primitive methods such as burning cables or acid leaching and the rare use of personal protective equipment (PPE) (Andeobu et al., 2023; Issah et al., 2022). Davis and Garb (2020) identified that so-called informal working "hubs" emerge when vast amounts of e-waste are accessible nearby, whilst, at the same time, infrastructures enable the practice. Further, the hubs emerge in areas where land ownership is unclear, and the space can be used by informal workers. The emergence of these hubs eventually depends on the presence of marginalized communities that are looking for economically viable work. Many workers migrate from northern Ghana or neighboring countries to Accra due to environmental and economic hardship, contributing to a diverse but sometimes conflict-prone workforce shaped by ethnic and religious differences (Amankwaa, 2013; Rams & Aladago, 2021). An example of the interplay of centralized and dispersed informal recycling is Agbogbloshie, Ghana, and the consequences of the scrapyard's demolishment in 2021 (Grant et al., 2024).

2.2.2. Approaches to organization

Informal work is not only the absence of a contract but is characterized by its working methods and its impact on the environment, the lack of access to (social) services, reduced support for legal compliance and regulation, and insufficient capacity building. Policy action on each of these levels, hence, contributes to an integration of informal settings into formal contexts (Andeobu et al., 2023; Issah et al., 2022). Insights from an analysis of the Ghanaian e-waste sector show that various stakeholders are concerned with such an integration idea and that public as well as private actors should contribute. The authors, Akon-Yamga et al. (2021), recommend establishing further trading links of formal collectors with informal ones to respond to a business narrative of the circular economy. These economic integration ideas respond to the primary objective of workers, which is the personal economic interest - making a living. OHS and environmental protection are, hence, not a short-term priority for the individual (Heacock et al., 2018; Parvez et al., 2021).

At the same time, capacity-building interventions aiming to develop the capacity to work in healthier and environmentally friendlier ways are needed (Andeobu et al., 2023; Manhart et al., 2020). The context specificity of these interventions matters as the informal sector is, in its own way, well-organized and efficient and bears advantages ranging from providing livelihoods to promoting change sustainably (Owusu-Sekyere & Aladago, 2023). Additionally, sectoral public policy is lacking among workers, as, for example, research from Accra, Ghana, shows that 35% of e-waste workers and close-by community members were registered with the national health insurance system. As this rate mirrors national coverage rates, this is a public health challenge that goes beyond the e-waste sector (Adjei-Mantey & Horioka, 2022; Fischer et al., 2020). Another challenge the informal sector confronts is, hence, the non-integration into regulated governmental structures and related services (Andeobu et al., 2023).

2.2.3. Formal

Globally, 22.3% of e-waste is collected and recycled in a formal, environmentally friendly way. This rate has increased from 8 billion kg in 2010 to 13.8 billion kg in 2022 (Baldé et al., 2024). However, the majority of waste is managed informally, as the costs of formal recycling exceed those of informal recycling practices. Most existing formal schemes, therefore, exist in HICs, whereas LMICs struggle to implement healthy and environmentally friendly e-waste practices (Andeobu et al., 2023; Parvez et al., 2021). In sub-Saharan Africa, formal work along the e-waste value chain occurs mainly in the import and export settings and trade related to recuperated materials. The collection practices are mainly performed in informal ways (Baldé et al., 2024). In Nigeria, four formal e-waste centers are reported, and in Ghana, one formal collection and recycling system existed in 2021 (Abalansa et al., 2021).

2.3. Political participation: associations, unions, rights

The question of representativeness of political decisions that are taken affecting the informal e-waste sector in Ghana relates to the notion that decision-making processes on communal, national, regional, and international levels should follow participatory approaches, representing the voices of all stakeholders, including workers (Lebbie et al., 2021). The connection and communication between downstream and upstream policy present a challenge that often results in the insufficient inclusion of health and environmental consequences in policy design and further policy implementation gaps (Owusu-Sekyere & Aladago, 2023; Sovacool et al., 2020). Workers' voices can trickle down to impact sectoral public policy and strategies, mainly on a national level, through associations or unions. Likewise, membership in such organizations serves the function of networking with other stakeholders, ensuring *social dialogue* along the value chain. Therefore, these entities not only contribute to the organization of the informal sector but also serve the empowerment of communities (International Labour Organization, 2019).

Ghana, the Ghanaian Greater Accra Scrap Dealers Association (GASDA) is one of the associations that represents collectors, recyclers, and traders with their interests while also overseeing e-waste activities (Atiemo et al., 2016; Fischer et al., 2020; Grant et al., 2024; International Labour Organization, 2019; Parvez et al., 2021). However, the mere existence of

associations does not suffice or guarantee balanced representation, which is essential for their contribution to the legitimacy of political decisions. Corporate stakeholders and business interests can dominate the views within e-waste associations, and with a multi-stakeholder approach, members may also include manufacturers or importers (Lebbie et al., 2021). Furthermore, the interaction with the associations may depend on the hierarchies of the informal sector related to individuals' income. Burners and collectors with the lowest incomes may, therefore, be less heard in discussions compared to middlemen or the chairpersons of associations (Abalansa et al., 2021). Another factor affecting the legitimacy of the associations is a country's gender norms and the limited participation of women (Baldé et al., 2024). Political affiliation can also influence the inclusion of diverse viewpoints and the sense of representation among individuals.

Reports indicate that national politics can impact the leadership structures of prominent associations, as these entities operate at the intersection of civil society and politics. In Ghana, GASDA changes its leadership whenever there is a shift in political majorities within the government. The representativeness of e-waste workers across various political views is questioned, and conflicts among political factions of e-waste workers arise alongside changes in political power (Rams & Aladago, 2021). Consequently, some groups of e-waste workers are reluctant to join associations and prefer independence. This reluctance presents further challenges in managing hazardous practices, as independent groups tend to favor economically viable options (Manhart et al., 2020). Lyon (2006) discusses trust and power within Ghanaian associations and finds that a combination of incentives, trust, and sanctions is necessary for workers to join an association. Incentives may include support for sustaining a livelihood based on working practices, housing assistance, and social support during difficult times. In the studied associations, trust is built through personal relationships and reputation, often tied to kinship, working relationships, or leadership. Sanctions can manifest as peer pressure and collective action. Efforts to enhance the representativeness of associations and promote the participation and inclusion of workers' needs at communal, national, regional, and international levels stress the importance of encompassing all steps in the e-waste recycling value chain while ensuring dialogue across political divides. This will help foster a trustworthy relationship within associations and between workers and government stakeholders (Lebbie et al., 2021; Rams & Aladago, 2021).

2.4. Overview of relevant policy

Ghana is one of the few African countries with established policies and regulations on e-waste. In 2019, only 13 African countries had national legislation in this area. While international regulations exist, such as the Basel Convention, enforcement remains weak, even among signatories (Lebbie et al., 2021). However, the national and international policy landscapes are evolving in response to the rapid growth of the e-waste sector. In 2025, Ghana's Environmental Protection Agency (EPA) introduced the Environmental Protection Act 2025 (Act 1124) (FAOLEX, 2025; Templars, 2025). At the international level, the Basel Convention was also amended to strengthen its provisions (Basel Convention, 2025).

2.4.1. National policy

Ghana has established a relatively advanced regulatory framework for e-waste management compared to other African countries. The Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917), along with its implementing regulation LI 2250, laid the foundation for sustainable e-waste governance through measures such as the registration of importers and the introduction of an eco-levy, a tax imposed on EEE imports. The funds collected are utilized by the EPA and related bodies (Lebbie et al., 2021). In 2025, this framework was updated and consolidated under the Environmental Protection Act (Act 1124), which repealed Act 917 while maintaining key provisions and expanding regulatory oversight. Act 1124 reinforces restrictions on the importation of electronic waste, allowing imports only from African countries that are parties to the Basel Convention, thereby limiting transboundary movement from non-African states (Templars, 2025). Additionally, the Sustainable Recycling Industries (SRI) program guidelines, adopted by the Ghanaian EPA, provide technical standards to support implementation (Manhart et al., 2020; SRI Ghana, 2018). Together, these policies reflect a growing national commitment to regulating the e-waste sector.

Box 1: Ghana's context

- Population (2023): 33,787,914 (increase by 2050 to 50,553,047); pyramid-shaped age structure
- Life expectancy at birth (2000 – 2021): 66.1 years
- GDP per capita (2023): USD2,260.3
- Poverty headcount ratio at USD2.15 a day (2016): 25.2 % (of population)
- Independence since 1957
- Ruling party: National Democratic Congress (NDC)
- Democracy: Multi-party system; Ghana is described as a role model for democratic governance in Africa. Since 2001, four peaceful transfers of power between the two parties, the New Patriotic Party (NPP) and the National Democratic Congress (NDC). Nevertheless, strong partisanship between these parties and the high vulnerabilities of those in power incentivize short-term solutions.

Fig. 2. Ghana's context

Source: Kindo et al., (2024); UNDP, (2021); Worldbank, (n.d); World Health Organization, (2024b)

2.4.2. International policy

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1992) establishes a shared international commitment to protecting human health and the environment from the harmful impacts of hazardous waste. However, despite this common objective, membership is not universal, and compliance remains a persistent challenge. The 2019 Ban Amendment further strengthened the convention by prohibiting the

export of hazardous waste destined for final disposal – and, in most cases, for reuse or recycling – from OECD, EU, and Liechtenstein to other countries. A 2025 amendment adds specific entries on electrical and electronic waste, reflecting growing concern over the global e-waste crisis. Nonetheless, the responsibility for managing e-waste ultimately rests with national governments (Lebbie et al., 2021).

In addition to the Basel Convention, the Rotterdam Convention, the Stockholm Convention, and the Bamako Convention are also relevant to the governance of e-waste. Each addresses a different aspect of hazardous material control: the Rotterdam Convention introduces a prior informed consent (PIC) procedure for the international trade of certain hazardous chemicals; the Stockholm Convention aims to eliminate or restrict the production and use of persistent organic pollutants (POPs), many of which are found in electronic products; and the Bamako Convention, which is specific to African countries, seeks to control and minimize the transboundary movement and management of hazardous waste within the continent. While the conventions are distinct, they are often considered complementary in addressing the broader issue of environmental pollution related to hazardous substances, including those found in e-waste (Lebbie et al., 2021).

2.4.3. Bargaining chips in negotiations

The acknowledgment that livelihoods and income must be sustained when opting for environmental and health protection has partly reached policymakers, as exemplified by the incentive-based pilot project in Ghana (Manhart et al., 2020). Policy evaluation examples from the mining industry confirm that without these considerations, success largely fails to materialize (Stoop et al., 2018). The conflict between economic and environmental or health priorities is evident in both international and national contexts. Considering the international perspective, the literature discusses a north-south divide that can impede the success of international negotiations: Environmental priorities are predominantly set by Global North countries, while the Global South advocates for social and economic development. The argument centers on the idea that the consequences of environmentally harmful practices associated with extractive industries are externalized to the Global South, which has, through colonial and postcolonial structures, not sufficiently benefited from these export-reliant frameworks, while the Global North maintains a *green* and prosperous consumption pattern. Underlying the discussions are deep sentiments of injustice and exploitation (Atapattu & Gonzalez, 2015; Gonzalez, 2001; Lessenich, 2016). Kindo et al., (2024) present a nuanced analysis of Ghana's trade implications on both economic and environmental outcomes, confirming that while economic gains occur, adverse environmental impacts can also be observed. They advocate for a balance between the two to achieve long-term sustainability in trade. As these discussions are linked to internalized historical injustices and livelihoods, similar patterns emerge when moving away from the international arena. Here, negotiations with local communities raise similar questions regarding recognition and economic sustainability. Acheampong & Okorley (2024) suggest that from a community perspective, acceptance of environmental policy largely hinges on trust and transparency, recommending collaborative approaches and consensus-building mechanisms.

3. Theory

Both the commercial determinants of health framework and transition theory referred to in this paper criticize the current overarching normative system for being driven by commercial profit priorities, which largely neglect sustainability, environmental protection, and public health (Gilmore et al., 2023; Grin et al., 2010; Köhler et al., 2019; Lacy-Nichols et al., 2023). The informal e-waste sector in Ghana presents the core inequalities resulting from overconsumption, externalization, and profit orientation (Sovacool et al., 2020). The narrative to transform the sector into a vital component of a functioning circular economy system, both nationally and internationally, is prominent. Akon-Yamga et al. (2021) note that previous transition approaches in the Ghanaian e-waste sector were guided by non-inclusive, top-down governance structures.

The politics of policy within the Ghanaian stakeholder landscape can illuminate potential policy failures, successes, and ongoing transformations. Such shifts reveal the underlying dynamics of power, agency, and interests among various stakeholders, which collectively shape health outcomes through policy decisions. To analyze these interactions, this study employs the theoretical lens of transition theory, focusing on *power*, and provides complementary insights into the structural drivers and stakeholder dynamics that influence policy effectiveness.

3.1. Transition theory and power

In analyzing how power dynamics and stakeholder agency influence sustainability transitions and associated policy processes, it is insightful to explore the theoretical perspectives outlined by Köhler et al. (2019), who emphasize the inherent complexity arising from diverse stakeholder interactions. Köhler et al. (2019) present two chapters specifically relevant to this analysis: “Power, agency and politics” by Flor Avelino and Florian Kern, and “ethical aspects” by Benjamin Sovacool, Kirsten Jenkins, and Elsie Onsongo. The authors underline that “winners and losers will be created in transition processes” (p. 6), as sustainable transitions are processes steered by multiple stakeholders with (often conflicting) values, involving disagreement, coalitions, and lobbying. A transition process inherently encounters resistance, and control of such a process can never be fully ensured. Diverse conceptualizations of power and related notions exist in the literature. To understand the relations of power (that influence agency), first, the understanding of agency and power used in this paper will be further explained. We first look at the central understanding of what power is, what features constitute this power, and why entities need it. Second, we regard the execution of power in direct and indirect forms.

First, according to Clegg (1989), “power is not a thing, but a process constituted within struggles” (p. 97), which is the struggle of actors for autonomy and control. Resistance serves as the agency to oppose control. Whether an entity has power depends on its resources, such as being a recognized stakeholder (signification, a meaningful stakeholder), an agent of production, or both (Clegg, 1989). An agent of production can own the means of production, which can include financial means or the human labor force of workers, or it can have the

bodily capacity to produce, which also relates to argumentation and persuasion in policy discussions (Arts & Van Tatenhove, 2005). In this paper, we will follow the notion that Grin (2010) and Clegg (1989) adopt: power is not centralized but distributed among various actors, including governments, market participants, and civil society. The rules between these actors constitute the basis on which power can be executed and diffused; these rules represent the "underlying rationale" (Clegg, 1989, p. 108) of action within a given system. This means that we adopt the understanding that the power of agents depends on their resources and signification, while the processes of power within a system depend on the rules that constitute the interaction between stakeholders and the underlying narrative of action.

Second, the question of how power is executed is disentangled into direct and indirect forms. Drawing from Fleming & Spicer (2014), forms of power include coercion and manipulation, both episodic theories of power. According to Fleming & Spicer (2014), episodic theories of power constitute power that underlies actions which can be identified as direct. Coercion relates to the employment of force and is often connected to resource possession. Manipulation is often linked to agenda setting and influencing the behavior of actors. This can occur by leveraging one's influential position as a significant actor or by shaping assumptions about outcomes and ideas, as well as impacting the composition of multi-stakeholder arrangements (who participates, who does not). Therefore, manipulation is less direct than coercion. Indirect forms of power, as noted by Fleming & Spicer (2014), are domination and subjectification, both systemic forms of influence. Systemic forms of influence are based on structures and norms, making direct action unidentifiable. Domination is the process "whereby actors establish influence through the construction of ideological values that become hegemonic" (Fleming and Spicer, 2024, p. 5). In this process, the values, attitudes, ideals, and preferences of actors are shaped, with the capacity to shape often depending on hierarchical structures – allowing sets and values of ideas to be reshaped and challenged. Subjectification refers to being in a social setting, an identity related to an actor's self and their emotions. It can be influenced by surveillance, self-monitoring, and discourse that guides actors' behavior. In this context, Clegg (1989) refers to the Foucauldian view that the governing of relations depends on the capacity to discipline. Discipline can be strategically achieved through either endorsement or enabling action, or through punishment and interdiction.

