



PROMOTING A GREEN ECONOMY: LOCAL KNOWLEDGE AND RESPONSE TO THE RISKS OF HEAVY METAL AND XENOBIOTIC POLLUTION AT INFORMAL E-WASTE SITES IN GHANA



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INTRODUCTION

- Production of EEE is the fastest growing sector of the manufacturing industry in industrialized countries (StEP Initiative, 2013; 2014)
- EEE become obsolete and discarded in significant amounts worldwide and are transported to developing countries as e-waste (Cobbing, 2008)
- E-waste describes all types and forms of electronic equipment which are no more of use or have been discarded as waste with no intention of reuse



INTRODUCTION – CONT'D

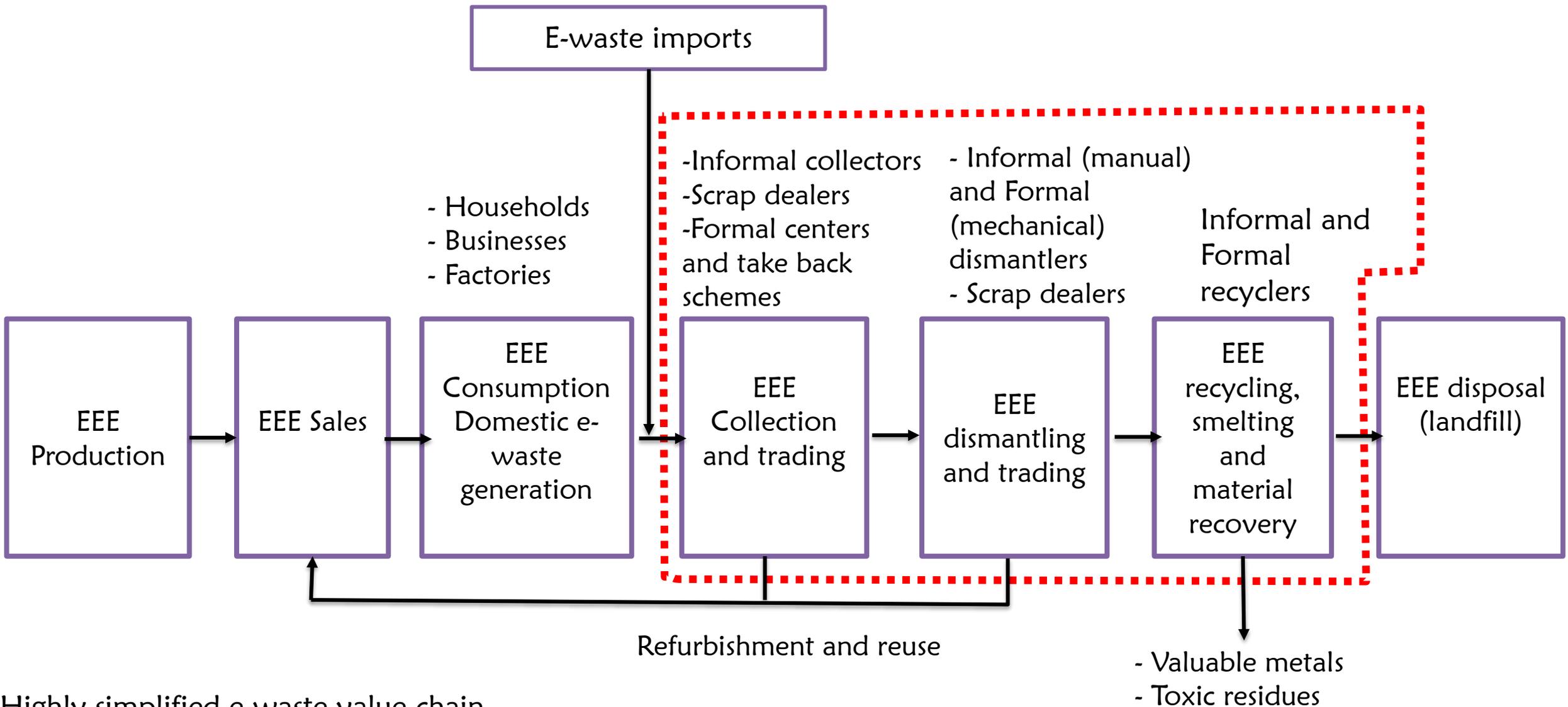
- There are two schools of thought about the activity/enterprise
- Transport of e-waste products is seen as an attempt to bridge the technological gap between the advanced and developing countries (Basel, 2010; Moore, 2012)
- Others regard it as hazardous due to heavy metal and xenobiotic pollution (Kuper and Hojsik, 2008, Brigden et al., 2008, Caravanos et al., 2011)
- A major challenge to city managers, environmental justice scholars, urban geographers, and political ecologists (Pulido, 2000; Moore, 2012; Pickren, 2014)



