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Unravelling Urban Environmental (In)justice of E-waste
Processing Activities in Agbogbloshie, Accra-Ghana

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DECLARATION

I hereby declare that with the exception of the references used which are duly acknowledge, this thesis is my own work under the supervision of Prof. Ragnhild Lund.

DEDICATION

I dedicate this thesis to my father. *May His Soul Rest in Peace*

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I wish to thank God for His guidance and wisdom. My utmost appreciation and thanks go to my academic supervisor, Professor Ragnhild Lund, whose supervisory style and directives have exposed me to knowledge. Her tolerance and constructive comments were indispensable.

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ABSTRACT

The aim of this thesis was to investigate and explain how e-waste management activities in Agbogbloshie, Accra-Ghana produce unjust conditions to the e-waste workers and the environment. In view of this, the concept of environmental justice or injustice was thoroughly explored. Urban Political Ecology was also adopted as a theoretical approach to the research for the purpose of understanding the roles and power differentials of actors involved as well as unravelling the integrated factors that interplay to produce injustices. A case study approach was employed to obtain and analyse both primary and archival data. In the process of presenting the findings, an analytical framework or model was designed based on the background concept, theory and the data produced.

The study shows that e-waste recycling industry is characterized with multiple actors with conflicting roles and interests. The e-waste recycling in Agbogbloshie is a well organised informal industry dominated and actively participated by the e-waste workers who have different social background. The e-waste management chain is seemingly hierarchical in nature with interconnected segments. The processing chain is characterised with unequal social power with respect to the position in the production rank or hierarchy, duration of engagement or experience, knowledge and asset. The existence of such unequal social power and relations is producing a corresponding unequal distribution of benefits and burdens by which those at the lower rank in the downstream production such as collectors, burners and dismantlers suffer from the greed and exploitation of the middlemen and scrap dealers.

The study further shows the role of institutionalised actors who passively engaged in the actual production process. However, the use of their political power and sometimes their inactivity influence the e-waste workers and their activities. Through the use of power they create monopoly market for recovered metals, cause price instability and restrict e-waste workers to use certain public spaces. They incur misrecognition on the e-waste workers leading to assaults, discrimination, devaluation, humiliation and lack of basic social services. It is also revealed that the e-waste workers should not be blame for using crude techniques in recycling which cause environmental damages. Rather institutional inefficiency and incapacity on the part of the institutionalised actors are the reasons of such environmental problems. In order to solve these multiple injustices emanating from the institutionalised actors and also circulating among the e-waste workers, an integrated modern industrial e-waste management system should be established that would incorporate the skills, knowledge and experience of the e-waste workers through training and also meet their basic needs.

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LIST OF ACRONYMS

AMA	Accra Metropolitan Assembly
CEPS	Customs Excise and Preventive Service
EEE	Electrical and Electronic Equipment
EPA	Environmental Protection Agency
GASDA	Greater Accra Scrap Dealers Association
MOTI	Ministry of Trade and Industry
OECD	Organisation of Economic Cooperation and Development
UPE	Urban Political Ecology
WEEE	Waste of Electrical and Electronic Equipment

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

The current world capitalist economic system is seen as the most successful wealth-creating economic system that the world has ever known. It has been pointed out that it has benefited the common people more than any other system. It creates wealth by continuously increasing productivity and advancing technology in a process which requires that the old is destroyed and replaced with the new. The system rewards the versatile and the efficient but punishes the redundant and the less productive (Gilpin & Gilpin, 2000). However, its rewards especially are not uniform as the world economies become increasingly integrated. There exist unequal distribution of benefit among nations and within nations with respect to wealth or income and technological advancement (Meschi & Vivarelli, 2009; Zhu & Trefler, 2005). As stipulated by Dicken (2011) and Goldin and Reinert (2012), most countries in the developing world are left behind with respect to benefits and potentials in the process of globalisation. Similarly, developing countries have been experiencing the footprint of global production and consumption. Thus they have become destination points of dumping of waste in this era of increasing global interconnectedness (Dicken, 2011).

A case in point is the global dumping of e-waste. Manufacturers of electrical and electronic product are always desirous to produce and consumers continuously consume with less concern about where the e-waste would end up and the consequences associated with it. In fact the use of electronic devices has proliferated in recent decades and the volume of electronic devices, such as PCs, mobile telephones and entertainment electronics that are disposed of is growing rapidly throughout the world (Widmer, Oswald-Krapf, Sinha-Khetriwal, Schnellmann, & Böni, 2005). The growing e-waste stream in the world is attributed to the accelerating technological changes alongside with the rapid obsolescence rates of those electronic products (Dwivedy & Mittal, 2012). A new UN report produced by Baldé et al. (2015) indicates that the quantity of global e-waste has reached 41.8 million tonnes. The amount is expected to grow to 49.8 million tonnes in 2018, with an annual growth rate of 4 to 5 per cent. This is becoming a great concern as majority of the e-waste generated are claimed to be transported to developing countries where India, China, Nigeria and Ghana receive the most (<http://www.aljazeera.com/programmes/insidestory/2015/04/facing-growing-waste-problem-150419202237782.html>)

However, despite the toxic elements the e-waste composed, there has been growing informal activities in most recipient countries where crude methods are employed to retrieve precious

metals that are contained in the e-waste (Oteng-Ababio & Amankwaa, 2014). A typical case is the informal e-waste recycling in Agbogbloshie which is popularly known as e-waste dumping and recycling site situated in the Accra, the capital city of Ghana. Indeed, Agbogbloshie in Ghana is “*the most high-profile e-waste site*” (Grant, 2014 p.141), which recycles e-waste of an estimated volume of about 300–600 40-ft-long containers a month (Oteng-Ababio, Owusu, & Chama, 2015). Again, studies have shown that Agbogbloshie treats over 171 000 tons of e-waste annually (Prakash et al., 2010) with a recycling output of about US\$ 200,000 in 2009 (Amoyaw-Osei et al., 2011).

Empirical studies have also demonstrated the socio-economic significance of e-waste recycling in Agbogbloshie. E-waste recycling in Agbogbloshie has been shown as a livelihood strategy creating employment and reducing poverty through income generation (Amankwaa, 2013; M. Oteng-Ababio, 2012; Prakash, Manhart, Amoyaw-Osei, & Agyekum, 2010). Again, its contribution to the Ghanaian economy is estimated to be around US\$105–268 million (Prakash et al., 2010). Though this might be over-exaggerated. However, these scholarships revealing the income potentials of e-waste recycling in Agbogbloshie rarely emphasize the inequalities inherent in the distribution of income among the e-waste workers let alone to recognise how such inequalities might exist.

More so, publications on the health and environmental impact of e-waste recycling conventionally attribute such impacts to the crude nature of the e-waste recycling by the e-waste workers in Agbogbloshie (Asante et al., 2012; Brigden, Labunska, Santillo, & Johnston, 2008; Caravanos, Clark, Fuller, & Lambertson, 2011; Caravanos, Clarke, Osei, & Amoyaw-Osei, 2013; Oteng-Ababio, Chama, & Amankwaa, 2014). Such publications scarcely concern about how power differences and relations among actors involved generate unfavourable impacts on the lives of the e-waste workers and the environment.

Additionally, studies that focus on mapping the source of e-waste (Amoyaw-Osei et al., 2011; Grant & Oteng-Ababio, 2012) are limited in discussing the integrated factors occurring at the global, national and local level which cause the e-waste flows to Agbogbloshie. These are missing gaps in the scholarships which Urban Political Ecologists intend to identify, investigate and discuss in the context of environmental injustice. However, the adoption of Urban Political Ecology as theoretical approach to investigate the e-waste processing activities in such urban space has been missing in the existing scholarships. In view of this, the research aims to employ Case study approach for data production and adopt the main tenets of Urban Political Ecology

and the concept of environmental (in)justice to design analytical framework or model to explain whether e-waste processing activities cause unjust social and environmental conditions in Agbogbloshie.

1.2 Research Objectives

Based on the aim of the research stipulated above, the research specifically seeks to explore the sources and the factors that cause e-waste dumping in Agbogbloshie. It also intends to identify and outline the roles, practices and powers of the various actors in the e-waste industry, and finally evaluate the social and environmental impacts of power differences and relations among the various actors.

1.3 Research Questions

With respect to aforementioned objectives, the study seeks to provide answers to the questions below.

- What are the factors that drive e-waste dumping in Agbogbloshie?
- What are the roles, practices and power relations of the various actors involved in the e-waste industry?
- How do the power differences cause injustices among the e-waste workers and the environment?

1.4 Relevance and Justification of the Research

The research would contribute to academic knowledge by filling the gaps in the literature. It demonstrates the importance of the derived model or the analytical framework as a useful toolkit to geographic enquiry with respect to understanding the injustice characterising the e-waste industry in Agbogbloshie. The research will also form the basis for further research for examining the interaction between institutional structures and informal economy and how such interactions impact on development and the daily lives of people. Again, revealing the interconnected processes driving e-waste flows and explaining the roles and powers of the actors provide the necessary background for policy formulation and implementation.

1.5 Structure of the Thesis

The thesis is structured into eight chapters. The first chapter is the introduction to the research. The introduction chapter provides the background to the study where it highlights the scope and the magnitude of the e-waste problem, identifies gaps in the scholarship and explains the inspiration behind the adoption of Urban Political Ecology as a theoretical approach to the study.

The chapter also defines the aim, objectives of the study and the research question. The relevance and justification of the study is also another component of the introduction.

Chapter two focuses on the research methodology. It discusses and justifies the adoption of case study approach as a qualitative research strategy. The design of the case study, the various sources of data, the research instruments and sampling techniques employed for the collection of primary data are also discussed in this chapter. The chapter also highlights on how the secondary data was collected. Again, the chapter discusses the positionality and reflexivity of the researcher in the process of data collection and how the data was analysed in a form of knowledge production. The chapter further discusses how truthful was the data, some ethical practices and practical challenges encountered during the research process.

Chapter three deals with the study area, Agbogbloshie. In this chapter, the locational characteristics of Agbogbloshie are outlined. The chapter discusses the spatial orientation of Agbogbloshie scrap yard in order to provide an overview on where the fieldwork was conducted. Moreover, it also presents the growth of Agbogbloshie and how the e-waste recycling activities emerged.

Chapter four presents the concepts and the theory underpinning the research. Concepts that are operationalized include e-waste and also environmental injustice/justice. In order to provide deeper understanding about the concept of environmental (in)justice, the chapter defines how the concept of environment and justice are framed in the discourse of environmental justice. Furthermore, Urban Political Ecology is also operationalized as the theoretical approach to the research where the main tenets or elements are presented as the guiding principles for the research. Based on the research objectives, ideas derived from the concepts are integrated with the theoretical elements of Urban Political Ecology to construct the analytical framework for the research.

Chapter five, six and seven present the analytical findings of the research. With respect to these chapters, the main elements of Urban Political Ecology framed in the analytical model are employed to discuss the data obtained. Findings that confirm or refute that of the existing studies are also highlighted. Chapter five discusses the types of e-waste materials found at the scrap yard, the sources of those e-waste and the driving forces behind the flows. Chapter six deals with the actors involved, their roles, practices and power differentials. Chapter seven focuses on how power differences cause various forms of injustice in Agbogbloshie. The last chapter focuses on the summary, conclusion and recommendations.

CHAPTER TWO: RESEARCH METHODOLOGY

2.1 Introduction

This chapter provides the methodological framework developed to conduct the research. It presents the systematic procedures employed to investigate the stated geographical phenomenon in Agbogbloshie. In geography, the two major approaches to enquiry and discovery are qualitative and quantitative research methodology. Equally, the two approaches are often combined in a process termed as mixing methods to undertake a research (Clifford, French, & Valentine, 2010). This research adopted qualitative research methodology.

Qualitative research methods are approaches that seek to uncover the thoughts, perceptions feelings and experiences of informants or particular group of people (Limb & Dwyer, 2001; Minichiello, Aroni, Timewell, & Alexander, 1995). Research instruments in qualitative methodology presents data that consist of words, pictures and sounds and are usually unstructured in nature (Kitchin & Tate, 2013). According to Creswell (2009), strategies of inquiry associated with qualitative methodology include, ethnography, grounded theory, case studies, phenomenology and narrative research. For this research, I employed case study as a research strategy. The choice of the research methodology and the strategy employed is influenced by the research objectives and questions, the nature of the study area and the characteristics of the target population. It is also determined by how I wish to produce and present geographic knowledge. On the basis of this, I present below the justification for the choice of qualitative research methodology, the methods employed and how the target population or interviewees were selected. I also elaborate on my role as a researcher on the field and relationships with the interviewees. I further describe the data analysis procedure, data validity, ethical practices and the practical challenges encountered during fieldwork.

2.2 Case Study Method as the Research Strategy

According to R. K. Yin (2012), a case study is an empirical inquiry about a phenomenon set within its real-world context. It involves systematic data collection and data analysis procedures. The choice of the case study approach is based on the assumption that critical examination of the context and other complex conditions related to the case will provide a detailed understanding of the case (R. K. Yin, 2012). In view of this, the choice of case study method is based on the rationale that it would provide rich description and insightful explanations of the injustice that characterizes the informal e-waste management activities in Agbogbloshie. Here, the choice of case study method is determined by the aim of the research. Case study method

presents useful tools to describe what is happening with respect to unjust conditions of e-waste management in Agbogbloshie and how or why they are happening.

Moreover, R. Yin (2003) emphasizes that conducting case study research is necessary for understanding complex phenomenon. Therefore as a strategy for qualitative research approach, a case study would provide reliable means to unpack the complexities of the e-waste management and the experiences of the informal workers. It would draw on the opinions, feelings and thoughts of e-waste workers and other related informants to gain deeper understandings of how informal workers in Agbogbloshie are immersed into the social world. Thus the e-waste workers would be able to share their everyday life experiences, their roles in informal e-waste management, how they organize their activities and the challenges they face in an interactive manner.

Also, the adoption of a case study would make it more suitable to obtain detailed or more information from informants. The attainment of detailed information helps to outline themes and provide in-depth explanations about connections between events and processes underlying the e-waste management in Agbogbloshie. The nature of the study area and the informants also underscore the adoption of case study method as a qualitative strategy. The adoption and use of quantitative research instruments such as structured questionnaire could obscure some vital information. However, the use of direct observation and in-depth interviews as case study methods together with archival data do not only present diversity of data but allow for the possibility of classifying and relating those varied information. This helps to systematise knowledge which would make sense for policies.

The research was conducted in phases. A comprehensive literature review was conducted within the 2013-2014 academic year. It was done by exploring various sources such as the internet, articles and books taking into consideration the main themes of the research topic. This exercise was aimed to identify gaps in knowledge with respect to e-waste management and also to formulate suitable research objectives and questions. Again, the review of the literature was to provide a thorough background knowledge and understanding of Urban Political Ecology as a theoretical approach to the research and the concept of environmental justice. In the summer 2014, a two month fieldwork was conducted to obtain primary data by employing in-depth interviews, direct observations and semi-structured interviews. After the fieldwork, between 2014 and 2015, additional secondary data was also obtained. This was analysed with the primary data to produce geographic knowledge.

In order to conduct the case study research, a case was defined from the main theme of the topic. The case was redefined after reading the literature and consultation with the academic supervisor. R. K. Yin (2012), defines a case as a bounded entity which may include a person, organisation, behavioural condition, event or other social phenomenon. With respect to this research the principal case which is also the main aim of the research is defined as a social phenomenon. Therefore, the case of my research is to describe and explain the unjust conditions of informal e-waste processing activities in Agbogbloshie. Based on this, the study adopted a single case study design. Within this overall holistic case, I also formulated and defined embedded subcases (R. K. Yin, 2012) with the aid of the research questions, the principles of Urban Political Ecology and the defining elements of environmental justice. (See chapter four for the theory and concepts underpinning the research). A summary of the single case study design for the research can be found below.

Table 1: A summary of a single case study design for the research

Principal Case	Unjust conditions of e-waste management in Agbogbloshie
Embedded Cases	<ul style="list-style-type: none"> • <i>Sources of e-waste flow</i> • <i>E-waste management practices in Agbogbloshie</i> • <i>Power differences and relations in e-waste management</i> • <i>The various means by which power differences and relations produce injustice</i>

Source: *Author’s construct*

The various case (s) were defined to reflect the aim and the objectives of the research. The cases also serve as main unit of analysis for the research. After defining the cases, research instruments and sampling techniques were employed to collect the primary data.

2.3 Data Collection

The study employed a number of research instruments to collect primary data. Before the data collection exercise was undertaken, a sampling programme was designed. The sampling programme as similarly stated by Kitchin and Tate (2013) was influenced by the aim of the research and resources available such as time, money and my capacity as a researcher. To design the sampling programme, I defined my target population as my unit of study (i.e. the actors involved in the e-waste recycling industry). I categorised the unit of study into primary informants and key informants.

2.3.1 Gaining access to the field and identification of Informants

The primary informants were the informal e-waste workers who collect and recycle e-scrap as well as trade in recovered metals in Agbogbloshie. A one day “*gate-opening*” exercise was undertaken. This was done by introducing myself to the leaders of Greater Accra Scrap Dealers Association whose office is located directly at the scrap yard. My purpose as a researcher was persuasively presented and the period within which the actual field exercise would be conducted was also articulated. They also informed me of the laid down tradition which I ethically obliged. Upon my request, the leaders introduced to me a “*gate-opener or field assistant*” who has been in the e-waste management activities for almost eight years.

Afterwards, a transect walk was undertaken with the field assistant in order to gain first hand observation of the recycling activities. Frequent enquiries were made from the field assistant upon my observations. After that, I was able to categorise and identify the primary informants at the scrap yard as consisting of collectors, dismantlers, burners, middlemen, scrap dealers and the Leaders of the Greater Accra Scrap Dealers Association.

The key informants are respondents in the various institutions whose jurisdiction partly encompass the nature of the informal e-waste management in Agbogbloshie. In other words, they are actors whose mandate and power extend to the e-waste management in Agbogbloshie. They include Accra Metropolitan Assembly, Environmental Protection Agency, Ministry of Trade and Industry and Custom Excise and Preventive Service. These institutions were all located within the city of Accra. To gain accessibility, a one day exercise was also undertaken to distribute letters of introduction to these institution seeking formal permission to undertake the research. Subsequently, approvals were granted and the research methods were undertaken.

2.3.2 Sampling Techniques

Due to the complexity of the informal e-waste processing activities, the study employed various sampling techniques in order to collect enough data as needed. The first sampling technique was stratified sampling method. This sampling method was decided after the familiarization tour or transect walk at the scrap yard where I was able to identify the informal activities as composing of collection, dismantling, burning, trading and repair or refurbishment. Based on this, it became relevant to use stratified sampling to divide the e-waste workers within the e-waste management segments into sub-groups consisting of collectors, dismantlers, burners, middlemen and scrap dealers. Also the leaders of the Greater Accra Scrap Dealers Association were also sampled as unique group at the scrap yard. This was aimed to understand properly

the complex nature of e-waste management activities and to obtain data about the life experiences of the e-waste workers. For the purpose of this research, a specific number was not selected from each sub-group, but the fieldwork exercise was undertaken and ended when the saturation point was reached (Thus a stage where all the information required have been obtained and additional information became more and more repetitive). It is very important to know that throughout the fieldwork exercise I was assisted by the *field assistant* who was also an e-waste recycler at the scrap yard.

Despite the assistance of the field assistant, it became difficult to actually locate some of the scrap dealers upon the realisation that they were not regularly present at the scrap yard, even though some of the leaders identified themselves as scrap dealers. In view of this, it became necessary to adopt snowball sampling technique after realizing that there is some form of direct relationship between the scrap dealers and middlemen who were easily identified with the help of the field assistant. Thus using the snowball sampling method was helpful to identify the scrap dealers with the help of the middlemen.

Again, a purposive sampling was used to select the key informants. These informants are officials in institutions such as Accra Metropolitan Assembly, Environmental Protection Agency, Ministry of Trade and Industry and Custom Excise and Preventive Service. This was aimed to obtain data with regards to their key roles they play which may influence the informal e-waste management activities in Agbogbloshie.

2.3.3 Research Instruments or Methods

The main method used to collect the primary data was in-depth interviews. In-depth interviews allowed for more thorough examination of experiences, feelings or opinions. This was to produce a rich and varied data set (Kitchin & Tate, 2013). However, the research also employed other methods such as direct observation and semi-structured interviews. These methods were combined not only to provide extensive data for the purpose of analysis but also to reduce the weaknesses of the various respective methods. In addition to these methods, field notes, audio recording and photographs were simultaneously employed. A description of the various research instruments adopted and how or why they are applied can be found below

In-depth interviews or open-ended interviews were employed as data production tools or techniques. According to Kitchin and Tate (2013), in-depth interviews are social interaction by which the researcher tries to learn about peoples' experiences or thoughts on specific topics. In

the same vein, I employed interviews to collect data from the perspectives of the e-waste workers in Agbogbloshie. (see appendix I for list of respondents and the interview guide). The interviews were conducted through face-to-face meeting. This medium enabled me to easily notice the interviewees' reactions to specific topic through their body languages and facial expressions (Kitchin & Tate, 2013). The main aim was to ensure that the various research questions as well as the case(s) were addressed. The interviews were applied to explore and explain the social and demographic characteristics of the e-waste workers, why they undertake such activities, how they were introduced into the e-waste activities, where they get the e-waste from, how they organise their activities, the benefits of their activities and the challenges they face. The interviews were also employed to examine how institutional and structural processes influence their activities. I developed an interview guide and the interviewees were briefly informed about these topics in the interview guide before the actual interview began. Various questions and follow-up questions were asked about these topics.

Moreover, I adopted two interview recording techniques such as audio recording and note taking. With the help of audio recording, I was able to record the interviews word-for-word. Moreover, I also undertook short notes to avoid any unfortunate circumstances such as damages or loss of the recordings. The short notes enabled me to record the body languages or any other forms of gestures that could not be captured on the audio or tape recorder. Also important scenes and events that reflects the various topics were captured in photographs. In using the audio recording photographs, I sought permission from my respondents.

Direct observation was another method employed to collect the primary data. Various observations were employed to focus on human actions, behaviours, the environment or real-world events. Observations involve the process of creating a narrative or provide a description of what have been seen, heard, felt or otherwise sensed (R. K. Yin, 2012). The aim was to interpret and evaluate the activities and the actions of e-waste workers in Agbogbloshie. Observations were also aimed to create a narrative about how the actions and activities of e-waste workers impact on the environment. Also, direct observations helped to understand and analyse critically how power relations characterize e-waste processing activities. In taking observational data, I tried to remain neutral and ensured that factual information were collected even though it was a daunting task. I also ensured that I needed to collect data that reflect the purpose of the study. In order to avoid irrelevant information, I outlined my aims (as discussed above) in a form of topics in my field notebook. Then, I reported or noted what I observed and the frequency of such observation under each topic outlined in the field notebook. Upon permission, photographs

were taken during the observations. Similarly, after the exercise, I categorized the photographs under each topic considered during the field work exercise for the purpose of easier data analysis.