Beyond these four power relations, trust is a key concept associated with the indirect theoretical view of power and the maintenance of adherence to agreed-upon rules, especially in contexts of weak legal enforcement (Lyon, 2006). Grin et al. (2010) identify building and maintaining trust as crucial factors impacting power relations. According to Grin et al. (2010), trust does not naturally exist, particularly when stakeholders face uncertainty; instead, it requires deliberate cultivation and ongoing reinforcement. Trust may be tested to (re)assess whether trustworthiness can still be relied upon. However, especially in uncertain policy environments, trust is central to multi-stakeholder relations. Individual subjective perceptions of trustworthiness play a significant role, while this perception and the consequently established relations often depend on past experiences (Clegg, 1989).

Narratives surrounding a policy, as well as the policy arena in which it is shaped, and the interactions of actors within and beyond this arena, ultimately impact equality or inequality in

health outcomes for individuals (Gilmore et al., 2023; Köhler et al., 2019). A key part of this deterministic relationship is the power dynamics inside and outside policy processes concerning the agency and control of actors. Moreover, an important aspect of this comprehensive approach to policy transition processes is ethics and representativeness: participation in decision-making must be ensured, as Sovacool, Jenkins, and Onsongo argue in their chapter in Köhler et al. (2019). The authors state that negative consequences of non-participation manifest in reinforced injustice, and similarly, that social acceptance is a critical factor contributing to transitions and policy. The theoretical framework employed in this study links transitions and the analysis of policymaking to determinants of health. Köhler et al. (2019) propose case studies to better understand transition processes across disciplines. This study adds to this body of literature.

4. Methodology

Qualitative research was conducted to contribute to the existing literature. Thus, the research was based on interviews with various categories of actors: governmental, private export companies, academia, non-governmental organizations, collectors, and associations. This structure supports the aim of precisely documenting stakeholder views on the topic. Likewise, the researcher undertook various field visits, enriching the study findings with observations and photography.

4.1. Study setting

The interviews (n = 14) were conducted in Accra and Koforidua, Ghana, by the researcher in February and March 2025. Six interviews took place in the offices of the interviewed stakeholders or in a conference room organized by the researcher (international organizations, governmental stakeholders, NGO, academia, agent). One interview was conducted in a quiet area of a restaurant (private stakeholder), three were held at a scrapyard (collectors, association), three at a collection center (collection centers, association), and one at the roadside (association). The consultancy Mountain Research Institute (MRI) and the non-governmental organization Pure Earth were present at the beginning of some of the interviews to provide an introduction, as they assisted the interviewer in contacting the individuals. A local support person accompanied the interviewee for interviews with informal sector stakeholders, ensuring that the interviewees felt comfortable. Interviews were recorded using the recording tool Marantz PMD661.

4.2. Study design and stakeholder selection

The interviews followed a semi-structured interview guide (Appendix B – Interview guide). The guide was developed after the literature review was conducted and the research questions were set. Afterwards, it was discussed with non-involved individuals to determine if the questions led the participants toward the researcher's assumptions; if so, the questions were adapted to avoid this. Unforeseen topics arose during the dialogue and guided the conversation. Consequently, building on the guide, additional questions were added, and clarifications were

sought. The conversation aimed to take place in an environment of trust, where the interviewer actively listened and encouraged interviewees to provide examples. This method aimed to turn reflexivity into a relational process while creating space for the interviewee to speak freely. Interviews were conducted in English, which is commonly spoken in Ghana and is the official language; one interview was held in French as it was the person's mother tongue. Consent forms were filled out and signed by all participants (Appendix C – Consent form).

The researcher's own judgment of eligibility served as a basis for selecting participants. Purposive sampling was applied to select participants who play a key role in the e-waste value chain in Ghana. The researcher judged sufficient experience in the field based on the time worked and snowball selection (prior recommendation by experts). Pure Earth and MRI recommended contacts in relevant stakeholder groups, particularly reaching out to the informal and governmental sectors. Twenty-two stakeholders were contacted via email or in conversations during the visit to Ghana. Stakeholders from the governmental sector, international development organizations, academic institutions, and the informal e-waste industry (associations, collection, and recycling centers) were contacted. Fourteen interviews were conducted in total. Additionally, two shorter conversations with collectors were held to provide insights into work in the informal sector.

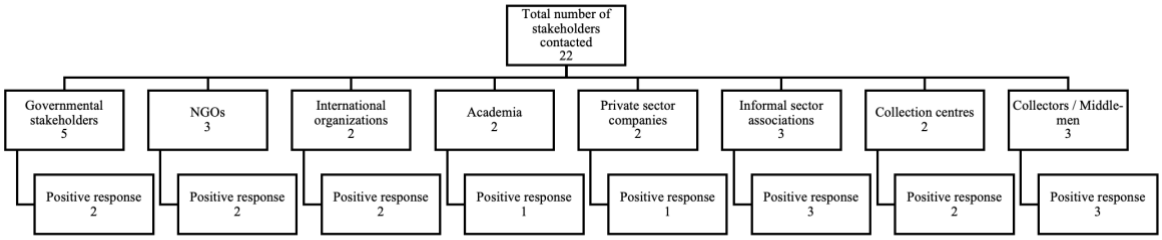

Fig. 3 Flowchart: Participant selection

Inclusion criteria to participate in the study were the individual's familiarity with one or several of the following fields: e-waste collection, recycling, and management; health effects of e-waste; environmental effects of e-waste; social conditions of e-waste; regulatory aspects; human rights; circular economies; waste-trade. This was established via the subjects' background, official statements, and previous public engagements. Availability in or close to Accra during February 22nd and March 8th, 2025, was another selection criteria. Only adults (>18 years old) were interviewed, following information and their consent to participate. Exclusion criteria were language (other than English or French), age (<18 years old), availability, or asking for remuneration.

4.3. Data outcomes and analysis

The interviews were analyzed, focusing on the outcomes of the politics of policy concerning e-waste management in Ghana. First, descriptive information about the policy approaches and stakeholders involved was of interest. Once the interviews were analyzed, these descriptions were compared. The second area of interest was to explore underlying dynamics, power, agency, and interests among stakeholders. Therefore, themes relating to systemic and episodic

theories of power by Fleming & Spicer (2014) were identified, specifically by investigating needs, resources, strategies, and relations of each stakeholder.

The analysis was performed using NVivo. To enhance the interpretation of the data, a combination of open and focused coding was employed. While some codes were predefined based on the theoretical framework, others surfaced inductively during the initial stages of data analysis.

4.4. Data storage and protection

GDPR clearance was granted by the Data Protection Officer of SciencesPo University, Paris, on February 6, 2025. Data was stored securely on HIDRIVE (STRATO), accessible only to the interviewer. Once transcribed, the recordings of the interviews were deleted, and the transcripts were anonymized.

4.5. Field visits and observations

4.5.1. Ministry of Environment, Science, Technology (MEST)

As part of the research, the researcher attended a meeting with the newly appointed Minister of the Ministry of Environment, Science, and Technology (MEST), Hon. Dr. Ibrahim Murtala Muhammed, in Ghana on the 24th of February 2025. The meeting, organized by Pure Earth, served as a courtesy introduction of the NGO and aimed to secure governmental support for their initiatives. Discussions covered topics such as the past destruction of the Agbogbloshie e-waste site, the impact of lead contamination in consumer products, and the migration patterns of informal workers. The researcher did not ask questions in this meeting, rather did she observe the interaction.

4.5.2. Agbogbloshie – Old Fadama

The researcher visited Old Fadama on the 7th of March 2025, accompanied by a local scrap worker. Old Fadama is the area next to the Agbogbloshie scrap yard, where workers moved to after the destruction of Agbogbloshie in 2021. The visit provided first-hand insights into daily operations, allowing the researcher to observe how practices were carried out. While no formal interviews were conducted, observations concentrated on working conditions and interactions within the scrap market. Photography was permitted only with explicit consent, reflecting the sensitivities surrounding documentation in the area. Agbogbloshie, which is just across the river from Old Fadama, was viewed from a distance since workers are currently resettling, and their sensitivity to journalism and research is heightened following the effects of previous documentation on the area. Again, no conversations occurred during the visit, as the researcher remained focused solely on observation.

4.5.3. Collectors in Koforidua

As part of her visit, the researcher also visited collectors in the inland of Ghana, Koforidua. Accompanied by MRI, she traveled to collectors that the consultancy was familiar with and who would be comfortable with her presence. Arriving at the sites, the researcher was introduced.

The first collector was a man from Nigeria who had been collecting in Ghana for 15 years. His wife and child were present at the center, where a scale was set up for "boys" (how the young men - collectors who walk around in the communities collecting materials in carts - are called) to weigh and sell their materials to the collector. During the visit, the boys dropped off materials and were paid directly. The materials were stored in garages nearby. A scrap yard across the street was established to further process the materials and to collect larger pieces. Three men were working in this yard.

The second collector was a man from Niger who had been collecting in Ghana for 20 years. He owned a yard where various materials were stored, and his sons were present. The visit lasted about 25 minutes, during which the researcher was free to walk around the scrapyard, capturing the environment.

4.6. Vulnerable populations

As stated above, even if child labor exists in the field, no interviews were conducted with minors. When conducting interviews with collection centers, collectors, middlemen, and associations, the researcher was accompanied by a local expert who knew the communities and could assist in selecting and contacting individuals who were willing and available to talk to the researcher. The local support person was present, and the researcher reminded interviewees that no questions needed to be answered and that the interview could be stopped at any time.

4.7. Validity and reliability

The researcher aimed for inductive reasoning and topic specificity. She pursued the goal of describing and learning from both her observations and what was mentioned to her in interviews. In this process, the researcher sought to understand the subject's point of view without bringing in her own perspectives. The credibility of the findings depends on their trustworthiness; the researcher is alert to her own bias and subjectivity and monitors this subjectivity. Likewise, it is important to understand how the researcher can influence the setting or the individuals (Walter, 2001). Member checks were performed by asking participants to react to transcripts. Saturation was reached after the 14 interviews conducted, as consistency across participants emerged, no new themes were discussed, and the depth and breadth of interviews were sufficient.

To avoid researcher bias, the assumptions of the researcher are described in the following section: Potential bias and values (expectations and beliefs): The researcher shares the idea that informal sector work should be continued. From her moral point of view, individuals in Ghana should not be excluded from global trade systems but should be included, while working

conditions are made safer. The researcher assumes that this is in the interest of the individual. The researcher is skeptical of the notion of “formalization". The researcher believes that individuals should participate in policy design and that inclusive approaches to evaluating policy are necessary and beneficial. Furthermore, the researcher holds the opinion that the capitalistic behavior of firms and their profit interests steer and overtake political decision-making. The researcher sees herself as an observer from the outside with no position within the structures she is researching. This leads her to assume that individuals perceive her in this way as well. However, it might be the case that individuals view her as a stakeholder from the Global North who could portray an image of the situation to generate more funding. The researcher is aware of this risk and aims to obtain transparent and “true” answers from interviewees.

4.8. Ethical approval

Ethical approval was not necessary as the risk is negligible for individuals interviewed in the study. Participants provided informed consent, and all interviews were conducted voluntarily. Clear information was given about the research purpose, confidentiality, and participants' right to withdraw at any time. Given these factors, the study aligns with standard ethical research practices. Formal ethical approval was not necessary.

5. Analysis – Findings

The research yielded a rich set of results from interviews, observations, and field visits. Results are presented in three main parts. The first part *sets the scene* for the reader. New findings on the e-waste value chain in Ghana are presented, along with the novel approach in the Ghanaian e-waste management landscape, including its financing. An analysis of citizens’ expectations towards e-waste policy is described as a key factor shaping the policy and dynamics between actors. This section *transitions* to an analysis of dynamics and relations by first presenting an overview and hierarchy of stakeholders that impact the health and environment of e-waste workers. Secondly, the case of Agbogbloshie in 2021 and 2025 is presented, as developments in the scrapyard represent crucial insights into policy making and failures in Ghana. The third part of the results presents findings on the *dynamics between stakeholders* by analyzing needs, strategies, resources, and relations of actors that were directly or indirectly voiced during the interviews. This third section provides insight into the logic of value and power, forming the core analysis needed to understand the complex dynamics that impact policy priorities and success.

Participant characteristics

Fourteen participants agreed to participate in the study, and two short conversations with collectors were conducted (response rate of 72%, see ***Fig. 3***). The participant characteristics are represented in *Table 1*. Two stakeholders interviewed represented NGOs, two were representatives from international organizations, one represented academia, one a private company, two governmental stakeholders were interviewed, three associations were included,

two collection centers, and three middlemen. The duration of the interviews ranged from 18 to 75 minutes; the two conversations lasted five and twelve minutes.

Table 1
Participant characteristics.

Stakeholder	Number of Participants	Job Title	Abbreviation
NGO	2	Project manager	NGO - Project manager
		Country director	NGO - Country director
International Organizations	2	Specialist	IO - Specialist
		Advisor	IO - Advisor
Academia	1	Professor	Academia - Professor
Private Company	1	Director	Director of private company
Governmental Stakeholder	2	Consultant	Consultant to the government
		Officer	Officer at the government
Associations	3	Secretary	Secretary of Association_1
		Secretary	Secretary of Association_2
		Secretary	Secretary of Association_3
Collection Centers	2	Manager	Manager collection center
		Managing director	Managing director collection center
Collectors / Agent	3	Middlemen	Collector_1
		Middlemen	Collector_2
		Middlemen	Agent

5.1. Setting the scene: The e-waste value chain in Ghana

The e-waste value chain in Ghana is evolving. Whilst the informal system is active and mostly used, the government is implementing a novel approach to organize the e-waste management in Ghana, which builds upon the incentive-based pilot project. The conversations with interviewees entailed a question inquiring about a description of the sector, adding on asking, "where do you position yourself within the e-waste value chain and which actors do you interact with?". These questions revealed detailed information on both formal and informal approaches. This section will introduce the Ghanaian e-waste value chain, specifically highlighting the programmatic idea of management that is currently implemented and developed, based on the results from the interviews. **Fig. 4** presents the current e-waste value chain in Ghana (see Appendix E – E-waste value chain for figure combined with photos).

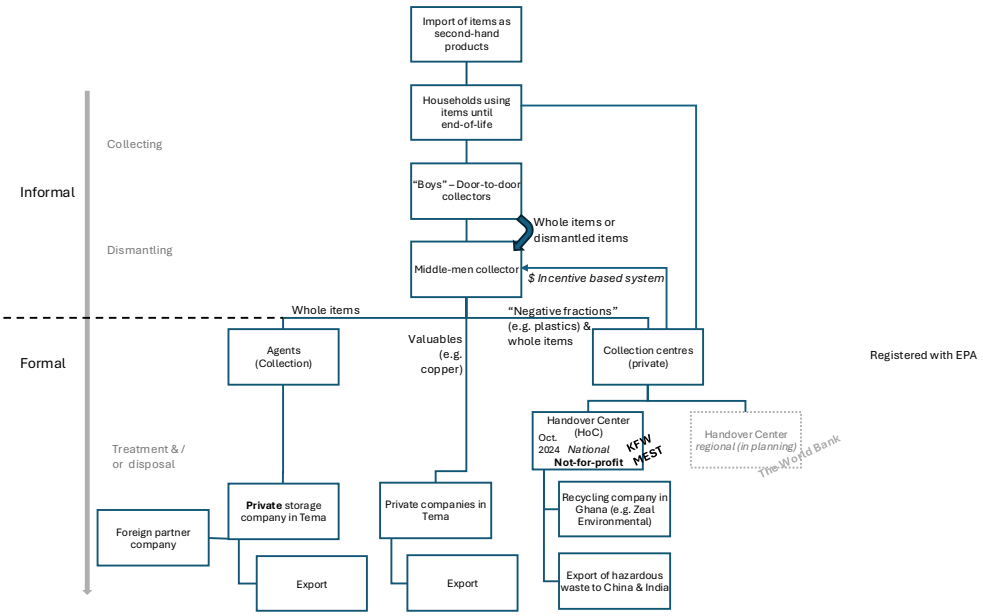

Fig. 4. E-waste value chain Ghana

Source: Own compilation

Most items that end up as e-waste enter Ghana as second-hand, reusable products. Interviewees from NGOs and associations specifically underscored that the market for these products from Europe or China in Ghana exists. However, the short-term livability of Chinese products and the small proportion of functioning parts of items were highlighted as concerns. Furthermore, imports from other African countries to Ghana increase, "*because there is a structure in Ghana, we are actually now even receiving e-waste from Cote d'Ivoire, Burkina Faso, they are bringing it in to sell in Ghana"* (NGO - Project manager). Another mode of importation is informal importers of direct e-waste, *"those who are dealing with small-scale importation. (...) There are some who will bring two or three items that might not even go declared at ports."* (Consultant to the government). This finding was also confirmed by an agent collecting items from communities.

