

Thea Schoeman & Dembe Ramutanda

Geography, Environmental Management & Energy Studies

Waste pickers and e-waste: Case Study in the Greater Joburg area

WasteCon
2022

25th Conference & Exhibition 18 – 20 October 2022



UNIVERSITY
OF
JOHANNESBURG



Outline

Introduction	E-waste and South Africa	E-waste as an opportunity	Informal sector in South Africa
Methodology and study area	Profile of waste pickers	Experience	Types of e-waste collected
Place of collection and storing	E-waste buyers	Willingness to sell to e-waste recyclers	Income
Dismantling	Processing	Repair	Training
	Concluding remarks	References	



Introduction

- Improper management of e-waste due to poor policy interventions, lack of accessible information on how to dispose used and unwanted electronics (Maphosa & Maphosa, 2020)
- Many poor nations in Africa manage outdated waste electrical and electronic equipment (WEEE) using primitive techniques such as manual dismantling, open-air burning, and landfilling
- E-waste is managed in the informal sector by inexperienced and untrained persons who are unaware of the environmental and health risks associated with their operations (Asante et al., 2019)
- Most African countries have legislation governing general waste, the environment, air, water, and health and safety issues, but there are few laws pertaining specifically to e-waste (Tetteh & Lengel, 2017; Grant & Oteng-Ababio, 2021; Lebbie et al., 2021)



E-waste and South Africa

- Fastest growing waste stream in SA (DFFE, 2020) and accurate data on e-waste generation is lacking and conflicting
- E-waste generation 3 times the rate of SW and estimated that only 11% is recycled annually (Lydall et al., 2017)
- Estimation of generation – 74 923 tonnes in 2015 (Lydall et al., 2017), 415 500 tonnes (Global E-waste Statistics Partnership, 2019), but DEA (2018) estimates it to be 300 000 tonnes and only 10% recycling
- SA considered the leading country in Sub-Saharan Africa in effective management of e-waste (Tetteh & Lengel, 2017)
- SA legislation & regulations – National Environmental Management Act (1998), National Environmental Management: Waste Act (2008), National Waste Management Strategy (2011, 2020) and Extended Producer Responsibility scheme (2021)



E-waste as an opportunity

- E-waste contains several precious and strategic metals
- Growing need to recover these resources due to scarcity, restricted global trade & fluctuations in prices of some of these metals
- E-waste recycling is and can contribute to economic growth by creating jobs
- Unemployed youth and adults in developing countries often work as waste pickers to earn income through waste and e-waste recycling
- WEEE recycling has the potential to be an important employer as 25 jobs can be created for every 1 000 tonnes of e-waste managed (Lydall et al., 2017)

- In SA the informal sector plays a significant role in e-waste recycling
- No study has been conducted on the role of waste pickers in e-waste in SA and this study tried to fill some of the gaps