Semi-structured interviews were employed to collect data from the key informants (see appendix II for list of respondents) in institutions such as Accra Metropolitan Assembly, Environmental Protection Agency, Ministry of trade and industry and Customs Excise and Preventive services Accra. According to Clifford et al. (2010), semi-structured interview is a verbal interchange where the interviewer attempts to elicit information from respondents by asking questions. Although the interviewer prepares a list of predetermined questions, semi-structured interview unfold in a conversational manner. It offers the respondent the chance to explore issues they feel are important (ibid).

Long bureaucratic procedures at the various institutions and lack of time on the part of the informants necessitated the undertaking of semi-structured interviews with the key informants. After the distribution of the letters of introduction, approvals were granted and prior notices of date and time were fixed for the actual conduction of the interviews. I obliged the request by some informants to see the content of the questions before the interview exercise. Note taking was made and audio recordings were employed upon approval. Based on a request and as a result of lack of time on the part of some informants, hard copies of the questions were presented to the informants to be answered. Some of the questions that were formulated are below:

1. What is your perspective on the informal e-waste processing in Agbogbloshie?
2. What do you think motivate the continuity of the e-waste recycling activities?
3. What roles do you play as far as the e-waste business is concerned?
4. To what extent do you think your roles have been influential?
5. On your assessment how do you think the e-waste recycling is beneficial?
6. Why do you think the e-waste recycling in Agbogbloshie is a problem?
7. How responsive are you to the challenges of e-waste workers?

The distribution of the above questions prevented me to ask follow-up questions as I did with some key informants during the face-to-face interviewing. In the process of face-to-face interviewing, some questions were adjusted and reformulated after cross-checking of information.

The primary data was immediately transcribed after the fieldwork exercise. However, the original data in the form of words, diagrams, audios and pictures as well as the transcriptions were stored in a my online back-up devices such as Drop box and Google drive. This was done to avoid permanent loss of data. Also, the storage of the original field data served as references during data analysis.

2.4 Collection of Secondary Data

The research was not limited to only primary data. Relevant secondary data was also collected. *“Secondary data consist of information that has already been collected for another purpose but which is available for others to use”* (Clifford et al., 2010 p. 61). With regards to the collection of secondary data or archival data, NTNU Library Data retrieval system was relied upon to obtain information. Information were sourced from articles, books, related thesis and other publications that were necessary for the study. Also, during the fieldwork secondary data was obtain from institutions such as Accra Metropolitan Assembly, Environmental Protection Agency and Customs, Excise and Preventive Service. Cross-referencing and comparison of secondary data were undertaken in order to avoid their biases and shortcomings (R. K. Yin, 2012).

2.5 Positionality and Reflexivity

One important difficult task in the entire research process was how I tried to position or place myself in the values or principles, beliefs, attitudes, emotions and the setting of respondents during the fieldwork exercise. Additionally, the fieldwork exercise was characterized with power imbalance between myself and the informants. The power imbalance was revolving around differences in status and knowledge between myself as a researcher and the informants. Positioning myself in the values, belief, attitudes, feelings and emotions of informants enabled me to manage the power relations which were essential for co-production of knowledge by both the informants and I. I therefore explain below how I placed myself in different ways among the primary informants and the key informants.

Preliminary information revealed that, the e-waste workers are usually unable to differentiate academic researchers from media representatives (journalists). They have stronger distaste for the media whose representatives usually propagate for their evacuation after going to the scrap yard. Therefore, I needed to manage the emotions and anger by placing myself as an academic researcher with a peculiar purpose different from journalists. I clearly and convincingly declared my status and articulated my aim during my first meeting with the Leaders of Greater

Accra Scrap Dealers Association who have control over the scrap yard. Being a Ghanaian and having previous knowledge about the field, I made sure to exhibit and maintain the cultural values during the introductory process. These initiatives helped me to gain virtue in the eyes of the leaders and also helped to minimize the power that was tilted to their favour. Also, the e-waste workers believed that some non-governmental organisations (NGOs) explore the scrap yard and use their information for personal gains. Therefore, it was very important I made proper introduction.

Again, my previous experience at the scrap yard as a teaching and research assistant (at the Department of Geography and Resource development of University of Ghana) shaped my relationship with the e-waste workers. In order to please them and engage them in the research process, I dressed like informal e-waste worker at the scrap yard. Undertaking the fieldwork exercise with the fieldwork assistant helped the e-waste workers to position themselves well to my advantage. During the interviewing process with the e-waste workers, I tried to establish an informal or a friendly relationship with them in order to engage them in the conversation since most of them were young. This prompted their enthusiasm to participate in the conversation. However, I was carefully reflecting on the objectives of the study. I was also managing time alongside.

I also placed myself well enough to manage the perception of e-waste workers with respect to taking of pictures. The perception revolved around the attitudes of some NGOs as being alluded to earlier. They also perceived that their pictures or images could be misused which would bring disgrace to them and their families. Therefore, I needed to let them understand the basis of my academic research and the importance of taking pictures. The field assistant played significant role in persuading them about taking of pictures. I also trained the field assistant how to use the camera and directed or supervised him in the photography. Again, I positioned myself in their Islamic religious values. In many occasions, I alerted them the praying time during the conversations. Moreover, since the scrap yard is a working environment, I made frequent interruptions and allowed the informants to transact their business after which the conversations continued. These distracted the interviewing process but care was taken to ensure that they did not deviate from the topic under discussion.

The nature of the working environment was also another issue I took into consideration. Positioning myself to obtain observational and interviewing data at this peculiar setting was a burden as the setting posed a threat to my health. I managed to endure the noise and the polluted air at the scrap yard during the fieldwork. For instance, mingling with the burners at the burning

site influenced their readiness and anxiousness to provide me the relevant information rather than engaging the burners at a location distant from the burning site. Also, as long as the setting or the working environment remained as a burden, it also partly became self-revelation of information.

With respect to the key informants, power was inclined towards them. I needed to make compromises to succumb to the bureaucratic procedures of the institutions and time of the informants. The informants seemed to have gained a lot of experience and knowledge in their respective positions. Therefore, I positioned myself to enable me explore their knowledge base to obtain the relevant data for the study. My dressing as well as my interaction with the informants were relatively formal. I was very responsive to their time even though some of my informants were not considering their volume of work. I made a formal request from some informants for a change of time schedule for the undertaking of interviews when there seemed to be clashes.

Moreover, due to politicisation of e-waste recycling and the exploitative attitude of some NGOs, the National Security of Ghana had established a security network to police issues regarding e-waste in Agbogbloshie. In view of this, my intentions were clearly disclosed. I was very reflexive on this security issue throughout the entire research process. Reflexivity actually characterized the research process. To be reflexive is to make conscious analytical scrutiny of the self as researcher. Reflexivity induces self-discovery and can lead to insights and new ideas about the research questions (Amoah, 2013). During the collection of primary data, I made self-scrutiny to ensure whether the interview guide has been exhausted. I also constantly ensured whether the information given answer the research questions and the cases needed to be addressed.

In collecting primary and secondary data, I adopted deliberate and vigorous search for discrepancies in the evidences obtained. I was sceptical about whether the events and actions appeared as they were and whether respondents were giving me their candid responses (R. K. Yin, 2012). Similarly, I also adopted the same attitude towards the collection of secondary data. I compared and identified gaps and contradiction in those data obtained from secondary sources. In general, this exercise prompted me to search for more data. It also increased the confidence about later description, explanations and interpretation of results (ibid).

2.6 Data Analysis

After the data collection, the next purpose was to relate analytically the data to the key assumptions or elements of the theory and concepts captured in the analytical model with the view of

answering the research questions. In order to do this, the data were transcribed in a Microsoft word format. Transcribing the data in such an electronic format allowed me to induce categorization into the large dataset obtained. It therefore served as a precursor for the coding of the data. Coding is a process of evaluating and organising data in an effort to understand meanings in a text (Clifford et al., 2010). Thus in the process of coding, I assigned interpretative tags to text based on the themes (ibid) build around the research questions. This helped me to trace and identify the themes and patterns that form the topic upon which the discussions were made. Each topic was discussed in a form of chapters and sections. Summaries were made using diagrams, tables and pictures. I ensured that the discussions under each topic had linkages and conformed to the theory and concepts underpinning the research. Quotations were made from the original transcript to ensure clarifications and emphases.

2.7 Validity and Trustworthiness of the Research

The research process undertaken, the procedures followed, data generated and the analysis produced must be subjected to some level of evaluation using some form of criteria. According to Graneheim and Lundman (2004), trustworthiness is more central to qualitative research tradition where concepts such as *credibility*, *dependability*, *transferability*, *truth value*, *applicability*, *consistency and neutrality* have been used as criteria to ascertain trustworthiness in qualitative research methodology (Graneheim & Lundman, 2004; Guba, 1981; Krefting, 1991; Lincoln & Guba, 1985). However, it is suggested that validity and reliability have the “*same essential meaning*” as trustworthiness regardless of research tradition (Long & Johnson, 2000 p.31). Creswell (2009), defines qualitative validity as the process of establishing the accuracy of findings. He also outlines procedures to ensure such validity. This research relied on the guidelines and procedures of Creswell (2009) to ensure that the data and the results produced were valid and accurate. It is believed that the procedures below would also equally fit the four concepts such as *truth value*, *applicability*, *consistency* and *neutrality* used by Guba (1981) and Lincoln and Guba (1985) to ensure trustworthiness in a research.

The first procedure employed to establish truthfulness and authenticity of the research was to obtain data from different data sources using multiple research instruments. Triangulating data sources and combining several research instruments minimize the errors of the research process. It also led to large dataset which provided the basis for categorizing and comparing evidence in order to build coherent themes for the research (Creswell, 2009). It can be also said that the research has credibility as the findings were produced from the perspectives of my informants in their respective contexts. This procedure suits the criteria of both *neutrality* and *truth value*

(Guba, 1981; Lincoln and Guba 1985) in establishing research trustworthiness. However sourcing related information from secondary sources may have undermined the *neutrality* and the *truth value* of the research which presuppose that the findings should be obtained solely from the perspectives of the subjects or respondents of inquiry in their contexts free from biases, motivations, interests and perspectives of the researcher (ibid). But it can be said that the research is devoid of the opinions, motivations and biases of the researcher as it focused predominantly on the perspectives of the informants. This is additionally justified by providing quotations directly from the expressions of the respondents in the data analysis.

Also during data collection, I undertook cross-checks of evidence to ensure that valid or accurate information were recorded. Doing cross-checks of evidence also prompted me to explore more about specific issues of concern. Even though some key informants tried to hide certain information in order to protect their image as well as the institutions or departments. However, it can be said that cross-checking or comparing of evidence as well as the production of large dataset minimise this problem. Moreover, due to the limited time frame assigned to the fieldwork (i.e. two months fieldwork), I did not had a prolonged time at the field. However, I managed to have sustained period of time and a regular contact with my informants. This also accounted for reliable production of evidence or data.

Again, the researcher executed a procedure to ensure research accuracy (validity) and replication or *applicability*. Guba (1981) stipulates that, research *applicability* is ensured when similar research procedure is applied and corresponding findings are obtained from different context. To ensure some degree of research applicability, the researcher provided rich description and explanation of findings using an analytical model derived from a chosen theory and concepts. I ensured that there were linkages in my explanations reflecting the defined analytical steps of the model and the coherent elements or principles of the theory and the concepts. This means that the use of similar procedures to obtain data from different geographic setting and analyse the data in the context of the analytical model or the chosen theory and concepts could show common revelation. However, deviation of findings may occur or over-generalisation would be impossible since Agbogbloshie and the e-waste workers as well as the institutional system in Ghana have distinctive attributes. But some degree of *consistency* (i.e. repetition of findings) (Guba, 1981) could be established if the same procedures are employed to obtained information on the formulated research questions from the same informants in the same context if situations remained unchanged.

Lastly, the contribution of my academic supervisor also enhanced the overall trustworthiness and validity of the research. She provided a more supervisory role and objective assessment of different aspects of the study including: advising on my data collection procedures, directing on the design of theoretical and analytical construct for the data, providing thorough editing of scripts, directing the research focus, ensuring coherency between the components of the discussion or analysis and many more.

2.8 Ethical Practices in the Research Process

According to Clifford et al. (2010), ethical research is the practice whereby the practitioner or the researcher behave with integrity and act in ways that are just, beneficent and respectful. In the same vein, I exhibited some moral values in diverse ways and contexts to ensure that the research would gain some form of acceptance and credibility.

Informants were contacted and well informed in advance about the purpose of the research before the interviews were conducted. This was done by formally introducing myself to the leaders of the Greater Accra Scrap Dealers Association and dissemination of letter of introduction to the various institutions. The research took into consideration the anonymity and confidentiality of the informants. Informants were informed that the study is purely for academic purpose hence, they in whatsoever would not be held accountable for their opinions. The consent or agreement of the informants were sought before audio recordings and photographs were undertaken.

Also, in the process of knowledge production, the interviews were designed and conducted in such a way that respondents especially the e-waste workers became more aware of their everyday lives and their skills, expertise and in general their capabilities. Public officials who were my key informants gained insights about their roles and the extent to which they have been very influential. Thus informants were also able to obtain knowledge in the interviewing process. With respect to archival or secondary data, acknowledgements (references) were given to the ownership of such intellectual property using a standardized referencing style.

2.9 Limitations and Practical Challenges during Fieldwork

Despite a successful research process, the methodological approach and strategy employed was characterized with some limitations and challenges. Firstly, the collection of primary data at the scrap yard was undermined by security and health concerns. Despite the fact that my introduction to the leaders of Greater Accra Scrap Dealers Association and the help of field assistant lessened hostility that was anticipated, some informants still exhibited unfriendly behaviour.

Also, it was learned that most e-waste workers extend their working time beyond 6:00 pm. However, I was informed by the leaders of the association that it was unsecured to extend my fieldwork exercise within that time period as well. They claimed that it is possible that I could be assaulted within that time. This prevented me to observe and capture events or behaviours within that time which could have been equally relevant for the study. I also experienced frequent coughing and headache due to inhalation of smoke and bad smell at the scrap yard.

Again, the noise level due to the dismantling activity of the workers influenced the interview process most specifically the audio recordings. This made transcription very difficult and time consuming after the fieldwork exercise. Actually, the transcription of large volume of the recorded information was boring and burdensome. Moreover, since most of the e-waste workers were Muslims and the fieldwork was undertaken within their fasting period, the progress of the fieldwork was somehow undermined. Some respondents who were fasting and working at the same time became wearisome about the interviews.

Furthermore, due to bureaucratic procedures, it took sometime before approvals on my requests were granted to formally conduct the interviews at the institutions. Again, getting public officials to provide me files and documents and respond to the interview on time became difficult due to their busy time schedules and strict institutional procedures. Moreover, it was also difficult and time consuming to analyse the large dataset obtained.

Additionally, more time could have been spent on the field instead of the required two months fieldwork exercise undertaken. A more time for this case study could have allowed for more comprehensive insights and discoveries. Despite these limitations and practical challenges encountered, it can be said with confidence that the fieldwork was successful.

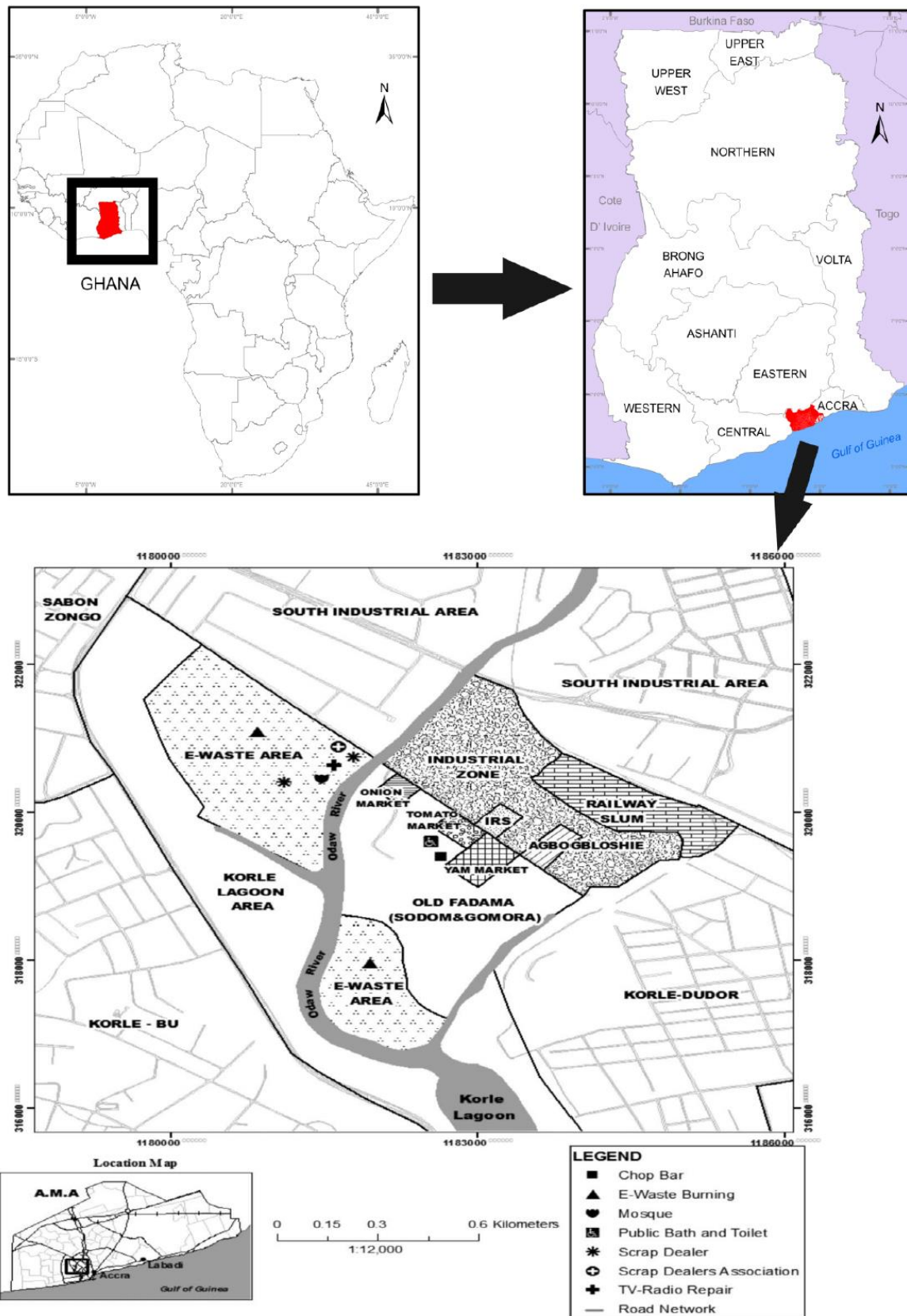
CHAPTER THREE: DESCRIPTION OF THE STUDY AREA

3.1 Location of Agbogbloshie Township in Accra

Agbogbloshie is located geographically at 05°35'N and 00°06'W. The town covers an area of approximately 16 km² (Huang, Nkrumah, Anim, & Mensah, 2014). Agbogbloshie is an area located in the urban space of Accra, the capital city of Ghana-West Africa along the coast of Gulf of Guinea. Agbogbloshie is connected to the Central Business District (CBD) of Accra by road with less than a kilometre (Grant, 2009). It is politically confined in the Odododiodoo constituency of Accra Metropolitan Assembly.

Agbogbloshie is a triangle of land bounded by the Abossey Okai Road, the Odaw River (in the upper reaches of the Korle Lagoon) and the Agbogbloshie Drain, and is flat, with gentle gradients in some areas (Amankwaa, 2013; COHRE, 2004). This is depicted in Figure 1 below. Beyond these boundaries are areas such as Sabon Zongo and Abossey Okai in the north-west and South Industrial Area in the north-east. Again, Agbogbloshie is not far from Korle-bu Teaching Hospital in the south-west and Korle-Dudor in the south-east.

Figure 1: Spatial location of Agboglobshie and the recycling site



Source: Adapted from (Martin Oteng-Ababio, 2012)

3.2 Spatial Orientation of Agbogbloshie Scrap Yard

The Agbogbloshie scrap yard, as shown in Fig. 1, is located on a flat ground along the bank of the Odaw River, and in the upper reaches of the Korle Lagoon in Accra (Amoyaw-Osei et al., 2011; Caravanos et al., 2011; Martin Oteng-Ababio, 2012). Agbogbloshie has two major recycling sites. The main recycling site is close to the South Industrial area on the right bank of the Odaw River. It is this main recycling site where the only office of Greater Accra Scrap Dealers Association is located. Near the office of GASDA is also a football field which is normally used during their leisure time and a mosque which serves as worshipping place for the e-waste workers. At the entrance of the scrap yard is a *sign board* with the inscription, *Property of National Youth Authority, Keep off*. This indicates that the National Youth Authority is the prime custodian of the land. The other recycling site is located north of the Korle lagoon.

Agbogbloshie scrap yard is adjacent to the food market, a market where onion, tomato and yam are sold to the growing urban population of Accra. Proximate to the scrap yard are also food joints popularly called in Ghanaian parlance *chop bar*. Apart from these, there are also other informal activities proliferating near the scrap yard including women selling second-hand clothes. There are also artisans who use metallic materials from the scrap to make coal pots cooking and grilling pots etc. These activities are flourishing along the road connecting Agbogbloshie to the Central Business District. The growing tendencies of the informal activities nearby the scrap yard have led to overcrowding and traffic jams in Agbogbloshie. There has also been increasing *Okada business* along the road (*Okada* is a local name for the use of motorbikes as means of transportation carrying passengers from one place to another).

The Agbogbloshie scrap yard is also adjacent to some large formal industrial enterprises such as brewing, paint manufacturing, engineering etc. The thriving business atmosphere in the area has led to the establishment of the AMA local market office for the purpose of monitoring traders. The Internal Revenue Service has also located an office in the area for the collection of taxes (Grant & Oteng-Ababio, 2012). There are some banking institutions Merchant Bank, Eco-bank and micro finance institutions operating in the area close to the scrap yard.

The two major recycling sites are in close proximity to the slum (popularly called Sodom and Gomorra) which serves as dwelling place for the e-waste workers and other traders in the area. The slum is known to be the largest and the most notorious slum in Ghana housing about 79,684 people (Amankwaa, 2013). The development of slums as light structures in Agbogbloshie may be attributed to physical characteristics of the area being a wetland with a gentle landscape

gradient. However, the existence of Agbogbloshie as a slum may be driven by historical, socio-economic and political factors

3.3 The Growth of Agbogbloshie and the Emergence of E-waste activities

The growth of the current settlement in Agbogbloshie can be traced back to the Non-aligned Movement Conference of 1991. As part of the urban programme developed for that conference, the government undertook a decongestion exercise in Accra to particularly address the major problem that hawkers posed in the city. The City Council removed many of these hawkers to the edge of Agbogbloshie, adjacent to the Abossey Okai main road, in what was intended to be a temporary move. During that period of relocation, a handful of people persuaded the chief to settle temporarily on the land (COHRE, 2004).