"In Ghana, people use secondhand things a lot. People cannot afford brand-new ones. A market for most developing countries. Often, these products are so bad that only a small part of the product can be used secondhand. And then the rest is dumped." (NGO - Country director)

These second-hand items are used by households and institutions and are often repaired several times. Once products reach their end-of-life, non-working products are collected from households by collectors ("boys") in carts. The *boys* buy the products from households directly and bring them to middlemen who collect these items and materials in the communities or at scrapyards. Boys dismantle products themselves or sell whole items to subsequent actors in the value chain. The social hierarchy between boys and middlemen was described as boys are often newcomers, recruited by middlemen themselves, and middlemen *"gradually moved from just collecting to now middlemen"* (NGO - Project manager). Until here, the system is classified as informal. Middlemen then recuperate valuable materials that are further sold to private companies in the industrial harbor region of Tema, Ghana, which are exporting these materials. The intersection of informal and formal sectors for valuable materials, such as copper, occurs at this stage of the value chain.

Photo 1 *Activities of middlemen*

In addition, the value chain includes contracted agents who are collectors that are directly working with private companies, supplying whole items such as phones: "*One or two of them have the potential to bring as many as a 100,000 pieces every month. We don't fund them, but we pay for it when they bring it"* (Director of private company). These agents work with middlemen collectors from the informal sector, hence, representing another significant interface of formal and informal work. The private stakeholder interviewed for this study indicated their collaboration with foreign partner companies, setting standards and forcing compliance with regulations that trickle down through the contracted agents, intending to reach the collectors these agents work with.

"We work with the informal sector by asking them to help us source whole scrap mobile phones. This is a case where before they do the collection, they have to manually dismantle the phones and take the components of interest. But now we are asking them not to dismantle and when they bring us the phones, we will incentivize you. So, this is forcing them to be compliant." (Director of private company)

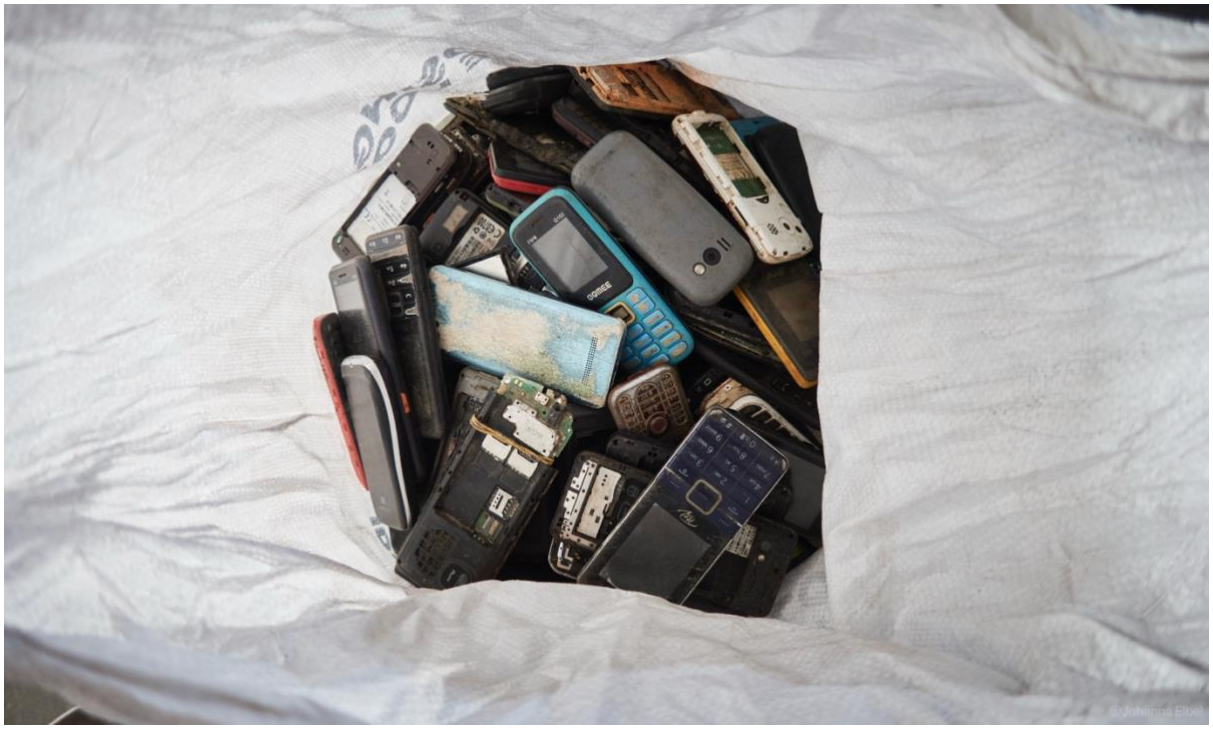

Photo 2 *Collected phones ready for export*

The items that the private stakeholder interviewed for this study were concerned with were exported as whole items to a European country for further recycling. Exports are approved by the export and import countries' EPAs. As the private stakeholder explained, the harbors the exports stop at must approve the layover of the shipment.

Photo 3 *Private company collection center in Tema before export*

Besides the traditional value chain of valuable material and the interaction with private companies to export whole items, incentivized by partner companies, the problem of dealing with "negative fractions" was identified during interviews, creating a third path of the value chain (see **Fig. 4**). After extracting the metals that can be sold, the non-valuable fractions of the items are frequently burned by collectors, e.g. thermoplastics. To avoid the practice of burning or disposal into the environment a "novel approach" is being implemented by the government, based on public-private partnerships, including reliance on external funding as well as generation of national funding through the E-Waste Fund, established under the Ghanaian Hazardous and Electronic Waste Control and Management Act (Act 917).

5.1.1. Ghana's approach to organization – An incentive-based system

A cornerstone of Ghana's novel approach to organizing the e-waste sector is an incentive-based system to collect so-called "negative fractions," which also allows for whole-item collection and provides storage space before recycling or export companies take on the material. The Ministry of Environment, Sciences and Technologies' project is implemented by MESTI-PIU and EPA, and is supported by funding from external partners. As part of the project, a private not-for-profit collection center, *EcoPartners*, financed by external German funding agencies, was established. This center compensates collectors for bringing thermoplastics and other items, such as cables, batteries, or lamp bulbs, to the center.

> *"The plastics that are not used anymore are likewise collected and are brought to the EcoPartners collection center. If no incentive would be provided, this plastic would be burned or would end up in the environment."* (Collector_1)

Photo 4 *Eco Partners private collection center in Koforidua*

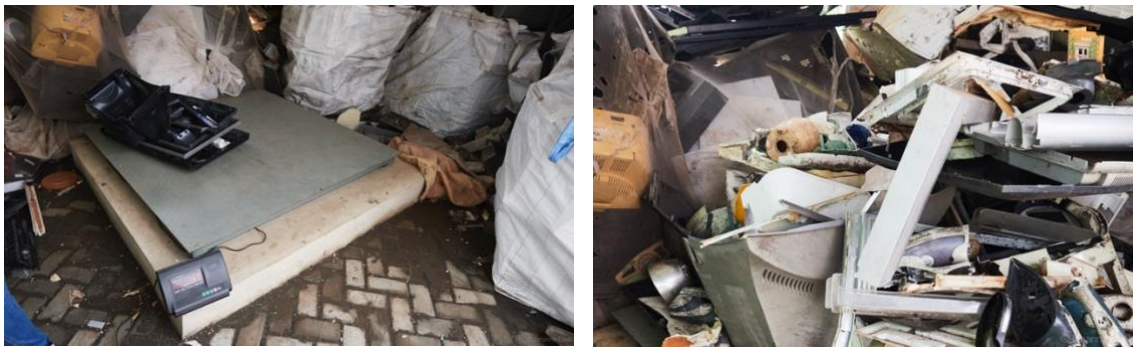

Photo 5 *Eco Partners private collection center for negative fractions*

This and other collection centers in communities are registered with the EPA. They serve the purpose of buying and storing wastes, negative fractions, and selling these fractions to a national handover center, the Handover Center (HoC). The HoC, opened in October 2024, is financed by the German KFW and supported by MEST. The center stores materials in Accra, collaborating with six collection centers in nearby regions. An advantage of the HoC is that recycling companies can easily access large quantities of materials in the centralized facility.

> *"We could see it [the HoC] as an intermediary point that connects the collectors. There are the collectors that starts with the value chain. So the HoC acts as that intermediary point between the collectors and then the final destination for recycling"* (Manager collection center)

Photo 6 *Handover Center (HoC) Accra, collected negative fractions*

Photo 7 *Handover Center (HoC) Accra, containers for export and recyclers*

The collection centers along the value chain also accept whole electronic items from community members who are unable to dismantle them. Additionally, these centers purchase cables before dismantling, as copper extraction from cable wires often involves burning. The HoC currently serves as a national holding center. According to a stakeholder representing a local NGO, additional centers are planned at the regional level, financed by the World Bank, to further centralize operations and facilitate transportation from various regions. Presently, the

project implementation focuses on initiatives in Accra and Koforidua. After collecting the negative fractions at the collection center, recyclers purchase the thermoplastics, recycling plastics locally in Ghana. Hazardous wastes, defined under the Environmental Protection Act (Act 1124) as subject to regulatory control, are, in accordance with the law, designated for export. However, due to the lack of adequate treatment facilities in Ghana, illegal dumping of such waste is reported.

Photo 8 *Handover Center (HoC) Accra, hazardous wastes*

5.1.2. Financing

Financing e-waste management approaches emerged as a key issue in all interviews, essential not only for sustaining the novel management system but also for profiting from exports of valuable fractions or whole items. An agent highlighted the perceived injustice in the Ghanaian economy, which collects but does not adequately profit from these processes. Interviews revealed a central aspect of Ghana's new approach to e-waste management: a shift towards sustainable financing. The E-Waste Fund collects an eco-levy on electronic items imported into the country. The resources from this fund are intended to support the incentive-based system described earlier, reducing donor dependency for these initiatives. However, NGOs reported implementation challenges, noting that insufficient funds were being generated to sustain Ghana's e-waste management system.

Regarding financing, the issue of pricing was raised as a challenge for collectors and governmental stakeholders. The pricing difficulties faced by collectors dealing with recyclers and private stakeholders were noted, as there is a lack of price stability. The collectors expressed that they have no choice but to sell their products at the prices set by their counterparts, having traveled long distances to reach the handover locations, primarily in Tema.

> *"Their [The collectors] main headache is with pricing, with the formal sector, the recyclers. These prices are set at the convenience of the recyclers. So, there is one day they sit down and drop the pricing without any negotiations with the informal sector, without any former notification whatsoever."* (Agent)

The second challenge of pricing is related to the incentive-based system aimed at avoiding environmental pollution and negative health effects, such as the burning of cables to extract copper, as collectors perceive burning as more profitable. As described by a government stakeholder, *"Now they are complaining that they are burning because of pricing"* (Officer at the government). To address pricing challenges systematically, a national pricing committee was established that "*pretests the price. Then they actually set it, and it is subject to review every quarter. So, it hasn't become an issue where you are paying this amount and another person is paying this amount elsewhere. So, it's a stabilized price for e-waste in Ghana."* (NGO - Project manager). This pricing committee consists of some of the main actors, including key representatives from the informal sector and EPA, MRI, GreenAd, MEST, MESTI-PIU, the E-Waste Fund, and the German KFW. This committee periodically reviews and adjusts prices based on stakeholder feedback. Despite this committee, pricing was raised as a key issue, and the general understanding is that incentives must be increased, as collectors draw away from the incentive-based mechanisms provided. In light of this realization, however, a governmental stakeholder voiced concerns about the competition between the government and private sector pricing: *"My question is, would that mean that anytime the private sector increases, the government would have to increase, too? How sustainable will it be for the country or the government?"* (Officer at the government). Nevertheless, the Minister of Environment promised collectors and associations during a visit to the Agbogbloshie area that another committee would be formed to reassess the pricing issues. The debate on finances introduces the key actors in the Ghanaian e-waste management sector, as well as the perception of value by general citizens.

5.1.3. Citizen awareness

As social acceptance shapes political decision-making and implementation success, as articulated by a governmental stakeholder, the interviewer asked all interviewees about the expectations of Ghanaian society regarding e-waste policy.

> *"If you're not aware of something, you don't have any expectations. As I initially said, someone's batteries are in his or her room. That person has no expertise. Unlike other kinds of waste, plastic waste and food waste, which we see all over. So, the Ghanaians are expecting the government to act on that kind of waste. But when it comes to electronic waste, there is little awareness, that is what makes it a challenging thing."* (Consultant to the government)

Three main themes related to this topic can be identified: first, a lack of awareness; second, the perception of the value of e-waste by society; and third, non-monetary incentives and responsibilities.

5.1.3.1. Lack of awareness

The lack of awareness among Ghanaian citizens about e-waste, its dangers, and disposal methods was consistently identified by all stakeholders. Key insights were that most citizens have a limited understanding, hence, little or no knowledge of what constitutes e-waste as a private stakeholder expresses, *"I think people don't know enough, so they don't care."* (Director of private company). Health and environmental risks related to improper disposal are not acknowledged. Awareness was described to be typically confined to individuals already working in or associated with the environmental management sector. Citizens are generally unaware of the hazardous nature of improperly stored e-waste, often keeping potentially dangerous items such as batteries at home due to ignorance of the risks involved.

> *"If environmental issues are a priority, we should be able to make a lot more noise on some of these things... A lot of our parliamentarians would not even appreciate what e-waste is."* (IO - Advisor)

Concerning current awareness efforts and the role of government in promoting the topic, the results show that efforts remain insufficient in scale and reach, even if some campaigns exist (e.g. Lead Awareness Week). National prioritization of the problem and even integration of e-waste education into school curricula was suggested by stakeholders representing NGOs, an international organization and a private stakeholder. Answering the interviewer's question, awareness was also related to the media attention on the Agbogbloshie scrapyard before 2021, and it was highlighted that international media portrayed the problem more than media outlets in Ghana.

> *"I would say, even Agbogbloshie, it was a bigger topic in Germany than it was in Ghana."* (Academia - Professor)

5.1.3.2. Perception of value and monetary incentives

> *"People really think that there's this big value, but it's really your trash... Normally, you will pay me to collect trash, but when it comes to e-waste, you suddenly think, I need to be paid for this."* (Director of private company)

As this quote by a private stakeholder points out, citizens have adopted the perception that e-waste has a monetary value, shaping reluctance to freely discard electronic items. The expectation of a value of e-waste compared to other waste can also be related to e-waste as a source of precious metals, hence, not only the end but also the beginning of a value chain, having considerable residual value. Despite the fact that other wastes are also recycled when collected (e.g., paper for recycling), citizens expect significant financial incentives to part with their electronic waste. Stakeholders from the private sector have indicated that higher incentives could substantially increase participation in formal collection programs.