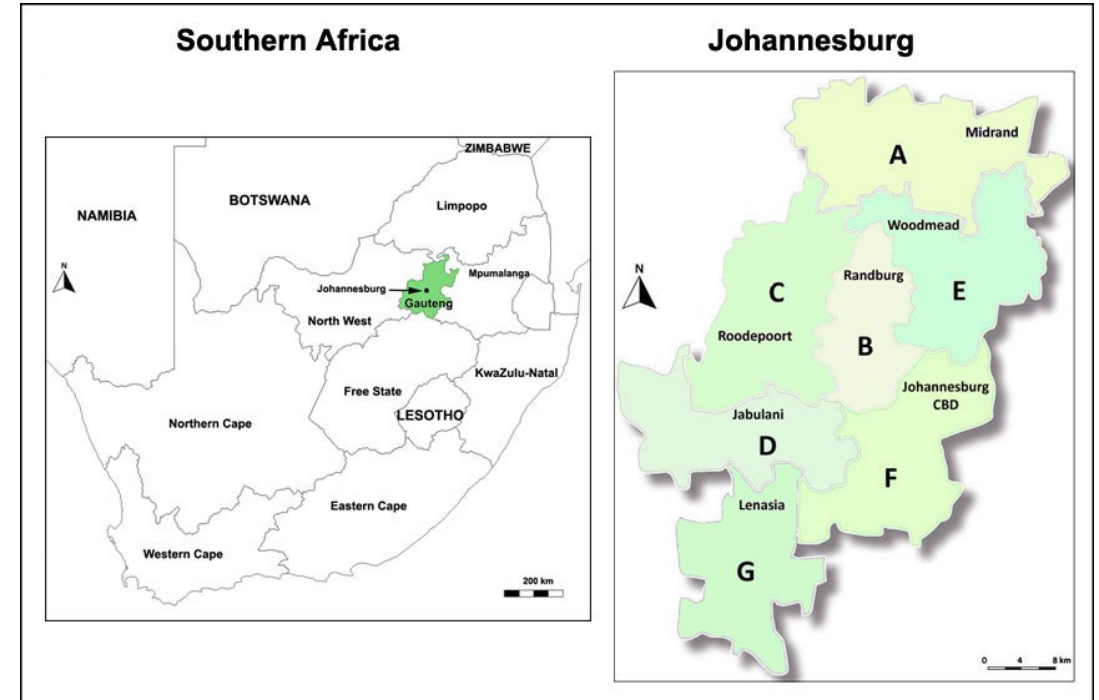
Informal sector in South Africa

- Informal e-waste sector consists of collectors and recyclers who are unlicensed & not registered with any official entities
- Waste pickers are the recycling experts, yet they are not given the recognition they deserve
- They collect various recyclables – including WEEE
- Informal sector contributed 25% of the e-waste recycling in South Africa with an estimated 10 000 waste pickers working with e-waste in 2013 (eWASA, 2013)



Methodology

- Study was conducted in the greater Johannesburg area
- Mixed methods approach with purposively sampling
- Face-to-face interviews using a questionnaire (229 in total)
- Some problems with data collection due to restrictive lockdown levels in SA
- Thematic and descriptive statistical analyses



Profile of waste pickers

- In line with other studies that found waste picking is dominated by African men
- Contrasting results in terms of nationality – this might be due to Covid restriction & undocumented foreign nationals do not participate in studies
- Two waste pickers were well educated – one with a nursing degree and another with an honours degree in Design and Technology

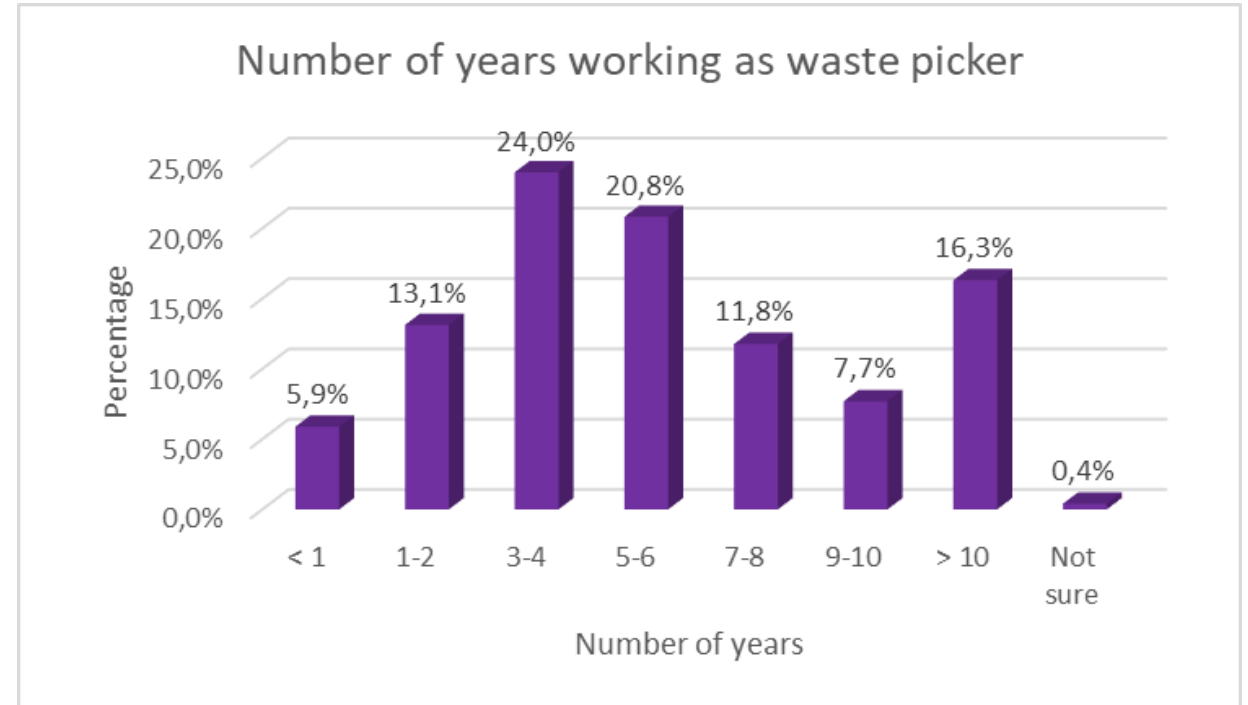
Table 1: Socio-demographic characteristics of waste pickers

