



**AUTHORS:**

Rissa V. Niyobuhungiro¹ 
 Catherina Schenck² 

AFFILIATIONS:

¹Postdoctoral Fellow: DSI/NRF/
 CSIR Chair in Waste and Society,
 Department of Social Work,
 University of the Western Cape,
 Cape Town, South Africa

²DSI/NRF/CSIR Chair in Waste and
 Society, Department of Social Work,
 University of the Western Cape,
 Cape Town, South Africa

CORRESPONDENCE TO:

Rissa Niyobuhungiro

EMAIL:

nybris001@myuct.ac.za

DATES:

Received: 15 Oct. 2021

Revised: 24 Feb. 2022

Accepted: 24 Feb. 2022

Published: 31 Aug. 2022

HOW TO CITE:

Niyobuhungiro RV, Schenck C.
 Exploring community perceptions of
 illegal dumping in Fisantekraal using
 participatory action research. *S Afr J
 Sci.* 2022;118(Special issue: Waste
 as a Resource), Art. #12563. <https://doi.org/10.17159/sajs.2022/12563>

ARTICLE INCLUDES:

- Peer review
- Supplementary material

DATA AVAILABILITY:

- Open data set
- All data included
- On request from author(s)
- Not available
- Not applicable

EDITOR:

Leslie Swartz 

KEYWORDS:

illegal dumping, perceptions,
 participatory action research,
 engagement, community

FUNDING:

South African Department of Science
 and Innovation, South African
 National Research Foundation, CSIR
 (grant no. CSIR/IU/WRIU/2018/019)



Exploring community perceptions of illegal dumping in Fisantekraal using participatory action research

We present the results from two interactive methodologies (interview and focus groups) that were used as part of a participatory action research (PAR) project to identify the reasons for and solutions to illegal dumping in Fisantekraal, Cape Town, South Africa. Worldwide, PAR has been applied in the context of marginalised groups and in different fields to stimulate dialogue amongst research participants, with the ultimate goal of promoting social change. The opinions expressed by the research participants (community members, NGOs, municipal officials, academics) demonstrate that the voices of the community matter and illustrate the transformative potential of the PAR methodology to change the status of stakeholder engagement in decisionmaking regarding a pressing concern such as illegal dumping in community. The research discussed here led to some planning of initiatives and to planned change because the conversations/interviews/focus groups at least allowed people to come together to discuss possibilities. It helped the community and other stakeholders to come together and share their views of the problem and to plan together for what could work to curb illegal dumping. Community projects were subsequently initiated, and their impact will be evaluated in future research.

Significance:

- This study shows the potential of the PAR process to facilitate conversations about a particular issue between various stakeholders in a community where effective communication is challenging. The inclusivity of PAR allows for the voices of marginalised communities to be heard and allows people to take ownership of an issue in their community, such as illegal dumping.

Introduction

Indiscriminate or illegal dumping, called flytipping in the UK, is a vast challenge faced by cities and municipalities globally¹⁻³, particularly in developing countries⁴⁻⁷. Low percentages of waste collection imply high incidences of littering, illegal dumping and burning of waste.^{8,8} Brandt³, Lynch et al.⁹, Siegmunt¹⁰ and Crofts et al.¹¹ all cite social disorganisation status as one of the major reasons for illegal dumping^{12,13}.

The 2019 General Household Survey by Statistics South Africa¹⁴ shows that refuse removal declined from 65.74% in 2016 to 58.8% in 2019. More people must now rely on their own mode of waste management. The failure to achieve waste management targets is caused by a lack of commitment by stakeholders such as municipalities¹⁵, the misuse of financial resources¹⁶ and the selection of inappropriate methods or technologies to deal with the problem¹⁷⁻²⁰.

Godfrey and Oelofse²¹ state that South Africa is known for having sound waste management legislation and policies, although practical implementation of these policies remains an issue. In order to achieve most of the desired waste management goals, successful collaboration and common understanding between stakeholders will be necessary.¹⁵ Niyobuhungiro and Schenck's²² research clearly shows that single and topdown solutions to illegal dumping are not effective.

One possible response to the problem of illegal dumping lies in the application of participatory action research (PAR) as a form of generating practical knowledge and solutions through engagement with all stakeholders.²³ Here we describe the PAR process utilised in Fisantekraal (Ward 105 of Cape Town Municipality) in search of possible solutions to illegal dumping with the community members of Fisantekraal.