> *"Even if people are coming to us, the price that we are paying them is not huge... It would encourage a lot more people to bring their items to us if the price would be more attractive."* (Director of private company)

5.1.3.3. Non-monetary incentives

Further, several stakeholders discussed using non-monetary incentives, such as convenience in the reachability of collection centers, generally improved collection infrastructure, or even small non-monetary rewards at collection points, to promote participation. These ideas were expressed by the governmental stakeholders and by the governmental collection center, both referring to the efforts of EPA to shift away from monetary incentives only. The awareness of these stakeholders, also about the sustainability and the financial fragility of current donor-dependent mechanisms, serves here as a baseline of their reasoning.

> *"We cannot police every aspect of our life, but we can use incentives to police ourselves... eventually, we have to look at how we put some non-monetary incentives also."* (Consultant to the government)

Self-regulation and personal responsibility as a goal of behavior change interventions were strongly expressed by two stakeholders, one advising the government and one from academia. Compared to the internalized motivation behavior of European citizens, the stakeholders expressed that changing the social norms of citizens would serve as the most effective baseline for sustainable improvement of e-waste management. However, current social norms and culture were mentioned by the stakeholders representing academia to hinder adherence and the internalization of new norms. On the contrary, one stakeholder representing a collection center strongly expresses a belief in intrinsic environmental expectations from the citizens, suggesting that Ghanaians inherently desire a clean environment despite low awareness.

Photo 9 *Prototype of e-waste collection point for citizens*

5.2. Transition to dynamics: Presentation of different actors in the e-waste sector in Ghana and their impact on environmental and health policy

After presenting the results that complete the picture of what the e-waste sector in Ghana looks like and what some of its main challenges are, we can now transition to the presentation of results on the dynamics between stakeholders concerned with the health and environmental policies of the informal Ghanaian e-waste sector.

Fig. ***5*** displays interactions among stakeholder hierarchies with the policy landscape, ultimately impacting the environment of workers and the health or ill health of workers and communities.

When mapping the actors and their hierarchies involved in the implementation of the new governance approach for the informal sector, Ghanaian political actors were identified as being at the top level of the pyramid. The related authority, EPA, along with the governmental project implementation unit, MESTI-PIU, follows. Implementing agencies, such as the German development agency GIZ, MRI, the NGO GreenAd, or Sustainable Recycling Industries (SRI)[1], are beneath these governmental authorities. The collectors and communities are hierarchically at the bottom of this pyramid; their health and surrounding environment are impacted by the layers of stakeholders above them. Associations include workers and individuals well-connected to implementing agencies or governmental actors. Likewise, local authorities, such as the metropolitan, municipal, and district assemblies (MMDAs), are described as essential stakeholders that both include and impact individuals, and vice versa. However, MMDAs and the associations are not yet sufficiently established or included in the policy processes. Stakeholders have voiced that to develop a long-term, sustainable interaction and representative system that is less dependent on donors, both financially and in terms of governance, these two entities play a major role.

[1] **GIZ** – GIZ acts as an intermediary and capacity-building partner in Ghana's e-waste sector, bridging governmental actors such as MEST and the EPA with informal sector associations through training, policy development, and project coordination. It supports systemic integration by facilitating cooperation across institutional levels and stakeholder groups, including local governments, recyclers, and international partners.

Green Advocacy Ghana (GreenAd) – GreenAd operates as a NGO within the e-waste collection infrastructure, coordinating a national network of collectors and serving as an intermediary between informal collectors and centralized collection points. Positioned beneath regulatory and financing bodies, GreenAd contributes to the operational implementation of Ghana's e-waste management system by facilitating material recovery and linking grassroots collection efforts to the new appraoch. GreenAd runs, e.g., a collection center providing incentives for cable collection.

MRI (Mountain Research Institute) – MRI functions as a Ghanaian consultancy bridging environmental research with implementation, supporting both government and international partners in designing sustainable circular economy solutions. Positioned as a technical intermediary, MRI connects with both policy actors and informal sector representatives, contributing to the participatory integration of worker perspectives in regulatory reforms.

Sustainable Recycling Industries (SRI) – The Sustainable Recycling Industries (SRI) initiative supports national efforts to improve e-waste recycling through pilot projects and capacity building, implemented in collaboration with the Ghana National Cleaner Production Centre, Sofies, and the Oeko Institute. The initiative works in coordination with the Ministry of Environment, Science, Technology and Innovation and the Environmental Protection Agency to advance sustainable recycling practices.

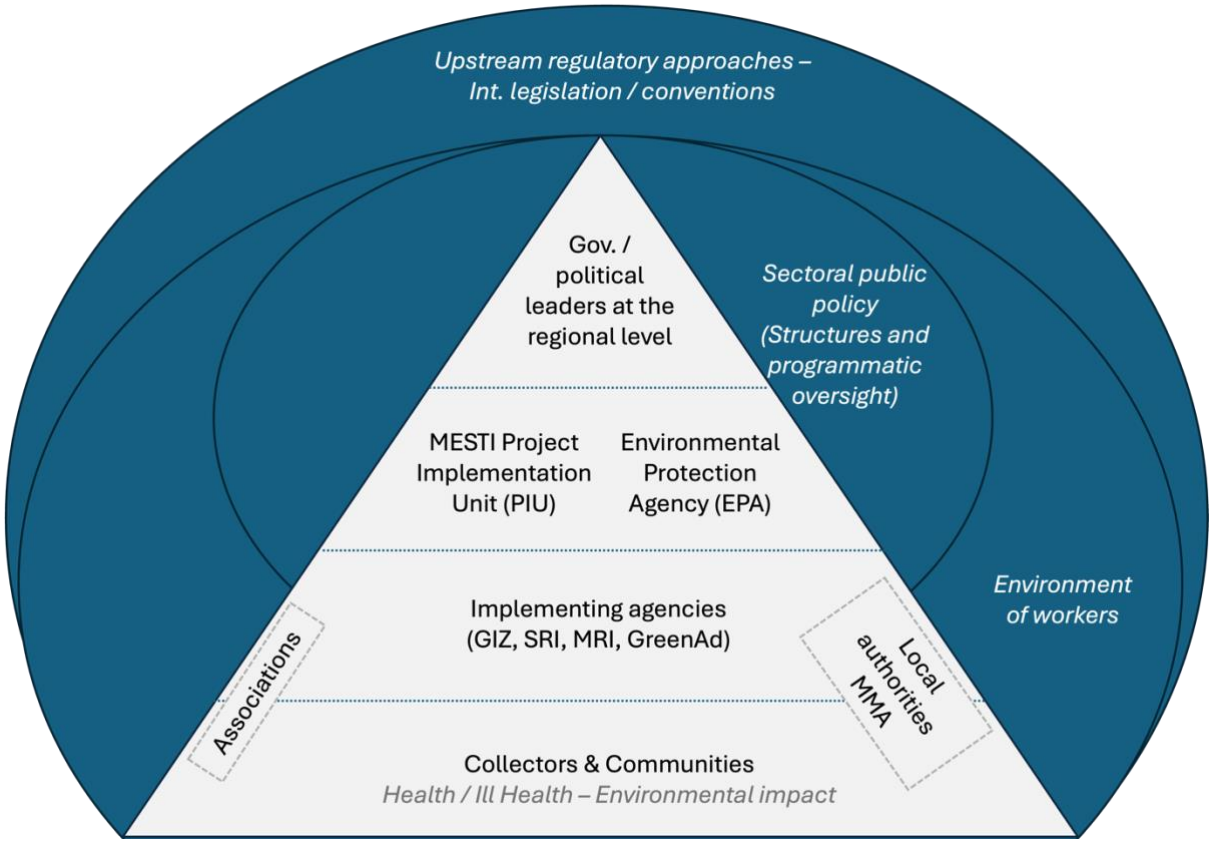

Fig. 5. Mapping actors and hierarchies in the Ghanaian e-waste sector

Source: Own compilation

Analysis shows that these stakeholders act on and are influenced by different levels of policy. Upstream regulatory approaches (international legislation and conventions) significantly shape the policy landscape in the e-waste sector in Ghana. National legislation is influenced by the requirements set in international legislation (e.g., the Basel Convention and its translation into Act 1124). Specific sectoral public policy in Ghana is largely affected by the interactions between implementing agencies and governmental stakeholders at higher levels. The formulation of policy and programmatic oversight is shared between the EPA and MESTI-PIU, respectively. The environment of collectors and communities is influenced by both upstream regulatory and sectoral public policy. The policy approaches are shaped by narratives and political factors, as the destruction of Agbogbloshie in 2021 and its consequences highlight.

5.2.1. Agbogbloshie 2021, 2025, and beyond

5.2.1.1. Current situation in the Agbogbloshie scrapyard

During the researchers stay in Accra in February 2025, scrap workers started returning to the Agbogbloshie scrapyard, which was dissolved in 2021, following a change in political administration: The political party previously in government, the New Patriotic Party (NPP),

was replaced by the National Democratic Congress (NDC) following the elections in December 2024. As NPP oversaw the scrapyard destruction in 2021, workers now decided to put their workplaces back up and are returning to the site, located in central Accra, as explained by stakeholders representing the workers' associations. The plan of NPP to build a hospital in the area after 2021 was not followed through. In the two weeks that the researcher was in Ghana, most stakeholders that she interacted with had just learned about the return of workers themselves. The situation was dynamically progressing within these two weeks. One stakeholder, an agent who is well-connected to the informal sector, was concerned about the uncertainty of developments in the area.

> *"You could see that the pollution has been distributed in the whole city. And the politician never thought that was a consequence, but it's a, it was a huge consequence to the environment. (...) Maybe when we get there, we'll try to understand what is under exactly is going on. Because if they should go back without any regulations, without any proper memorandum of understanding, they may intend to do the same as it was before."* (Agent)

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Photo 10 *Scraping and burning activities in Old Fadama and Agbogbloshie, March 2025*

The destruction of the Agbogbloshie scrapyard in 2021 had unintended consequences, such as pollution from scrap activities dispersing widely across Accra, spreading environmental hazards, and worsening regulatory challenges, as highlighted in the quote from the interview with the agent above. The relocation to the old scrapyard, however, implies the risk of a return

to a centralized yard with hazardous practices negatively impacting health and the environment, as no structures to control activities were established in the area, and the risk of an "uncontrolled" return of workers is high, as all stakeholders voiced. Nevertheless, individuals returning to the site bring along easier regulation of the workers. A governmental stakeholder stated that the recent developments make them "*hopeful that togetherness will be back. Which will make work easier, and it will make it easy to manage their activities*" (Officer at the government). Despite this potential positive impact on sector management, the return uncovers potential tensions. Following this movement, territorial conflicts concerning the scrapyard become evident, analyzing the interview results. Whilst some workers are trying to resettle in Agbogbloshie, another group of workers had tried to secure a different territory by themselves, moving to Teacher Mante in the north of Accra first. After realizing that the new area was too far away for workers, these workers are now planning to start activities in Mallam Market, an area in the west of Accra: "*We all agreed that Teacher Mante is far, but now we have also gotten a place at Mallam Market, which is where we are also working*" (Secretary of Association_2). Whilst one interview partner from an NGO was describing that the ownership of the land at Agbogbloshie is not clear and traditional rulers may claim the land for themselves, members of the different associations were highlighting that the land is legally acquired under the National Youth Authority (NYA), whilst others stated that there is no legal ownership, explaining that this question of land ownership and territorial control "*becomes a battle. It can get so tough that you need military presence to actually douse the flames. So, we are actually sitting on a ticking time bomb*" (NGO - Project manager). The unintended consequences of the destruction in 2021 bring along varying views on the policy action of the stakeholders interviewed.

5.2.1.2. Stakeholders' perspectives on the demolition

> *"I guess it depends on the metrics that you're measuring a failure with. So here the question is whether it was sustainable. I mean, if they are back again, then it has not been sustainable."* (IO - Specialist)

Results show that all stakeholders agree with the quote above, indicating that the policy action did not result in sustainable improvement of the informal sector work at Agbogbloshie. Views, however, diverge on the question of whether the policy action was necessary and executed with good intentions to resolve the issue in the first place. An argument brought up by the private and some of the non-governmental stakeholders confirmed that the action was necessary, as the policy action was moving back and forth for too long, trying to manage the sector without success and that the government *"really had good intentions, but it's always the delivery"* (Director of private company). Likewise, a member from one of the associations confirmed that "*the disruption was right, but it was not properly done. It was not properly done in the sense that they should have pre-informed us, get us a place, furnish the place*" (Secretary of Association_2). Consultants to the government explained that they believed that this policy action would result in an improvement of the environmental and health-related pollution problems of the sector. The necessity of the action was also justified by the view of the destruction as a needed display of governmental enforcement power, with positive

consequences on compliance with future regulations out of fear of recurring destruction today. Contrary to this argument, other agencies stated that the media display contributed to the perception of the situation as dire, that, however, the reality reflected another picture, claiming that if similar efforts, as those that were employed for the destruction, would have been employed for the enforcement of management regulation aiming for compliance, the effects may have been positive, resulting in sustainable change. One of the reasons for the destruction, hence, was identified to have been the media coverage and the image of a government that is finally enforcing regulations on an issue of pollution, which worries international stakeholders.

> *"So now that they are back, clearly EPA doesn't like to talk about this. It's actually a very sore point for them. I remember when the international community lit it up, they were embarrassed, because we are all based in Accra. How can you possibly not know what's going on to the point where it's on international media now?"* (Director of private company)

> *"I don't think it was so scary. There are places in Asia, in India. There are other places in Africa that are worse, also looking at the numbers of people. (...) if we would have really understood what was happening, we could have managed it to make some sort of profit out of it. It would have been to the advantage of the masses. (...) There are certain issues that need policy makers to say, we want to correct this. We have the mandate, we have the powers to correct it - and it will be corrected. You can't leave some of these things to the people for them to make their own decisions. (...) . If Agbogbloshie was not what they wanted and they could demolish the place, they could have as well regulated the activities at the sites. If you have the powers to demolish it, you could have used the same powers to say that, okay, stop burning, we are putting soldiers, like you put soldiers there for three weeks, one month to make sure. It's really about management. Understanding the problem and finding the right solutions to it. It's not that crazy. It's manageable. It can be done."* (IO - Advisor)

Reactions to the demolition, the following dispersion, and the workers' return to Agbogbloshie were analyzed. It was described that following the demolition, workers displayed anger and frustration against the governmental stakeholders, claiming non-understanding of the field and non-recognition of the workers' contributions to a functioning system of e-waste management, including fiscal gains for the country's economy: *"That is where we felt that our rights have been trampled upon by the government. The government should have come down to see the kind of work we are doing"* (Secretary of Association_1). Agencies were stepping in as mediators when conflicts emerged and tried to resolve tensions. The government, in the aftermath of the destruction, is vocal about the lessons learned from the consequences of the action and admits its failures. Notably, one of the priorities of the government's strategy for the management of the e-waste sector is now to also provide lessons learned for future processes.

> *"I think we've learned that every government takes decisions and whatever we do as a ministry, as people, we take some decisions. Some of them are good, others are not good. We still learn lessons."* (Officer at the government)

An association described that the governmental stakeholders are congratulating them for returning to the scrapyard in 2025, in line with the government's statement, hoping for better management of the sector once centralized. The minister visited Agbogbloshie in late February 2025. Asking for feedback from this meeting, the governmental stakeholder stated that the minister promised to establish a working group to address pricing concerns voiced by the workers. As the minister was not commenting on prohibiting the workers' return to the scrapyard, members of the associations read the political agreement regarding their recent resettlement. Likewise, a potential resettlement was used to gain political support during the elections in December 2024, as stated by a stakeholder from a local NGO.