Similarly, in 1993, the Accra Metropolitan Assembly undertook a separate exercise and relocated the yam wholesale market to the Agbogbloshie. This, in turn, led to the gradual emergence and development of a larger wholesale food market. The operation of the growing yam market is very labour intensive (COHRE, 2004). More labour was needed for off-loading of yam trucked down to Accra from the northern regions of Ghana. Again, more trustworthy labour was required to market the yam produce and also to guard the yam before they were sold. The increasing demand for labour led to the migration of people from food producing areas. The market eventually became their home and workplace. The traders numbers tended to increase at a rapid pace as mechanics and welders attracted to the area for the maintenance of trucks. This led to temporary structures for both marketing of farm produce, maintenance services and housing (ibid). Moreover, settlement growth in Agbogbloshie became intensified due to the inter-ethnic conflicts in 1995 in the north between the Kokomba, Nanumba and Dagomba peoples. People escaped from this conflict and migrated to Accra to settle in Agbogbloshie with people of their own ethnic and hometown origin (ibid).

The impact of the implemented Structural Adjustment Programme (SAP) in 1980s also caused more people to settle in low income areas like Agbogbloshie. The execution of SAP led to massive retrenchment and removal of subsidies. This increased cost of living particularly in urban areas like Accra. This burden coupled with increasing land cost in the metropolis or city centre forced people to internally move to areas like Agbogbloshie where rent and establishment of house were affordable (Amoyaw-Osei et al., 2011; COHRE, 2004).

Furthermore, the increasing growth of settlement and population is stemmed from the economic opportunities presented by Agbogbloshie. Many areas in Accra are relatively expensive to rent

a house and a space to establish business. Landlords in those areas usually demand higher deposits for two to four years rent in advance. Also many landlords and the planning department of the local authority refuse to allow tenants to operate businesses from they live. Agbogbloshie became less expensive to construct light structures or temporary buildings to be used as workplace and home (Amoyaw-Osei et al., 2011; COHRE, 2004). This attracted many people to the area and proliferated informal businesses and settlements.

The existence of the food crop business created avenues for the diversity of other informal activities. According to the Vice chairman of Greater Accra Scrap Dealers Association, scrap business began to flourish when trade in food crop business gradually became unprofitable. Thus some group of people decided to engage in scraps trade as alternative to the declining food crop trade. The green vegetation was cleared to provide space for the scrap business. More people started joining in upon seeing the lucrativeness of the scrap business. The growing scrap business eventually led to the discovery of precious metal in electrical and electronic waste. The excessive expansion of the e-waste management demanded for more space. National Youth Authority which is the custodian of the land was formally consulted and agreed on the further expansion of the recycling site. Agbogbloshie has become the largest and most prominent e-waste market in Ghana. The e-waste recycling activities and cheaper accommodation continue to attract more people to the area (Grant & Oteng-Ababio, 2012). The e-waste recycling has been very lucrative and well organised informal activity. Though there are various informal activities such as food crop trade (especially yam, onion and tomato) and others, still Agbogbloshie is well-known for its e-waste recycling activities in Ghana and globally. Agbogbloshie is the second largest e-waste processing site in West Africa. It is even among the top ten polluted sites in the world as of 2013 (<http://www.worstpolluted.org/2013-press-release.html>; <http://www.worstpolluted.org/2013-report.html>).

CHAPTER FOUR: CONCEPTS, THEORETICAL PERSPECTIVES AND ANALYTICAL FRAMEWORK

4.1 Introduction

This chapter presents the various concepts and theory for the research. The operationalization of the concepts and definition of the theory and its elements helped to provide a well-defined practical questions for the fieldwork. It also provided guidelines for the design of analytical framework to discuss the data obtained. In this chapter, I adopt operational definition of e-waste. I also define the concept of environmental justice or injustice. Urban Political Ecology as the theoretical approach to the research is also presented.

4.2 Definition of E-waste

There is yet to be a standard definition of e-waste (Widmer et al., 2005). However, the literature on e-waste make available some various forms of definitions. For the purpose of this research, I adopt the following as the operational definition of e-waste for the study.

According to Widmer et al. (2005), e-waste is a generic term that embraces various forms of electrical and electronic equipment that have ceased to be of any value to their owners. E-waste products may range from large household devices such as refrigerators, air conditioners, cell phones, personal stereos, and consumer electronics to computers which have been discarded by their users (Puckett et al., 2002). E-waste is a term used to cover all items of electrical and electronic equipment (EEE) and its parts that have been discarded by its owner as waste without the intent of re-use (Step Initiative, 2014).

It is also referred to as WEEE (Waste Electrical and Electronic Equipment), electronic waste or e-scrap in different regions (Baldé et al., 2015). In this study, the term e-waste, WEEE, e-scrap or e-junk have the same meanings and they would be used interchangeably. E-waste is composed of both precious metals such as iron, gold, copper, aluminium, silver, lead, palladium etc. and toxic elements (Cui & Jørgen Roven, 2011).

4.3 Operationalizing the Concept of Environmental Justice

The concept of environmental justice is not a new term in the academic environment. However, it is very prudent and scholarly apt to build the foundation of this research by providing a clear and insightful understanding of this terminology. I therefore do this below by giving an overview of the history of environmental justice, the definition of environmental justice and how the term *environment* and *(in)justice* are used within the context of environmental justice frame.

Factors behind the production of environmental injustice are also provided. This indeed helps to define the scope of the research and clears out a terminological misunderstanding. It also helps to integrate the ideas of environmental justice with the theoretical approach of Urban Political Ecology to design an analytical framework for the research. This will help to explain how the e-waste activities produce unjust social and environmental conditions in Agbogbloshie.

4.3.1 The Historical Background of Environmental Justice or Injustice

The issue of environmental justice or injustice is not a recent phenomenon. Some scholars articulate environmental justice or injustice issue in the form of the way colonial and post-colonial authorities structured or structures access to certain natural resources in Global South (Blaikie, 1985; Blaikie, Brun, & Jones, 2014; Sikor & Lund, 2009). Those practices included appropriation of ecological resources for forest reserves, ecological parks, wildlife conservation, etc. Most of these issues are academically lamented by political ecologist as causing poverty, marginalisation, discrimination, depopulation and destruction of cultural values of certain affected population (Blaikie, 1985; Robbins, 2012).

However, the evolution of the concept actually dates back to the 1970s and 1980s in the United States and Europe (Schroeder, Martin, Wilson, & Sen, 2008). But quite recently we have witnessed a geographic dispersion of the term. The discourses around environmental justice have not only diffused but also re-contextualized which manifest in different spatial and social context (Holifield, Porter, & Walker, 2010).

The birth of environmental justice particularly emerged in United States following a prolonged public disagreement surrounding the pollution of Love Canal in upstate New York and the civil disobedience by groups of mainly African Americans protesting the disposal of toxic wastes in a landfill in Warren County, North Carolina (Schroeder et al., 2008). This was the time race was defined as a factor behind such unfair distribution of environmental burdens. The mobilisation of people against their right to clean, safe and healthy environment led this initiation to be regarded as environmental justice movement or environmental justice activism (Bryant, 1995; Bullard, 2000; Harvey, 1996; Pulido, Sidawi, & Vos, 1996).

In the UK environmental justices activism dates back to the late 1980s (Agyeman, 2002) and agitations for ethnic minorities to obtain access to recreation opportunities in the countryside (Elvers, Gross, & Heinrichs, 2008). According to Agyeman (2005), such barriers recreation opportunities in the countryside are regarded as environmental injustice as well. Also, in Germany, environmental justice issues rose first in debates on environmental health. Though a

substantial research was conducted on health inequality with respect to environmental diseases in 1990s (Heinrich et al. 1998 in Elvers et al., 2008). But the name environmental justice was not mentioned until 2001 when the term was first introduced as a new term encompassing social policy, environmental policy and public health in Germany (Elvers et al., 2008).

Moreover, reports on cases of environmental justice issues in many developing countries have also emerged. Typical cases are the blast of both the Union Carbide chemical plant in Bhopal, India, and the PEMEX liquid propane gas plant in Mexico City which killed thousands and injured millions resident nearby (Arturson, 1987; Rajan, 2001 in Schroeder et al., 2008). Additionally, the term began to become apparent in reports of the press on indiscriminate dumping of North American and European toxic waste materials in over a dozen different countries in Africa (Vir, 1989; McKee, 1996 in Schroeder et al., 2008).

The above historical perspectives of environmental justice and some evidence of its spatial occurrence inherently shows that environmental justice discourse is not limited to only rural context but also urban environment. It also encompasses the issues surrounding human relationship with the natural environment, our place of abode and place of work. It also covers issues about how structures could undermine the existence of not only marginalised human population but also the ecological resources and their accessibility. Though, the concerns surrounding environmental justice or injustice are not new but it has been defined in different ways to relate to series of geographical events or phenomena at different places and time

4.3.2 Definition of Environmental Justice

According to Schlosberg (2007), environmental justice is defined to include equitable distribution of environmental risks and benefits; fair and meaningful participation in environmental decision-making; recognition of community ways of life, local knowledge, and cultural difference; and the capability of communities and individuals to function and flourish in society.

Another comprehensive definition of environmental justice from the quarterly newsletter of the South African Environmental Justice Networking Forum highlighted by McDonald (2004) is that, environmental justice is about social transformation seeking to meet basic human needs and enhance people's quality of life in areas of economic quality, health care, housing, human rights, environmental protection and democracy. In view of this, the Environmental Justice Networking Forum (EJNF) links environmental and social justice issues in order to challenge the abuse of power which cause poor people to suffer from the greed of others (McDonald, 2004).

This goes to say that any form of social transformation that is skewed towards deepening economic inequality, exploitation, manipulation, health burdens, poor housing, human rights violation, environmental damage and its effects will be considered as environmental injustice. These are issues environmental justice advocates seeks to address. As noted by Schlosberg (2013), that environmental justice advocates insist on bringing attention to the environmental conditions in which people are immersed in their everyday lives and how they could realise their potentials or capabilities in a society. This statement is synonymous with one of the founders and intellectual pillars of environmental justice movement, Bryant (1995), that environmental justice is served when people can realize their highest potential. Environmental justice is supported by decent paying and safe jobs; quality schools and recreation; decent housing and adequate health care; democratic decision-making and personal empowerment; and communities free of violence, drugs, and poverty (Bryant, 1995 in Schlosberg & Carruthers, 2010). This is what this research seeks to do by typically examining the e-waste activities and the workers involved in Agbogbloshie in order to explain various forms of socio-environmental conditions that characterize their everyday lives which are defined as injustice. This will help to suggest appropriate and adequate solutions to the e-waste problems to ensure sustainable community and working environment where people can harness their capabilities for them to be free, equal and functioning.

4.3.3 The Concept of 'Environment' in Environmental Justice

There is no watertight or standard definition of environment in our academic discourse. The term environment has been conceived in different ways. Similarly, it should not be very surprising that the term “environment” is conceived diversely within the broad concept of environmental justice. In the early conception of environmental justice, the term environment was conceived as the wilderness and the big outside where the environment was regarded as a single natural entity without humans (Schlosberg, 2013; Robbins, 2012). This conception of environment was criticized with the recognition that the environment should be more broadly defined to include “*where we live, work, and play*” (Novotny, 2000 in Schlosberg, 2013 p.39). Thus, this broad definition of the term environment is “*unrepentantly anthropocentric in its orientation— placing people, rather than flora and fauna, at the centre of a complex web of social, economic, political, and environmental relationships*” (McDonald, 2004 p.3).

It should be noted that widening scope of the concept of ‘environment’ does not mean that environmental justice does not take into account the existence of endangered species or the

natural landscapes. Environmental justice movement also deals with the relationship between human beings and nature (Schlosberg, 2013).

It can be understood from the above construction that the definition of environment in environmental justice does not only encompass the concerns of the existing natural landscape but also concerns regarding human world. In view of this, environmental justice is framed to address various forms of injustice to humans and nature within the perspectives of structure-agency relationship and human-environment interaction respectively.

4.3.4 Defining '(in)Justice' in Environmental Justice

The concept of justice is a much contested term. So, there are varied definitions of what exactly is meant by justice in the literature. Similarly, the contestation of the term justice has also led to the diverse nature of the conception of environmental justice. However, in building the foundation for this research is not to provide a comprehensive definition of justice in the literature of the theory of justice provided by *Rawls (1971)*, *Barry (1995)*, *Young (2011)*, *Fraser (2000)*, *Sen (1985)* and *Nussbaum (2006)* but to uncover simply how justice or injustice has been or is used in environmental justice. Though their diverse theoretical postulations and definitions of justice reflect the use of justice or (injustice) in environmental justice movement (Schlosberg, 2007). It is also very important to stress on the fact that the various conceptions or definitions of justice below mirror the definitions of environmental justice outlined above. It should be noted that many environmental justice movements employ not only one but multiple conceptions of justice. This is particularly useful as these concepts of justice are inter-linked in one way or the other (ibid). Below are various ways by which justice is conceived in the discourse of environmental justice.

The early and central definition of justice of environmental justice was particularly limited to the issue of equity where mal-distribution or inequity in the distribution of environmental benefit and burdens was or is regarded as injustice (Low & Gleeson, 1998; Schlosberg, 2007). The injustice that fundamentally premised the environmental justice movement is that low-income and minority communities are exposed to a disproportionate risk from hazardous waste sites, workplace hazards, polluting industries, and other facilities potentially harmful to human health (Bullard, 2000; Harvey, 1996; Pulido et al., 1996; Schlosberg, 2007). Injustice also encompasses inequality in the distribution of benefits that are necessary for human existence (Agyeman, Bullard, & Evans, 2003; Hobson, 2004).

However, justice cannot be solely restricted to equity in the distribution of benefit and burdens but it could be defined to include the procedures and processes that influence such distribution. Distributive equity is absolutely central but it cannot answer who has a right to make a decision and by what procedures (Hunold & Young, 1998). This definition of justice of environmental justice would help to ask the question: who has the right to decide what for whom? We could also make an analysis that injustices may arise when individual superiors abuse their rights or authority in deciding for others; how their rights or authority, institutional barriers, structures and processes lead to various forms of inequality in a group or society (Schlosberg, 2007).

Again, in environmental justice discourse, justice is defined to include recognition of as well as respect for individual and communities, their cultural meaning and identity, local expertise, knowledge and their position in the social realm. It is argued that justice framed as equity or equality and recognition are closely connected. Equity could only be promoted if communities and individuals are given recognition regardless of their status in the society (Schlosberg, 2007). The manifestation of injustice, and one driving factor of unjust distribution, is a lack of recognition of group difference. Lack of recognition or misrecognition defined as injustice could be featured in various forms such as insults, disrespect, discrimination, degradation, and devaluation at both the individual and cultural level (Schlosberg, 2004; Tschakert, 2009). It damages the integrity of the marginalised and their image in the larger society (Schlosberg, 2004; 2007).

Misrecognition also constrains and harms people and prevents them from participating (Fraser 1998, 2000; Honneth 1995, 2001; Schlosberg 2004; Taylor 1994; Young 1990 in Tschakert, 2009). Misrecognition as element of injustice is seen “*as ‘status injury’, a social and institutional subordination and injustice that precludes disrespected identities and communities from participating as peers in social life*” (Fraser, 2000; 2001 in Tschakert, 2009 p.708). It abuses both the physical and psychological integrity of people or group of people (Schlosberg, 2004). Hence it is always very important that we eliminate it in the society. Harvey (1996), stresses that recognition can only be achieved by “*confronting the fundamental underlying processes (and their associated power structures, social relations, institutional configurations, discourses, and belief systems) that generate environmental and social injustices*” (Harvey, 1996 p.401).

Another defining element of justice of environmental justice is participation. Justice as participation refers to the meaningful involvement of all people irrespective of their status in decision making process, policies formulation and execution with regards to issues about the environ-

ment and their lives. It includes matters of fairness in process and regulation, inclusion in decision making and access to environmental information (Dunion, 2003; Hampton, 1999; Hunold and Young, 1998 in Walker, 2009). On the contrary, the injustice emerges when individuals and community are partially or virtually excluded from decision making process. Participation as justice is achieved when voice is given to the voiceless in expression of opinion in matters concerning their everyday lives (Schlosberg, 2007). This promotes the respect for diverse cultural perspectives and offering honour to people's cultural integrity (ibid).

Moreover, many movements of environmental justice draw on the conception of justice postulated by Sen (1993) and Nussbaum (2006) that focuses on the capacities or capabilities necessary for individuals or communities to fully function and flourish (Schlosberg, 2007; Schlosberg & Carruthers, 2010). In this context, justice is framed as the existence of basic needs that are capable to transform the lives of people. Justice is not only about distribution of goods but more particularly how these goods are transformed to enable individuals and communities flourish (Sen, 1985; Sen, 2005; Nussbaum, 2004 in Schlosberg, 2007). In other words, it focuses on how these distributions affect our well-being and how we function and not about mere distribution per se (Schlosberg, 2007). Viewed from the above, it could be said that any hindrances or barriers that interrupt those capabilities for individuals or communities to function well could be deemed as injustice (Tschakert, 2009).

It is very interesting to note that there is definite inter-linkages among the various conception of justice (i.e. equity, recognition, participation and capability) explained above. It is very difficult to discuss one aspect of justice without it leading to another. The possibility of achieving one concept or dimension of justice has a trickle-down effect on the others. For instance, equitable distribution of benefits is achieved if all people are recognized, fully and actively participated in the distribution and decision making process which eventually help them to realize their potentials and function well in the society. Similarly, there is also explicit relationship between inequity, misrecognition, lack of participation and capabilities as various elements of injustices (Schlosberg, 2007). If people or communities are experiencing inequity, then they are not recognised; they are discriminated and excluded hence they lack the capacities to function and flourish in the society which to large extent deepening their inequalities (ibid).

However, the definition of justice in environmental justice is not limited to the issues of equity, recognition, participation and capabilities of the humans. Justice could be extended to nature as well. Thus doing justice to nature is also found in the realm of environmental justice (Schlosberg, 2007). Such discussion of justice revolves around how exactly we are immersed in the

environment and how we exploit or manipulate our natural surroundings. This is a shift from defining and discussing justice in the social context to a situation where justice is applied to the treatment of the environment itself (Schlosberg, 2013). Agyeman (2005), insists on a conception of environmental justice that goes beyond socio-cultural impacts alone to the interactions between social and environmental communities. Thus various forms of damages that we inflict on the natural environment as a result of our activities could be regarded as injustices. “*When we interrupt, corrupt, or defile the potential functioning of ecological support systems, we do an injustice not only to human beings, but also to all of those non-humans that depend on the integrity of the system for their own functioning*” (Schlosberg, 2013 p. 44).

It is discussed above that there are multiple concepts of justice that characterize environmental justice in light with philosophical theories of justice. It is very possible that various forms of injustices could be experienced in numerous ways at once. I assume that various multiple injustices could be associated with e-waste processing activities in Agbogbloshie. Therefore, it is very necessary to examine these injustices in order to provide suggestive solutions to remedy them.

4.3.5 Factors behind the Production of Environmental Injustice

In addition to various definition of concepts outlined above, I also intend to present the factors that potentially cause various forms of environmental injustice.

The environmental justice literature focuses on social difference or social identities e.g. race, ethnicity, gender, age, class, religion, education, disability (Schroeder et al., 2008) as determinants of various forms of injustice. The main variable of social identity that cause unequal distribution of burden and benefit was race in most of the US-based research on environmental justice. However, the emerging literature challenges such arguments and reveals that other forms of social difference rather than race also cause environmental injustice (Debbané and Keil, 2004; Williams and Mawdsley, 2006 in Holifield et al., 2010). In addition to these social differences or identities, poverty is being identified as a central indicator of the presence of environmental bads in some community. Poverty could also cause unequal access to certain environmental benefits. Low-income groups are often neglected and marginalized in the distribution of benefit. They also receive the most burden of environmental hazards. They do not only lack basic needs, and sometimes live in unclean and unsafe places but also they are not recognized. They are discriminated, disrespected and excluded in the decision making process in the community or larger socio-political context (Agyeman et al., 2003; Bullard, 2000; Hobson, 2004).

Again, differences in the availability of resources and hierarchy of needs that individual or larger community desire to achieve first could cause environmental injustices. Using the Maslow's theory, researchers point out that minority groups are in a constant struggle to meet their basic needs (i.e. needs at the top of the hierarchy) and are not concerned with environmental quality and pollution issues and therefore would do everything possible to meet their basic needs (Sapat, Vos, & Thai, 2002).

Also, neo-liberal policies that generate certain economic and market forces may cause environmental injustices. Environmental injustices may result from the way global, national, regional and urban markets remain unregulated which permit favourable and unfavourable grounds for free trade (Castree, 2008a, 2008b; Heynen et al 2007 in Holifield, 2009; Schroeder et al., 2008). Moreover *“place specific policies and practices can have consequences that cross national boundaries, affect multiple scales, and extend across global networks. Even if intra-local practices or distributions can be conceived as “just” according to one or another set of criteria, they can result in unjust extra-local outcomes”* (Holifield et al., 2010 p.595). Furthermore, political and administrative structures through which some actors with certain level of unrestricted power operate may abuse their power which cause various form of injustices (Sapat et al., 2002).

From the above definitions of environmental justice (including environment and justice/injustice) together with its causes, I use e-waste processing activities as a good case of an urban activity that produces multiple injustices. In order to understand and explain in-depth how such injustices occur by outlining the actors involved, their differing roles, interest and powers, the research adopts the elements of Urban Political Ecology (UPE) to achieve such purpose.

4.4 Urban Political Ecology as a Theoretical Framework

Urban Political Ecology has emerged as an important and influential theoretical framework for environmental justice studies. Through the work of Swyngedouw and Heynen (2003) and others, Urban Political Ecology has not only laid out a clear theoretical and political agenda for addressing environmental injustice, but has also generated a rich and growing body of empirical research (Holifield, 2009).

According to Bjerkli (2013), Urban Political Ecology emerged from Political ecology which has been a highly dynamic theoretical approach for geographical studies on development (Zimmer, 2010). The origin of Political Ecology dates back to the 1970s when some commentators

including journalist Alexander Cockburn, anthropologist Eric Wolf, and environmental scientist Grahame Beahurst coined the term with a view of questioning access and control over resources (Watts, 2000).

However, the foundation and definition of Political Ecology was laid down and formulated by Piers Blaikie and Harold Brookfield in 1987 (Zimmer, 2010). It was broadly defined as an approach which seeks to combine the “*concerns of the ecology and the political economy*” (Blaikie & Brookfield, 1987 p.17) to understand and address the effects “*on people as well as their productive activities, of ongoing changes within society at local and global levels*” (Blaikie & Brookfield, 1987 p.21). The analytical aim of Political Ecology was to examine and understand the relationship between nature and society which produces environmental change through processes at different scale driven by uneven power relation (Robbins, 2012). But Political Ecology has evolved in many different directions. One of such newly formed Political Ecology is Urban Political Ecology (Bjerkli, 2013; Zimmer, 2010). The difference between them is not significant though they have a common theoretical toolkit (Bjerkli, 2013).

