Mapping and Monitoring Macroplastic Waste Sources along the Umgeni River using Unmanned Aerial Vehicles
UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI
SARCHI Chair
CLEANUP
Tadiwanashe Gutsa[1], Thomas Manff, Robin de Vries[2], Cristina Trois[1]
1. NRF/DSI/CSIR SARCHI Research Chair in Waste and Climate Change, School of Engineering, University of Kwazulu-Natal, Durban, South Africa
2. The Ocean Cleanup, Rotterdam, The Netherlands

Africa

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PERSPECTIVES ON WASTE AND CIRCULARITY
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INTERWASTE
TRANSTECH
LUHLAZA
sasol
envitech
JPCE
DCLM
EnviroServ
Jones & Wagener

Norms and
standards
Environmental
liability
Environmental
control and
enforcement

Norms and
standards
Environmen
liability
Environmen
control and
enforcemen

THE GREEN

EXIT
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Circular Economy and the Sustainable Development Goals
The South African Informal E-Waste Sector
Takunda Y Chitaka, PhD
CSIR/NRF/DSI Chair in Waste and Society
University of the Western Cape
South Africa
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Takunda Chitaka

Polyco
Making waste work
PROLining
RECLITE
SINOWATEK
fournier
THE GRE
IS

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outhern Africa

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Southern Africa
DELEGATE

Heidi Cox
(RF) NPC
GATE

of Southern Africa
promote
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waste and
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sectors.
INTERWASTE
ENVIRONMENTAL SOLUTIONS
Eskom
Rotek Industries
Sanitech
AVERDA
UD TRU
PIKI TUP
east london idz
City of Ekurhuleni

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IDC Sectors for Funding
IDC
AGRO-PROCESSING & AGRICULTURE
AUTOMOTIVE & TRANSPORT EQUIPMENT
CHEMICALS, MEDICAL & INDUSTRIAL MINERAL PRODUCTS
ENERGY
INFRASTRUCTURE
MACHINERY, EQUIPMENT & ELECTRONICS
MEDIA & AUDIO-VISUAL
MINING & METALS
TEXTILES & WOOD PRODUCTS
TOURISM & SERVICES
IDC Sectors for Funding
IDC
AGRO-PROCESSING & AGRICULTURE
AUTOMOTIVE & TRANSPORT EQUIPMENT
CHEMICALS, MEDICAL & INDUSTRIAL MINERAL PRODUCTS
ENERGY
INFRASTRUCTURE
MACHINERY, EQUIPMENT & ELECTRONICS
MEDIA & AUDIO-VISUAL
MINING & METALS
TEXTILES & WOOD PRODUCTS
TOURISM & SERVICES

CSIR

Illegal dumping is widespread in many areas
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Illegal dumping is widespread in many areas
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Eugene Pienaar
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of Southern Africa
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Eugene Pienaar
Depart Env Affairs & Dev
Planning

CIB
Purpose led organization
> R360m
study loans to students[1]
> R5bn
loans for student accommodation[1]
R121m
CSI spend in 2021, with 47% allocated to education
R57bn
loans to SMEs, entrepreneurs, professionals[1]
> 1 900
job opportunities supported for unemployed youth (YES)
87%
of Nedbank-owned buildings green star rated
Carbon neutral
operations (since 2009)
R5bn
loans for affordable housing[3]
R25bn
loans for green buildings[4]
Level 1
BBBEE
status
(for past 4 years)
Black staff[1]
> 79%
Own operational total water consumption down by
19% yoy
(& 39% since 2019)
106
tons of food & supplies to employees, families & communities impacted by the July 2021 riots
TOGETHER
BEKE
BEKE
Some see renewable energy.
We see youth empowerment.
Seeing the gold in green.
see money differently
NEDBANK
Confidential | Page 6

CIB
BEKE
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University of
Johannesburg

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Francois Marais
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Urban Elements
IWMSA
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THIRST
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Suzanna Oelofse
Council for Scientific and Industrial Research (CSIR)
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Shabeer Jhetam
PRO Alliance
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CATCH ON
INTERWASTE
YOUR PRIZE
AT THE
INTERWASTE
Catch on
to the
circular
economy
and let's
work towar
zero waste
PLASTIC

Methodology
• A mixed method was used (qualitative and quantitative).
• Data collection using semi - structured interviews was used.
• Data collection using interviewer - administered questionnaires.
• Field observations, data records and management were applied.
• Data analysis was conducted using Statistical Package Social Sciences (SSPS) package and Microsoft Excel.
• Permission was granted to the researcher to conduct the study within the District Municipality.
• Ethical clearance was obtained from the institution(UNISA).
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EHLANZENI
DISTRICT MUNICIPALITY

Southern Africa

Southern Africa

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problem with space and transport, pyrolysis can be a viable alternative
cineration?
between pyrolysis and incineration
ment for the conditioning of emis
ume saving more than 90%
re waste is collected –
can be used on site.
Christopher Eden
University of Warwick
Science Park,