> *"The government has not released any direct communication to that effect, however, some of them were promised by the people when they were going around, canvassing for votes that they would be permitted to go back. They didn't wait for them to come and say that, okay, now we have given you the permission: Go back. No, they just, once you won your elections, that means we've done our part of the bid, you are going to do your part of the bid."* (NGO - Project manager)

Whilst the previous approach of demolishing Agbogbloshie was described as an execution of a "*populist approach – 'Hey, let's use power'"* (NGO - Project manager), the NGO explains that this approach may *"once politics is read into it it's a complete failure before it even begun"* (NGO - Project manager). Looking ahead, all stakeholders voiced "hope" and a positive vision concerning the management of the sector following the change in government, nevertheless, the governmental stakeholders were highlighting that many challenges remain. The risk of prioritizing political power versus creating a discussion that includes all relevant stakeholders was voiced by an agent, however, highlighting the need to recognize the leadership in Agbogbloshie to effectively move ahead.

> *"I believe that when the ministry is able to bring all stakeholders on board, there could be some changes in terms of managing pollution in that area rather than to leave them to do their own thing because of political expediency. And I'm afraid it'll even be worse than it used to be." (Agent)*

5.3. Dynamics: Actors and decision-making

After giving the reader an overview of the state of the art of e-waste management in Ghana, this section of results presents the dynamics between stakeholders concerning policy making. These dynamics impact the priorities of policies and present the politics behind the policies that eventually affect the workers' health and environmental protection. Explicitly considering the above-explained return of workers to the Agbogbloshie area, and hence a failure of policy that was enforced in 2021, the change of dynamics and the identification of novel strategies following this policy failure are to be analyzed. The new policy approach currently being implemented in Ghana, and its potential success or failure, largely shapes and depends on these relations. On the one hand, this analysis aims to provide a detailed description of the social and political dynamics of policymaking following a policy failure. On the other hand, future

policies and implementation, as well as enforcement strategies, can be guided by these results. Dynamics are to be analyzed in terms of the stakeholders' relations towards each other, their strategies, and their main resources and assets in negotiations versus their needs. Stakeholders are divided into workers (middlemen and collectors), associations, implementing agencies, the governmental sector, and private companies. **Fig. 6** displayed at the end of this section, shows a scheme of actors and the relations between them, which become evident to the reader after reading the following section.

5.3.1. Workers (middlemen and collectors)

The **strategy** of collectors or middlemen is to make a business case for e-waste work, as explained by one of the collectors as well as the agent. The collector raised the concern that the government should not be concerned with the profit-making sector, the valuable extraction of the value chain, but rather concentrate on the non-profit-making aspects. The narrative that the collectors are the basis of the value chain and that their contribution to the economy should be valued was underscored. After the destruction of Agbogbloshie, some of the workers, hence, continued their business. Considering the changing government, these workers are now coming back to the scrapyard.

The **resources** of the workers that are identified to support their strategy are financial and network related. Some of the workers, especially middlemen, have a high income, supporting independence in decision-making. Income between workers, however, largely varies. Collectors ("boys") earn the least, whilst middlemen are reported to have very high incomes. Observations show that the network in which these workers interact relates to their ownership of the practice of e-waste management, as the networks sustain the functioning of the informal sector.

> *"I can tell you for a fact that the money that this information is getting, even the policymaker is not getting that kind of money. That one I can bet my life on it. The kind of money they make, as individuals."* (Agent)

A **need** for middlemen and collectors is to be represented in political decision-making. However, this need was voiced by the agent. In conversations with collectors, the need for participation was not specifically voiced. Specific needs were related to market issues, and questions on participation were related back to monetary issues. Needs expressed by middlemen and collectors centered around practice-related issues and concrete demands towards the improvement of the value chain: Increased profitability, stable pricing, and transportation were the main issues raised by the workers. Here, financial support from the government was voiced as a need by middlemen. In addition, territorial control is identified as a core need, as it serves as a basis for the functioning of the business.

Analyzing the **relations** of workers with other stakeholders, a trustful relationship with implementing agencies was observed during the field visits. Some level of existing trust was a condition regarding the setting in which the interviews and field visits took place, as the researcher was connected and introduced to the collectors by agencies. Trust was observed to be a result of the recognition and technical and financial support of these implementing

agencies. Further, the trust based on the relationship seemed fragile, and respect towards the worker was carefully upheld in all interactions (observation). The needs of the workers were seen by these agencies, whilst the interplay of agencies voicing workers' needs and workers voicing their own needs was not always clear (e.g., about participation or the need for government support to deal with negative fractions). Furthermore, the worker's relation to the private sector can be highlighted.

> *"…and they contract agents to do the collection for [a private export company[2]]. We work with the informal sector in terms of policy. When there's some issues with policy, we refer to EPA and then EPA gives the direction.*" (Agent)

The private companies that are contracting agents/middlemen to supply them with resources, either whole items or extracted metals, have a contractual relationship. A dependency of workers on the companies was identified through pricing power, whilst the middlemen and the informal sector supply the companies with the demanded materials. As also highlighted by the quote of the agent above, a relation to the governmental agencies does exist. Here, the hierarchies, correlating with income, define whether a connection to the agencies is established. Agents and middlemen can be included in governmental discussions, whilst boys remain excluded.

5.3.2. Associations

The interviews with three associations revealed insight into their strategies, needs, resources, and relations. Related to the strategy of the workers, the **strategy** of the associations builds upon the perspective on e-waste collection as a profession. The inclusion of this profession in the network of stakeholders that are discussing e-waste management is a key goal for the associations. Associations framed to cooperate with the government's demands of organizing the sector and presented themselves as an essential tool to achieve this aim. The strategies of the three associations included the emphasis on a positive and hopeful outlook following the change in government. Whilst they underscored that they had understood and adopted the government's needs for environmental and health protection, a bargaining situation of recognition versus compliance was created.

> *"Gradually, I can see that there is the notion that everybody has other parliament government institutions, private companies, individuals, NGOs, we all have the same idea: let us find the lasting solution to whatever is going on because it's harming our health. (…) The minister was there. We received him. He mentioned some of these problems that I was mentioning because they are the Ministry of Environment, the concerns that they have is burning, the smoke into the atmosphere and then handling the negative fractions. They mentioned all these things, and we had a very good dialogue with them. And then we have also given them assurance that we also will do our best. (…) Yes, we have hope in the new government because even with what we did coming to the scrapyard, the government has never said: "look, my friend, you are not*

[2] Company name is replaced by "a private export company" for anonymization purposes.

supposed to be there." They've told us to calm down. They are coming to listen to us." (Secretary of Association_1)

This quote reveals and relates to the **need** of the associations for territory. The different associations have different territories in mind that they aim to claim for themselves. The need for the stability of a future workplace was voiced in this regard, relating to the demolition in 2021.

> *"Oh, yes. I see hope coming because in the future we will be close to Mallam Market. We want to make that place a standard scrap yard. That is what we are working on now. We felt that when we come back here, the activities are going to be the same, if the activities are going to be the same, we are going to face the same eviction, if we don't change our attitude."* (Secretary of Association_2)

In line with the need for land, the need for recognition is a key perspective given by the associations, as described in the quote below this paragraph. This point was also related to the need for the enforcement of rules by public authorities, as a secretary from an association voiced that "*there must be discipline. (...) We must have rules. Either the ministry and us; we put up something together"* (Secretary of Association_1). Being recognized, hence, comes along with labor protection, such as the enforcement of rules. Recognition also brings along a representation of the associations when designing policy to reinforce the acknowledgment of these and other needs. Furthermore, the associations voiced that they require training that can trickle down to communities, recognizing their role of providing workshops on occupational health and safety and environmental protection, motivated by monetary incentives. Specifically relating to the e-waste value chain, the need for stable pricing and governmental assistance to deal with the negative fractions was voiced, in line with what workers stated.

> *"The government didn't take the time to look into it. That is where we felt that our rights had been trampled upon. The government should have come down to see the kind of work we are doing. (...) You can't say the government doesn't earn anything through the exports. But they don't want to come down to know or to formalize what we are doing. That is their problem. They only see the pollution. But what are we polluting for? They're not taking time to take a look at what we are doing. That's the problem that we have with the government."* (Secretary of Association_2)

A recurring and main **resource** of the associations interviewed was related to their membership, aiming to communicate to the agencies and governmental stakeholders as a group. As implementing agencies are supporting associations and as mentioned, legitimacy is given to political engagement of the workforce through these entities, an active membership is at the same time a key need.

> *"Mainly, it's all the scrub dealers coming under one umbrella. To get one mouth to speak whenever there is something we want to communicate to the government or to the municipal office"* (Secretary of Association_3)

To workers, these associations offer protection and a voice, especially pronounced in dealing with legal issues and interaction with the police, as these associations describe as stepping in and defending workers' rights. Based on the researcher's observations, it can be hypothesized that the leaders of the associations are key, charismatic figures that can also be related to leadership structures within the Muslim culture, potentially providing a resource for community leadership and connection to the workers. Further investigation of hierarchies and leadership in associations, in line with Lyon (2006), is needed to confirm this result. The ongoing recognition of agencies and, hence, the government of these associations further puts the entities in a position in which their demands are systematically considered. Lastly, associations provide valuable information on and a connection to workers that are of interest to institutional and governmental stakeholders, increasing the potential effectiveness of health and environmental policy interventions and avoiding resistance to interventions as observed in Agbogbloshie in 2025.

Similar to the collectors, a predominantly trustful and collaborative **relationship** with implementing agencies exists. The associations recognize the usefulness of the training provided by some of these agencies and express the need that these should be continued. These agencies are used as communication channels for workers' needs when the agencies interact with their respective stakeholders. Here, the roles of key individuals within these agencies are highlighted as particularly significant. The relationships between different associations are marked by rivalry over territory and political interaction based on recognition. Interactions with political leaders are influenced by previous experiences and need reestablishment under the current government, creating a mixture of hope and disappointment among association members. Internally, associations face challenges convincing their workers of the value of organized participation, as many struggle to appreciate membership.

5.3.3. Implementing agencies

Creating a network and strengthening this system is part of the **strategy** of the implementing agencies that are identified as crucial intermediaries. Their role in this system is determined by the trust that workers hold towards them, and vice-versa, which is aimed to be kept up through careful and thoughtful interaction, whilst staying somewhat external and in a way neutral, whilst, paradoxically, being this crucial stakeholder.

> *"It begins with somebody. And we really have to identify that somebody. (…) Systems must work. I don't believe in individuals holding things to themselves. If the systems are working, I think we should be fine."* (IO - Advisor)

Two stakeholders from consulting agencies mentioned the role of presentation and media, presenting the issue of e-waste, specifically Agbogbloshie. The impact on the sector's (global) perception and related support of and attention to the issue is and has been largely determined by this portrayal as voiced by a stakeholder from an international organization. The implementing agencies demanded a nuanced view, also incorporating the progress of their strategies and efforts, hinting, also here to a strategy based on the images of positive progress instead of despair, as this statement by a consultant to the government pointed out "*What*

prevents us from picking up the two stories and comparing them?" (Consultant to the government).

The agencies voiced specific **needs** in relation to the incentive-based collection system that is currently being implemented, referring to financing options that counteract the current dependency on donor funding, suggesting public-private partnerships, and efficient use of resources. Implementing agencies provide information for policymakers, as described by the consultant below, whilst collaborating and being connected to workers and associations, providing capacity training, which are both key **resources**.

> *"The ministry wants to make policy decisions, so they will need information that they can use to make the policy decisions."* (Consultant to the government)

They hold financing and connections to international partners as an asset and, hence, also often keep close network connections beyond the national e-waste management system. As some of these agencies are themselves related to international partners, agendas are influenced by these international priorities. Further, industrial and international organizations such as United Nations Industrial Development Organisation (UNIDO)[3] and Suame Magazine Industrial Development Organization (SMIDO)[4] were identified as partners. On a national level, the public development partners are crucial **relations** (e.g., MEST, EPA, NYA, Ghana Health Services). Likewise, relations to the local government departments exist, as it is part of the programs to resource and equip these structures. As described earlier, clear relations to the informal sector can be identified. Associations are aimed at being developed to ensure the acceptability of future policy. Interaction between agencies and associations appears reciprocal, as the informal sector's priorities are impacted by the agencies' visions and vice versa. Currently, collectors (mainly individuals) are well connected through direct collection involvement and interaction with the facilities set up or supported by agencies. Interviews highlight again that the individuals in the network of e-waste management, specifically in these implementing agencies, matter, as trust between stakeholders remains a scarce resource.

5.3.4. Private companies

Only one private company was included in the analysis, and the results presented hence only provide a snapshot and one angle to a much more diverse picture. The private company stated to focus on transparency and compliance of agents in the private sector it works with. The focus of the sector's **strategy** here was framed to be on the integration of the workers into the system rather than formalization. Integration, in the words of the private sector, is based on the legal requirements that the companies set, which are, in turn, impacted by the international partner companies.

[3] The United Nations Industrial Development Organization (UNIDO) provided key funding for the interagency initiative, supporting collaborative efforts between government institutions and NGOs to address pollution and public health challenges. (Explained in interview with NGO - Country director)

[4] The Suame Magazine Industrial Development Organization (SMIDO), based in the industrial hub of Kumasi, plays a pivotal role in Ghana's manufacturing sector. As one of the largest industrial organizations in the country, SMIDO also serves as a regional economic node, attracting cross-border trade and collaboration from neighboring West African countries. (Explained in interview with IO - Advisor)

"They have contracts with us. Through these contracts, they understand that you are supposed to work in a manner that is not against human rights. All those things are because people do have child pickers for the phones from the landfills. So those types of things are out. They also understand that if it's illegal, we don't want to be part of it. (...) We are always abreast with the rules and all that." (Director of private company)

The key **needs** of the company are market-related, as they focus on a consistent volume of supply. To further develop the private sector in Ghana, such as recycling companies, and reduce exports of whole items, policy and government support would be required, ensuring openness to public-private collaborations. The private company stated that it has enforcement and compliance power over the workers, as the latter need to comply with their contracts. Another **resource** is the company's capacity to navigate the bureaucratic processes required for exports and compliance. The companies are on the demand side in relation to the informal sector and on the supply side in relation to international recycling companies in other countries. Their **relations** are established with agents or middlemen who are directly connected to the informal sector. Considering the relations with international partners, the private stakeholder mentioned a lack of trust when working with local partners and a preference for global engagement.

"For us to work with each other here, there's very little trust. That's the sad part. It's where you would find us making connections with international partners but not with each other." (Director of private company)

Following this statement, it can be said that the strategies of the government and the strategy of the private partners did not always align, as the private partner relies on their model for the collection and direct export, as stated by the company: *"They weren't too hooked on the idea of exports, to be honest. I know with EPA that the goal would be to figure out how do we make this work here?"* (Director of private company).

5.3.5. Government / Political leaders

The governmental sector now focuses its **strategy** on cooperation and diplomatic engagement with the informal sector, whereby the advisors are admitting the mistakes of the previous administration, aiming to develop lessons learned from policy failures.

"Possibly, if we had paid attention and looked at how best we can support them to move away, possibly, we might have made a lot more positive impacts than fully just evicting everybody or moving everybody to then only wait for them coming back to the same place." (Consultant to the government)

The communication was perceived to be clear and humble. Multistakeholder approaches were emphasized for designing policy as well as for sharing responsibility. Enforcement was recognized as another key aspect of the government's strategy to manage the sector. Here, an association secretary voiced an interesting point that before the destruction of Agbogbloshie, informal workers did not take the demands of the government seriously. Now, as the associations highlighted, the workers understand what the potential consequences of non-

compliance could be. Hypothetically, this awareness could contribute to adherence. However, this remains to be explored in future research.

> *"As for the government, what they told us was that our activities were not in line with EPA. The burning, pouring of acid on the ground, and then pouring of oil on the floor and whatever. So they felt that we were not doing the right thing. They came several times, but people didn't take them seriously until the demolition."* (Association)

In addition to minimizing negative environmental effects and transitioning most polluting activities to the formal sector, the government's priorities include avoiding intervention in job losses, developing pricing mechanisms, and strengthening local companies along with the Ghanaian economy. Health consequences have been emphasized regarding environmental health and pollution.