INTRODUCTION – CONT'D

- Several EEE materials contain valuable substances such as gold, copper, and aluminum, which can be retrieved and recycled for reuse.
- Serves as an attractive livelihood source for the urban poor in developing countries (Prakash et al, 2010)
- These materials are harmful to destination countries because they contain hazardous compounds which are detrimental to both human health and the environment
- The sector in recipient countries occupies a hazy world of **informal environment** (Nartey et al, 2016)





Highly simplified e-waste value chain
 Source: Adapted from UNEP (2007)

Metal	Component of EEE	Health and Environment Risks
Lead (Pb)	Printed circuit boards, cathode ray tubes, light bulbs, monitors, batteries	-Kidneys and damage nervous system of children, blood and brain disorders.
Nickel (Ni)	Power supply boxes, computers, x-ray, ceramic components of electronics	-Lung cancer, skin disease that is characterised by poor wound healing and wart-like bumps.
Zinc (Zn)	Batteries, cathode ray tubes, soldering flux, and wood preservatives	-Stomach cramps, skin irritations, vomiting, nausea and anaemia, respiratory disorders
Copper (Cu)	microprocessors, transformer coils, cables terminal strips, plugs and sockets	Irritation of the nose, mouth and eyes, headaches, stomachaches, dizziness, vomiting and diarrhea, liver and kidney damage
Polycyclic aromatic hydrocarbons (PAHs)	exposed to by breathing polluted air, wood smoke, vehicle exhaust, eating contaminated food; or drinking contaminated water	Liver damage, skin irritation, cancer
Flame retardants		Infertility, birth defects, neurodevelopmental delays, reduced IQ and behavioral problems in children, hormone disruptions, and cancer.





OVERVIEW OF GHANA'S E-WASTE SECTOR



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OVERVIEW OF GHANA'S E-WASTE SECTOR

- It is a major source of livelihood for the urban poor
 - Employed 20,300 to 33,600 people in 2010 with an increase factor of 2.7
 - Between 121,800 and 201,600 people are dependent on the sector
 - Generates between US\$ 105 and 268 million annually (Prakash et al, 2010)
- Due to the informal nature of the activity, this is not reflected in the nation's GDP
- Only 0.2% of the collection and recycling of e-waste is done by the formal sector
- There is a relationship between the informal and the formal industry where the former supplies recycled inputs to the latter



OVERVIEW OF GHANA'S E-WASTE SECTOR



- Studies at Agbogbloshie and Koforidua sites show severe chemical contamination
- Samples had high levels of toxic heavy metals most of which are used in EEE or formed during the **open burning**
- Fumes from **open burning** cause pollution and pose several health risks
- Is there an alternative to this practice?



GOVERNANCE

Articles 36 (9) (10) and 41(k)
of the 1992 Constitution of
Ghana

To safeguard the national environment for posterity and seek co-operation for the purposes of protecting the wider international environment for mankind

EPA Act 1994 (Act 490)
(Section 10)

Only existing law closely related to WEEE in Ghana “to monitor the use of hazardous chemicals by collecting information on the importation, ..distribution, sale, use and disposal of such chemicals”

National Environmental
Policy of 1995

The policy provides broad framework for the control and management of potentially toxic substances, which include releases from uncontrolled management e-wastes



GOVERNANCE

Hazardous and Electronic
Waste Control and
Management Bill, 2016

- To regulate the sector for the control, management and disposal of hazardous WEEE waste in the country (Part TWO of the Bill)
- To ensure sound management and recycling systems to have a green economy and fulfill the obligations under the multilateral conventions.