Background

PAR as a method for social mobilisation

Although many have contributed to different PAR approaches²³⁻²⁶, PAR has two main origins. Firstly, it can be traced back to the work of Kurt Lewin, who is considered to be the founder of action research.²⁵ His philosophy was that people, particularly the marginalised in society, would be more motivated about their work if they were involved in the decision-making process about how their workplace was run. Lewin's original idea was summarised in a cycle of steps which includes observing, reflecting, acting, evaluating and modifying (Figure 1).

The second origin of PAR emerged in the 1970s from the work of Paulo Freire, a Brazilian adult educator. Freire viewed PAR as a tool to enable marginalised members of society to enact social change through the pedagogy of problem formulation, creation, self-awareness and critical reflection.^{23,27} Hope and Timmel²⁸ state that 'it is not participation when people just listen to the commands of those in authority and submissively do the donkey work involved'.

PAR and waste management

Globally, PAR has been used to facilitate dialogue amongst members of marginalised groups with the central goal of promoting social change.^{20,23,25,29-31} Some studies show that traditional environmental education methods were largely unsuccessful at engendering environmentally friendly and sustainable practices and institutions, until the year 2000 when environmental educators became more aware of PAR.^{32,33} PAR has been used in the management of natural resources³⁴⁻³⁶, as well as in sustainable development³⁷⁻⁴⁰. Gutberlet et al.²⁰ report on the successful use of

PAR in community composting in order to reduce municipal solid waste management. This success particularly relates to the promotion of anti-littering and illegal dumping practices when all the stakeholders are centrally involved in the participatory research process.^{40,41}

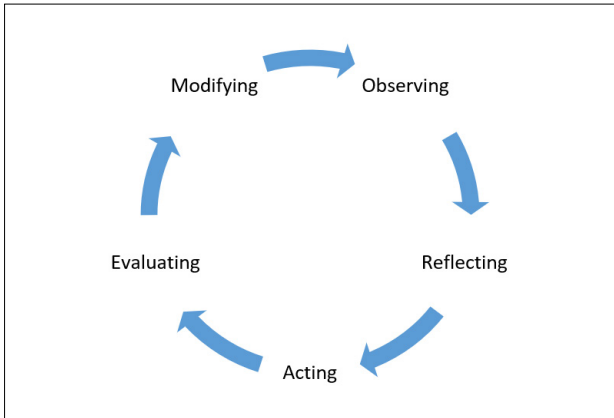


Figure 1: Lewin's cycle of participatory action research.¹⁵

This study builds on this literature by exploring the perceptions of both the community and the authorities with regard to illegal dumping, including the causes of and solutions to illegal dumping. To achieve the study objectives, we explored the opinions of the community, local government and other interested stakeholders. These opinions were gathered through interviews. This research was approved by the Humanities and Social Science Research Ethics Committee of the University of the Western Cape (reference number HS19/9/10).

The research was guided by the following questions:

- What are the main reasons for the illegal dumping of waste in Fisantekraal, Cape Town?
- What are the participants' perceptions with regard to the responsibility to prevent or clear illegal dumping in Fisantekraal, Cape Town?
- What are the best strategies to prevent illegal dumping in Fisantekraal, Cape Town?

Study setting

Fisantekraal is a suburb of the City of Cape Town that is surrounded by open space on one side and the Mosselbank River on the other. People regularly dump their waste in the area near the river, from where it gets blown by the wind into the river.

Fisantekraal is composed of three main areas (Figure 2):

- **Area A: Informal settlement/old Fisantekraal**

Area A is composed of two sides: one side consists of informal selfbuilt houses and the other side consists of lowcost social houses, the majority of which have at least three backyard dwellers on each plot.

- **Area B: Phase One**

Area B is also known as Phase One. The houses in Area B were constructed during the first phase of a low-cost housing scheme. In this area, the houses are formal and without backyard dwellers; the roads are paved and spacious.

- **Area C: Phase Two**

Area C is known as Phase Two. It has many of the same characteristics as Phase One, except that in this area there is still ongoing construction. The houses in this area are formal structures constructed as part of a low-cost housing scheme. The roads are wide and the municipality does weekly door-to-door waste collection.