The governmental stakeholders **need** information and an understanding of the sector, time to develop and implement policy, as well as financing to sustain projects. In terms of **resources**, the government has set up the E-Waste Fund and can mainly provide regulatory and enforcement-related tools. Regulation can, e.g., force the middlemen or companies into compliance, as *"if you are not registered in one way or the other. You can't get your collected materials to the next level."* (Officer at the government). The governmental stakeholders established **relations** with the donors and financing agencies of the sector, e.g., GIZ, KFW, or the World Bank. Implementing agencies then receive funding, often in return for information or policy advice. International legislation is a foundation for national legislation, as Ghanaian policies align carefully with international conventions without significantly deviating or contradicting them, as explained by a non-governmental actor who is advising government work.

> *"We have put together our policies in line with some of these international conventions. Not adversely deviating, but we are toeing those lines. It's such that these financing mechanisms we are talking about, they stay at the top"* (NGO - Project manager)

The relations of the government to the collectors and the associations are being established and are part of the multi-stakeholder approach and the new approach to regulating the informal sector. The recent dialogue with the Minister of Environment demonstrates a commitment to acknowledging stakeholders' contributions and concerns.

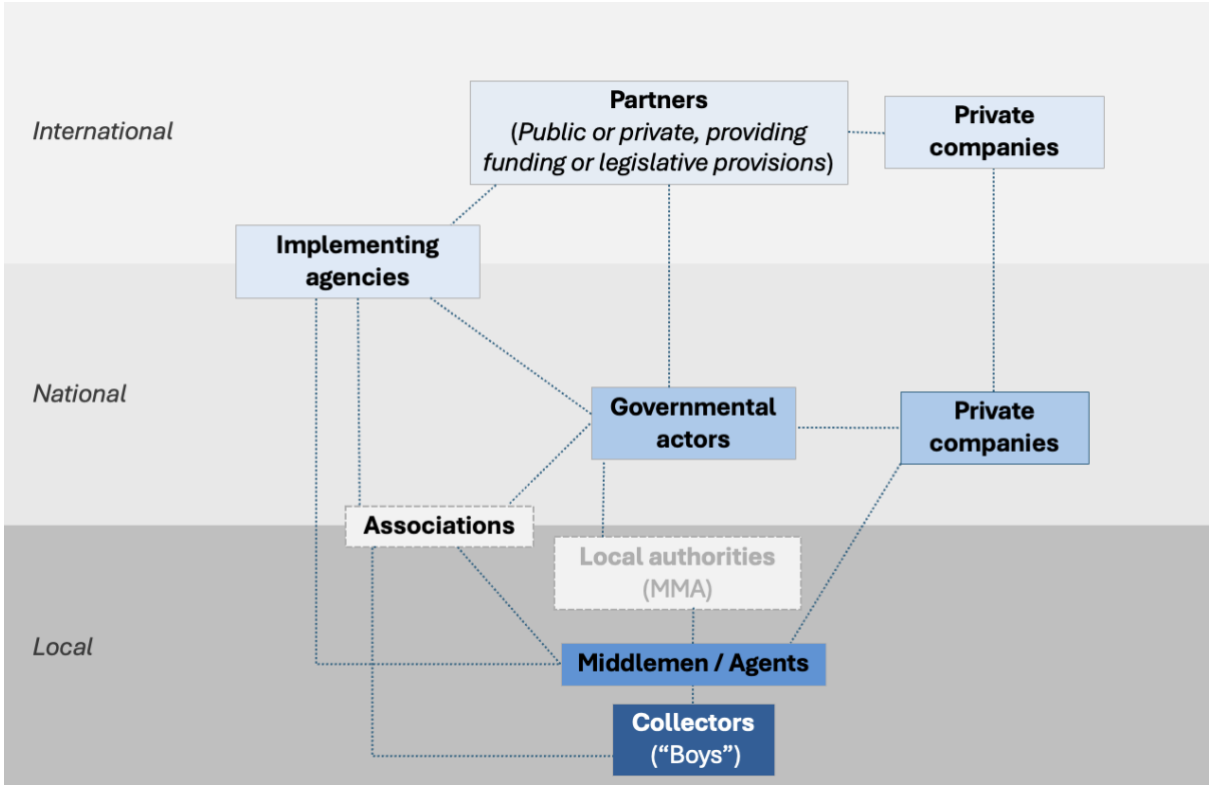

Fig. 6. Scheme of actors and relations

Source: Own compilation

6. Discussion

This study demonstrates how health and environmental outcomes in Ghana's e-waste sector are deeply embedded in political decisions and stakeholder power dynamics. Using the case of Agbogbloshie, it illustrates that a complex multipolar health crisis – shaped by informal labor, environmental degradation, and governance practices – cannot be resolved through top-down interventions alone. The analysis highlights three main findings.

First, following the demolition of Agbogbloshie in 2021, workers are resettling in the scrapyard after a change in government in December 2024. This return highlights the unintended consequences and limited sustainability of the 2021 demolition, revealing critical governance failures such as inadequate stakeholder engagement and insufficient provision of alternative workspaces. While centralizing activities after resettlement may improve management potential, unresolved territorial conflicts and unclear land rights pose significant risks for future tensions.

Second, beyond Agbogbloshie, the Ghanaian government and funding partners aim to organize the e-waste sector by implementing an incentive-based system for the negative fractions, the non-valuable material that remains after the extraction of valuable parts. These parts are often burned, polluting the environment and negatively affecting health. The incentive-based approach faces ongoing difficulties due to its reliance on donor funding and

the lack of effective, long-term, sustainable financing options. Despite these challenges, the new approach presents an example of potential transformative change in the sector.

Third, stakeholders recognize that this change must continuously include workers' voices and priorities to gain acceptance. As part of this transition, the implementing agencies advocate for strengthening associations and metropolitan municipal district assemblies to ensure they are actively involved in sector regulation. By highlighting the relations among current stakeholders that may influence the success – or failure – of policy models, this study demonstrates that implementing consulting agencies, such as GIZ or MRI, connect both to workers (through middlemen and associations) and government actors. Additionally, the private stakeholders' contractual relationship with middlemen offers an opportunity for international standards to be disseminated. If implemented effectively, these governance structures could mitigate environmental pollution and enhance workers' health.

6.1. Placement in the literature

This study derives implications for future policy and negotiations from its theoretical framework on power relations. These insights help explain why the destruction of Agbogbloshie failed to produce sustainable change. For the transition to lead to sustainable change and positive health outcomes, power relations are restructured, as is the case in the multi-stakeholder policy landscape in Ghana. A system of interdependent actors is reinforced that balances autonomy and control: the autonomy of workers by the informal sector and the control of environmental impacts by governmental stakeholders. Associations and implementing agencies serve as intermediaries that can help buffer potential conflict between these groups. However, as Fleming & Spicer (2014) argue, participatory structures may be manipulated by those designing them. In this case, implementing agencies and advisors often select the actors who participate, shaping the governance structure in line with their own agendas. The advisors and implementing agencies are steering the wheel of constructing this network, and media and international perceptions influence their priorities. Private stakeholders present an additional actor and relation that is embedded in both regulatory and business rules, leaving room for potential impact on the sector.

The balance between control and autonomy has been challenged by a coercive approach to power in 2021. The workers, whose autonomy was threatened by the destruction of a key resource, territory, resisted and returned to the lands, reasserting their agency. The interdiction of working in the scrapyard created awareness of the government's willingness to enforce regulation, which can, according to interview partners and Clegg (1989), trigger adherence to future policy, as such coercive interventions can paradoxically strengthen the role of the state by signaling its capacity to enforce rules. This coercive tactic increased the significance of the government for the informal sector.

Following this coercive episode, governance strategies shifted toward more indirect and enabling forms of power. The somewhat surprising change of strategy by governmental stakeholders, implementing agencies, and associations to endorse the positive and hopeful future of the policy landscape aligns with Clegg's (1989) concept of "disciplining through enabling action". While the long-term effects of combining coercion, fear, and manipulation

remain uncertain, these tools can serve as complementary components of disciplinary governance in a sociological sense. Through the domination of government actors and implementing agencies, the value of environmental protection can trickle down to associations and e-waste workers. Implementing agencies adopt and communicate their goals as advisory agents to some of the government actors, whilst, vice versa, government actors transfer their priorities to the agencies, who are the link to associations and middlemen. Their priorities are co-constructed through international influence and domestic policy goals. These dynamics offer potential not only for stakeholder mediation but also for the dissemination of environmental values and livelihood concerns across the sector.

However, the success of the policy of implementing agencies is dependent on the workers' compliance. The multistakeholder approach requires certain dynamics of trust to reach positive health outcomes, especially because regulation is insufficiently enforced. First, trust between implementing agencies and associations must be fostered; second, associations must gain the trust of workers, which remains insufficient. This confirms Acheampong & Okorley (2024), who describe that trust and collaborative approaches are necessary to foster acceptance of environmental policy. Drawing on Grin (2010) and Lyon (2006), trust is especially fragile in informal contexts and must be actively cultivated to create a functioning network approach to organization. Many workers still feel betrayed by government actors, a residue of the 2021 demolition. Some collectors and middlemen report a loss of trust in the policy process, diverging from official association representatives[5]. These dynamics confirm earlier findings on legitimacy gaps (Manhart et al., 2020; Lebbie et al., 2021; Abalansa et al., 2021) and Clegg's (1989) observation that trust is shaped by past experience. To foster this confidence between stakeholders, repeated and reciprocal action is necessary, implying long-term thinking and a sustainability of interaction. While resistance remains a risk, it may also contribute to a change in the policy landscape in one direction, especially when other public counter-voices are rare. Social acceptance is essential for legitimacy and policy success (Köhler et al., 2019). However, in this case, the unawareness of the issue by a large part of Ghanaian society can allow worker resistance to go unchecked and the state to avoid accountability. The challenge lies in balancing short-term political interests that hinder public engagement with the broader goal of societal transformation, where environmental norms become internalized and widely accepted.

The effectiveness of policy interventions aimed at organizing the informal e-waste sector depends on a bargain between workers' *compliance* and their *recognition*, as well as between *environmental protection* and access to *territory* or *income*. Currently, e-waste workers hold the resources – materials that are ultimately demanded in the circular economy's value chains – acting as agents of production. Signification would increase workers' power; however, while workers demand professional recognition, not all seem willing to engage in established participatory structures, which are key to the approach to organization (Köhler et al., 2019). For workers, recognition does not necessarily equate to political participation; instead, their inclusion relates mainly to market-based interests (e. g., pricing, transportation, territory). Here, both environmental goals and democratic legitimacy appear increasingly tied to monetary

[5] The finding that some collectors and middlemen lost trust into policy processes provides room for future research and cannot be considered representative opinion of these actors per-se. It is key to understand factors that impact why collectors and middlemen loose or gain trust in the policy process to then thoroughly discuss these.

incentives. Abalansa et al. (2021) report on the e-waste management hierarchy related to monthly income, differentiating between collectors, dismantlers, middlemen, and chairmen, and power increasing with income, average income varying from USD91 to USD1300 a month. The authors describe increased power with increased income, hinting towards a correlation of income and decision autonomy and control over actors, which was confirmed by the results of the interviews performed for this study. This implies that the incentives and approaches to reach the various types of informal workers may differ[6]. Furthermore, joining associations is often motivated more by the desire for social protection, stable income, and territorial control than by the impact on the legitimacy of political decisions (Lyon, 2006). While signification seems to be an important factor, confirming Clegg (1989), the relations established between associations and workers, as well as between associations and implementing agencies, extend recognition and market-based needs: The bargaining chip of *information* can serve as a valuable resource, flowing from downstream to upstream (from worker to association to implementing agency to government). In return, *rules* (policy) are ideally shaped by this information. When evaluating the effectiveness of a policy, if the exchange of information is obstructed, the implemented rules may fail to exert power, as the legitimacy of the actions is not established, mirroring Foucault's insights on the limits of rule-based authority. In such situations, established rules can become an impediment to power, allowing actors to operate independently of the organized system.

The potential to shift to the organized sector through connections to private actors is high, as this sector responds to financial needs as well as the agency of the workers. Both actors follow the strategic interest to see e-waste as a "business case". The environmental and health protection is incorporated into this narrative by the demand side, international companies. The inclusion of the informal sector into value chains of the private sector bears the risk of overshadowing environmental priorities, but also holds the opportunity for standards to trickle down. The recognition of workers as an essential and legitimate part of the e-waste value chain brings along an opportunity for indirect compliance with the requirements set through routinization and legislation, both prominent when collaborating with middlemen and agents, in line with Clegg (1989). As described above, however, the downstream workers, "boys", are often not affected by these rules and, hence, are not included in these indirect organizational approaches. Recognition structures to potentially include the boys are being set up with the MMDAs and associations, aligning with ILO recommendations (2019), increasing the legitimacy of policy action, potentially impacting downstream workers. A recent political visit to Agbogbloshie and engagement with association leaders revealed that government officials and intermediaries are at the top of the hierarchy. Still, the path toward integration requires ongoing negotiation. Workers' willingness to transition toward the organized sector depends on whether their concrete needs – especially income stability and territorial rights – are met. Nevertheless, beyond these capital resources of income and territory that Clegg (1989) insists on, the informal e-waste workers' network is a strong counteracting factor of workers'

[6] The concept of *power* lacks to be further defined in the study by Abalansa et al. (2021). Future research on the needs, relations, strategies and resources of the different actors of the informal sector can provide further insights into incentives to be provided to the different actors, possibly linked to income, to increase the membership and legitimacy of associations.

necessity to adhere to other structures provided. The integration of workers into the value chains steered by private stakeholders could contribute to circumventing participation in the organized approach. Public-private collaboration and support of the private sector for these set-up structures could contribute to the creation of a necessity for the functioning of this systematic approach. Hence, cultivating this willingness will require more than regulation; it demands a constant renegotiation of trust and resources.

The systemic approach to organizing the e-waste sector could positively impact the health of communities and scrap workers. However, it lacks acknowledgment of the multipolarity of health hazards that workers and communities confront. The main aim of the system is to handle associated plastics, as the primary goal of stakeholders involved in its design is environmental protection and the reduction of the "burning" of plastics, thereby reducing air pollution. Air pollution is a significant risk factor and determinant of ill health in LMICs (Fuller et al., 2022). Yet, the health risks of e-waste work extend far beyond this. They arise from structural conditions: hazardous informal labor, the overlap of work and living spaces, and insufficient access to health insurance or care (Heacock et al., 2018; Parvez et al., 2021). In its current design, the system treats health risks as environmental byproducts rather than as structural conditions rooted in informality and poverty. As a public health measure targeting the entire population, the health of e-waste workers is not systematically addressed. Acknowledging informal workers as contributors to the national economy necessitates recognizing their rights to occupational and environmental health protections. The significance of systemic integration for achieving health outcomes can be supported by a Foucauldian perspective on power as embedded within systems and structures. In the context of e-waste governance in Ghana, this underscores the limited capacity of individual actors to generate lasting positive change in isolation. Instead, sustainable impact depends on collective integration and systemic regulation, which can discipline practices and align behavior. Such a shift would move the system beyond harm mitigation toward structural transformation, reducing exploitation while safeguarding health.

The dominant narrative surrounding Ghana's e-waste sector is increasingly framed in terms of entrepreneurship and economic opportunity. Recognition of the sector as a contributor to the national economy reinforces this shift. Contradicting the aforementioned positive impacts on health of a systematic multi-stakeholder approach, the potential for positive health impacts through a Foucauldian framework is challenged, as the underlying discourse on entrepreneurship can diminish health and prioritize market inclusion. This corresponds to the view of underlying narratives that shape health impacts, as described by Gilmore et al. (2023). The authors illustrate in their framework how these ideas can influence all layers of policy that affect individuals' health. Narratives determine who benefits and who bears the burden (Köhler et al., 2019). Circular systems primarily designed around the narrative of profit, hence, miss the target of environmental protection (Anantharaman, 2021). As outlined by Andeobu et al. (2023), the informal sector faces challenges in being integrated into organized systems. In this study, we observed that middlemen are becoming part of this system and are affected by policy changes; however, the impact on those eventually collecting and dismantling remains to be seen. When adopting an entrepreneurial mindset, making a business case for e-waste, it is, despite the sector's potential, imperative not to overlook the underlying problems related to e-

waste and its hazardous collection and recycling processes, as well as the impact it has on communities through environmental pollution. Incorporating this discourse opens up the possibility for a transformative shift toward both economic inclusion and health protection.