Characteristic	Class	Frequency	Percentage
Gender	Male	191	83.4
	Female	38	16.6
Race	Black	200	87.3
	Coloured	26	11.4
	White	2	0.9
	Indian/Asian	1	0.4
Country	South Africa	187	81.6
	Zimbabwe	26	11.4
	Lesotho	7	3.1
	Mozambique	6	2.6
	Malawi	2	0.9
	Botswana	1	0.4
Education	Completed some primary school	29	12.9
	Completed primary school	15	6.7
	Completed some high school	146	65.2
	Completed Matric	31	13.8
	Post-matric qualification	2	1.4



Experience

- 16.3% had more than ten years' experience & the most experienced waste picker had 22 years' experience
- Almost half (43%) had less than 5 years' experience
- One such reason is high youth unemployment
- In the Alexandra Township, most of the young waste pickers indicated that they are just into waste picking/recycling because they are *“tired of staying at home and doing nothing”*



Types of waste collected

- Cables (45%) most collected type of e-waste
- Bulky and heavy equipment (geyser, washing machine, stove, etc.) or those that are perceived to be valuable by their owner (laptop, cellphone, etc.) least collected
- Waste pickers do not only collect e-waste, but all recyclables
- Recyclables collected were:
 - metals (79.0% of waste pickers)
 - plastic (77.1%)
 - paper (76.2%)
 - cans (72.0%) and
 - cardboard (71.5%)



Table 2: Types of e-waste collected

Commonly collected waste	Percentage	Commonly collected waste	Percentage
Cables	45.0	Stoves	5.9
Screen	39.5	DVD player	4.1
Radio	19.5	Laptop	4.1
TV	19.1	Cellphone	3.2
Computer/CPU	15.9	Fridge	2.7
Kettles	11.4	Fan	2.3
Machines	10.5	Washing machine	1.4



Place of collection & storing



- E-waste is collected from multiple locations
- Dustbins outside houses (74.2%) were where the most e-waste was collected
- Just more than half (54.9%) of waste pickers store their e-waste
- E-waste collected is stored at home or in their backyards (46.8%)
- A third (33.0%) indicated they store it where they sleep in places such as bushes, under bridges or next to streets
- Five waste pickers paid for storage place for the waste they collected



E-waste buyers

- Majority of waste pickers (76.4%) sold the e-waste to scrap metal dealers
- 49.8 % and 49.3% respectively sold it to the general buy-back centre and an e-waste buy-back centre
- A buyer with a bakkie (49.3%) and an e-waste recycler (45.3%) were the other popular buyers

Table 3: E-waste buyers

Sold to	Frequency	Percentage
Scrap metal dealer	172	76.4
General buy-back centre/depot	112	49.8
E-waste buy-back centre/depot	111	49.3
Buyer with a bakkie	111	49.3
E-waste recycler	102	45.3
I do not know who it is	23	10.2
Other	10	4.1



Willingness to sell to e-waste recyclers

- Less than half (45.3%) sold to e-waste recyclers
- Those that did not, were asked about their willingness to sell to e-waste recyclers
- Those willing indicated that they would do so if they can earn more money

“Yes, maybe they will pay better than other dealers.”