Urban Political Ecology has evolved over the last years to focus on specific spatial context. Researchers who employed Political Ecology skewed their attention to rural areas in developing countries on issues such as soil degradation, deforestation, conflicts regarding access to natural resources and protected areas, climate change, environmental entitlement, environmental protection and conflicts of livelihood strategies etc. (Zimmer, 2010). On the contrary, Urban Political Ecology focus on urban areas in developed countries and discusses issues like access and control of urban water, urban environmental politics, land use changes and urbanisation processes, urban risk, control over urban environment, urban environmental justices etc. (ibid). With an increasing urbanisation process in most cities in developing countries, urban political ecology could be useful research approach to study geographic phenomenon in urban areas in developing countries as well.

Urban political ecology is “*an integrated and relational approach that helps to untangle the interconnected economic, political, social and ecological processes that together go to form highly uneven and deeply unjust urban landscapes*” (Swyngedouw & Heynen, 2003 p.15). It focuses on both the social and ecological nature of urban environment. Thus it defines urban areas as being hybrid in character comprising of both physical and social environment with no clear-cut boundary and hence welded together (Zimmer, 2010).

It assumes that the social and physical environment which constitute an urban landscape is produced by the interconnected political, economic and cultural processes which produce spatially differentiated and highly uneven urban landscape (Heynen, Kaika, & Swyngedouw, 2006). These processes occur in the realms of power in which social actors strive to defend and create their own environments. It also premises that such produced social and environmental conditions are not independent of class, gender, ethnicity, or other power struggles. Those interconnected political, economic, social and cultural processes are identified at different level of scale (i.e. at global, regional and local levels) (Swyngedouw & Heynen, 2003) which produce socio-environmental conditions which favour powerful individuals and groups but to the disadvantage of the marginalized (Heynen et al., 2006).

Urban Political Ecology is purposefully determined to critically examine such uneven social and ecological conditions of a particular urban landscape by identifying actors and their agendas, and exploring their power relations (Bjerkli, 2013) in order to understand the changing socio-environmental conditions in an urban space. It assumes that unequal power relations shape the social and political configurations and the urban environment in which we live (Heynen et al., 2006). In view of this, it attempts to tease out who gains and who loses (and in what ways), who benefits and who suffers from particular processes of socio-environmental change (Desfor & Keil, 2004; Heynen et al., 2006). This helps Urban Political ecologist to devise plans or ideas that would determine what or who needs to be sustained and how this could be done (Gibbs, 2005; Heynen et al., 2006).

It is very imperative to summarize the above propositions and principles of Urban Political Ecology that had been teased out from the literature. It is shown that Urban Political Ecology focuses on the physical and social environment of an urban space with a particular emphasis on the examining how unjust social and physical urban environment are produced. It posits that there are different actors with different roles, interest and agendas as well as their distinct power relations which drive the various social, economic, political and cultural processes. The unequal power relations among these actors cause unjust physical and social conditions in a given context.

The research therefore intends to integrate the various definitions of environmental justice, the concept of environment and justice in environmental justice and factors behind the production of injustice. Again, it incorporates the various principles of Urban Political Ecology and readings on e-waste from the literature. This provides a useful foundation for the design of an analytical framework in order to explain the unjust social and environmental conditions of e-waste

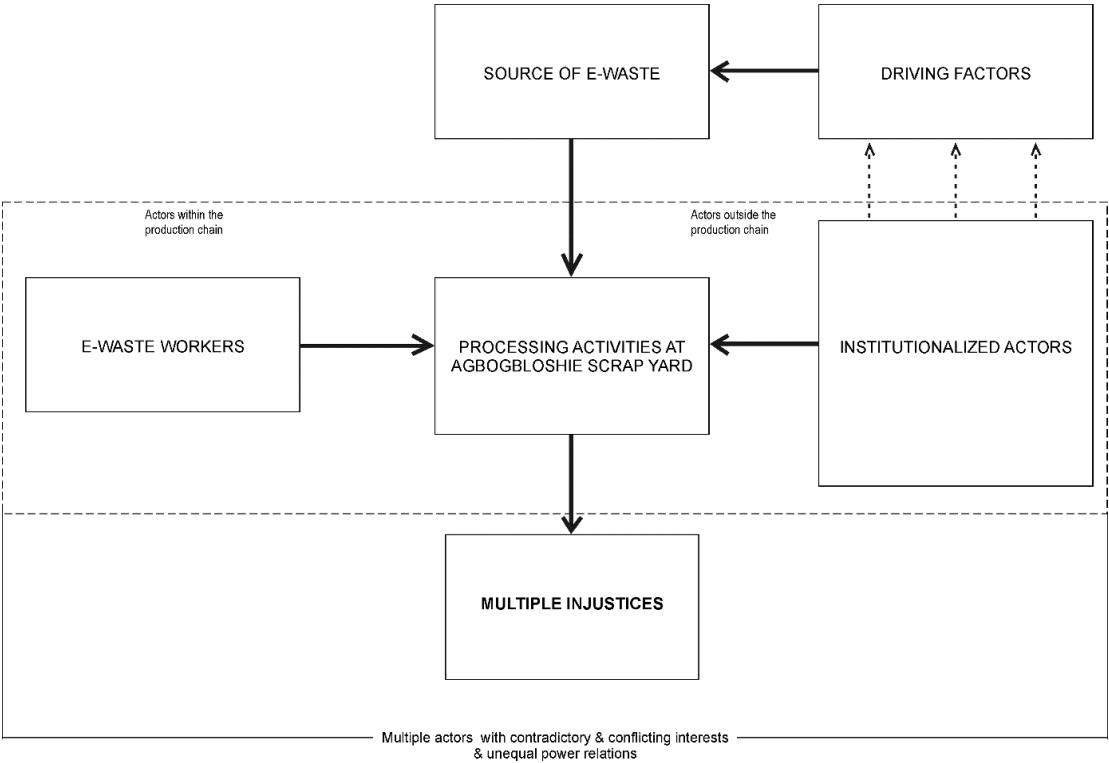
processing activities in Agbogbloshie. The subsequent sections therefore focus on the analytical framework of the research.

4.5 Analytical Framework

Below is a model that conceptualizes how e-waste processing activities, actors involved, their roles and powers cause unjust social and environmental conditions in Agbogbloshie-Accra. The model was developed after the collection of data. Based on the data collected, I integrated ideas from diverse concepts discussed in the preceding sections and combining them with the theoretical assumptions and principles of Urban Political Ecology to design the framework for the analysis.

Figure 2: Analytical framework

A model which conceptualises how e-waste processing activities, the actors involved, their roles and powers cause injustices in Agbogbloshie-Accra



Source: *Author's Construct*

The model conceives that e-waste is generated both domestically and internationally. It postulates that within the confines of Ghana, e-waste are generated domestically by the growing population especially in urban centers. Also, international sources of e-waste are those generated outside the international borders of Ghana. Those e-waste originating from both sources

find their way to Agbogbloshie Scrap Yard (Amoyaw-Osei et al., 2011; Grant & Oteng-Ababio, 2012). The model further intends to outline some of the various driving forces behind the flows of e-waste from the sources to Agbogbloshie. It believes that the integration of institutional system of Ghana in the world's free trade system causes the flow of e-waste to Agbogbloshie. Also, internal institutional challenges cause internal dumping of e-waste in Agbogbloshie.

With the aid of Urban Political Ecology, the model assumes that there are various multiple actors with conflicting interests and power relations intersecting between them. The e-waste workers are categorized as actors within the production chain with varied social background, experience, knowledge, asset and skill. They include collectors, dismantlers, burners, repairers or refurbishes and scrap dealers, middlemen and leaders of the GASDA. They undertake activities such as collecting, dismantling, burning, repairing or refurbishing and trading at Agbogbloshie scrap. On the other hand, international and national public actors are categorized as those actors outside the main production chain of e-waste recycling in Agbogbloshie. However, the model gives precedence to the institutionalized actors in some responsible institutions in Accra-Ghana. It is believed that these actors outside the production chain in Agbogbloshie through their roles and powers in administrative system, political and economic structures influence the e-waste flows and the activities of the e-waste workers in Agbogbloshie.

Moreover, the model posits that the roles and unequal power relations of e-waste workers operating at the Agbogbloshie Scrap Yard and the combined influences and practices of actors outside the production chain produce unjust social and environmental conditions in Agbogbloshie. Additionally, it assumes that there is unequal power relations between e-waste workers in general and various actors outside the main activities in Agbogbloshie and such unequal power relations create multiple injustices. These forms of injustices directly affect the living conditions of the e-waste workers and this in turn deepens their deprivations and marginalization. However, the model assumes that there is possibility that such influences, roles and power relations directed towards the activities of e-waste workers or among the e-waste workers within the production chain might produce some form of justices that could be beneficial to the e-waste workers. The model therefore attempts to espouse Urban Political Ecology perspectives on environmental injustices of e-waste activities in Agbogbloshie.

4.5.1 Analytical steps

The research will use the framework of the model and its conceptualization to analyze the data that are directly produced from the field and those that are obtained from secondary sources. Using the framework, the first step is to identify the sources of e-waste and explain the flows

to Agbogbloshie Scrap Yard. I will also examine the reasons behind the flows to the scrap yard. This will help me to understand the complex integrated processes at different context (thus both domestic/local and international) that are influencing the e-waste inflows to Agbogbloshie.

The second step is to examine the roles and practices of the e-waste workers and their power differences. To do this, I will evaluate their social background and how they organize their activities in the production chain at the Agbogbloshie Scrap Yard. Then I will also explain the roles and powers of actors outside the e-waste management chain (i.e. institutionalized actors) and how their action and inactions affect the e-waste workers and their activities.

The final step is to assess the various forms of injustices in Agbogbloshie. Here again, I assume that these injustices are defined in the form of inequality, misrecognition, exclusion and environmental pollutions. I will try to uncover these forms of injustices by examining how powers emanating from actors outside the processing site influence the social conditions of the e-waste workers, their processing activities and the environment in Agbogbloshie. Also, I will analyze how the roles and power differences among the e-waste workers produce some form of injustice in Agbogbloshie.

4.6 Conclusion

It is hoped that these three analytical steps will help to understand and explain how roles, practices and powers of multiple actors from interact with the processing activities of e-waste in Agbogbloshie Scrap Yard to produce various forms of multiple injustices or unjust social and environmental conditions. It should be noted that in the process of revealing various forms of injustices, there is possibility that some form of justices may be highlighted.

CHAPTER FIVE: TRACING THE SOURCE AND UNCOVERING THE DRIVERS OF E-WASTE FLOWS TO ABOGBLOSHIE

5.1 Introduction

It is very evident that Agbogbloshie in Accra-Ghana is experiencing the rising tides of e-waste generation. In an attempt to understand the Urban Political Ecology perspectives of injustice surrounding the e-waste sector and subsequently proposing strategic initiatives to curtail the e-waste menace in the area. This chapter analytically tries to mark the course of e-waste flows. This is critically done by invoking one of the selected essential principles of Urban Political Ecology highlighted by (Heynen et al., 2006) and which was also conceptually framed within the analytical framework in the preceding chapter. The selected principle or element of Urban Political Ecology upon which the analysis is developed in this chapter is that spatially differentiated and highly uneven urban space is produced by interconnected processes from different scale levels. Here, this principle speaks to the issue of how integrated processes cause uneven geographical phenomenon. In the same vein, I explain how integrated factors influence the flow of e-waste to Agbogbloshie. This analytical explanation provides the foundation to explain further in the subsequent chapters, the unevenness (justice or injustice) characterizing the e-waste management or recycling activities in Agbogbloshie.

Drawing on the analytical framework, the element of Urban Political Ecology is analysed and discuss in two major sections in this chapter. The first section of this chapter explores the spatial origin and generation of e-waste flows in Agbogbloshie where the various types or categories of e-waste are identified. The sources (i.e. internal sources and Trans-border shipments) are also discussed in an attempt to illuminate the linkage between the sources and the informal e-waste management or recycling in Agbogbloshie. The second section also provides the reasons or factors that drive the trans-border shipments and internal movements (or dumping) of e-waste in the area as a way highlighting the integrated processes producing a distinct social and environmental conditions in Agbogbloshie. These are practically done using empirical data from the field and data from the published literature and other relevant documents from the secondary sources.

5.2 The Origin and Generation of Waste of Electrical and Electronic Equipment (WEEE)

5.2.1 Types of E-waste found in Agbogbloshie

It is revealed that the e-waste processing activities as a segment of the informal scrap recycling industry in Agbogbloshie sustains its production through the persistent flow of e-waste products. These e-waste materials serve as the *raw materials* for the industry. In Agbogbloshie, one could find wide varieties of e-scrap such as personal computers, TV monitors, mobile phones, printers, iPad, photocopying machines, radio sets, audio amplifiers, refrigerators, microwaves, washing machines, air conditioners, heating regulators, electrical fan, discharge lamps etc. These e-scrap (raw materials) found during fieldwork activity are grouped based on WEEE categorization according to the EU directive on WEEE (EU, 2002). This is illustrated in Table 2 below.

Table 2: Examples of E-waste found in Agbogbloshie

No.	Category	Label	Ex. of WEEE/E-waste found in Agbogbloshie
1	Large household appliances	Large HH	Air conditioning units, refrigerators, washing machines, microwaves, dryer
2	Small household appliances	Small HH	Rice cookers, blender, electrical fans, electric iron, kettle, electric heater
3	IT and telecommunications equipment	ICT	Mobile phones, computers, printers, copying machines
4	Consumer equipment	CE	television sets, radio sets, audio amplifiers, speakers, iPad MP3s, game console, camera, DVD player
5	Lighting equipment	Lighting	Electrical bulbs, dischargeable lamps
6	Electrical and electronic tools (with the exception of large-scale	E & E tools	Drills

stationary industrial tools)			
7	Toys, leisure and sports equipment	Toys	Not Available
8	Medical devices (with the exception of all implanted and infected products)	Medical equipment	Not available
9	Monitoring and control instruments	M & C	Not available
10	Automatic dispensers	Dispensers	Not available

Source: EU, 2000; fieldwork, 2014.

The table above displays only various e-waste products found in Agbogbloshie at the time of the fieldwork. This indicates that some particular type of e-waste material were found at the time of the fieldwork while others were not available. For example some e-waste materials under the various category numbered as 7, 8, 9 and 10 above were not found. This does not mean that e-waste materials of such categories are not recycled in Agbogbloshie.

However, at Agbogbloshie scrap yard, the largest quantities of e-scrap being recycled are those of the electrical and electronic products manufactured by the IT industry. They include computers, iPad, MP3, mobile phones etc. According to one dismantler, he indicated that, “*we get a variety of e-scrap almost every day. It is not that we get one particular scrap all the time. But I can tell you, most of the time you could see people dismantling computer components here*” (Musa, 19 years old teenager).

This assertion confirms the finding of Amoyaw-Osei et al, (2011) that PCs forms the bulk of e-scrap collected for recycling in the scrap yard. Also, it is indicated that “*the major source of e-waste is the IT industry, which, until just a few years ago, was perceived as a totally clean engine of growth in comparison to the much-maligned chemical process industries*” (Premalatha, Tabassum-Abbasi, Abbasi, & Abbasi, 2014 p. 1578) Thus, the rapid growth of the information technology (IT) industry has indeed tipped the scales of e-waste production (ibid). It is therefore not surprising that these IT products particularly computers and mobile phones constitute the bulk of e-junk in Agbogbloshie. This is because both mobile phones and computers have shorter average life span of 2 and 3 years respectively than other electrical and electronic

equipment such as refrigerator, air conditioner, photocopier, radio sets, washing machine, electric cooker, microwave etc. with average life spans ranging between 7-12 years (Betts, 2008). The computers and mobile phones with shorter life spans are continuously replaced by new ones immediately the old ones reach their end-of-life and also as new models create obsolescence of older models. On the contrary, other industries such as electrical and electronic industry, automobile industry, building and construction industry, hospitality industry etc. may also contribute to the generation of e-waste.

Additionally, though computers (PCs) constitute the bulk of e-waste that flood Agbogbloshie scrap yard but we cannot rely significantly on such evident to indicate that informal e-waste workers are selective and have strong preferences for only discarded computers. Again, even though e-scrap from IT and telecommunication equipment contain a higher amount of precious metals than scrap from household appliances (Tanskanen, 2013; Wang & Gaustad, 2012). However, there are some e-scrap from household equipment such as air conditioning units and refrigerators which are still preferred by the informal recyclers. This is because they also contain high value of metals such as copper and iron. Dismantling those e-scrap are sometimes laborious and cumbersome. However, it does not deter informal recyclers from obtaining these scrap and recycling them because of the huge economic returns that are accrued after processing and selling the precious metals. Thus, in the pursuit of making economic gains for the sustainability of well-being, informal recyclers do not specifically hunt for a particular e-waste product or WEEE that are composed of higher amount and varieties of precious metal. Instead, they search for and recycle whatever e-scrap they can get, sell them to make money for their livelihood sustenance. This evidence can be highlighted in the words of one respondent below:

.....Here, you don't look for scrap (referring to e-waste) that you think you can make a lot of money from them. If someone brings electric fan or electric heater or computer to you, you can't say you won't buy them. So you will wait till you get air conditioners before you start your business. If you do that you can never make any profit. You are a dismantler so you deal with whatever scrap you get. If you are lucky enough to get e-waste materials mixed with other e-scrap including air conditioners and fridges so be it (Ghanim, a 27 years old dismantler).

It should be noted that the ability to obtain these materials and recycle them to recover precious metals depends on the financial capability and knowledge of the individuals. More details of this is discussed in chapter six.

5.2.2 Internal Generation of E-waste

E-waste workers in Agbogbloshie claim that they obtain most of these WEEE within the city and other places of the country. Within the city of Accra, these informal workers push trucks from ‘house-to-house’, mechanic and repair shops, dump sites and even on the streets in search of these materials. Also, apart from households that consume and generate e-waste, manufacturing companies, cooperate institutions like the banks, private and public companies, government agencies, departments and ministries are some of the major sources from which WEEE are obtained by the informal recyclers in Agbogbloshie. These institutions, companies or individual e-waste generators could cart these e-junks themselves and sell them to the informal workers. Some experienced and relatively wealthy informal e-waste workers travel beyond Accra to other parts of the country’s cities, towns and villages in search for e-scrap. Some of these institutions and companies have strong ties with the informal workers and frequently inform them (either through personal contact or telephone conversation) of the e-waste they have generated that needed to be discarded. For instance, the Secretary of the Greater Accra Scrap Dealers Association asserted that:

.....there are manufacturing companies or other companies that have these materials within their yard or store. These companies come to the scrap yard to inform us that they have some of these materials for sale. So some of our boys go there and negotiate the price and buy them and then bring them to the scrap yard. And then also some of these government agencies, the ministries...etc., they may have some of these materials for sale where we will go there, we negotiate, buy and bring them to the scrap yard (Ali, the Secretary of GASDA).

The comments from the respondent above clearly indicate the close network interlinking the informal e-waste workers (and their recycling activities) and the sources (consumers and generators) of e-waste such as the households, private and public institutions and companies either local or transnational. These persistent interactions and linkages have made Agbogbloshie scrap yard a form of a ‘*de facto informal scrap industry*’ whose operations are interminable and consistently absorbing the WEEE generated within and beyond Accra.

This form of interconnectedness between the internal generators of e-waste and informal e-waste workers brings us to the discussion of the nexus between the informal recycling industry in Agbogbloshie and contribution to development in Ghana. The informal e-waste recycling activities contribute to the improvement of sanitation in the city and nationwide and therefore promoting a healthy society. They also reduce the huge cost burden of managing these waste

by the state and clearing out the mess (the e-waste generated) created by the citizens and institutions. For instance in Vice Chairman of Greater Accra Scrap Dealers Association commented that

We are even helping them to clean the city by collecting and managing these waste just to get something for ourselves. Tell me, do they have the capacity to manage these huge quantities of waste that are generated in the city? Without us, the city would be a mess and uninhabitable.

It is also undisputable to argue that the informal recycling industry generates employment opportunities not only for workers from the north of Ghana, but also for other inhabitants of Agbogbloshie. The recovery of valuable metals such as copper, iron, aluminium, lead etc. by the informal recyclers serve as raw materials for the local industry. The benefit of recovering these valuable metals and importing them has global significance as it reduces the pressure on the environment as a result of intensified mining of these minerals worldwide (Prakash et al., 2010). Moreover, the dismantling of WEEE provides spare parts or components for repair services that are patronized by the urban dwellers.

Conversely, the dumping and recycling of e-waste in Agbogbloshie has derogatorily typified the area as a notorious site. But the source of e-waste is not only limited to those generated in Ghana. There are also e-waste that are transported across borders to Ghana. Hence, I turn my attention to the trans-border shipments of e-waste.

5.2.3 Trans-border Shipments of E-waste

E-waste flows to Agbogbloshie for recycling are also sourced outside the geographical or political boundaries of Ghana. Although less information were obtained from the e-waste workers at the recycling site regarding trans-boundary flows of e-waste materials. However, comprehensive synthesis of data from the secondary sources together with data from stakeholders in Ghana such as Ministry of Trade and Industry (MOTI) and CEPS indicates that there exist persistent trans-border movement and dumping of WEEE in Agbogbloshie.

There is a rising mass movement of electrical and electronic equipment (EEE) to Ghana which occurs both intra-regionally and inter-regionally. According to Ministry of Trade and Industry and Customs Excise and Preventive Service, these EEE products include brand new equipment, second-hand products and discarded or end-of-life equipment (e-waste) of which majority of them constitute computers. It is revealed that computers which form the bulk of e-waste stream in Agbogbloshie are exported from countries such as Canada, United States, Japan as well as

countries in Europe. Those countries are internationally recognised as rich or developed countries and members of OECD. Thus the exportation of EEE from these countries constitutes inter-regional flows of EEE to Agbogbloshie. The most important exporting region is Europe followed by the United States (Amoyaw-Osei et al., 2011; Grant & Oteng-Ababio, 2012) though the US is noted as the largest consumer of EEE worldwide (Premalatha et al., 2014). China and India are emerging economies but trends in movements of goods shows that they have become the original sources of EEE and WEEE. This not surprising because China is the largest manufacturer of EEE globally (Widmer et al., 2005).