6.2. Limitations

The study has several limitations. The study aims to explore the subject by exploring various perspectives. It must be acknowledged that with the limited number of contacted participants, the views are expected to lack full representation of each stakeholder group. To be visible to the researcher in the first place, potential participants required a certain level of publicity in their respective stakeholder groups. Views described may, hence, not represent the full picture. Specifically, workers' perspectives from the "boys" are lacking as rather information from collectors, middlemen, and agents is provided. Despite the study's section on narratives and international legislation, no international public and private perspectives were included. The inclusion of only one private actor leads to an underrepresentation of this sector in the study. Considering the interviews performed, institutions helped the researcher to get in touch with the local stakeholders and thereby impacted the stakeholder selection. The picture that the researcher got was also shaped by the representation of the achievements of these individual institutions that were selected. Interviewed stakeholders may have had a personal agenda when talking to the researcher, hoping for positive representation and change in the sector. As described, the interviewee was accompanied to some of the interviews. Results may be biased by this introduction of an individual who plays a role inside the e-waste management system, sometimes related to funding. Lastly, it should be noted that the views of stakeholders on the current situation in Agbogbloshie represent insights up until the beginning of March 2025 and not beyond.

6.3. Research recommendations

As described in the introduction, the latest estimates of workers affected originate from 2012, from interviews conducted. It is of great relevance to conduct a precise counting of collectors and workers in Ghana, to estimate the scale of the sector, and to measure the costs and benefits of interventions and the burden of disease related to e-waste work.

Second, the impact of different compliance tools is yet to be evaluated. Specifically, considering the demolition and the resistance by workers, coming back to the scrapyard, but potentially willing to comply with environmental demands. Related to the return, it is of great importance to keep updating the literature on the situation in Agbogbloshie and potential changes to the sector. The willingness of workers to shift to the organized sector could be further evaluated in surveys with workers to get specific insights into perspectives, potentially conducting pilot studies.

Third, the role of the public and lay citizens was highlighted in this thesis. Nevertheless, to continue the extension of the current framework model of collection centers in Ghana, it is relevant to explore factors that are affecting lay citizens' participation in the system of collection. The willingness of the public to participate in collection systems could be further

evaluated in surveys with citizens to get specific insights into perspectives, potentially conducting pilot studies with different incentive models (monetary versus non-monetary).

Lastly, the role of private companies and international narratives should further be explored, connecting the commercial determinants of health more thoroughly to the e-waste sector and exploring trade impacts on the health of workers, possibly comparing private versus public initiatives and their different potential to impact occupational and environmental health.

6.4. Key policy recommendations

Policy recommendations derived from the analysis aim to promote sustainable change and the reduction of negative health effects of sector engagement. The goal of these recommendations is to increase compliance and decrease resistance to approaches that promote environmental protection. In line with the findings, trust is a key variable to be increased to ensure the policies' sustainability. Recommendations are structured along the framework of health determinants by Gilmore et al., (2023): Targeting, first, the political and economic system impacting the transformations, addressing global actors and narratives, second, regulatory approaches and upstream policies, addressing national policy, and third, sectoral public policy specifically addressing the e-waste management scheme in Ghana, see **Fig. 7**. Recommendations are presented from the top (discourse) to the bottom (collectors).

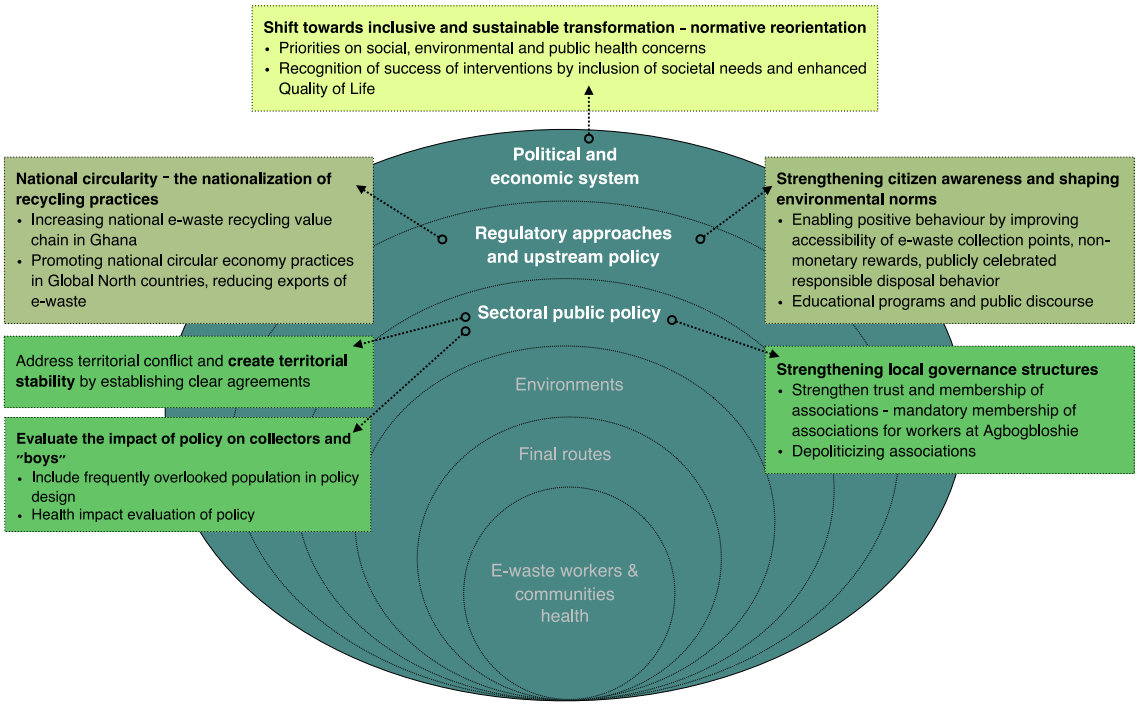

Fig. 7. *Policy recommendations: promote sustainable change and reduce negative health effects*

Source: Own compilation

6.4.1. Political and economic system

1. **Shift towards inclusive and sustainable transformation:** Creating a political and economic system that allows for a slow but determined transformation toward sustainability and inclusivity is a process that requires patience but can yield long-lasting outcomes. It entails a constant shift away from narrow, growth-centric, and profit-oriented narratives toward priorities grounded in social, environmental, and public health concerns, addressing the underlying issues of overconsumption, externalization, and profit maximization. Recognition of success (measurement and evaluation) must go beyond monetary incentives and system performance measured solely by GDP and economic growth. Instead, it should include the recognition of other societal needs to enhance quality of life. The role of the public sector to regulate private industries that are pushing against this narrative is central to Gilmore et. al (2023) in this regard. However, this transformation should not be guided solely by direct policy instruments, but by a normative reorientation – one that acknowledges the systemic influence of prevailing structures and discourses.

6.4.2. Regulatory approaches and upstream policies

2. **Strengthening citizen awareness and shaping environmental norms:** To enhance the effectiveness of Ghana's regulatory framework for e-waste management, policy interventions must address the root problem of low citizen awareness and environmental norms. Drawing from Fleming and Spicer's (2024) conception of domination as ideological influence and Clegg's (1989) Foucauldian notion of discipline and subjectification, systemic change can be achieved by reshaping citizens' environmental values and norms.
    a. **Enabling positive behavior**: Improvement of convenience and accessibility of e-waste collection points, provide small non-monetary rewards for participation, and publicly celebrate responsible disposal behavior.
    b. **Changing social norms:** Encourage internalized environmental responsibility through educational programs and public discourse to create new societal expectations and standards around environmental behavior and increase awareness.
3. **National circularity – the nationalization of recycling practices:** To effectively reduce the reliance on exporting whole electronic items and minimize externalization of environmental impacts, policy should foster public-private partnerships (PPPs) aimed at enhancing national recycling capabilities. This recommendation emphasizes sustainable, incremental transitions rather than pursuing rapid economic growth.
    c. **Increasing national value chains in Ghana:** Bringing additional steps of the recycling value chain into Ghana would enhance profitability, increase employment opportunities, and elevate the economic value of recycled exports. Profits derived from expanded recycling capacities could sustainably finance organization efforts within the informal e-waste sector.
    d. **Promoting national circular economy practices:** Encourage stronger recycling, repair, and prolonged use of electronic products within Europe (or Global North), aligning with circular economy principles. Policy measures

should aim to significantly decrease exports of electronic waste, ensuring end-of-life products remain within national recycling systems.

6.4.3. Sectoral Public Policy

4. **Strengthening of local governance structures:** To ensure sustainability and meaningful stakeholder participation, policy implementation should gradually transition from reliance on intermediary implementing agencies toward strengthened local governance structures – especially associations and municipal and metropolitan assemblies (MMAs). Implementing agencies can play a key role in realizing this recommendation.
    e. **Relevance of associations – strengthening trust and incentives for membership:** Development of a strategy fostering trust within associations requires a blend of incentives (e.g., livelihood support (territory), housing assistance, social security) and intangible factors such as kinship, personal relationships, and respected leadership.
        i. **Mandatory membership in association for workers returning to Agbogbloshie:** Workers who want to come back to Agbogloshie should be required to register in an association to continue this work. This allows for the counting of workers. To promote membership and health, registration should come along with health insurance provision, financed by, e.g. the eco-levy.
    f. **Depoliticizing associations:** Mitigate the effects of national political affiliations on association leadership and activities to prevent political polarization within associations (Rams & Aladago, 2021). Establish governance structures and practices encouraging dialogue across political divides, facilitating consistent engagement and stability irrespective of political changes.
5. Addressing **territorial conflict**: To build trust and achieve compliance in the informal e-waste sector, policy must address workers' needs for territorial stability. This element is essential to foster a sense of agency among workers. Associations should play a central role in mediating these dynamics, supported by implementing agencies to reinforce trust at multiple levels.
    g. **Secure territorial access**: Clear territorial agreements must be established among associations. This stability is essential for long-term planning and for workers' willingness to participate in organized structures.
6. **Evaluate the impact of policy on collectors:** Collectors, "boys", occupy the lowest tier of the e-waste value chain and are typically most exposed to the sector's negative health impacts. Despite their central role, they are frequently overlooked in policy design. As middlemen and agents increasingly act as intermediaries between formal and informal actors, policies must also address the conditions and needs of collectors directly. The organization of the sector should include:
    h. Mechanisms to evaluate the health impacts of policies on collectors.
    i. Tailored policy approaches to ensure these actors are effectively reached and included.

7. Conclusion

This thesis demonstrates the potential for sustainable transformation of the Ghanaian e-waste sector within a multi-stakeholder landscape. I find that compliance with environmental policy is impacted by the perceived legitimacy of informal e-waste workers' activities. Recognizing workers as essential contributors to an organized e-waste value chain and solving tensions over territory to work can eventually impact the health of workers and communities.

The case study of the workers' return to Agbogbloshie in 2025, after its demolition in 2021, showcases that purely top-down approaches and exclusion of workers are met by resistance. Instead, a novel compliance strategy is emerging, centered on inclusion, recognition, and a hopeful reimagining of the sector's future. Recognition, rather than coercion, emerges as a central mechanism of governance in this policy context. Strengthening and expanding the systemic approach to organizing the sector, both geographically and with respect to a broader conceptualization of health beyond air pollution, is key. This systemic approach, however, faces the difficulty that while organization and health impacts are more manageable up to the level of middlemen, collectors remain difficult to reach. Associations play a pivotal role, and increasing workers' willingness to join these entities could be a crucial driver of positive change. This should be based on stakeholder engagement while transitioning toward policy approaches centered on environmental sustainability and health protection.

Ghana is one of the countries confronted with the externalities of circular economy transitions. The country's e-waste sector provides a critical lens into how environmental governance intersects with informal labor, health inequities, and postcolonial trade dynamics. Reducing Ghana's role as a purely global collection point and expanding national recycling capacities can ultimately impact such global hierarchies. A deeper transformation of political and economic systems is grounded in increasing environmental responsibility and questioning global consumption patterns.

Photo 11 *Cables and smoke over Old Fadama and Agbogbloshie, March 2025*

Declarations

Ethical approval and consent to participate
Participation in the study was voluntary, and all participants consented.

Consent for publication.
Consent for publication was granted by all participants.

Competing interests
No potential conflict of interest was reported by the authors.

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Appendix

Appendix A – Personal reflection

"You can look as far as you can see.
Sometimes you can't see at all, sometimes you can see very far."
– Sampson Atiemo during a conversation one afternoon close to Obosomase.

Perspectives change over a lifetime. Values can change; realizing this possibility can help one overcome judgment of convictions that contrast with one's own view. The skill to reassess and to analytically understand a framework of belief can give room for challenging others', and most importantly, one's own point of view, over and over again. However, a certain stability in the personal relationship to the political, philosophical, or sociological spectrum leads to action, leads to conversation, leads to professional decisions. Is one transitioning between beliefs, or can there be a point of acceptance of reasonable uncertainty and observation rather than embeddedness? In my case, not knowing the truth may lead to objectivity rather than a subjective presentation of what I hold for the truth.

Before – during – after

I left Europe with a strong sense of responsibility as a European citizen for the disruption of neocolonial exploitation patterns that still exist today, with the understanding that European regulation, as well as regulation in high-income countries, must reflect on historically built inequalities. The action of European countries must be based on participatory approaches, on listening to the needs of those *affected* by policy. Standards should not be forced upon, but rather should inclusive democratic processes determine standards, as well as adherence approaches. I criticized capitalist mindsets per se; *innovation* was an insult in my ears, hypocritically prioritizing profits over everything else. Not that my green-left mindset had not been critical of established approaches before – I was, for example, skeptical about an EU supply chain law – but the baseline seemed established.

In Ghana, with the eyes of a social scientist, I observed and analyzed what I saw. I asked and listened, not just my interviewees but most people I met, taxi drivers, receptionists, market sellers, artists, colleagues. "What is the origin of the conflict between Nigerians and Ghanaians? – It's Jollof rice, ours is better than theirs!" – a conversation with a dear colleague in one of the long Uber drives through evening traffic in Accra. "Why do you keep the label on your bag? – Oh, it's the first time I own a new product, I want to show off." – a conversation with a (now) friend, I brought a tote bag from Paris. "If you don't know anyone, you'll never get a job in government" – comment by a colleague on future perspectives; I felt partly guilty for my privileges. But there was also this feeling of hopelessness mixed with anger. "Why can these structures not work like ours?", a frustrated voice inside me, overwhelmed by her incapacity to deal with these structural differences. During my visits to the different stakeholders, I quickly lost trust in public and, then, less quickly, gained trust in private actors. I perceived a largely dysfunctional public system, seeing the big cars, the buildings, somehow, this screamed corruption. Then, the donor dependencies were imminent, and the public sector

was swallowing the means provided, everyone wanting a piece of the cake. I perceived an indifference to the actual impacts of these programs. Certain structures allow for impact, and these structures are set up by donors. During my first week in Ghana, far away, Zelensky and Trump had their discussion on TV, and the CDU was elected in the German government. Now I thought, maybe Trump's (and potentially at some point Germany's) donor pullback might not be the worst idea? The private sector needs to step in, and these market-based solutions will have more impact than anything that is forced upon people, because what people want is in their economic interest. Again, frustration voiced itself inside me, and these thoughts were shared in more private conversations after the interviews: Being pushed into the void might lead to a crisis that triggers ownership of solutions, that in turn triggers innovation. If you suffer enough, will you help yourself at some point? What happened to my initial thesis on commercial determinants of health?