“Yes, I think they would pay better than scrap yards. I think scrap metals pay less”.

- For those unwilling, three reoccurring reasons were identified, namely location, familiarity & reduced income

“No, I don't know their locations”.

- Fluctuations in prices & not been paid fair prices were identified as serious problems by waste pickers in selling waste to e-waste recyclers

“No, they will give me a small amount of money compared to what I get at scrap dealers”.

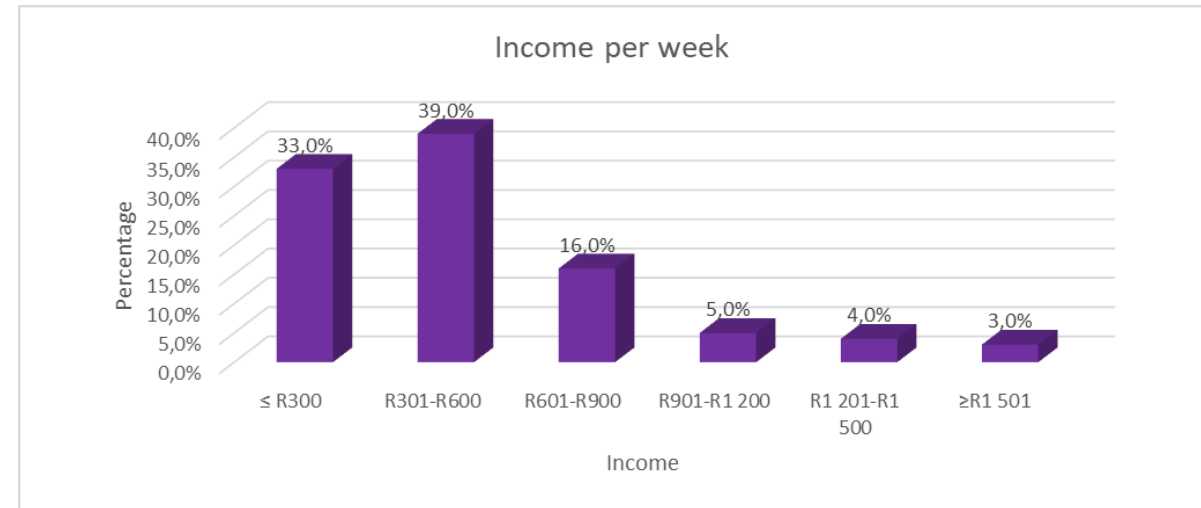
- Being familiar with a buyer and having a good working relationship is also important to waste pickers

“No, I have a good relationship with my current buyers”.



Income

- Unfortunately, it was not possible to determine income made from the selling of e-waste
- Waste pickers collect more than one type of recyclable and when paid, the receipts they receive do not show the earnings for different waste types
- Almost three-quarters (72%) of waste pickers earned less than and up to R600 per week
- Average income calculated was R580 per week
- In order to earn more income, waste pickers often dismantled and/or processed e-waste



Dismantling

- Majority of the respondents (68.0%) dismantled e-waste
- Only 3% received training in dismantling & mostly informal training
- Majority (69.6%) prefers to do dismantling operations on their own & not with other waste pickers
- If working together it is for reasons as sharing responsibility, sharing carrying the load & protecting waste from theft

“I have learnt by watching other people do it.”

“From experienced co-workers.”

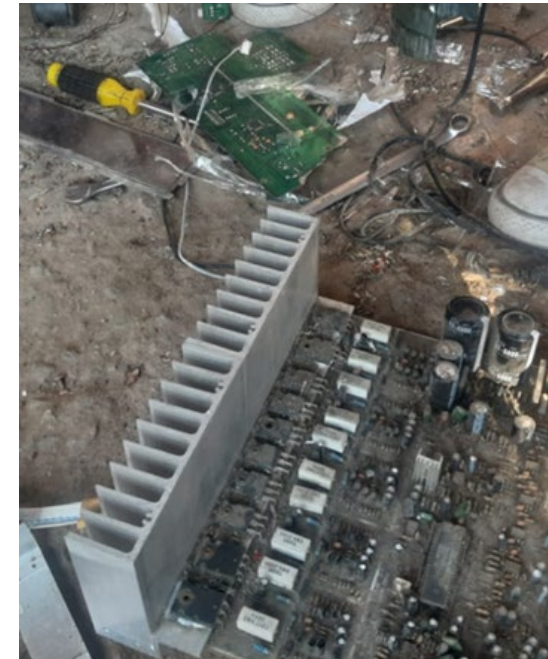
“Training from friends.”