Methodology

Nel et al.³¹ explain that any systematic research process consists of five basic steps: deciding on the research question, designing the research method, collecting the data, analysing the data, and reporting the results. In participatory research, the members of the community participate as co-researchers in the five basic steps of the research process. Gaymans and Maskoen⁴² assert that a study is more reliable when community members are coresearchers, as they have less difficulty establishing the needed relationships and are more likely to receive the full cooperation and trust of the people being surveyed.^{23,42}

The study design was qualitative and included focus group discussions and interviews. The methodology consists of two main phases (Figure 3). The first phase comprised many steps, from entering the community to data sharing, and is discussed in detail below. The second phase is implementation, which is not reported on in the current article.

Phase 1: Exploring and describing the prevalence and dynamics of illegal dumping in Fisantekraal

The first phase consisted of exploring and describing the prevalence and dynamics of illegal dumping in Fisantekraal. This phase consists of three steps: (1) building relationships with the community, (2) data collection and analysis, (3) and results sharing (Figure 3).

Building relationships with the community and recruiting co-researchers

The first step in this phase is building relationships with the community and choosing the resident coresearchers.

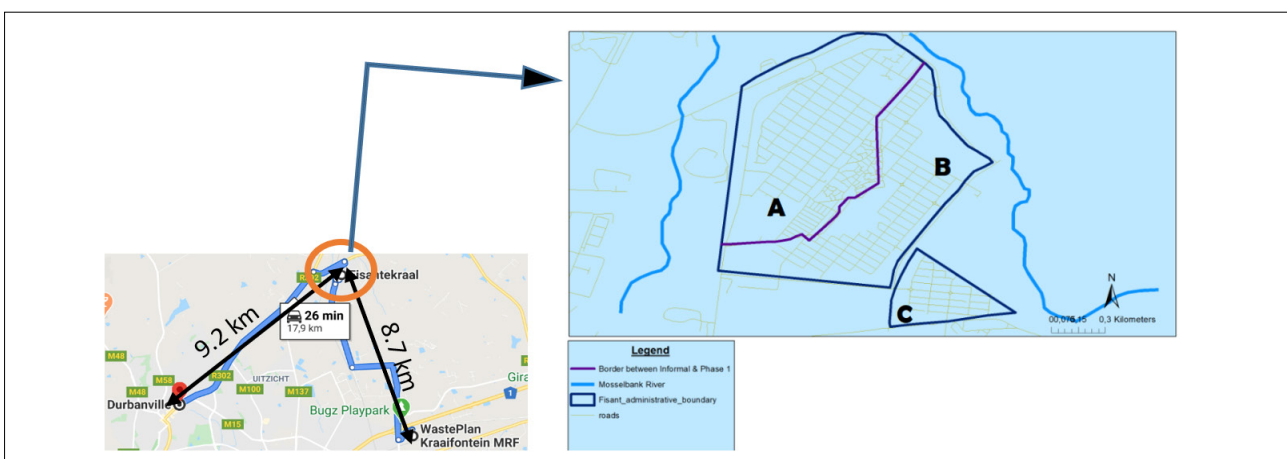


Figure 2: Fisantekraal boundaries.

According to Collins⁴³, before change can be enacted to alter a social situation, the situation must be well understood by all people involved. Relating to the current study, this suggests that the problem of illegal dumping must be well understood by all participants before possible solutions can be generated and implemented. A PAR network consisting of residents, researchers, local organisations and academic and government institutions was established by the first author. The purpose of the network was to design and carry out the study together.

The first author (R.N.) entered the Fisantekraal community to build relationships and networks by attending the monthly community meetings that took place on the first Friday of every month. The meetings were organised by the community development professional officer on behalf of the City of Cape Town. Permission to enter the community was negotiated at this meeting with the help of community members (the 'resident researchers' as referred to by Arcaya³⁰). The researchers commenced data collection in May 2019 until the outbreak of COVID-19 in March 2020, when South Africa's national lockdown was implemented. Data collection resumed when COVID-19 restrictions were eased and community visits were again allowed.

Seven resident researchers were recruited with the help of the community representatives who attended the monthly meetings. The resident researchers were well known in the community and had been or currently were community leaders, therefore they were familiar with most of the issues faced in the community, including illegal dumping. The recruitment was done by the first author (R.N.) in collaboration with NGOs, and local authorities.³⁰ The resident researchers were trained in conducting interviews prior to the commencement of interviews for data collection.