Clearly, on my return from Africa, I feel the need to reflect on the experience in the sense that some of my values and my assumptions have to be reevaluated. During my stay, and coming back, I did, and I still do frankly, sense despair. Mainly because some deeply rooted convictions that I concentrated my actions on were complexified or shuttered. I am grateful for the experience, as, even if reality is more complex and less easy to *fix* with my ideals than I may have thought, I get the chance to reevaluate my own position in society and in my future professional life. My horizon has expanded, and I see value in potential solutions that I neglected before. I made some big steps towards being an adult in the past four weeks (When I will be reading this in a couple of years, I will be laughing). I have a broader view of perspectives given in politics and policy. Is disillusionment part of it?

Why Africa?

The question comes up now. The patterns I am observing in my analysis are patterns I am reflecting on (now) when I walk through Paris. When I see the tent of a homeless person next to the Seine, when I see that there are premium spots for tents (those that are protected from rain and have a view of the river) and spots that can only be set up at night, exposed to rain, light, and pollution. What are the networks that determine the hierarchies here? Or negotiation processes that I was involved in at my job at the Ministry: It's always about trust, it's likewise been individuals steering the wheels, it's about resistance and perception, and about recognition. My relationship is representing these patterns. My shared flat is. So, I was asking myself, why do I go so far away and deal with a system that you, first, don't really understand (historically and socially), and second, that fails to align with your ideals.

My role

In the Uber back home from the Goethe-Institut in Accra on my last evening, I recorded my own voice, after listening to other voices for two weeks. I had just visited an exhibition on e-waste by Muntaka Chasant, a photojournalist who reported on Agbogbloshie 2021 in a visual way. Earlier that day, I had visited the Agbogbloshie scrapyard for the first time. Arriving at the exhibition, I went to the bathroom to wash off the dust from my arms and face. The exhibition was scratching the surface of something I had just studied for two weeks, the

conversation with Muntaka afterwards stimulated reflection, confirmed some thoughts that I had built up and not shared yet, and made me question myself. The unique perspectives that were given to me, the observations that I made, left me an outsider to the tight networks. An outsider whose purpose was to observe. Those I engaged with saw me as someone who is seeing something. Seeing and then potentially judging it. Seeing and writing about it. What picture do you want to present to me? The recording describes that the views that were presented to me were biased, and were instrumentalizing me. Everyone has their own agenda. So, how do I extract the truth?

Appendix B – Interview guide

Interview Guide

1. Can you please describe the e-waste sector and the main stakeholders involved? What is your role?
2. How do you perceive the e-waste sector's main problems in Ghana?
3. What are the main priorities in regulation on e-waste management?
4. Can you tell me about the informal sector's representation in decision-making on e-waste management? Which groups and stakeholders do you interact with when designing e-waste policy?
5. What role do the international sector and international regulation play?
6. How can the informal sector management be improved and the problems that you mentioned be solved?

Optional: Detailed follow-up questions

Agbobloshie

1. What are the consequences of the destruction of Agbogbloshie in 2021?
   a. Did workers' health and environmental conditions diminish or improve over the past years? Elaborate, please.
   b. In what way did the environments of workers and communities change?
   c. Was the removal of Agbogbloshie in 2021 a success or failure?

Regulatory approaches and decision-making

2. Can you tell me about the informal sector's representation in decision-making? (What about the public sector, academia, and development organizations)
   a. How have you engaged with GASDA and other associations (since 2021)?
3. What does the newly elected government change?
4. How do groups influence decision-making that affects the informal waste sector? What are their interests? What conflicts arise?
5. What are the expectations of the Ghanaian society for e-waste policy?
   a. What kind of policy concerning e-waste is socially accepted and why?

International policies

6. What are the consequences of the international circular economy policy for Ghana?
7. Ghana was proposing the amendments to the Basel Convention. In what way do they affect Ghana?

Appendix C – Consent form

Consent for participation in interview study

Project Title: "A Qualitative Interview Study: Application of the Commercial Determinants of Health Framework to the Informal E-Waste Sector in Ghana". Herewith I confirm that I volunteer to participate in a research study conducted by Johanna Elbel, Public Policy student at Sciences Po University, and agree to the following:

1. My participation is voluntary, and I will not be paid or reimbursed for participating or any interview-related costs.
2. I can withdraw this consent at any time until 22.04.2025 when the thesis is submitted. Withdrawal will stay confidential and will not have any consequences.
3. Participation involves one interview of approximately 45 minutes, and one 15 minutes follow-up session (written or oral) to validate the understanding of perspectives. Notes will be taken during the interview, and the interview will be recorded via *Apple Voice Memos* and with the recording tool Marantz PMD661. If I do not want to be recorded, I will not participate in the study.
4. If I decline to participate for any reason, this decision will remain confidential.
5. If I feel uncomfortable at any point of the interview the interview can be stopped or cancelled, single questions can be declined. This decision will also remain confidential.
6. Raw notes and transcripts will only be accessed by Johanna Elbel and her supervisor. This precaution will prevent my individual comments from having any negative repercussions.
7. The data will only be used for this study and may, in this regard, also inform a report on E-waste by the World Bank.
8. I benefit of this study as I experience self-acknowledgment, confidence and a sense of purpose. The study provides a voice for the most vulnerable in society, enhancing justice and equality.
9. My name will not be mentioned in the study. Occupation and affiliation will be mentioned if I consent (A). If I answer "No" for the occupation I will be excluded from the study.

   A. Herewith I consent that my

	Yes	No
Occupation	O	O
Affiliation	O	O

   is used in the submitted Master thesis and any related publication.

10. Johanna Elbel is responsible for data protection, data storage and performs the data analysis. Data will be stored on a secure data storage and interviews will be deleted once transcribed. The Ethics Committee of Sciences Po University approved this study.
11. GDPR rights: In accordance with the General Data Protection Regulation 2016/679, any person will be able to access their data, as well as remove it if possible. To do so, I can send an email to johanna.elbel@sciencespo.fr. In case of difficulty, please contact the Sciences Po Data Protection Officer dpo@sciencespo.fr If your question is not answered properly, you can address a complaint to the French data protection authority (the CNIL at www.cnil.fr/).
12. I have read and I understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.
13. I have been given a copy of this consent form.

_____ _____

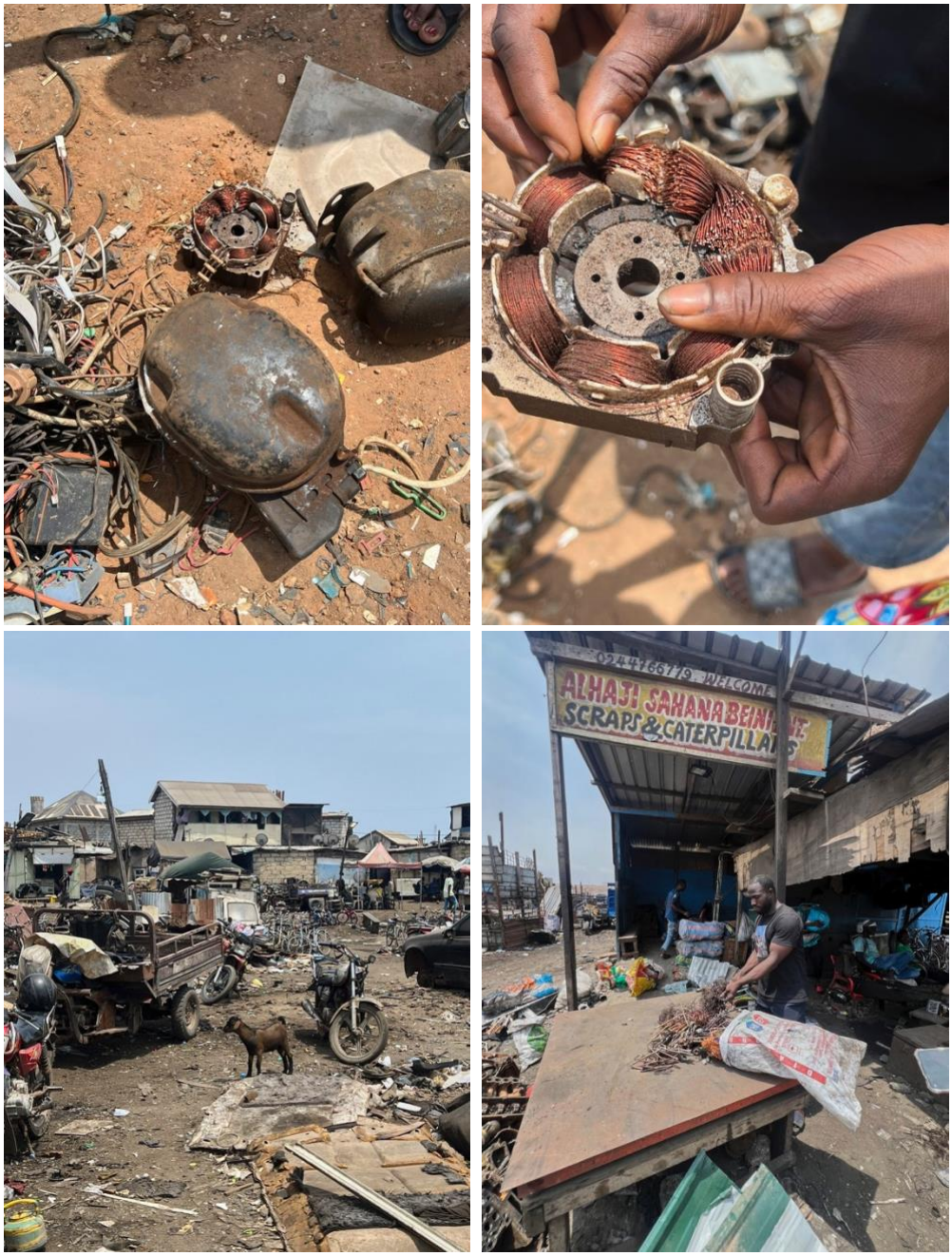
Date & Signature (Participant) Printed Name (Participant)

_____

Date & Signature, Johanna Elbel

Appendix D – Additional photography

Interview settings



©Johanna Elbel

Field visit: Agbogbloshie – Old Fadama

©Johanna Elbel

Field visit: Agbogbloshie – Old Fadama

Meeting with the Minister of Environment, Science and Technology, and Pure Earth

Field visit: Koforidua – Countryside scrapyards of middlemen

Appendix E – E-waste value chain

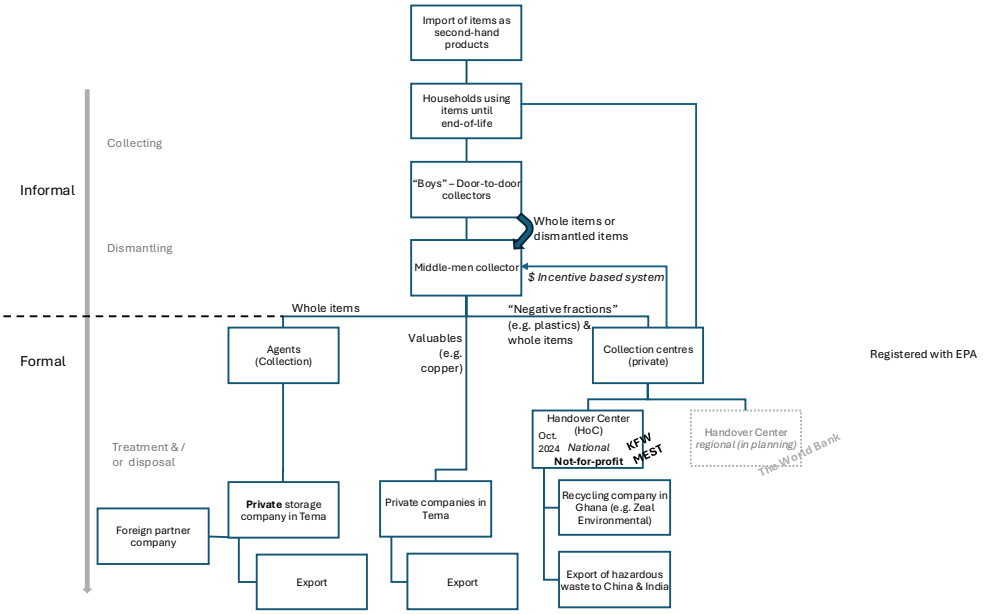


Figure 4a E-waste value chain

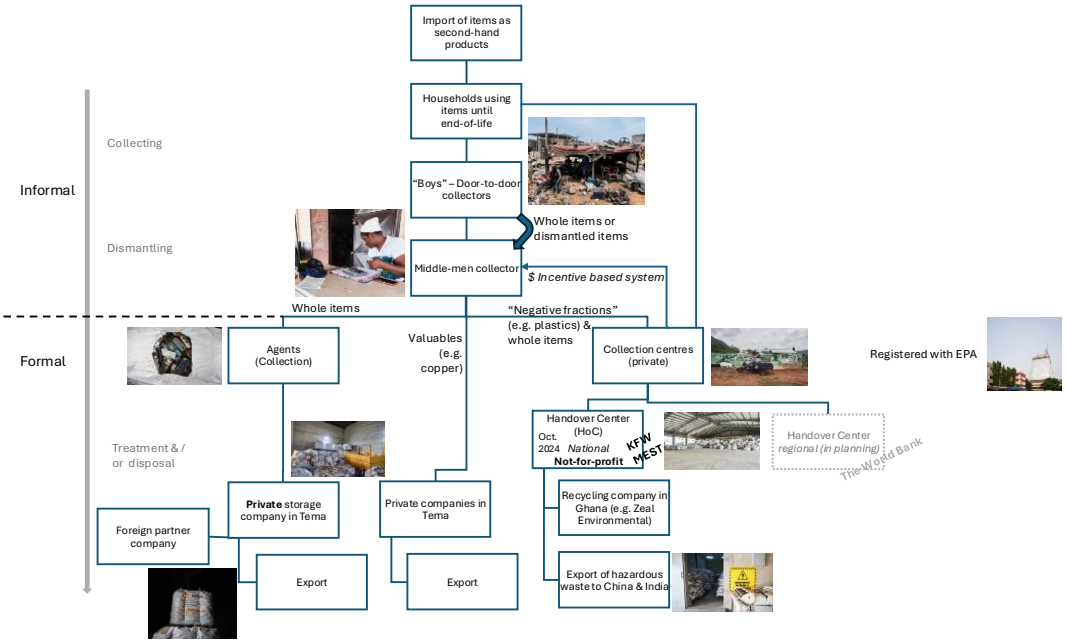


Figure 4b E-waste value chain with photos

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Dynamics of value and power: Organization of the informal e-waste sector in Ghana and its health impacts

Johanna Elbel

Abstract

Background: Ghana's informal e-waste sector sits at the intersection of global waste and recycling value chains and is central to circular economy narratives. The sector faces severe environmental and health risks, and policy approaches to regulate these risks differ. This study investigates decision-making processes in Ghana's e-waste sector, focusing specifically on the power dynamics that shape policy and its effects on workers' health. **Methods:** Fourteen semi-structured interviews with representatives from non-governmental, governmental, and private actors, as well as informal sector associations and collectors, were conducted in Ghana in February and March 2025. A descriptive analysis was performed, and systemic and episodic theories of power were operationalized. The data was coded and analyzed using NVivo. Observations from field visits and photography enriched the results. **Results:** The case study showcases the potential for the sustainable transformation of the Ghanaian e-waste sector within a multi-stakeholder landscape. E-waste workers are returning to the scrapyard Agbogbloshie in 2025 after its destruction in 2021, highlighting resistance to coercive, top-down approaches. The inclusion and recognition of informal e-waste workers influence environmental policy compliance and health outcomes. **Conclusion:** Informal e-waste workers' health can be positively impacted by a strengthened multi-stakeholder e-waste management system that addresses workers' needs. By strengthening workers' associations and increasing the willingness of workers to join these, the participation and reach of collectors can be ensured. To organize the system in Ghana sustainably, donor dependency must be decreased, potentially by expanding national recycling capacities. General awareness of e-waste as a problem, along with its environmental and health effects, must be improved.

Key words: E-waste; Ghana; Informal sector; Sustainable transformation; Circular economy; Stakeholder dynamics.