Most of these EEE that are transported from OECD countries (most especially US and European countries) are used or second-hand electronic products that have lower life span but could be used by consumers. There is high demand for these second-hand or used EEE because they are cheaper to purchase as compared to the brand new EEE (Amoyaw-Osei et al., 2011). It is logical that high consumption of these imported second-hand or used EEE by the population leads to huge internal generation of e-waste within shorter period of time. The generated e-waste are subsequently obtained by the e-waste workers and dumped at the recycling site in Agbogbloshie. Therefore, it could be argued that international or trans-border flows of EEE that are mostly second-hand products exacerbate internal generation and dumping of e-waste in Agbogbloshie. This argument confirms a report produced by Schlupep et al. (2011) that the rising tides of E-waste is generated by domestic consumption of new and used electrical and electronic equipment. The report further establishes that high volume of e-waste generated by such domestic consumption is influenced or fuelled by persistent flows of used equipment from industrialized countries. Also, the inter-regional flows of used EEE from these rich countries are not only economically driven by the importers (thus to sale and make profit) but also some used enter the ports of Ghana in the form of donations to schools and other training institutions (Amoyaw-Osei et al., 2011).

Moreover, some of the second-hand EEE especially computers that reach Tema harbour (the most prominent international harbour in Ghana) are non-functioning and non-repairable after testing them. Although in the process of exportation, they are indicated as second-hand EEE portraying that they are functional and usable (Amoyaw-Osei et al., 2011). These non-functioning used EEE are offered for sale and then purchased by e-waste recyclers in Agbogbloshie. Even there are occasions where the processes of transporting the EEE (whether second-hand, brand new ones or e-waste/discarded ones) are illegally facilitated. The EEE that occur in illegal processes are sometimes confiscated by CEPS which are afterwards offered for sale and hence

purchased by e-waste workers in Agbogbloshie. This is highlighted by one respondent that *‘from the Tema harbour there may be certain auction of goods from CEPS where our people will go and then buy them and bring them to the scrap yard’* (Anonymous: E-waste worker at the scrap yard).

Additionally, there is intra-regional movement of e-waste products among countries within sub-Saharan Africa. This makes Agbogbloshie as a destination point of e-waste flows within the intra-regional network. This finding confirms that of Lepawsky and McNabb (2010) to refute the mere conventional notion that the burden of e-waste in most developing countries is promoted by consistent flows of WEEE from most developed countries. According to CEPS and also highlighted by Grant and Oteng-Ababio (2012), high volume of used computers are transported from South Africa. These used computers are those generated within the internal Southern African markets and those accumulated at the port of Durban. Some significant quantities also comes from Nigeria through Lagos and from Tunisia via Bizerte. Lesser quantities moves through Dakar, Senegal and Mombasa, Kenya. We may mistakenly be tempted to understand that these are really e-waste generated and transported within Africa (Grant & Oteng-Ababio, 2012). However, these ports sometimes function as major trans-shipment terminals of e-waste for exporters to circumvent the provision of the Basel Convention which critically attempts to govern the trans-boundary movement of e-waste exports from developed to developing countries (ibid).

As discussed above, the e-waste flows to Agbogbloshie scrap yard is as a result of domestic consumption of new and especially used EEE. However, there is also trans-border shipment of used EEE to Agbogbloshie which occur both inter-regionally and intra-regionally. The above analysis confirms the findings of Schluep et al. (2011) that the trans-border shipment of new and used EEE especially from OECD countries fuels and exacerbates the domestic or internal consumption and generation of e-waste which are dumped in Agbogbloshie for recycling.

With the aid of the analytical framework, I was able to establish the linkages or relationship between the sources or origin of e-waste and the destination point of Agbogbloshie. In the subsequent section, I try to provide the reasons or factors that drive the trans-border shipments and internal movements or dumping of e-waste in the area. This helps to understand the integrated processes producing such an urban landscape of Agbogbloshie as Urban Political Ecology seeks to unravel.

5.3 The Driving Forces behind the Flow of WEEE to Agbogbloshie

Based on the field and secondary data, this section explains the factors driving the flow of WEEE to Agbogbloshie. With respect to this study and underpinned by the theoretical approach of UPE (conceptualised in the analytical model), these factors are discovered as the integrated processes that promote the movement of WEEE which produce a distinctive urban space of Agbogbloshie as an informal e-waste recycling site. The factors are broadly discussed as causes of both the internal generation and trans-border shipments of e-waste/WEEE flows to the destination place of Agbogbloshie. These factors are specifically explain below.

5.3.1 Domestic Factors of WEEE flows

The conscious initiative by the government of Ghana to implement policies and programmes to bridge the ‘digital divide’ (i.e. the disparity between Ghana and developed nations in the adoption of information and communications technology) is one of the factors accounting for the digital dumping in Agbogbloshie. This finding is also highlighted by (Azuka, 2009; Breivik, Armitage, Wania, & Jones, 2014; Williams et al., 2008) that such desperate initiatives have been adopted by most African countries to close the gap in ICT that exist between them and industrialized countries and hence causing the flows of used computers. It should be noted that this deliberate public policy is also triggered by other social and economic factors in the country.

According to a personnel from Ministry of Trade and Industry (MOTI), Ghana experience a rapid increase in the importation of used computers after 2004 when ICT policies was executed to revolutionize the public and the private sector. The underlying motive behind the implementation of policies to bridge the digital divide is to accelerate development in Ghana. ICT is seen not only to connect the country to the global world but also to ensure effective and efficient operation of activities both in the private and public sector. It is believed that ICT would ensure quality delivery of education, health and improve communications (Amoyaw-Osei et al., 2011) One of the programmes executed by the Government of Ghana (GOG) as part of the policy to ‘bridge the digital divide’ is the ‘reduction of the import duty to zero on used computers’ (also highlighted in Grant and Oteng-Ababio, 2012). Other policy programmes such as the one laptop per child initiative as well as the laptop per household project were also adopted. These programmes create conditions for increased consumption of used computers and high e-waste generation rate for which Agbogbloshie becomes a dumping site. It could be argued that these policy programmes were implemented without taken into considerations the adverse consequences of digital dumping which is now persisting in Agbogbloshie (ibid).

More so, there is unregulated and unrestricted import regime for second-hand EEE. Though some level of restriction is imposed on some used EEE. For instance, there is restriction on the importation and sale of used air conditioners, refrigerators, refrigerator-freezers and freezers by LI 1932 (2008) (Amoyaw-Osei et al., 2011). However, despite this restriction there is no enforcement leading to persistent influx of used functioning and non-functioning EEE into the country which are subsequently dumped in Agbogbloshie. It is argued that large volume of e-waste could therefore enter the country under the guise of second-hand EEE without restriction or detection as a result of such unrestricted imports for second-hand EEE (ibid)

Another factor driving the dumping of e-waste is non-existence of laws for the management of e-waste in Ghana. It is revealed that currently, Ghana do not have laws that would safeguard proper management of e-waste. Though e-waste is categorized as part of municipal solid waste but is specifically known to be a special waste among the municipal solid waste stream in Ghana. At the time of formulating laws for the management of solid waste, e-waste did not emerge, hence it was not taken into account. Similarly, a personnel from Chemical Control and Management Centre (CCMC) of Environmental Protection Agency asserted that

Though there is a law in Ghana (i.e. Environmental Protection Agency Act 490, 1994). This law is somehow related to WEEE. It provides us the mandate to regulate, coordinate and manage the environment against any hazardous substances in a scientifically acceptable manner. But the law does not clearly make specifics with respect to e-waste. So that's the problem we have now.

This means that the absence of clear-cut definition of national legislation on e-waste has made Ghana and Agbogbloshie for that matter an easy access point of WEEE dumping. Moreover, according to Amoyaw-Osei et al., (2011), though Ghana has ratified the Basel Convention (i.e.an international convention which prohibits the trans-boundary movements of hazardous wastes and their disposal). But the incorporation of its provisions into national legislation and subsequent applications to ban used EEE and WEEE imports to Ghana could have adverse implications for Ghana's ICT Policy (ibid). Hence, the existence of unregulated flow of used WEEE to Ghana which are dumped in Agbogbloshie after their end-of-life. Also, another interesting finding is that, there exist institutionalized actors (see Chapter 6) but none of these actors is legally mandated to solve the problems of e-waste processing activities in Agbogbloshie. Such institutional deficiency has create some level of passivity which promotes movements of WEEE to the scrap yard.

Additionally, certain socio-economic conditions stimulate the dumping of WEEE in Agbogbloshie. To begin with, it is discovered that there is high demand and consumption of used EEE

as compare to the brand new ones. Most Ghanaians have high purchasing power for second-hand EEE as a result of their cheaper prices at the market. The inability of many Ghanaians to afford expensive brand new EEE and the development of taste for cheaper used EEE encourage the inflow of large volume of used EEE to be discarded in Agbogbloshie within a short period of time after their consumption.

Furthermore, high level of unemployment is also intensifying informal e-waste recycling activities in Agbogbloshie. Since the reuse and recycling of WEEE is a source of employment for many unemployed youths, the e-waste has become a form of livelihood resource around which employment is continuously generated. As a result of this, there is pervasive interaction between the sources of e-waste and the destination point of the informal e-waste recycling activities. E-waste workers in Agbogbloshie are mostly unskilled and therefore find e-waste business as a means to escape from abject poverty. They always ply any possible access route to the source of obtaining the e-waste materials. These materials are recycled to extract valuable metals which are subsequently sold or use for repair services for attainment of profit to make a living. This intensifies the flows of e-waste to Agbogbloshie. Similar argument is highlighted by Breivek et al., (2014 p.8735) that the “*export of used EEE and e-waste to less affluent regions also represents a reallocation of resources as repairable equipment, spare parts, raw materials, and valuable metals generate substantial post consumption economic activity*”. Therefore, it would be sheer error to dispute the fact that high level of unemployment characterizing the Ghanaian population contributes to constant influx of WEEE to Agbogbloshie.

5.3.2 External factors of WEEE flows

It is discussed above that various political, socio-economic processes or factors cause the internal generation and subsequent dumping of e-waste in Agbogbloshie. However, it is very important to also reveal and explain some factors or processes that create conditions for the trans-border flow of WEEE to Agbogbloshie.

It is indubitable that human well-being has been enhanced through the advancement in ICT, electrical and electronics engineering. However, the creation and proliferation of e-waste is as a result of technological irresponsibility on the part of the manufactures of EEE. Manufacturers of EEE are consistently producing non-upgradeable products with limited life spans a “*stratagem referred to as planned obsolescence*” with the motive of making huge industrial revenue through repeated sales (Azuka, 2009 p.97, <http://www.greenpeace.org/international/en/publications/reports/green-electronics-survey-2/>). Such industrial strategy has contributed to increased generation of e-waste mostly by US and EU which consumed most of the worlds’ EEE

(Premalatha et al., 2013). By principle, manufacturers of EEE and generators of WEEE or e-waste should take full responsibilities of the disposal of e-waste in environmentally sustainable manner (i.e. according to the principle of Extended Producer Responsibility-EPR) (Widmer et al., 2005). The inability of manufacturers to adhere to this principle cause persistent exportation of WEEE from place of generation especially (from rich countries) to destinations points in most developing countries like Ghana's Agbogbloshie in Accra. There has been existence of international laws that seek to govern the trans-boundary movement and disposal of e-waste. However, empirical findings from secondary sources indicate that flaws or limitations of these international laws have created favourable conditions for interregional e-waste flows to Agbogbloshie (Azuka, 2009). A typical case is the Basel convention that governs the trans-boundary movement of hazardous wastes from rich countries to poor countries and management of their disposal. However, the provisions of the convention does not strictly proposed a restriction on trans-boundary movement of e-waste (Lepawsky & McNabb, 2010; Azuka, 2009). Its provisions create a scheme that requires mutual agreement between rich and poor nations to be reached before any trans-border movement of hazardous waste is actualized (Azuka, 2009). Moreover, it provides that trans-border movement of hazardous wastes is allowed where the importing countries has the technical facilities and expertise to dispose these waste in an environmentally sound manner (ibid). How should this provision be formulated knowing that there is unequal distribution of technology where most of the poor regions lack technical facilities and expertise? The lax nature of this provision actually promotes trans-border movement of e-waste. Though the Basel Amendment (thus the Basel Ban which seeks to impose outright ban on the trans-boundary movement of e-waste) has been adopted but it has not been entered into force (ibid).

Based on the flaws of the Basel Convention, it can be argued that there is no point of accusing United States of being reluctant to ratify the convention. On the contrary, it is argued that:

the US government has intentionally exempted e-waste within the Resource Conservation and Recovery Act, from the minimal laws that do exist (requiring prior notification of hazardous waste shipments) to protect importing countries. When questioned, officials at the United States Environmental Protection Agency (EPA) admit that export is very much a part of the U.S. E-waste disposal strategy and the only issue of concern for the U.S might be how to ensure minimal environmental standards abroad (Puckett et al., 2002 p.3).

Similarly, the US and Canada have refused to follow suit of the European nations to define e-waste as hazardous waste. Rather e-waste are being defined as special waste and are excluded from the domestic hazardous waste regulations convention (Ladou & Lovegrove, 2008).

Furthermore, the Basel Protocol on Liability and Compensation for Damage resulting from such trans-border movements has even worsened the situation. Its provisions encourage dumping of hazardous wastes but liabilities are assigned and compensations are given to the affecting nations suffering from the trans-border dumping of waste especially from rich countries (Choksi, 2001). In fact, we are yet to see whether some level of liabilities and compensation are being executed to affected nations. More so, it will be very debatable to say that such compensations can cover up the damages caused.

Moreover, inability of producers in rich countries to adhere to strict environmental rules governing the disposal and management of toxic materials like WEEE also cause the inter-regional WEEE dumping. Rich countries have strict environmental rules to protect their environment. Exporting e-waste provides producers of EEE and generators of WEEE with the opportunity of complying with the legal requirement of their countries (Azuka, 2009; Puckett et al., 2002).

Another reason that influences the trans-border flow of e-waste is the high cost of disposing or managing e-waste in the place of origin especially in the rich countries where most of the EEE are produced and WEEE generated. Such high cost of e-waste disposal does not only include the design of management strategies but also investment in advanced technological infrastructure for management of e-waste in an environmentally sound manner (Azuka, 2009; Puckett et al., 2002). Manufacturers of EEEE and generators of WEEE in rich countries fails to take the responsibility of the post-consumption disposal of WEEE. They prefer to export the WEEE with the intention of escaping from the high cost of e-waste management as well as making profit with no regards to the consequences that may evolved (ibid). It is believed that it is profitable to transport and dispose WEEE to places like Ghana-Agbobloshie due to the fact that Ghana like any other developing country has cheaper labour cost and non-existence of rules governing the management of e-waste as a hazardous substances.

Also, the trans-boundary movement of WEEE is motivated by sheer economics (Azuka, 2009). E-waste are seen as resources from which precious metals such as gold, iron, aluminium, copper, lead etc. are 'mined'. There is growing market for valuable materials recovered from WEEE. This intensifies and perpetuates the rising trade in the export of WEEE to Agbobloshie. There is also a growing market for the importation of recoverable metals. Though large quantities of recovered metals from WEEE in Agbobloshie are now being patronized by the local companies. This is due to the directives by Ministry of Trade and Industry to protect the local manufacturing companies which depend on these recovered metals especially for the production of building and construction materials such as ion rods, roofing sheets etc. Some local

companies also used these metals to manufacture households cooking equipment such as pots, knives, spoons etc. Hoes and cutlass are also made as livelihood assets for farming. However, despite the directives by Ministry of Trade and Industry to ban the import of recovered metals, substantial volume leaks to countries outside the geographical boundary of Ghana through fictitious means. Therefore, large market created by the exportation of e-waste, importation of precious metals from e-waste, consumption of cooking equipment by households, demands for building and construction materials and agricultural production equipment contributes to the influx of e-waste to Agbogbloshie.

5.4 Conclusion

The explanations in this chapter have created deeper insight about how the consumption of EEE and generation of e-waste lead to informal e-waste collection and trade in Agbogbloshie. The chapter also highlights the essential developmental impacts of the informal e-waste management in Agbogbloshie. It is also very intriguing to understand how e-waste management and trade in Agbogbloshie scrap yard is part of the global transnational economy through various integrated processes. It is very essential not to limit ourselves to only the processes or factors that account for trans-border movements of e-waste. There are also domestic factors in Ghana that also account for the influx of e-waste in Agbogbloshie. Conclusively, it could be argued that the persistence movement or dumping of e-waste in Agbogbloshie is attributable to global governance in the management of e-waste along the production chain of EEE, consumption of EEE and disposal of e-waste. In as much as it is very essential to understand the flows of e-waste to Agbogbloshie, it is equally relevant with respect to the objective of the research to unpack the informal e-waste management practices in Agbogbloshie. In the subsequent chapter, the research seeks to untangle the roles, practices and powers of actors in the e-waste business in Agbogbloshie.

CHAPTER SIX: UNTANGLING THE ROLES, PRACTICES AND POWERS OF ACTORS IN THE E-WASTE INFORMAL ECONOMY OF AGBOGBLOSHIE

6.1 Introduction

The purpose of this chapter is to critically understand the informal e-waste management activities in Agbogbloshie. In view of this, the chapter draws on the perspectives of Urban Political Ecology to identify actors and elucidate their roles, practices, power relations and differences in the e-waste sector. Here again, I am guided by the analytical framework to categorize these actors as those who actively engaged in the actual e-waste processing activities (i.e. the informal e-waste workers in the main production chain) and those institutionalised actors outside the recycling site. I discuss the background characteristics of the informal e-waste workers, their roles and practices in e-waste management In Agbogbloshie. I also discuss the influential roles of Greater Accra Scrap Dealers Association as the mouthpiece of all the e-waste workers in the region. The roles of institutionalised actors in the e-waste sector are also outlined. Finally, I examine the power differences and relations among the various actors in the e-waste sector.

6.2 Identification of Actors in the E-waste Economy

The study identifies main actors in e-waste management activities in Agbogbloshie scrap yard as informal e-waste recyclers or workers. They are e-waste collectors, dismantlers, burners, middlemen, scrap dealers, and repairers. They organize their activities around e-waste products that are generated domestically and those that move across the international boundary of Ghana to Agbogbloshie. The e-waste management activities of these informal workers are interlinked in a form of production chain with the motive of recovering and selling valuable materials for economic gains. The e-waste management or processing activities encompass collection, recycling (i.e. dismantling and open burning), disposal, repairing or refurbishing and trading. Moreover, apart from these informal workers, there are also other actors who are part of the e-waste management system. They are institutionalised actors in some public institutions whose actions and inactions influence the e-waste processing activities in Agbogbloshie. Apart from these, there are also international actors who in spite of their geographical distance exert some influences far distance. As discussed earlier on, they could greatly cause trans-border shipments of WEEE and used EEE to the country. Also, these international actors could influence the market prices of recovered metals. However, the scope of the research does not intend to identify these international actors and specify in depth their influential roles.

6.2.1 Informal E-waste Workers and their Socio-Demographic Characteristics

The study captures various characteristics of e-waste workers in Agbogbloshie during the field-work interviews. They include age, gender, education, nationality, ethnicity, marital status, religion, residential status, economic status, reason of engagement, mode of entry and duration in e-waste business. These variables influence their operational activities. The variables also determine the powers, roles of the e-waste workers and how they relate among themselves and actors outside the scrap yard. It is revealed that as these variables define the social and economic status of the e-waste workers, they also create conditions for various forms of injustice.

The e-waste operational activities in Agbogbloshie are dominated by the young age group with their age ranging between 14-30 years. Though there are individuals who are below 14 years and above 30 years. The youngest age group within this age range normally operates as collectors, dismantlers and burners. Most of them are unmarried. But majority of the unmarried are cohabiting. Few that are married have divorced. These youths are internal migrants from the northern belt of Ghana, a region which survives on rainfall dependent agricultural activities. The reason of migration to Agbogbloshie which is also partly reason of engagement is to escape from poverty accelerated by precarious climatic conditions such as irregular rainfall and long drought which affect agriculture as the main economic activity. Some of them are temporarily migrant who make yearly return back home to support the family labour force and finances during the rainy season. They return to the scrap yard immediately after the rainy season. However, most of them have become fully settled resident but visit home intermittently. Moreover, some youth participate in the e-waste recycling activities with the motive of saving money to support their education. This was significantly stressed by the Chairman of Greater Accra Scrap Dealers Association (GASDA):

You people think our work is not good. Our job is very important. I know about more than 60 students in Legon (referring to University of Ghana) who came to do e-waste activities before they went to school. Some people complete SHS (Senior High School) and JHS (Junior High School), and do not have any financial support. Doing the e-waste job help them to finance their study.

Also, the culture of creating large family size in the northern belt to constitute labour force for agriculture productivity results in inability of the family head to cater for all the needs of the members of the family. This instigates young members of the family to migrate and undertake activities in the scrap yard to cater for themselves and the family. The majority of the e-waste workers are males. However, there are females who participate and provide support services such as selling of food, water, second-hand clothes etc. Some females sometimes trade in e-

waste products as well as recovered metals on behalf of their husbands and relatives. It should be noted that there are females who patronize the scrap yard with no form of connection in terms of family relations with e-waste worker.

Apart from having a common ethnicity particularly from the northern parts of Ghana which serves as a bond among them, most of the e-waste workers are predominantly Muslims. This common Islamic religion also binds them as well. It should be noted that not only do common ethnicity and religion provide key mediums through which some e-waste workers are introduced to or enter the e-waste business in Agbogbloshie but also common hometown origin provides an access to entry as well.

With respect to their level of education, it will be wrong to assume that these e-waste workers are mainly illiterates. However, some of them have some level of formal education. At least majority of them have primary education. Others have also completed their Senior High School and Junior High School education. Some group of people are school drop out as a result of financial problem. This group of people have the intention of going back to school again after making some substantial savings. However, those above 30 years do not have such intention. Also, it would be surprising to know that there are few e-waste workers who have University and Polytechnic education. Some of them have completed while others are still continuing students. This indicates non-existence of formal jobs that could absorb graduates in Ghana.

Again, it should not be confused that majority of the e-waste workers are Ghanaians. There are also e-waste workers who are nationalities of countries in West Africa. Majority of these workers who have different nationalities are Nigerians. There were others too who were reluctant to disclose their nationalities. They operate as scrap dealers and middlemen. This confirms how lucrative the e-waste business has become and how its activities operate in international circuits (Grant & Oteng-Ababio, 2012; Lepawsky & McNabb, 2010).

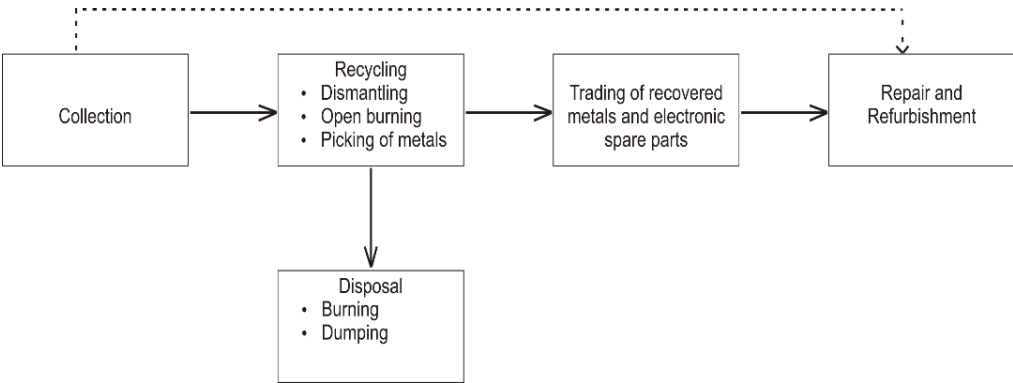
Duration of participation in the processing activities vary among the e-waste workers. Majority of them are new entrants and their length of stay in business ranges between 1-5 years. These group of people are the collectors, dismantlers and burners who form the young age group. There are also another group of people who have gained a lot of experience and have stayed in business between 6 and 10 years. This group of people are relatively rich and have extensive capital base in terms of asset, network and knowledge. They operate as scrap dealers, middlemen or repairers. Among this group, those who have more than 10 years working experience constitute the leading members of the Greater Accra Scrap Dealers Association.