- It is however not clear what role the proposed legislation has carved for the informal sector;
- ... whether it is going to be at the expense of the well mesh-worked system or would complement it.



PROBLEM STATEMENT

- Local knowledge is the perception, awareness and the way people observe and measure their surroundings, how they solve problems and validate new information
- It is argued to contribute significantly towards informing decisions on minimising vulnerability, mitigating risks and building resilient and green economy (Mekbib 2009)
- Decision-makers have limited contact with local reality and knowledge (Nartey, 2016)
- The Protection Motivation Theory (PMT) states that an individual's awareness and perception about exposed risks influence his 'behaviour' towards such risks.
- Risk is a social construct and so the need to have contact with local reality and knowledge (ACDP, 2010)



PROBLEM STATEMENT – CONT'D

- Issues of:

- the local knowledge of primary actors about risks of heavy metal and xenobiotic pollution
- the mechanisms and systems in place by primary actors to respond to the risks
- the effect of access to risk information on adopting eco-friendly e-waste practices

- at the informal e-waste sector

Missing from existing literature

This study will address the knowledge gap and inform policy appropriately



RESEARCH OBJECTIVES

Aim

To assess the level of local knowledge of and response to the risks of heavy metal and xenobiotic pollution of WEEE communities and make recommendations to improve the sector and promote a green economy.

Specific Objectives

- To assess the responsiveness of Ghana's current e-waste legislation to addressing the risks of heavy metal and xenobiotic pollution at informal e-waste sites
- To assess the local knowledge of primary stakeholders about the environmental and health risks of heavy metal and xenobiotic pollution
- To examine the mechanisms and systems that are in place to address the risks of e-waste activities
- To assess the effect of access to risk information on adopting eco-friendly practices