“From my father who was an electrician.”

“I did an electrical engineering course at Sedibeng College”.

Table 4: Dismantling, training and working together

Response	Dismantle e-waste	Training in dismantling	Work with other waste pickers to dismantle
Yes	68.0%	3.3%	30.4%
No	32.0%	96.7%	69.6%



Processing

- More than a half (60.2%) of waste pickers conducted e-waste processing
- Only 1.6% received training & then informal training by friends or family
- The processing was done by mostly burning cables to extract copper and aluminium
- Metals (63.7%) were considered as the most valuable fraction, followed by copper (34.0%), aluminium (28.0%)

Table 5: Processing, training and work together

Response	Process e-waste	Training in processing	Work with other waste pickers to process
Yes	60.2%	1.6%	33.6%
No	39.8%	98.4%	66.4%





Repair

- Less than half (43.8%) of respondents collected e-waste for repair
- Three-quarters (75.0%) indicated that they do the repair themselves
- Repaired items were kept for personal use & to sell
- Majority of waste pickers (87.4%) indicated that they sold repaired items to earn additional income
- 42.1% indicated that they also kept some of the repaired goods for personal use
- Items that are kept for personal use included cellphones, kettles, irons, fans, heaters and even large household appliances such as stoves
- Only one respondent received training in the repair of e-waste as he was previously employed at a repair centre

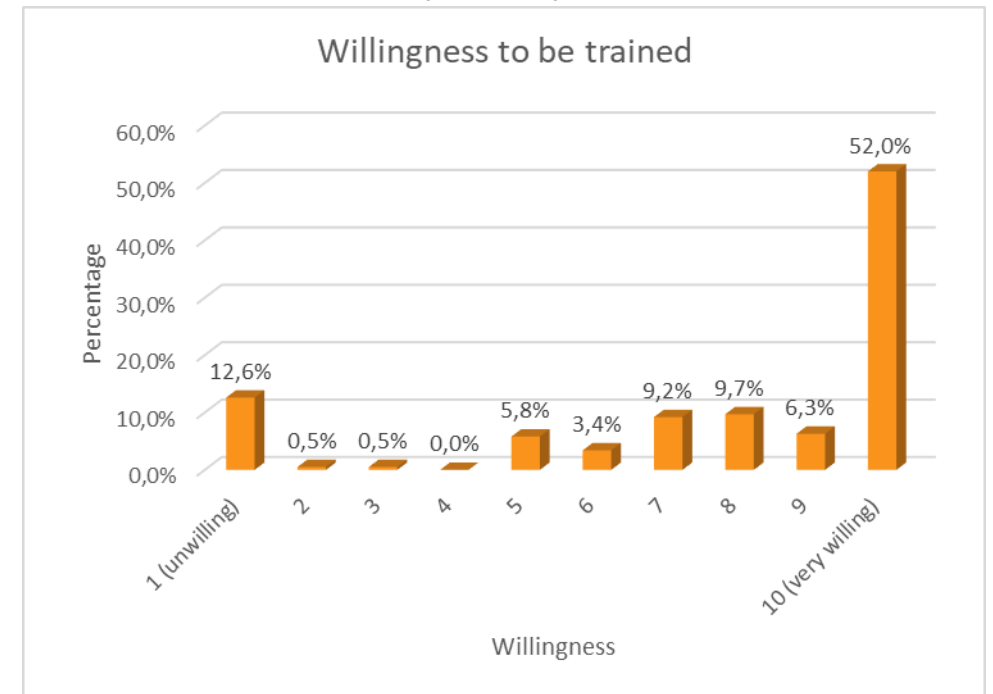


Training

- The DEA (2016) report on waste pickers and the guidelines developed for the integration of waste pickers (DEFF & DST, 2020) both emphasized the importance to up-skill waste pickers and that municipalities should provide training for waste pickers
- 52% of waste pickers were very willing to be trained, 9.2% of them was neutral while 12.6% were very unwilling to be trained
- The top training need identified by waste pickers was training in safety (47.7%) , followed by repair of household appliances (24.9%)

“I would like to learn how to properly break-down the appliances without hurting myself.”