With the exception of the leaders of GASDA, scrap dealers and middlemen, majority of the e-waste workers such as the collectors, dismantlers, burners and some repairers live in a nearby slum. The rooms are being shared and a single room could be crowded with more than three people.

6.2.2 Organization of E-waste Operational Activities in Agbogbloshie

The recovery of valuable metals and electronic spare parts from Waste of Electrical and Electronic Equipment (WEEE) involves numerous interlinked activities. These activities include collection (or scavenging), recycling, disposal, trading of recovered metals and electronic spare parts and repair or refurbishment. The activities are undertaken by informal e-waste workers in Agbogbloshie scrap yard. They are collectors, dismantlers, burners, middlemen, scrap dealers and repairers. The activities of the informal workers are regulated by the leaders of GASDA. The e-waste processing activities in Agbogbloshie are manual and crude in nature unlike those scientifically operated e-waste recycling process of the advanced countries which are systematically designed and guided by environmental standards and occupational health and safety precautions. At a glance one may think that these activities are very simplistic but they are inherently characterized and dominated by knowledge, experience, network and a range of assets that are not easily obtainable. I present and use the diagram below to explain the e-waste management or operational activities undertaken by informal e-waste workers in Agbogbloshie in a form of interconnected segments or stages. I explain the various components or segments as practices undertaken by the e-waste workers as part of their roles in the e-waste management process.

Figure 3: E-waste processing activities in a form of interconnected segments or stages in Agbogbloshie



Source: Author's construct

The initial stage of e-waste management in Agbogbloshie scarp yard is collection. Collection provides the means through which various categories of WEEE reach the scrap yard. Collection is found to be an act of navigating the urban space to acquire and transport WEEE to the scrap yard for recycling. It involves scavenging of e-waste materials from various sources such as the streets, dumpsites, houses, repair shops, public and private institutions etc. for the recovery of metals that have economic value. Collection is also an initial or first entry route by which an individual is introduced into the e-waste business. It is an e-waste management stage or component by which the collectors learn and acquire knowledge, experience, assets or capital and build networks for themselves. It is also a stage where newly introduced informal workers who lack financial capital and transporting equipment begin to operate. It is learnt that lack of knowledge, experience, assets serve as barriers for the collectors to become middlemen or even scrap dealers.

As mentioned earlier, most of the collection process is undertaken by the collectors who are young males migrated from northern belt of Ghana. However, it is not the case that the collection of WEEE to the scrap yard is unilaterally undertaken by collectors. Other individual dismantlers, middlemen and scrap dealers may also participate in the collection process as well. For instance, private and public institutions or companies may contact a middleman or scrap dealer about availability of e-waste products that need to be discarded. Also middlemen are occasionally involved in the purchase of huge quantities of e-scrap due to the limited financial capabilities of collectors. It could be stressed here that, it is not always the usual routine for the collectors to report back to friends and superiors about the large quantities of e-scrap discovered somewhere in the city due to insufficient money. Some inexperienced collectors provide this information due to lack of knowledge in price negotiation and quantities of precious metals contained in a particular WEEE. The involvement of other e-waste workers in the collection process is particularly highlighted by the Secretary of GASDA that:

It is not necessarily like it is a procedure that it is the collectors who have to go out there.....it depends upon the nature of the transaction. Like I said some people even come to the scrap yard and inform people about the availability of scraps somewhere. So I don't need to go and call a collector that it is his work and that he should go and buy them. I am also into scraps. I will follow the man there, go and buy and then put them in a vehicle and then bring them to the scrap yard..... So the business is interwoven. It is not like...specifically this is this person's job.

However, in most cases, upon discovery of large quantities of e-waste products, some intelligent individual collectors normally return to the scrap yard, borrow money and hire transporting equipment such as motorbike, trucks or even vehicle to convey these e-scrap to the site. They

may sometimes too hire the services of colleague workers to help cart the e-waste materials to the scrap yard.

In the city of Accra, collectors operate on daily basis lasting for about 8 hours. There are also some collectors who travel beyond the outskirts of Accra and may spent more than 3 days before returning to the scrap yard. Collectors normally search and transport e-scrap to Agbogbloshie by walking, riding bicycle, motorbike, pulling of trucks and travelling with vehicle to the various sources. Most of the collectors operate in groups. The group may constitute 2-3 members. The group may or may not be characterized by family relations, common ethnic or hometown origin. Most of the groups are financially and asset dependant. They borrow money and hire trucks or vehicles from colleagues to undertake the collection of e-scrap. But there are collectors who operate individually and independently without reliance on any form of aid with respect to finance and equipment. The figure below shows how some collectors work in group by pushing a truck to cart e-waste to the scrap yard.

Figure 4: Collectors performing their roles by pushing truck



Two collectors working in group with truck loaded with e-waste. They stopped just few meters from the entrance of the scrap yard to take few minutes rest after a long day of pushing and pulling of the truck.

Source: *Fieldwork, 2014*

E-waste collectors make a living through scavenging or collection. Money is normally accrued by selling those e-scrap collected. This is especially done by those who operate independently. Collectors who operate under superiors have fixed weekly or monthly salaries and deliver the collected e-scrap to their superiors. There are prices tagged for different types of e-scrap at the scrap yard and outside the scrap yard. The prices of some of these e-scrap are displayed in the table below.

Table 3: Market prices for some e-scrap*Price in Ghana Cedis (GHC)*

No.	<i>E-waste</i>	<i>Outside the scrap yard</i>	<i>At the scrap yard</i>
1	Personal Computer Monitor/Laptop	5-10	15
2	PC System Units	15	20
3	Air conditioner-Small	30	40
4	Air conditioner-Medium	40	50
5	Air conditioner-Large	80	120
6	Refrigerator-Small	30	40
7	Refrigerator-Medium	50-70	80-90
8	Refrigerator-Large	90	100
9	DVD player	5	7
10	TV set	5-7	10-15

Source: *Fieldwork, 2014* Exchange rate during fieldwork: USD1= GHC3.4

From the table above, there is variation in the price of the various e-scrap. The variation in prices is a result of the volume of precious metals such as copper, aluminium, brass, iron or steel that are contained in the various types of e-scrap. For instance, copper has high market value, hence, large refrigerators composed of copper and other metals has the highest market price of Gh¢ 90 outside the scrap yard and Gh¢ 100 at the scrap yard. The difference between the price of WEEE at the scrap yard and outside the scrap yard determines the profit margin. However, attainment of profit depends on a number of factors such as the nature of relation between superior workers, knowledge about values contained in WEEE, quantities of WEEE collected, proper price negotiation during collection and stability of market prices. Some part of the money obtained from this activity are used for personal and family expenses while some substantial portion are saved usually in the banks and other micro finance institutions for the purpose of financing their education or to manage future uncertainties. This is emphasized in the words of one collector. He says:

I cannot do this for the rest of my life. I need to go to school again. So I usually save for that purpose because I have a lot of siblings and my father cannot take of all of us. Sometimes, I am compelled to use part of my savings when there is serious problem in the family.

Furthermore, the second component or activity of e-waste management in Agbogbloshie is recycling of WEEE. Recycling involves various practices undertaken to retrieve or recover valuable metals or electronic spare parts from the e-waste that have been collected. The various practices that encompass recycling are dismantling of e-waste components, open burning or incineration of cables and components and picking of minute metals and other residues. These activities are undertaken by dismantlers and burners. However, some hardworking and experience informal e-waste workers could engage in both collection and dismantling at the same time. The dismantlers buy the e-scrap from the collectors based on the standard price at the scrap yard. But dismantlers who work with superiors (they usually call them Boss) do not buy the e-scrap. The usual norm is that their colleague collectors are supposed to deliver the collected e-waste for them to dismantle. Sometimes they hire the services of other workers when there are huge quantities of e-scrap to dismantle. They usually work in groups using simple tools such as hammer, chisel, pliers, screw drivers, pans and sacks. Sometimes big stones are used to smash some e-waste which easily disintegrate them into small pieces. But it is possible that some dismantlers could work individually. Figure 5 and 6 respectively show a single dismantler and group of dismantlers undertaking their roles at the Agbogbloshie scrap yard. They dismantle e-waste products to recover copper, aluminium, iron, brass etc. Knowledge and experience actually characterized the dismantling process. For instance, a dismantler should know the values and quantities of the precious metals contained in a particular e-waste so as to use his techniques in the dismantling process to retrieve those valuables.

Figure 5: Dismantlers working individually



Source: *Fieldwork, 2014*

Figure 6: Dismantlers working as a group



Source: *Fieldwork, 2014*

As observed above, Figure 5 and 6 display the roles and practices of dismantlers in the e-waste management process. Figure 6 also shows the practice whereby the dismantlers segregate the various valuable metals into separate groups. These metals have economic value and are sold for money.

Moreover, residues of e-waste that are produced through the dismantling process are discarded as waste. These residues are either burned at a designated burning place or dumped at the dumpsite. The purpose of disposing these unwanted residues is to avoid overcrowding and ensure easy movements. However, dismantlers who know the economic values of these residues do not discard them as waste. Rather they gather them into appreciable quantities and sell them afterwards. There are also other workers who tour around the site to gather these residues like plastics and sell them. In the words of one anonymous dismantler:

After selling the valuable metals, I also gather the non-valuable such as the plastic rubber and sell to some people. In the scrap yard everything is important. You don't have to throw away or burn the non-valuables or unwanted remnants. I sell them for money. Others who do not know about this dispose them off or throw them away. Some people also move around to collect these plastic and sell them.

Another recycling activity is open burning or incineration of cables. This activity is undertaken after the dismantling of e-scrap.

Figure 7: Cables segregated for burning



Observed from the picture are segregated cables from WEEE at the back of a dismantler. These are sent to the burning site for burning. Loaded on the truck are bags of recovered copper from the cables after burning.

Source: *Fieldwork, 2014*

Cables are gathered (see Figure 7 above) and sent to the burning site located along the banks of the lagoon (i.e. Korle-Lagoon). The burning of cables is undertaken by a group of young male workers. The cables are rolled in large quantities for them to be burnt. It should be noted that some dismantlers or other e-waste workers may not have any relational bond with any burner like family relation or employer-employee relationship. Despite this, a working relationship could still be established with some burners. Each burner must always be present at the burning site in order to get the cable recycled on time. Burning of rolled cable attract price of 2 Ghana cedis (USD 0.58). The burners use polyurethane or foam of dismantled refrigerators and discarded paper boxes from a nearby dumpsite to burn the cables. Long iron rods and woods or sticks are used to turn over the flaming cables to make them burn properly. The metal that are mostly liberated through burning is copper. The practices or activities of the burners as part of their roles are displayed in Figure 8 below.

Figure 8: Burners burning the dismantled cables at the scrap yard



Source: *Fieldwork, 2014*

Figure 9: A burner cooling off the hot copper after burning



Source: *Fieldwork, 2014*

The liberated metals are then thrown to a stagnant water or the lagoon to cool them off. This is displayed in Figure 9 above. Sometimes they fetch water from the lagoon to quench the fire or the heat. In the dry season, when the volume of water in the lagoon reduces and becomes too polluted to contend with, they subject to the buying of sachet water from some young girls who patronize the scrap yard to cool the hot metals. The recovered metals are returned to the owner either by the burners themselves or a co-worker. Some of the burners use magnets from old speakers to gather the tiny metals left behind at the site. Sometimes small sticks are used to stir the ash for easier identification of the visible metals to be picked by hand. They sieve them to remove sand or dust and sell them eventually to make money. In fact the activities of the burners has serious health and environmental impacts. The impacts of open burning are discussed in the next chapter.

Trading of the recovered metals such as copper, aluminium, iron or steel, brass etc. is another important activity or component of e-waste management after recycling. This activity is undertaken by the burners, dismantlers, middlemen and scrap dealers. The middlemen and scrap dealers are identified as the buyers of the recovered metals while the dismantlers and burners represent as sellers. Few of the middlemen are Ghanaians from the northern part of Ghana. Nigerians constitute the majority of middlemen at the scrap yard though there are other middlemen who originate from other countries in West Africa. It was discovered that the main buyers of recovered metals at the scrap yard are the middlemen. This confirms the findings of Amankwaa (2013), that the middlemen are the intermediaries between collectors, recyclers and scrap dealers. They create accessible micro-level market for the recyclers (i.e. dismantlers and burners). They also extend their trading endeavours to the purchasing of e-scrap from collectors to undergo recycling. Mostly, the metals that are recovered are bought from dismantlers who operate independently. These dismantlers usually gather the recovered metals into appreciable quantities and sell them afterwards. Some of these dismantlers even postpone selling in order to attract higher market price. The transaction of recovered metals is undertaken by weighing on a scale (see Figure 10 and 11 below).

Figure 10: Various models of scale at the scrap yard



Source: Fieldwork, 2014

Figure 11: Determining the weight of a recovered copper on a scale



Source: *Fieldwork, 2014*

The metals have different price. The variation in price of the various metals is based on their respective values. The prices of the various recovered metals can be displayed in the table below.

Table 4: The weight and price of some metals at the scrap yard

Metals	Weight	Price in Ghana Cedis
Copper	1 pound	3 Ghana cedis
Aluminium	1 pound	8 pesewas
Brass, iron or steel	1 pound	1.50 pesewas
Others	1 pound	40 pesewas

Source: *Fieldwork, 2014* Exchange rate during fieldwork: USD1= GHC3.4

It can be observed from the table above that copper is the most precious metal at the scrap yard. Copper is also highly demanded by middlemen. However, fresh copper attracts higher price above the standard market price displayed in table 4 above. Fresh copper is obtained during the dismantling process. However, the burning of cables to recover the copper cause them to become dirty. But the dirty copper is not purchased below the standard market price at the scrap yard. Apart from copper other metals such as aluminium, brass, iron or steel and others there is no such price differentiation for their metal quality. Also, it very significant to note that most middlemen strategically organize their own e-waste management activities by employing collectors, dismantlers and burners who are paid either weekly or monthly for the performance of

their respective responsibilities. In this case, they automatically own the recovered precious metals.

Scrap dealers on the other hand are the final buyers of the recovered metals. They have a working relationship with the middlemen. Hence, they obtain these metals through the middlemen. They may not directly operate within the scrap yard. But could influence the various activities at the scrap yard through the middlemen. Some of the scrap dealers work as agents of local manufacturing companies. The local companies depend on the roles of the scrap dealers (as buyers of the recovered metals with the aid of the middlemen) to get access to these raw materials (i.e the recovered metals) for the manufacturing of building and construction materials such as iron rods, nails, roofing sheets etc. They also use these metals to manufacture cooking utensils such as pots, knives, spoons etc. as well as cutlasses and hoes for farming. There are also scrap dealers who operate as exporters of recovered metals to other countries. They sometimes buy electronic spare parts from the middlemen as well. However, the exportation of recovered materials from e-waste have recently minimized drastically due to the ban on their exportation imposed by Ministry of Trade and Industry.

Repair and Refurbishment is another relevant segment of the e-waste management process undertaken by repairers and refurbishers. (Note that the repairer and refurbisher are collective names used for informal e-waste workers who simultaneously repair and refurbish EEE). Repair and Refurbishment involves reconditioning and upgrading broken down or discarded electronic equipment. This activity or component mainly relies on the recovered electronic spare parts and collected electronic scraps. It is revealed that repair and refurbishment component is strategically created and synchronized by the repairers or refurbishers due to the continuous availability of recovered electronic spare parts and collected electronic scraps. In the repair and refurbishment process, they normally purchase the e-waste especially computers and DVD players from collectors. Again, there are those who also repair and refurbish radio sets, mobile phones and TV monitors. They remove the malfunctioning components and replace them with well-functioning spare parts. Figure 12 displays some repairers or refurbishers in Agbogbloshie scrap yard. Usually the crude methods adopted by the dismantlers cause damages to the spare parts. In view of this, repairers or refurbishers take the initiative and responsibility upon themselves to recover their own spare parts for both repair and refurbish services. Urban residents form a large market base for the repair and refurbish services and substantial amount of money is obtained from these services by the repairers or refurbishers.

Figure 12: Some repairers or refurbishers reconditioning and upgrading computers in Agbogbloshie



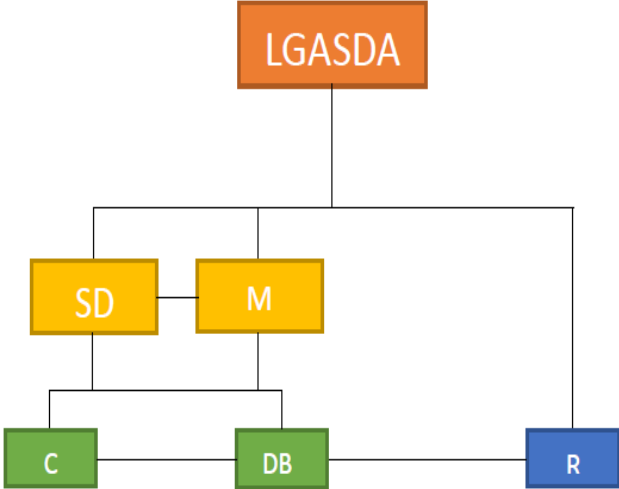
Source: *Fieldwork, 2014*

The discussion above focuses on the various e-waste management activities. Additionally established is the roles and practices of informal e-waste workers within each segment or e-waste management activity. In the way of advancing these explanations, the next section below therefore seeks to extend the analysis to examining the power differences and relations among the e-waste workers in Agbogbloshie based on their respective roles and practices. This exercise is guided by the principle of Urban Political Ecology premised on identifying actors and explaining their unequal power and relations in a particular urban setting.

6.2.3 Power differentials and relations among e-waste workers

It is discovered that the various e-waste workers in Agbogbloshie wield some level of power. The elements of power revolve around assets, network, knowledge, experience, collectiveness and position or role in the e-waste management process. The e-waste processing activities are organized and influenced by these elements of power which vary among the e-waste workers. The power differences and relations among the e-waste workers is captured in the diagram below.

Figure 13: A diagram displaying power differences and relations among e-waste workers



Key:

LGASDA	Leaders of Greater Accra Scrap Dealers Association
SD	Scrap Dealers
M	Middlemen
C	Collectors
DB	Dismantlers and Burners
R	Repairers or Refurbishers

Source: *Author’s construct*

The collective initiative for all the e-waste workers to be united into an association called Greater Accra Scrap Dealer Association has instituted power for the e-waste workers. The association has over 3000 registered members. Though it is not mandatory to become a registered member, however, e-waste workers who are unregistered still own allegiance to the association and must submit to the rules, regulations and directives of the association. The association is the mouthpiece of the e-waste workers. The power of the association is possessed by the leading members such as the chairman, the vice chairman, the secretary and the treasurer. The mode of their recruitment is by appointment on the basis of experience, knowledge and network in the e-waste business and the level of influence the person has at the scrap yard and also outside the scrap yard.

As indicated in the diagram above, the leaders of the association (LGASDA) possess significant amount of power relative to other e-waste workers. The leaders of the association have the power to regulate the activities of all the informal e-waste workers in Agbogbloshie. Thus they relate and influence all the actors of e-waste management such as the scrap dealers, middlemen,

recyclers (i.e. the dismantlers and burners) and the collectors. The power of LGASDA is clearly defined at Agbogbloshie scrap yard where the only office of the association is located. It is within their authority and jurisdiction to allocate lands to e-waste workers (i.e. both new entrants and existing e-waste workers). All the e-waste workers irrespective of their roles and practices are supposed to pay a certain amount money in return. Apart from that, a yearly dues must also be paid. This is a rule and both registered and unregistered members at the scrap yard are subject to it. It is only the LGASDA who have the power to ensure that the rule must be obeyed. Significant amount of the dues collected are being paid to the National Youth Authority in a form of compensation for operating on their land. All conflicts, misunderstandings and cases must be reported to the leaders not the police. They deliberate on them and provide amicable solutions to the problems. On extreme cases, they can arrest offenders at the scrap yard who violate public laws and hand the person over to the police. The police cannot directly arrest any e-waste worker at the scrap yard without the consent of the leading members. They speak on behalf of their members by justifying the importance of their activities and resist any form of evacuation.

Though the leading members have significant power over every activity undertaken by all e-waste worker but there is limitation to their powers. Some of the leading members also operate as scrap dealers and middlemen, hence there is conflict of interest in the exercise of their powers. Similarly, the powers of the LGASDA do not actually affect most scrap dealers who do not operate directly at the scrap yard but normally participate in e-waste management through the middlemen. For instance most scrap dealers who act as exporters and employees of a local company do not specifically require land to undertake their operations. Their main roles are to buy the recovered metals from the middlemen. Thus they mostly operate outside the scrap yard. The power of the LGASDA to regulate all e-waste management activities affect those e-waste workers who operate simultaneously as scrap dealers and middlemen at the scrap yard. They are those groups of e-waste workers who undertake their activities directly at the scrap yard by employing and financing collectors and recyclers. Therefore, it may be misleading to argue that the leaders of the association exercise absolute control over all the e-waste workers. But the fact still remains that their powers and control are very significant over collectors, recyclers and repairers who directly operate at the scrap yard.

The LGASDA exercise power and relate to the collectors in several ways. Apart from allocating lands, collecting dues and settling conflicts, the collectors must also comply with the directives of the leaders. For example, the collectors are obliged to respect and follow directive not to

operate in certain designated areas of the city. The collectors are also advised not to buy stolen e-scrap. Failure to follow these directives, the leaders of the association are not under any obligation to defend and protect them when these acts are eventually criminalised by the police.

It should be noted that land is only allocated to those collectors who also operate as dismantlers. Again, the LGASDA have the power to allocate land to dismantlers and repairers or refurbishers. They must also equally comply with the same directives as well. The leaders also monitor the disposal of waste and the burning activities of the burners at the scrap yard.