Data collection and analysis

The second step of the research consisted of data collection and analysis, which involves the identification and documentation of illegal dumpsites, individual interviews and focus groups. It subsequently involves planning and implementation of the changes and lessons learned in the first phase.

Before the interviews could commence, the first author (R.N.) toured the community with one of the resident researchers in order to identify possible illegal dumpsites.

The total number of research participants was 79 and included household members, community leaders, teachers and shop owners. Participants were interviewed on a voluntary basis after signing consent forms.³⁰ Participants also had to meet the following criteria: (1) be 18 years or older and (2) have lived in the area for at least 1 year.

Shamrova and Cummings⁴⁴ report that interviews and focus groups are the most common methodologies used in PAR studies. In this study, interviews and focus groups were both chosen due to their reported potential to validate each other.

To collect the data, semi-structured interview guides were developed. After testing the semi-structured interview guides with seven resident researchers, they were modified to include the suggestions from resident researchers. From 4 to 15 December 2019, the first author and resident researchers conducted the interviews in the three areas of Fisantekraal by going door to door. Observations and notetaking were also done during this process. Anonymity was respected and only pseudonyms were used.

On average, the interviews lasted 30 minutes each. All interviews were digitally recorded and later transcribed by a research assistant whose work was checked for consistency by the first author (R.N.).

In total, 79 individual interviews and two focus groups were conducted. The first focus group included six participants from the community while the second group had four participants: two from the local NGOs and two from the municipality. Although the size of the second focus group was small, which could be a limitation, the total number of interview participants in this study was substantial.

The focus group discussions commenced after the analysis of the individual interviews. Two separate groups were formed. The first group consisted of residents who were previously interviewed individually.

The second group consisted of a group of informants such as members of NGOs and local authorities. The purpose of the focus groups was to explore possible information that was missed during individual interviews and to verify the individual interview responses.²⁸

On 10 January 2020, the first group of nine residents from all the areas of Fisantekraal participated in the focus group. On 25 January 2020, the second group of four participants representing local NGOs, local authorities and academics participated in another focus group. With the consent of the participants, the focus groups were recorded, transcribed and analysed, as in the case of the individual interviews.

After the data were transcribed, they were exported into ATLAS.ti 8.1. for analysis. To aid this process, the results were shared with different audiences for review and interpretation in an iterative process that involved going back to the transcripts and recordings. Thereafter, data that shared common aspects were grouped together to form categories guided by the three main research questions. For each research question/category, a certain number of themes appeared and the link between them was also looked at. The categories are: reasons for illegal dumping, responsibility to clear illegal dumping, and strategies to prevent illegal dumping. Once all the data were categorised, they were then interpreted and triangulated with the findings from focus group discussions and interviews.

Triangulations helped in validating the qualitative data, together with the deep saturation of the responses from interviews as well as the focus group discussions. It is important to note that the data analysis and triangulations continued until after the data sharing because of the PAR process; as new information appears from stakeholders during feedback (validation), that information gets integrated into the existing data to improve the accuracy. This process (member checks) ensured the accuracy, validity and credibility of the data.

Results sharing

After analysing all the collected data, the results were shared with different stakeholders (community members, municipality officials and academics) for their feedback. Workshops were arranged for this purpose.

The first feedback session about the results from individual interviews was held on 21 January 2020 with academics from different disciplines to gather their input in order to shape the interpretation of the results. The feedback session had eight attendees. After incorporation of their feedback, the data collection, analysis and interpretation continued until it was time to share the results with the rest of the PAR participants.

The next feedback session was held on 10 March 2020. Two municipality officers attended this session. A meeting with the academics and the community was planned for April 2020. However, the national COVID-19 lockdown was implemented before the meeting could occur. On 19 May 2020, a meeting with the ward officials was held in order to share the results of the study with them and to hear their opinions and guidance on the way forward in Fisantekraal. An online webinar for academics and other stakeholders was held on 22 May 2020; 42 people attended this webinar. The idea was to conclude with workshops in the community to communicate the findings of the research after incorporating the different stakeholders' feedback. When following a PAR approach, any change in policy or practice must be decided with the community before it can be implemented.^{28,29} After the results were shared with stakeholders, the implementation phase followed.

Before any concrete steps were taken, they were discussed with the community in order to allow them to take the lead. The implementation phase took into consideration the recommendations from various meetings with stakeholders. It included community cleanups and establishment of a vegetable garden in order to curb illegal dumping by beautifying the area. A summary of the methodology is shown in Figure 3.