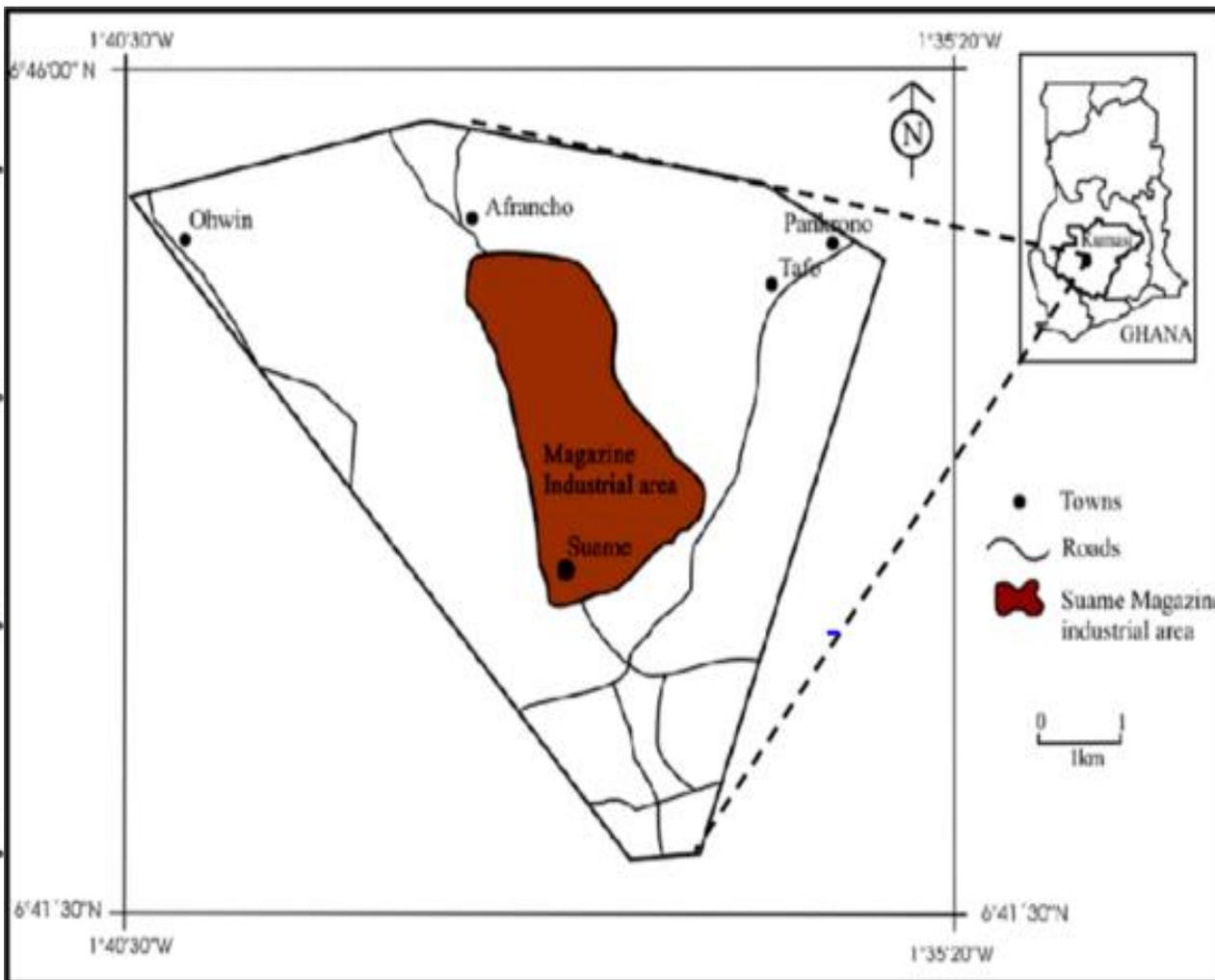
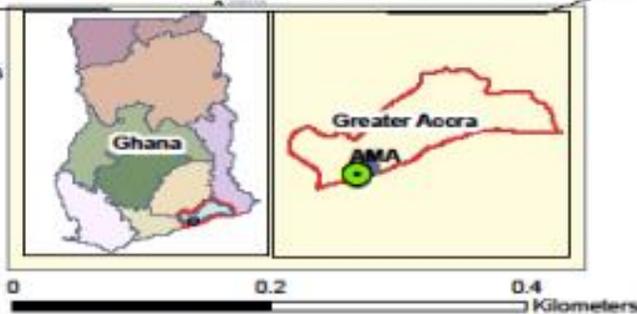


See the final, detailed, Google Earth map at www.knust.edu.gh for more details. The map shows the location of the study area in the Greater Accra Metropolitan Area (GAMA) and the location of the study area in the Greater Accra Metropolitan Area (GAMA).

Data Source:
Field Work, 2014

Legend

- Other Livelihood Activities
- Burning
- Dismantling
- Refurbishment
- Youth Council Building
- Study Area
- AMA boundary



GENERAL METHODS

- The explanatory sequential mixed methodology will be adopted for the study
- **Quantitative**
 - Cross-sectional survey of stakeholders along the e-waste value chain
 - Experimental research
- **Qualitative (PRA)**
 - Key informant interviews
 - FGDs
 - Observation
- MESTI; MoH; MoTI; EPA; MLGRD; Ghana Standards Board; relevant NGOs; relevant decentralised departments at the MMDAs (WMD, DHD, DED, DADU), among others
- Actors along the e-waste value chain: collectors, dismantlers, recyclers, refurbishers
- Clusters of related activities at the site: food, water, and beverage vendors, petty traders



EXPECTED OUTPUT

- Re-inform institutional legislations on regulating e-waste recycling activities to minimise the severity of risks and exposure and sound environmental management
- Consideration of local knowledge about risks can be an important driver for the formulation and implementation of interventions that could be targeted and responsive to the sector.
- Serve as lessons for responsible bodies on the subject matter and the need to operationalise new approaches and alternatives bearing in mind WEEE communities
- Appreciate various theories to be adopted and the need to adapt and improve such theories, particularly those related to knowledge, risk perception and communication



THANK YOU



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A THREAT TO HEALTH, ECOSYSTEMS AND DEVELOPMENT IN GHANA.

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