The group of e-waste workers next to the leaders of GASDA who have some level of great control and influence in the e-waste management chain are the scrap dealers and middlemen. The scrap dealers create a final market for the recovered materials. As a result of this, they have relevant amount of influence which affect the downstream e-waste workers such as middlemen, collectors, dismantlers and burners. Scrap dealers of local companies purchase the recovered metal from the middlemen on credit. This significantly affect the activities of the middlemen who need regular cash return to ensure continuity in business. Middlemen have no alternatives because scrap dealers who are exporters of scraps and create competition in the market have been eliminated in the market as a result of the ban on export of recovered metal by Ministry of Trade and Industry. Scrap dealers of local companies take the advantage of the monopoly they have to exploit the middlemen. This has created a situation whereby a substantial amount of recovered metals are exported through illegal means. It may be argued that the monopoly gained in the trading of recovered metals by these scrap dealers is as a result of strong network they have built with politicians and their ability to participate and use political administrative channel to achieve their goals. The ban on export of recovered metals is based on the ability the local companies to justify their contribution to development. For instance some local manufacturing companies produce building and construction materials, cooking equipment and agricultural tools. They also justify that they generate employment for the growing population.

More so, scrap dealers of local companies could use their power to create conditions leading to reduction of market prices. They aim at buying the recovered material at lower prices in order to make huge profits. Middlemen lack the knowledge and information to make critical scrutiny of market prices. Even if they could scrutinize and compare them with world market prices, the ban on export create a trade barrier for them. Therefore middlemen always succumb to the prices proposed by these scrap dealers. The price instability and reductions greatly affect their business.

On the contrary, middlemen also exercise some level of influence in the e-waste management chain. It should be noted that there are some scrap dealers who concurrently operate as middlemen. The middlemen are the main buyers of recovered metals at the scrap yard. As intermediaries between the scrap dealers and downstream workers, the middlemen relate and exert much influence on the collector, dismantlers and burners. They have large financial capital base. They own most assets such as storerooms, vehicles, motorbikes, trucks, weighing scale at the scrap yard that are very imperatives for e-waste management. With respect to this, they are able to control and organize downstream activities such as collection and dismantling. They employ collectors and dismantlers and finance their activities. Middlemen pay collectors their employees either monthly or weekly and sometimes based on amount of work done in a day. They give loans to other collectors and dismantlers who are their regular customers. They also offer their assets such as trucks and vehicles for hiring. It is revealed that most middlemen exploit recyclers by adjusting their weighing scales. They are also able to use their experience and knowledge to prevent recyclers from postponing the sales of recovered materials by refusing to inform them in advance in times of price fall. In addition, middlemen are also able to utilize their network to discover and operationalized new ways of recycling e-waste. Also, they are able to discover the economic value of components in e-waste. However, they intend to keep these innovations to themselves and their employees. Though these innovations may leak to others eventually. The figure below shows a middleman busily keeping records of the business of the day while his employees are also working.

Figure 14: A middleman keeping records of his business



Source: *Fieldwork, 2014*

The next group of e-waste workers are collectors, dismantlers and burners. Collectors and dismantlers have less power and exercise limited influence at the scrap yard. Even though without their activities the flow and recycling of large quantities of e-waste could cease. They are powerless since most of them are financed and employed by the middlemen. Collectors as well as dismantlers employed by middlemen lack the ability to negotiate any increase in allowance or salary. Middlemen are reluctant to increase their salary even if they experience boost in business. Desperation to survive and escape from poverty make them to accept any offer from the middlemen.

Though some of the collectors and dismantlers finance themselves and operate independently, their power and control is still limited. These group of e-waste workers have limited financial capital and assets. In view of this, they often depend on the middlemen for financial assistance and transporting equipment. In times of price fall they are compelled to sell their materials at the reduced price in order to sustain a living.

With regards to the burners, it is difficult to actually delineate their power at the scrap yard. In fact, they are the weakest and the most powerless e-waste workers. They exert no control at the scrap yard. Among the e-waste workers, they are the most subordinate. This may be due to the fact that they constitute the youngest age group and the poorest at the scrap yard. Burners lack the capital and knowledge in e-scrap to even start as collectors. Tools like long stick, iron rods, matches, polyurethane and discarded paper box used for burning of cables are easily attainable.

Repairers or refurbishers are the independent group of e-waste workers at the scrap yard. With the exception of the leaders of GASDA, they are unrestrained and no e-waste worker has a dominion over their activities. They have created an auxiliary market for collectors and dismantlers. They relate to both collectors and dismantlers by purchasing e-scrap and recovered electronic components for repair and refurbishment services to the urban dwellers in Accra though sometimes they purchase the e-waste and recover the electronic component by themselves. The strength of the repairers or refurbishers do not only depend on the persistent availability of the e-scrap at the scrap yard but to larger extent the huge market formed by the urban populace. Therefore, it can be said that the urban population of Accra generate e-waste and form a large market for the e-waste management activities in Agbogbloshie.

Moreover, the power of most repairers and refurbishers to provide effective and efficient repair or refurbishment services is based on their ability to employ skilful repairers or refurbishers.

Through employer-employee relationship, they obtain skills and expertise from these employees. The repair and refurbishment activity in Agbogbloshie absorbs these skilful people who lack the initial capital to establish their own business after their training. It is discovered however that the employers benefit larger proportion of income that are obtained.

The power distribution of the e-waste workers is not uniform. As indicated, some group of e-waste workers possess significant share of power. The most powerful group are some leaders of the GASDA who operate as middlemen and scrap dealers at the same time. Also, in general the middlemen are the most beneficiaries in the e-waste management chain whilst the burners are the most disadvantaged and dependent group of e-waste workers. The elements of power like knowledge, experience, networks, assets and position in the e-waste management chain greatly underpin and influence the distribution of power and relationships among the e-waste workers. However, there are other institutionalized actors whose roles, power and relations also influence the activities and the well-being of e-waste workers. The next section illuminates these actors and how they influence the e-waste management activities.

6.2.4 Institutionalised actors and their relations with the e-waste workers

It is found that there are various institutionalised actors whose actions and inactions influence the e-waste workers and their processing activities. These formalised actors are personalities who are representatives of institutions which have been constitutionalised. These institutions include Ministry of Trade and Industry, Customs Excise and Preventive Service, Accra Metropolitan Assembly and Environmental Protection Agency. The institutions are constitutionally mandated to perform certain roles hence the actions of the representatives are deemed as rightful. Thus the incorporation of these institutions in the constitutions of Ghana confers legitimacy on the representatives. Therefore, these representatives or personalities are being granted political power to perform their roles. The institutions have distinct political powers that are being exercised in a manner which affect the e-waste workers and their activities. Since the representatives act in the name of the institutions, the name of the various institutions are used for the discussions instead in order to avoid personalisation.

Firstly, the Ministry of Trade and Industry (MOTI) has the political and constitutional power to formulate, implement and monitor Ghana's internal and external trade (www.ghana.gov.gh/index.php/2012-02-08-08-18-09/ministries/270-ministry-of-trade-and-industry). The Ministry provides the policy framework for regulating imports and export of goods. It is within this power that the ministry acted to impose a restriction on the importation of used refrigerators into the country. This restriction has led to the suspension of substantial

quantities of used refrigerators that may eventually end up in Agbogbloshie for recycling. This greatly affects the e-waste workers and their activities.

Moreover, the Ministry of Trade and Industry acted within its power to regulate the trade in recovered metals which directly affected the e-waste workers and their processing activities. Thus it issued an authoritative directive to ban the export of recovered metals. The directive is to ensure that only local companies become the sole buyers of the recovered metals. The action has undermined the market of recovered metals for the e-waste workers in Agbogbloshie. It has eventually created a monopoly market to the disadvantage of the e-waste workers. It has resulted in a situation where recovered metals are bought on credit. Despite the agitations and persuasions by the leaders of Greater Accra Scrap Dealers Association, the ministry has been reluctant to use its powers to eliminate the purchasing of the recovered metals by the local companies on credit. These interventions as well as the inactions of the ministry are in contrast with its objectives to liberalise trade and internal urban market.

Furthermore, Customs Excise and Preventive Service (CEPS) is another institution whose powers influence the e-waste workers and their activities. It has the power to enforce laws on import and export restrictions and prohibitions. It controls the flow of goods in and out of the country. It is in view of these powers that it collaborates with the Ministry of Trade and Industry to enforce the ban on the import of used refrigerators and export of recovered metals. On the contrary, CEPS promotes the activities of e-waste workers by allowing significant flows of used computers into the country that are eventually discarded at Agbogbloshie after consumption within a short period of time. This is an unintended action but a collaborated effort taken with the government to close the digital divide. CEPS also controls and monitors the ports and borders of Ghana and causes the inflow of non-functioning EEE to Agbogbloshie. It also sources out e-scrap to informal workers in Agbogbloshie. It intercepts, confiscates and puts illegal imports of e-scrap for auctioning which are eventually purchased by the e-waste workers. Generally, CEPS controls the imports of EEE and exports of recovered metals. Since it is a law enforcement institution of imports and exports their powers cause instability in the e-waste business. It is only answerable to Ministries such as Ministry of Defence, Ministry of Interior, Ministry of Finance and Economic Planning and Ministry of Trade and Industry. Therefore CEPS is not under any obligation to provide answers to agitations and persuasions from the e-waste workers.

Another most influential institution is the Accra Metropolitan Assembly (AMA). It is a sub-institution that is subordinate to the Ministry of Local Government and Rural Development. It

has a decentralized power under the decentralization system of Ghana to provide and ensure grassroots development in a designated areas in the city of Accra. As Agbogbloshie lies within its area of jurisdiction, it endeavours to interact and influence the e-waste management activities and the e-waste workers. In fact, there is a prickly relationship between the e-waste workers and the authorities of AMA. This kind of vexatious relation is stem from various attempts and threats by the AMA to evacuate the e-waste workers from Agbogbloshie scrap yard. The authorities of AMA claim that the e-workers is not only causing environmental health problems but also the e-waste management activities are impeding the progress of the Korle Lagoon Ecological Restoration Project (KLERP). This is a project which the AMA spend 85 000 dollars every year to restore the Lagoon from pollution but it proves futile because of the crude activities of the e-waste workers. Again, the location of Agbogbloshie scrap yard and the primitive recycling processes as well as the slum which house the e-waste workers in the city contravenes the declaration by the AMA to make Accra a Millennium city. In view of these impediments, the AMA is engaging the e-waste worker represented by the leaders of GASDA in a series of lengthy litigation in order to evacuate them from the Agbogbloshie. However, the sole owner of the land is the National Youth Authority who are in support of the e-waste management as a way of creating employment for the youth. The frequent attempt and threat of evacuation together with land litigation is on the other hand causing obstructions and frustrations to the e-waste management activities and the e-waste workers respectively.

Additionally, the AMA disregard the informal e-waste management in Agbogbloshie and regards the e-waste workers as temporarily illegal residents. In view of this, the AMA has refused to ensure development in Agbogbloshie by providing certain basic amenities such as water, toilet facilities, clinics etc. that could enhance their activities as well as their well-being. The AMA overlooks the significance of e-waste management by the informal workers even though it is beyond the financial and technical capacity of the AMA to manage the huge quantities of e-waste that are discarded in the city.

Furthermore, Environmental Protection Agency (EPA) has been relating to the e-waste workers in several ways. It operates as an agency under the Ministry of Environment, Science, Technology and Innovation. It is a leading public body with the power to protect and improve the environment in Ghana (<http://www.epa.gov.gh/web/index.php/about-us/about-us>). It is within this power that the environment of Agbogbloshie has become its great concern in the city. However, since there is no specific law on e-waste management, the EPA has been establishing a cordial relationship with the e-waste workers in Agbogbloshie in order to minimize the environmental

impacts of their activities. EPA educates them about how their practices are causing environmental problems and proposes to them the best possible way of recycling e-waste. Through the collaborative effort of the EPA and other international organisations, some e-waste workers travelled to some European countries to experience modern scientific recycling technology which has less impact on health and environment.

6.3 Conclusion

The reliance on the UPE and the analytical model has provided a deeper understanding about the complexities of the informal e-waste management activities in Agbogbloshie. The discussion in this chapter actually illuminates the various actors and their specific roles in the e-waste sector. These actors are informal e-waste workers in Agbogbloshie and institutionalized actors in the city. It is revealed that the informal e-waste management is well functioning activity but a seemingly hierarchical in nature with respect to the distinctive roles e-waste workers play. Another important discovery is the existence of social power differences and relations among e-waste workers determined by knowledge, experience, network and assets. On the other hand, institutionalized actors who are representatives of institutions such as Ministry of Trade and Industry, Customs Excise and Preventive Service, Accra Metropolitan Assembly and Environmental Protection Agency have different political powers because their acts and responsibilities are constitutionalized. With respect to their powers they could influence the e-waste workers and their activities. Indeed, it very important to analyze how such unequal social and political power divide among the actors generate various forms of injustice in e-waste management process.

CHAPTER SEVEN: INJUSTICE IN THE E-WASTE MANAGEMENT PRACTICES

7.1 Introduction

The analytical focus of this chapter is to unpack the injustice that characterized the e-waste management activities. The chapter relies on the analytical framework to explain how the unequal power differences and relations produce injustice for the informal e-waste workers in Agbogbloshie. The chapter is divided into three sections. The first section explains the unequal distribution of benefits and burdens. The second section is devoted to the issue of misrecognition of e-waste workers in the social realm while the third section analyses the environmental problems associated with the e-waste management activities in Agbogbloshie. The chapter therefore explains these sections as various forms of social and environmental conditions/injustice persisting in Agbogbloshie. It succeeds in linking these conditions to the earlier discussions on power differences and relations among actors and to large extend the generation and the flow of e-waste to Agbogbloshie.

7.2 Inequality in the distribution of benefits and burdens

Benefits and burdens are very fundamental in the e-waste management practices. Benefits are found to be comprised of income attainment, accessibility and acquisition of assets, knowledge and experience. On the other hand, burdens are the various forms of hardships, suffering or distress experienced by the e-waste workers as they undertake various e-waste management practices. Burdens also includes various degree of exposures to damages or losses. The occurrence of hardship or sufferings and damages include victimisation, theft, business loss, fire outbreak, road accidents, physical injuries and illness or potential contraction of diseases. However, the distribution of benefits and burdens are not uniform. They are unevenly distributed among the informal e-waste workers in Agbogbloshie.

7.2.1 Benefits

Income attainment varies among the e-waste workers. The income variation or inequality correspond with the particular roles or activities the e-waste workers undertake which are influenced by their respective powers. The table below displays income levels of the various e-waste workers.

Table 5: Unequal distribution of income

E-waste workers	Income level per month in GHC
Scrap Dealers	Not available
Middlemen	Not available
Repairers or Refurbishers	More than 1000
Dismantlers	350-500
Collector	250-300
Burners	50 or less

Source: *Fieldwork, 2014* Exchange rate during fieldwork: USD1= GHC3.4

As shown above there is wide income disparity among the e-waste workers. E-waste workers such as collector, dismantlers and burners whose roles lead to the recovery of precious metals receive less income as compared to the buyers of recovered metals such as scrap dealers and middlemen. Some e-waste workers such as scrap dealers and middlemen refused to disclose their income level. However they confessed that the e-waste business is lucrative and they make substantial amount of income from it. The income levels of the various e-waste workers displayed above are not fixed or stable but could change over time. The changes in their income level could be influenced by the level of intensity of flow of e-waste, the changing market price for e-waste and the recovered metals and the changes in the price of other products such as trucks, fuel etc. that could enhance their activities. Indeed, power differences and relations are also very essential in the determination of income level. Below are the detailed discussion about the income inequality among the e-waste workers and various unjust means that underpin such inequality.

Scrap dealers who occupy the highest rank in the e-waste value chain are found to be the most income beneficiaries in the e-waste management chain. The main reason for relatively higher level of income is as a result of their role and power in the e-waste management process. Thus scrap dealers act as agents of local companies to buy recovered scraps from the middlemen. They therefore take advantage of their role to manipulate the market to their advantage. For instance, purchasing recovered metals on credit helps them to accumulate huge quantities that can be sold for high profits. Similarly, another manipulation of the market by the scrap dealers is their failure to disclose the new market price and buy the metals by the old price when there is price increase. This also increases their profits to the disadvantage of others. The scrap dealers’ benefit of attaining the disproportionate level of income in the value chain is a clear case

of injustice as they passively participate in the actual recycling or management process despite the fact that they create a final market for the recovered metals.

Another beneficiary of income in the value chain of e-waste management are the middlemen. Though they also refused to disclose their income level, they admitted that they get more income than the collectors and the recyclers. The relatively higher income level obtained by the middlemen is due to a number of reasons. Firstly, most middlemen do not merely purchase the recovered metals but actively engage in the recycling at the scrap yard by financing and supervising their employees who are collectors and dismantlers. Secondly, they possess huge financial capital base and physical assets such as stores, trucks, weighing equipment, vehicles and motorbikes. Most middlemen give loans to some collectors and dismantlers to undertake their own independent activities in return of supplying them scraps to buy at a reduced price. Another mischievous means of generating huge income by the middlemen is adjustment of scale at the time of buying the metals. Apart from these unjust means, they also underpay their employees who are collectors and dismantlers. Thus middlemen who are financiers and supervisors get much in return whilst their employees who are active workers lag behind. Even collectors and dismantlers who work independently admitted that the middlemen are the 'money-makers' in the e-waste business. Middlemen also generate a lot of income by providing their vehicles and trucks for hiring. However, the various unjust means increase the income gap between the middlemen and the collectors, dismantlers or even the burners. It is found that accumulation of income by the middlemen at the scrap yard also increase their financial and physical capital base which consequently strengthen their role, power and dominance at the scrap yard.

Repairers or refurbishers are also found to obtain some maximum income level. Though they admitted that they do not earn as much as the scrap dealers and the middlemen but their income level is far better as compared to the collectors, dismantlers and the burners as indicated in Table 5. Repairers could earn more than GHC1000 per month. Some repairers or refurbishers also exploit their employees by taking the largest share of money obtained from any work done. Most repairers or refurbishers give their employees according to their output during the day irrespective of the number of hours they spend. There is no specific measure of output, fixed monthly or weekly salary for their employees. This widens the income gap between the repairers and their employees.

Dismantlers, collectors and burners are the least beneficiaries of income in the value chain despite the fact that the downstream recycling activities depend on the roles they play at the scrap yard. However, the dismantlers earn higher income than collectors. This is because the income

level of dismantlers is due to their ability to recover different variety of valuable materials which are sold at different prices. They are also able to perform more than one activity. Thus they can collect and dismantle e-waste products unlike collectors whose income level is solely dependent upon their role of collecting e-scrap and selling them. However, as discussed earlier, a number of factors may also determine the income level of both dismantlers and collectors. These include the nature of relation between superior workers, knowledge about values contained in WEEE, quantities of WEEE collected or bought, price negotiation during collection, adjustment of scale during the sale of recovered metals and stability of market prices. Burners are the lowest income earners at the scrap yard. This is because despite their role in the recycling process, they have minimal power to influence the activities of other e-waste workers.

However, despite this widening income gap collectors and dismantlers who are employed by middlemen or scrap dealers obtain knowledge, experience and create some network for themselves. They could also get financial support from their employers when they decide to work independently. This kind of benefit help them to rise to the next rank in the e-waste management chain. For instance, in the words of one e-waste worker:

I started as a collector then later as a dismantler. After learning on the job and getting experience within a period of 3 years, I stop scavenging and dismantling. I then began buying recovered metals and selling them to scrap dealers using the little savings I made and a loan from my Boss which I paid him back in regular instalment without interest (An anonymous middleman at the scrap yard).

It can be argued that this benefit is incomparable with the exploitations they experience as well as the corresponding widening income gap. Also after acquiring knowledge and experience, they replicate and perpetuate the similar exploitations in order to increase their income. Hence there is continuous persistence of income inequality.

Additionally, repairers or refurbishers who operate at the scrap yard benefit from the availability of e-waste and their components for repair and refurbishment. E-waste in Agboghloshie are not only cheaper to obtain but also different models of e-waste are available at the scrap yard through the effort of the collectors. Locating their shops and operating at the scrap yard put them in an advantageous position.

Another case of injustice in Agboghloshie which can be framed in the form of inequality is lack of basic social services such as water supply, electricity, toilet facility, clinic etc. which are very necessary to transform the lives of the e-waste workers. It is incumbent on Accra Metropolitan Assembly to provide these essential services. However, the AMA fails to provide these services

because ensuring development in Agbogbloshie means that the AMA endorse their crude activities. Again, the recycling activities in Agbogbloshie as discussed earlier undermine the ongoing Korle Lagoon Restoration Project for the AMA.

7.2.2 Burdens

Apart from these inequalities in the distribution of benefits, there are also unfair distribution of burdens among e-waste workers. It is revealed that downstream e-waste workers such as collectors, dismantlers and burners experience sufferings and hardships at workplace more than middlemen and scrap dealers.

Collectors who push trucks and walk on the street are sometimes knocked down by vehicles. Those who use motorbikes and bicycles also incur road accidents. They sometimes die from the accidents or even if they are lucky they may sustain various forms of minor and major injuries. Sometimes payment of hospital bills becomes difficult. Again, most collectors who are truck pushers suffer the burden of pulling trucks for a long distance in order to obtain e-waste or even reach the scrap yard with the e-waste. Collectors are also occasionally beaten by the rain and risk at being flooded up during scavenging. Rainfall and flooding are not the only weather conditions that impact on the collectors but direct sunshine intensity and high occasional temperatures are also inescapable. They are sometimes victimised by the public and accused by the police as being thieves in the city. Some collectors who travel for a long distance and spend about 2 or 3 days scavenging for e-waste sleep in public spaces. These collectors are exposed to mosquito bites and risk of contracting malaria.

Figure 15: A collector potentially at risk to road accident



Source: Fieldwork, 2014

The figure above demonstrates a collector who is more vulnerable to road accident. He is also exposed to the intense sunshine and probably rainfall. Pushing trucks for a long distance requires him to sit on the truck and rest. Upon all these burdens he receives minimal economic return or income relative to dismantlers, middlemen and the scrap dealers. This is indeed a real case of injustice define as inequality in the share of burdens.

Dismantlers on the other hand suffer minor cuts on their hand during dismantling. This is because most of them do not wear protective equipment. They also experience waist pains. The dismantling process is manual and requires a lot of energy and time.

Figure 16: Disproportionate burdens on the part of dismantlers



Source: *Fieldwork, 2014*

As observed from the figure above, there are three dismantlers who are required to dismantle these huge quantities of compressors from air conditioning units and refrigerators in order to obtain copper, iron and other metals. Even though they have worn protective gloves to avoid minor cuts. However, they experience waist pains for being in a fixed position for long hours. Despite erecting an umbrella, they still experience the intensity of the sun and consequently work slowly and receive less income from their employer. Similarly, burners also usually sustain minor cuts and burns during open burning or combustion of cables and plastic coated wires to recover the encased copper. Undertaking burning in open spaces also exposes burners to high sunshine intensity which can lead to severe headache.