Christopher Eden
University of Warwick
Science Park,

Christophe
University of Wa
Science Park,

BLK2

BLX2

South Africa Waste Picker Registration System (SAWPRS)
Development and Pilot
CSIR-Wits
Funded by City Support Programme, UNIDO (Government of Japan), DSI Waste Roadmap
Participatory Development
Online – app coming soon
3 phases – mobilisation, registration, distribution
Must prove work as a reclaimer/waste picker
Registrar and verifier
Led by ARO and SAWPA
Pilot registered 994 reclaimers in Joburg, Cape Town, Pietermaritzburg and Buffalo City
SA WPRS
South Africa Waste Picker Registration System
Identification Card
Lebogang
Mokone
3775744
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JG Afrika
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Johannesburg

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Eli Kodisang
University of Johannesburg
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Thulisiwe Hangana
Buffalo City Metropolitan
Development Agency
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65
ENVITECH
64
envitech
Environmental Engineering Solutions

AGRIMAN WASTE BENEFICIAT
GEOSYNTHETICS
MANUFACTURERS, D
Orkel

Duncan Village
WasteCon

ON WASTE
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ALL HANDS ON WASTE
Duncan Village
Deidre Nxumalo-Freeman
Director | DNF Waste & Environmental Services

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Director | DNF Waste & Environmental Services

PROJECT STAKEHOLDERS
national treasury
Department
National Treasury
REPUBLIC OF SOUTH AFRICA
National Treasury
Project Funder
BUFFALO CITY
METROPOLITAN MUNICIPALITY
Buffalo City Metropolitan Municipality
Project Applicant
BCMDA
BUFFALO CITY METROPOLITAN
Buffalo City Metropolitan Development Agency
Project Implementer
DNF Waste & Environmental Services
Project Management Specialists
Mariswe Engineering Solutions
Project Engineering Design Specialists
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METHODOLOGY
1. Semi-structured INTERVIEWS, and self-administered QUESTIONNAIRES.
Range of stakeholders consulted:
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METHODOLOGY
1. Semi-structured INTERVIEWS, and self-administered QUESTIONNAIRES.
Range of stakeholders consulted:
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GEEE
Saves Land, Lives and contributes to SED
INTERWASTE
ENVIRONMENTAL SOLUTIONS
Rajas Pillay
Interwaste
South Africa

Institute of
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of Southern Africa
2022 Annual General Meeting of the Institute of Waste Management of Southern Africa (IWMSA)
Date: 19 October 2022
Venue: NCC, Emperors Palace
Time: 17h00
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25th Conference & Exhibition 18 – 20 October 2022

K1 RECYCLING
AVERDA
PIKITUP SOC LTD.
RAALEERBORG ENVIRONMENTAL
ELB EQUIPMENT
DELEGATE

MPACT PLASTIC CONTAIN
GUNDLE GEOSYNTHETICS
27
TALBOT
Gundle
GEOSYNTHETICS
DELEGATE

DCLM
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022

100 YEARS OF
EXCELLENCE
DELEGATE

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SARCHI Chair Waste and Climate Change Group, School of Engineering, University of Kwazulu-Natal, Durban, South Africa
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Co-Supervisor
Lead River Field Scientist, PhD
The Ocean Cleanup, The Netherlands
Robin de Vries
Remote Sensing Expert
Geospatial Analyst
The Ocean Cleanup, The Netherlands
Cristina Trois
Supervisor
Professor
SARChI Chair in Waste and Climate Change, School of Engineering, University of Kwazulu-Natal, Durban, South Africa
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Plastic Emissions from Rivers
1600
Responsible for 80% of plastics emitted into the oceans.
0.41-4
MILLION TONS OF PLASTIC PER YEAR
400
TONS OF PLASTIC PER YEAR
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Delegates registration
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Delegates registration
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Séché
INTERWASTE
tixsa

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NATIONAL TREASURY
Environmental problems facing South Africa…
• Climate change – high greenhouse gas emissions in absolute terms and per capita – Commitments under the Paris Agreement
• Local air pollution – emissions of Soxs, Noxs, particulate matter etc
• Water and waste water – water scarce country and inappropriate disposal of effluent into water resources
• Waste (solid waste and hazardous) – priority waste streams plastic pollution, electronic waste, lighting, tyres.
• Groundwater pollution
• Greenhouse gas emissions
• Land degradation and biodiversity loss – rehabilitation, management and conservati
Sustainable development is development that meets the needs of the present without c ing the ability of future generations to meet their own needs."
• -Brundtland Commission, 1987

NATIONAL TREASURY
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"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
• Brundtland Commission, 1987
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NATIONAL TREASURY
Environmental Fiscal Reform
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Informal Urban Mining
Urban mining reclaims previously discarded waste and reintroduces it into the manufacturing sector
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Urban mining reclaims previously discarded waste and reintroduces it into the manufacturing sector
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PALACE
HMONT RESORT