“Learning how to dismantle goods and how to be safe while doing so would be great.”



Concluding remarks

- E-waste poses both a danger to the environment and human health, but if properly managed, can contribute to the circular economy, job creation, reduction in greenhouse gas emissions, reduction in the use of virgin sources, etc.
- The informal sector in South Africa collects, transports, dismantle, process and repair e-waste
- Often in an unsafe manner and without proper training and equipment
- The question arises if there is political will to integrate the informal sector and/or to assist them with training and equipment to safely recycle and repair e-waste

Funding for this project was received from the Department of Science and Innovation through the Waste Research, Development and Innovation Roadmap.

We would like to thank and acknowledge the waste pickers that agreed to participate in this study.

Recommendations	% responses
Information, education and awareness	43.3
Provide PPE	11.2
Provide jobs	8.2
More bins	7.5
More e-waste recycling facilities	7.5
Equipment	6.7
Fine non-recyclers	3.7



References

- Asante, K.A., Amoyaw-Osei, Y. & Agusa, T. 2019. E-waste recycling in Africa: Risks and opportunities. *Current Opinion in Green and Sustainable Chemistry*, 18:109-117.
- DEA (Department of Environmental Affairs). 2016. *Report on the determination of the extent and role of waste picking in South Africa*. DEA: Pretoria.
- DEA (Department of Environmental Affairs). 2018. *South Africa State of Waste Report*. Available from: <http://sawic.environment.gov.za/documents/11766.pdf>.
- DFFE (Department of Forestry, Fisheries and the Environment). 2020. *National Waste Management Strategy 2020*. Republic of South Africa: Department of Environment, Forestry and Fisheries.
- DFFE (Department of Forestry, Fisheries and the Environment) & DST (Department of Science and Innovation). 2020. *Waste picker integration guideline for South Africa: Building the recycling economy and improving livelihoods through integration of the informal sector*. Available from: <https://wasteroadmap.co.za/wp-content/uploads/2021/02/Waste-Picker-Integration-Guidelines.pdf>.
- eWASA (e-Waste Association of South Africa). 2013. *Business opportunities in South Africa's e-waste sector*. Available from: <https://www.ewasa.org/>.



References

- Global E-waste Statistics Partnership. 2019. *South Africa*. Available from: <https://globalewaste.org/statistics/country/south-africa/2019/>.
- Grant, R. & Oteng-Ababio, M. 2021. Formalising e-waste in Ghana: An emerging landscape of fragmentation and enduring barriers. *Development Southern Africa*, 38(1):73-86.
- Lebbie, T.S., Moyebi, O.D., Asante, K.A., Fobil, J., Brune-Drisse, M.N., Suk, W.A., Sly, P.D., Gorman, J. & Carpenter, D.O. 2021. E-waste in Africa: A serious threat to the health of children. *International Journal of Environmental Research and Public Health*, 18(16):8488.
- Lydall, M., Nyanjowa, W. & James, Y. 2017. *Mapping South Africa's waste electrical and electronic equipment (WEEE) dismantling, pre-processing and processing technology landscape*. Mintek External Report #74. Pretoria, DST. Policy Report. Available at: https://www.ewasa.org/wp-content/uploads/2018/04/weee_technology_landscape_assessment_report.pdf.
- Maphosa, V. & Maphosa, M. 2020. E-waste management in Sub-Saharan Africa: A systematic literature review. *Cogent Business & Management*, 7(1):1814503.
- Tetteh, D. & Lengel, L. 2017. The urgent need for health impact assessment: proposing a transdisciplinary approach to the e-waste crisis in sub-Saharan Africa. *Global Health Promotion*, 24(2):35-42.



THANK YOU FOR LISTENING!

Thea Schoeman

Geography, Environmental Management & Energy Studies

University of Johannesburg

South Africa

theas@uj.ac.za