Moreover, the crude and manual e-waste recycling in Agbogbloshie could expose e-waste workers to toxic chemicals that have potential health implications. It has been indicated that e-waste components contain chemicals elements or toxic substances such as lead in circuit boards; lead oxide and cadmium in monitor cathode ray tubes (CRTs); mercury in switches and flat

screen monitors; cadmium in computer batteries and circuit boards; polychlorinated biphenyls (PCBs) in older capacitors and transformers; and brominated flame retardants (BFRs) on printed circuit boards, plastic casings, cables; polyvinyl chloride (PVC) cable insulation and non-dioxin-like polychlorinated biphenyls, or NDLCBs. Additionally, some chemicals are released during e-waste combustion. These chemicals include polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs) and dioxin-like polychlorinated biphenyls (DL PCBs) (Frazzoli, Orisakwe, Dragone, & Mantovani, 2010; Puckett et al., 2002). E-waste workers are exposed to these toxic chemical substances through inhalation and oral intake of contaminated local food and drinking water (Wong, Duzgoren-Aydin, Aydin, & Wong, 2007; M. Wong et al., 2007). Workers who engaged in e-waste recycling are unaware of the serious health risks that are involved (Agyei-Mensah & Oteng-Ababio, 2012; Gillwald, Anyango Tocho, & Mwololo Waema, 2013; Itai et al., 2014) and therefore do not use personal health protection equipment.

E-waste handling in Agbogbloshie exposes workers to lead and mercury. These substances are known to be highly potent neurotoxins, particularly among children. Majority of workers who are young can suffer IQ deficiency and developmental abnormalities even at very low levels of exposure (Puckett et al., 2002). Additionally, occupational exposure to chemicals such as polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs) and dioxin-like polychlorinated biphenyls (DL PCBs) could cause high rates of miscarriage and other reproductive problems, birth defects, cancer, mental disorder and disruption of immune development among workers (Benford et al., 2008; Darnerud, 2008; Larsen, 2006; Lee, Chang, Wang, & Wen, 2000; Pacyniak et al., 2007; Peters et al., 2006). Also, exposure to cadmium can lead e-waste workers in Agbogbloshie to suffer from kidney damage, renal toxicity, bone disease (osteomalacia and osteoporosis) and lung emphysema. High dose levels of copper and iron can cause liver damages among e-waste workers (Frazzoli et al., 2010).

It can be argued that potential recyclers at the scrap yard like the dismantlers and most especially the burners have higher level of exposure as a result of their active role in the actual recycling process that are primitive in nature. A demonstration of burners' exposure to toxic substances through open burning can be found in Figure 17 below. Therefore burners are more at risk with respect to the above mentioned health problems. Thus collectors, middlemen and scrap dealers are less exposed to these toxic substances hence less health impact.

Figure 17: Exposure of burners to toxic substances through open burning of cables and circuit boards.



Source: *Fieldwork, 2014*

7.3 Misrecognition of informal e-waste workers in the social realm

The informal e-waste workers in Agbogbloshie experience various degree of injustice which can be defined in the context of misrecognition. Various institutions and the urban dwellers in Accra do not have recognition for the e-waste workers. The misrecognition manifests in the form of disrespect, discrimination, insults, degradation or humiliation, devaluation or underestimation for the e-waste workers and their ways of living. The manifestation of these forms of misrecognition is as a result of the failure of the various responsible institutions and the urban dwellers to recognize and understand the social and demographic characteristics of the e-waste workers, the underlying factors or motivation behind their engagement in the e-waste management, their skills, expertise and knowledge.

Individual e-waste workers have the right to work and enjoy safe and healthy lives. As enshrined in the constitution of Ghana that: “*every person has the right to work under satisfactory, safe and healthy conditions, and shall receive equal pay for equal work without distinction of any kind*” (Article 24 (1) of The 1992 Constitution of Ghana). On the contrary, e-waste workers especially collectors, experience disrespect and derogatory comments from the public on the street of Accra. The public fails to realise that it is part of the fundamental human right of the collectors to work and live. The urban residents do not take into account the fact that the role of the collectors are promoting good sanitation in the city of Accra. Collectors especially are occasionally prevented by the Police and AMA task forces (under the directives of Accra Metropolitan Assembly) not to use certain streets in the city of Accra. This is a clear case of

discrimination as the collectors just like any other resident or road user in Accra are entitled to the freedom of movement and the use of public spaces. This form of discrimination makes scavenging difficult as the collectors had to travel long distance to acquire e-scrap. They also undergo the burden of pulling and pushing heavy loads of e-waste before reaching the scrap yard. Again, the Police and the AMA task forces usually humiliate collectors or truck pushers on the streets and other public places because of their violation of such directives not to use certain streets or roads. They are sometimes arrested and detained.

The AMA and other public institutions as well as the residents regards the e-waste workers as illegal residents in Agbogbloshie. More so, a clear case of devaluation of e-waste workers and their activities is that AMA and other public actors disregard or do not recognize the significant developmental role of informal e-waste management to the e-waste workers as well as the urban economy of Accra. The informal e-waste management in Agbogbloshie generates employment for the youth who are mostly unemployed. The demands for recovered metals by manufacturing companies do not only create employment but also make available large quantities of household materials, building and farming equipment for consumption. This generates revenue for the government and ensure circulation of money in the economy. The activities of the e-waste workers also relieve the AMA from the cost of managing these large quantities of e-waste that are discarded almost every year. Despite the fact that both the AMA and the EPA lacks the legal, financial and technical expertise and capacity to manage e-waste in Accra, they fail to recognise the local expertise, skills and knowledge of the e-waste workers. The various institutionalised actors and the public devalue the e-waste workers and their activities by failing to recognise that they are helping to prevent the mess or unaccounted consequences generated by the implementation of policies and programmes of the government to close the digital divide (Grant & Oteng-Ababio, 2012).

Furthermore, failure to value the activities of the informal e-waste workers and their social well-being had led to lack of social or basic services such as water, electricity, housing, clinic etc. that are needed for their survival and existence. In fact, they are neglected in the distribution of social amenities. Therefore, there is truly a connection between misrecognition and inequality of inequity in the distribution of benefits. The impact of this misrecognition leads to the deplorable conditions of the people in Agbogbloshie, a suburb where, there is poor sanitation, poor housing and water supply. Lack of recognition on the part of Accra Metropolitan Assembly in the provision of social services has deepened vulnerability or exposure of the e-waste workers to the various forms of burdens discussed earlier. For instance, failure of Accra Metropolitan

Assembly to ensure security normally leads to incidence of theft cases at the scrap yard. Again, lack of electricity supply has caused illegal connections of power from the nearby residents or facilities leading to occasional fire outbreak. Another example is that manipulation of the e-waste market by the Ministry of Trade and Industry creates unstable price of recovered metals leading to business loss.

It can also be argued that, there is potential linkage between misrecognition and inequality in the distribution of income among e-waste workers. The misrecognition that characterizes the power divides and relations of the e-waste management activities is partly the cause of the widening income gap among the e-waste workers. For instance scrap dealers and middlemen underestimate or devalue the roles and the associated burdens of collectors, dismantlers and burners. In view of this, they employ various unjust means (as discussed earlier) to exploit these collectors, dismantlers and burners for their own economic gains.

Again, lack of respect and underestimation of e-waste workers constrain them to fully participate in the decision making process. A typical example is the refusal of Ministry of Trade and Industry to acknowledge the concerns of the leaders of the Greater Accra Scrap Dealers Association before issuing a ban on exportation of recovered metals. Sometimes the leaders of GASDA who are the representatives of the e-waste workers are allowed to participate in meetings on issues related to their activities. However, they are not allowed to present their grievances in such meetings. Usually, their voices are overshadowed. Thus misrecognition causes exclusion of the e-waste workers. Indeed, misrecognition remains as a “*status injury*” (Fraser, 2000 in Tschakert, 2009 p.708) which *abuses the physical and psychological integrity* (Schlossberg, 2004) of the e-waste workers in Agbogbloshie.

7.4 Environmental impact of e-waste management activities

Numerous publications have highlighted the direct environmental impacts of e-waste recycling especially in many developing countries. According to (Prakash et al., 2010) major impacts from current recycling practices in West Africa result mainly from the processes of dismantling, material recovery and final disposal. Collection as well as refurbishment or repair of electrical and electronic equipment may have negative impacts on the environment, but such impacts are generally insignificant. In as much as there are evidences of the impact of e-waste processing activities on the environment in Agbogbloshie, it is equally important to analyse these evidences in the context of power differences and relations among the various actors

In Agbogbloshie, it is observed that e-waste recycling activities undermine the various environmental elements such as air, land and water which make the area unattractive. Heavy smoke from the burning of cables and unwanted remnants is very persistent. Open burning therefore releases dangerous toxics (as discussed earlier) and contaminate the air. Sometimes the smoke reduces visibility and makes breathing difficult to other neighbourhoods. This can be demonstrated in the figure below

Figure 18: Air pollution due to open burning of cables and unwanted residues



Source: *Fieldwork, 2014*

Again, the soil as well as the lagoon which is bounded by the recycling activities are polluted. Toxic ashes and other harmful substances are discharged to the soil during dismantling of e-waste on unfortified ground. Burning of copper cables and wires, as well as monitor and TV casings, accumulate in the soil at the burning sites. Insulating foam from dismantled refrigerators, primarily CFC containing polyurethane, or old car tyres are often used as the main fuels for the fires contributing to acute chemical hazards and long-term contamination at the burning sites, as well as emitting ozone depleting substances and greenhouse gases into the atmosphere. (Prakash et al., 2010). The nearby lagoon is also contaminated due to open burning of cables and remnants along its bank. The lagoon has also become a dumping place for unwanted materials and other waste. Also, muddy ground and stagnant water are prevented by e-waste workers using some discarded broken components of e-waste. These evidences can be shown in the figure below.

Figure 19: Contaminated lagoon and soil due to e-waste recycling in Agbogbloshe



Source: *Fieldwork, 2014*

However, these environmental impacts of e-waste recycling revolved around the issue of power differences and relations. Lack of capacities in terms of finance, technology and labour on the part of the Waste Management Department of the Accra Metropolitan Assembly has necessitated the crude recycling activities that pose damage to the environment. Such incapacities of the Waste Management Department of AMA has given more power to the e-waste workers. The e-waste workers because of their numbers have large labour power to collect and recycle e-waste even though they have limited knowledge and technology of ensuring safe and environmentally friendly recycling.

Lax or non-existence of law on e-waste management undermines the effectiveness of Environmental Protection Agency to protect the environment from such activities. This also skews power to the advantage of the e-waste workers. Again, since the land on which the recycling activities are undertaken is owed by the National Youth Authority which are in support of the recycling activities, the AMA lack total control over the area. The e-waste workers through

their leaders are only answerable to the National Youth Authority by paying yearly compensation for the use of their land. This kind of power differences have shifted power to the advantage of e-waste whose activities are causing serious environmental problems.

Moreover, the various institutionalized actors has their own respective power and roles enshrined in the legal requirements. However, the inconsistency and poor interrelationship of visions among the institutions encourage the recycling activities in Agbogbloshie. E-waste workers are in a better position to continuously undertake their recycling activities due to such institutional inconsistencies.

7.5 Conclusion

This chapter succeeds in providing understandings about how power differences and relations produce various forms of injustice. In this chapter, the application the element of Urban Political Ecology in the analytical model has helped to explain how power differences which define the roles of e-waste workers cause inequality in the share of benefits and burdens and some form of misrecognition. It also enabled us to understand how the power differences between the institutionalized actors and e-waste workers cause lack of basic social services or amenities in Agbogbloshie and misrecognition for e-waste workers. Moreover, this chapter has provided an understandings that such power differences are outcome of environmental damages in the area. This goes to say that in an attempt of relying on the scientific laboratory studies (Addae, 2013; Brigden et al., 2008; Caravanos et al., 2011; Caravanos et al., 2013; Huang et al., 2014; Oteng-Ababio et al., 2014; Otsuka, Itai, Asante, Muto, & Tanabe, 2012) to establish the evidences of environmental impacts of e-waste management in Agbogbloshie, we may support those evidences that social and political relations could equally undermine the environment as well. This provides a decisive tool for the design of strategies to curtail the e-waste problem in Agbogbloshie.

CHAPTER EIGHT: SUMMARY FINDINGS, CONCLUSION AND RECOMMENDATIONS

8.1 Introduction

This research employed case study techniques to understand and explain the injustice inherent in the e-waste management practices in Agbogbloshie. The research developed its theoretical background by employing the elements of Urban Political Ecology and the concept of environmental (in)justice from which an analytical model was developed. The discoveries as well as the discussions of the findings of the research sought to outline the sources of e-waste flows and the factors that drive the flows, identify actors and explain their roles and powers in the e-waste management and lastly to explain the impacts of power differences and relations in the context of injustice or justice. In this chapter, I present the summaries of the research findings, conclusions and relevant recommendations that would inform policy formulation and implementation.

8.2 Summary and conclusions

With respect to the sources of e-waste and the driving forces, the study has shown that the domestic consumption of used or second-hand electrical and electronic equipment generate e-waste and cause e-waste flows to Agbogbloshie. Moreover, there is also inter-regional and intra-regional trans-border shipment of used EEE to Agbogbloshie. However, the inter-regional flows of e-waste particularly from OECD countries to Agbogbloshie is the one which is clearly significant. It confirms the findings by Schluep et al. (2011) that the trans-border shipment of new and large quantities of used EEE especially from OECD countries fuels and exacerbates the domestic or internal consumption and generation of e-waste which are dumped in Agbogbloshie for recycling.

Again, with the aid of an analytical model, the study was able to explain the integrated process or factors that drive such movements of e-waste to Agbogbloshie. It was established that some internal factors like the execution of policies and programmes to bridge the digital divide by the Government of Ghana to ensure socio-economic development through ICT create avenues for excessive proliferation of second-hand electronic products. In view of the fact that these second-hand products have shorter life span, they become obsolete and eventually discarded in Agbogbloshie. Also, unregulated and unrestricted import regimes for second-hand electronic products, high demand and consumption of second-hand electronic product and unemployment are other internal factors that cause e-waste flows to Agbogbloshie.

Additionally, there are also external factors that cause trans-border shipments of e-waste. It was discovered that the persistent production of non-upgradeable products with limited life spans by manufacturers of electrical and electronic products account for mass generation of e-waste after a short consumption period. The high cost of disposing e-waste in the place of origin especially in the rich countries couple with the inability of producers of EEE in rich countries to adhere to strict environmental rules governing the disposal and management of toxic materials like e-waste account for the influx of e-waste to Ghana, Agbogbloshie. Also flaws or limitations of international laws like the Basel convention have created favourable conditions for interregional e-waste flows to Agbogbloshie (Azuka, 2009).

The research also critically examines the e-waste management activities in Agbogbloshie and identify the various actors and their specific roles in the e-waste sector. Apart from the informal e-waste workers in Agbogbloshie, institutionalized actors were also identified as influential stakeholders whose actions and inaction affect the e-waste workers and their activities. The research revealed that the roles of the e-waste workers in e-waste management are not only influenced by social and demographic characteristics but also knowledge, experience, network and assets. Also, power differences and relations dominate the e-waste management in Agbogbloshie. Critically, there are unequal social power differences among the e-waste workers which are determined by such knowledge, experience, network and assets. Such unequal social power drives the relationship among the e-waste workers.

On the other hand, institutionalized actors who are representatives of institutions such as Ministry of Trade and Industry, Customs Excise and Preventive Service, Accra Metropolitan Assembly and Environmental Protection Agency play essential roles. They have different political powers because their acts and responsibilities are constitutionalized. Also, such political power could influence the larger population in Ghana. In view of their political powers, they perform certain roles and influence the e-waste management activities. The MOTI and CEPS influence trans-border flows of e-waste, control and form monopoly market for recovered metals. The AMA frustrate e-waste workers with threats of evacuation and litigations. They also prevent collectors not to ply certain streets and areas of the city and refuse to provide some basic developmental needs of the e-waste workers. Unlike the AMA and MOTI, the EPA in the absence of regulations on e-waste management, have established a friendly relationship with the e-waste workers in their attempt to reduce environmental pollution of the e-waste activities. This indicates that finding solutions to complex problems of that nature needs diplomatic cooperative

means rather than radical use of power. However, there is uncertainty about this cordiality between the e-waste workers and EPA as the passage of the bill on e-waste management will give the EPA enough power to act. This is because more political power could be abusive and this could generate unnecessary tension between EPA and the e-waste workers.

Another significant finding was produced with regards to the impacts of unequal social and political power on the social well-being of e-waste workers and the environment in Agbogbloshie. The impacts were discovered and discussed in the context of environmental injustice. It has been shown that the unequal social powers among the e-waste workers cause uneven distribution of benefits and burdens. Also, e-waste workers are being neglected in the distribution of basic social services. Again, it was established that attitudes of the institutionalized actors cause various forms of misrecognition for the e-waste workers. It is the misrecognition that has led to poor or lack of the basic social services. The research also revealed the environmental impacts of e-waste management in Agbogbloshie. It is indicated that we should not make an absolute judgment that the crude and primitive recycling techniques employed by the e-waste workers cause various forms of environmental damages in Agbogbloshie. Rather, it is the institutional challenges that have tilted power to e-waste workers to continuously use such crude methods in the e-waste management.

Conclusively, the reliance on the analytical model composing of the main tenets of Urban Political Ecology have provided a framework to gain deeper insights about the e-waste processing activities in Agbogbloshie. We have understood the integrated processes that cause the flow of e-waste to Agbogbloshie. We now also know the diverse means through which actors, their power differences and relations affect the social well-being of the e-waste workers and their environment. Thus the model espousing the elements of Urban Political Ecology has provided a useful tool to trace injustice from the global level through the national institutional framework down to the local level in Agbogbloshie. Urban Political Ecology will continue to be a reliable theoretical background to investigate how national institutional structures and processes which have global connections impact on people and their environment at the local level. Indeed, we are able to understand that Agbogbloshie e-waste management activities are connected within the global network of production and consumption. Such connectivity is not only beneficial but has some drawbacks which make poor people more vulnerable. Actually, the burdens or such drawbacks outweigh the benefits. A cooperative global effort is therefore required to mitigate

the burdens. More importantly, it is incumbent on the Government of Ghana to initiate appropriate measures to harness the potentials and benefits free from burdens and impacts of the growing e-waste stream.

However, despite the knowledge being produced by the research, there are also shortcomings or limitations. Firstly, the concepts and the theoretical approach of Urban Political Ecology provided as useful guidelines for the research but there was difficulty in making them very operational during the fieldwork. The diversity of subjective views presented by the respondents even compounded the problem. The concepts were also conflicting with the concept of social well-being which could have also been an equally important alternative concept. Again, a more prolonged fieldwork time could have been relevant for this type of case study in order to have a thorough understanding and knowledge about people real life situations. The research methodology was also limited in scope and could not seek the perspectives of other international actors whose action at far distance could equally cause some level of injustices. However, spatial distance, time, money and institutional code of conduct could have been impediments even if the research was designed to cover those international actors.

8.3 Recommendations

The research findings and the knowledge it has produced provide the bases or guidelines for policy formulation and implementation for the betterment of humanity. Apart from that, some recommendations could be made in view of the findings. Firstly, there is no need for relocation of recycling site. Relocation or evacuation of the informal recycling industry in Agbogbloshie means redistribution of environmental burdens. Therefore, the scrap yard which is even close to an industrial zone should remain in its existing location. Relocation or evacuation to the countryside will also increase the burden of transporting even the e-scrap and the recovered metals.

Secondly, in an attempt to curtail the unequal distribution of benefits and burden it can be proposed that an integrated modern industrial e-waste management system should be established. In view of making the informal e-waste recycling a modern recycling industrial unit, there should be continuous existence of unrestricted e-waste import regime so that we may have ceaseless flows of e-waste feeding the recycling industry. However, laws on e-waste should be constituted to regulate the flows and also ban crude recycling techniques.

Also such modern e-waste management system should apply the principle of Extended Producer Responsibility where manufacturers of EEE and generators of WEEE or e-waste should

take responsibilities in the disposal of e-waste (Sthiannopkao & Wong, 2013; Widmer et al., 2005). They must be involved in the financing or establishment of bring-back shops or stores to ease the collection of e-waste generated internally. Again, the e-waste workers should be incorporated into the modern e-waste management system in order to avoid loss of jobs. They should be guided to operate such modern recycling unit as business oriented unit where a standard working hours and associated standard working allowance are determined for the e-waste workers. In the incorporation process, training facility should be instituted for the e-waste workers to learn how to use advanced technology in the recycling of e-waste.

Moreover, such modern industrial recycling unit should include essential social services such as portable water, adequate housing, power, clinic and occupational hazard and safety unit. The provision of these services will not only enhance workers' productivity but also their well-being. Furthermore, trading of recovered metals should be liberalised to allow for competition in a way of ensuring efficiency. However, the trading of metals should be regulated and monitored by the appropriate institution to ensure that the internal market prices for recovered metals reflect that of the world market prices. It is also important to suggest that these recommendation would work perfectly when adopted if only there is proper cooperation and coordination among the various institutionalised actors.

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APPENDICES

APPENDIX I

Unravelling Urban Environmental (in) justice of E-waste Processing activities in Agbogbloshie, Accra-Ghana

A. LIST OF PRIMARY INFORMANTS

List of Respondents	Number
Collectors	4
Dismantlers	5
Burners	5
Repairers or Refurbishers	4
Middlemen	5
Scrap Dealers	4
Leaders of Greater Accra Scrap Dealers Association	3
Total	30

B. INTERVIEW GUIDE FOR PRIMARY INFORMANTS

1. Age
2. Gender
3. Nationality and Ethnicity
4. Religion
5. Marital status
6. Place of residence
7. Level of education
8. Duration of engagement
9. Reason of engagement
10. Mode of entry
11. Sources of e-waste and means of collection
12. Description of main activity and roles in the e-waste management process
13. Sources of resources such as money, tools, trucks, vehicles etc
14. Relationship with other activities and e-waste workers
15. The impact of other activities and roles of e-waste workers

- 16. Level of income
- 17. Challenges
- 18. Other issues

APPENDIX II

Unravelling Urban Environmental (in) justice of E-waste Processing activities in Agbogbloshie, Accra-Ghana

A. LIST OF KEY INFORMANTS

List of Respondents from the various Institutions	Number
Accra Metropolitan Assembly	3
Ministry of Trade and Industry	1
Custom Excise and Preventive Service	1
Environmental Protection Agency	2
Total	7

B. INTERVIEW GUIDE FOR KEY INFORMANTS

1. What is your perspective on the informal e-waste processing in Agbogbloshie?
2. What do you think motivate the continuity of the e-waste recycling activities?
3. What are the source of the e-waste?
4. What do you think cause the e-waste dumping in Agbogbloshie?
5. What roles do you play as far as the e-waste business is concerned?
6. To what extent do you think your roles have been influential?
7. On your assessment how do you think the e-waste recycling is beneficial?
8. Why do you think the e-waste recycling in Agbogbloshie is a problem?
9. What are the challenges the e-waste workers face?
10. How responsive are you to the challenges of e-waste workers?

11. What are solutions to the challenges they face?
12. Any suggestions as to how the e-waste problem could be solved?
13. Other relevant issues