Landfill Compliance
Fully Compliant
Partially Compliant
Non-Compliant
Unweighted: DEA&DP
12%
58%
30%
SAME DATA, WITH DIFFERENT COMPLIANCE LEVELS AND WEIGHTS
Weighted: DEA&DP
7%
21%
72%
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Average Waste Management Facility Category Compliance
Compliance Rating
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
73.67%
WDF
DOF
RF
RTS
MRF
All
Waste Management Facilities Audited
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To support
sustain
practice in
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Introduction
Waste pickers are reclaimers of waste, process of recycling waste products, and poor people to generate income.
They are playing an important role in Tzaneen Landfill Site, by reducing the quantity of waste collected from the study area, Greater Letaba Municipality.
They are assisting Tzaneen, by extending the lifespan of the Landfill Site, through reclamation of solid waste.
They are also vital to the functioning of waste management systems.
These are the people who saw a gap, supported industry, and protected the environment.
These are also referred to the community, that struggles to make ends meet by rummage through waste.
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WHAT ARE THE EPR RESPONSIBILITIES OF PRO'S?
Polyco

TARGETS
Polyco
The EPR Regulations have set you targets per identified Producer type, both for collection and recycling
IMPACT FOR BUSINESS
Diversion of material will be prioritized
Increase of capacity needed for both collection and recycling
Innovation in business models

Polyco
Making waste work
Collection
Recycling
EXIT
INFRASTRUC
Existing infrastructu
infrastructure to be
Seeking t
in existin
infrastruc
Southern Africa

Approach
Treatment | Recyclers
EXIT
VISION
PROs should Implement the All Actors Approach
WasteCon

EXIT

PURPOSE
PRO ALLIANCE
facilitate collaboration by Producer Responsibility Organisations (PROs)
matters of EPR and areas of mutual interest and benefit
Aerosol Manufacture Association
The Glass Recycling Company

Drivers and Pressures
Economy
Drivers and Pressures
Economy

Economy
Drivers and Pressures
Personal services 6%
Agriculture, forestry and fishing 2%
General government services 18%
Mining and quarrying 8%
Manufacturing 13%
Electricity, gas and water 4%
Construction 4%
Finance, real estate and business services 20%
Trade, catering and accommodation 15%
Transport, storage and communication 10%
Contribution of key economic sectors to the national GDP in 2016
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2017 General Waste Data
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CONSTRUCTION
Raalebbong
Environmental Solutions

MPACT PLASTIC CONTAINERS
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ASTIC CONTAINERS
25/26
ROKIWASTE
24
pact
containers

THERMAL

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TRON MEMBERS
DSW
EnviroSer
KEMACH
EQUIPMEN
Sanite
UD T
PEACE

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PEACE

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The Organics Group of Companies
1986
2005
2010
2015
2021
FUTURE
Landfill gas and leachate EPC
Ammonia removal from leachate
Clinical waste and biomass pyrolysis
Anaerobic digestion
Ammonia recovery from wastewater
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What is Pyrolysis?
Pyrolysis involves the heating of organic material in the absence of oxygen. As no oxygen is present, the material does not combust but the chemical compounds (i.e. cellulose, hemicellulose, and lignin) that make up that material thermally decompose into combustible gases and charcoal.
Pyrolysis of biomass produ
products: liquid, solid and
(pyrolysis oil and char).
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7 steps for implementing waste picker integration
Step 5
Institutionalize
WPIP
Adopt the WPIP
participatory monitoring and evaluation process
Permanent committee
Establish a permanent WPI Committee
Waste Picker Integration Plan
Align policies and plans
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To sup
sus
practic
resc

Contents
Introduction
Overview of the GKMA waste management environment
Character of GKMA waste
Waste character and link to Kiteezi and Strategy
About Kiteezi
Closure of Kiteezi
SW Diversion and Management Strategy for the GKMA.
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Community & Social Programmes
Reclaimer Creche/ Day Care: Bekezela, Newtown, South Africa
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Reclaimer Integration Programmes
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A techno- economic study of a fluidized bed vacuum reactor for mixed plastic pyrolysis.
UNIVERSITY OF KWAZULU-NATAL
Kuven Moodley, Ph.D.
Paramespri Naidoo, Bradlee Naidoo, Tenisha Naidoo, Matome Mpe
University of KwaZulu-Natal, School of Engineering, Thermodynamics Research Unit
South Africa
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HYVA

PROTUP SOC LTD.
Raabobbong
INNOVATIVE WASTE MANAGEMENT SOLUTIONS
ROKI

DUNCAN VILLAGE WASTE MANAGEMENT PROJECT
ALL HANDS ON WASTE
Duncan Village
Deidre Nxumalo-Freeman
Director | DNF Waste & Environmental Services
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RESULTS
Q2 - What does the collection of aerosols for recycling currently entail?
PRE-CONSUMER AEROSOLs
Depend on good SOURCE SEPARATION.
Significant volumes of PRODUCT plus PROPELLANT
May require further separation by PRODUCT TYPE (contents).
exclude aerosol cans (due to risks).
if there is ACCESS, a MARKET and at right PRICE to
as required.
& Exhibition

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Results: Waste collection in NLM
A) Do you receive waste collection service?
B) Frequency of waste collection
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Results: Waste collection in NLM
A) Do you receive waste collection service?
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ALL HANDS ON WASTE
DUNCAN VILLAGE
REDUCE · REUSE · RECYCLE
DELEGATE