Results and discussion

The results and integrated discussion are structured according to the four main themes that emerged from the research questions: reasons for illegal dumping, responsibility to clear illegal dumping, solutions for illegal dumping, and strategies to sustainable solutions.

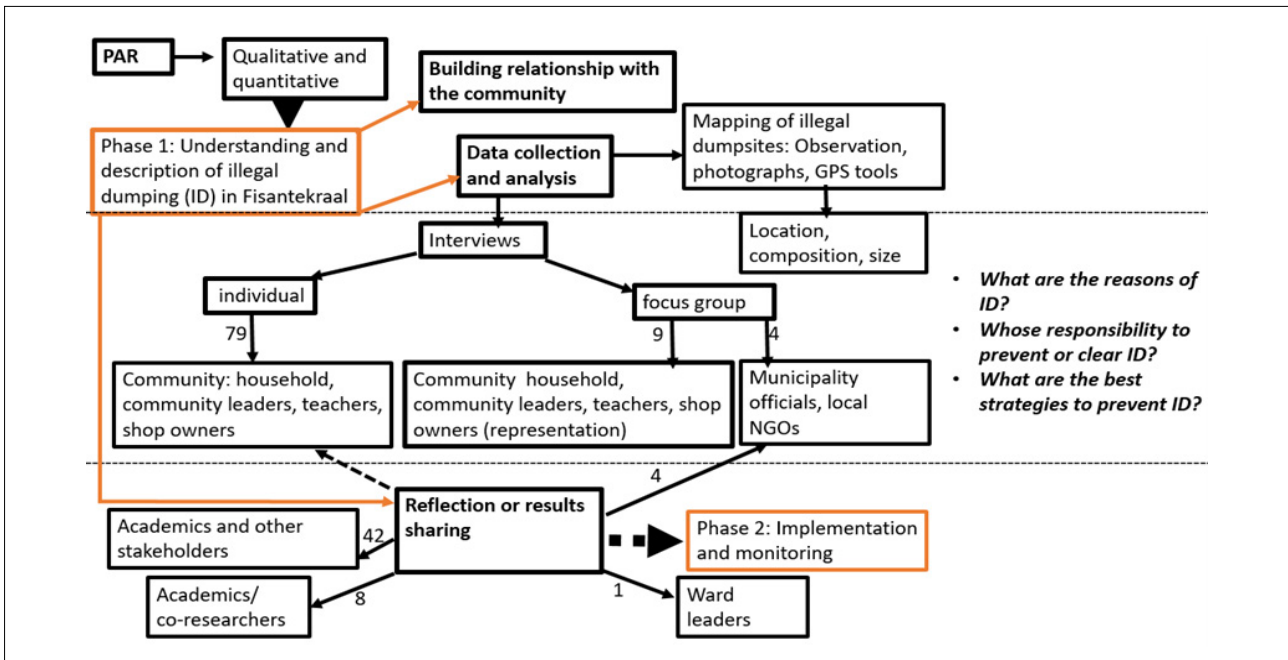


Figure 3: Schematic representation of the participatory action research (PAR) methodology.

The findings also reveal the potential connection and engagement among all the stakeholders as a result of PAR processes.

Reasons for illegal dumping

In both developed and developing countries, a lack of adequate waste facilities is one of the main reasons for illegal dumping.^{5,17} In Fisantekraal, 32% of participants confirmed that a lack of containers (2 m x 3 m rectangular facility used for shared waste collection) caused people to dump their waste illegally, while 19% of the participants said this was due to the lack of bins (150-L black bins). 'The containers we have it's only people work for the municipality use it and lock it so we always find it locked then we throw the rubbish outside the container.' The statement above informs that the container is not for everyone, which implies that people in the community are not treated equally. As alluded to above (Study setting), due to the high density and poor road infrastructure of Area A in Fisantekraal, it is almost impossible to reach and provide services in this area, as in other areas (B and C). Another reason is the sharing of a bin between the backyard and the homeowner. This is seen by the community as a weakness on the part of the municipality; however, the municipality provides for the homeowner and not for the backyard dwellers. In the case of a container, the municipality appoints a volunteer in the community to look after it, i.e. locking and opening it. This means there are certain times that the container will remain closed as the people in charge often have other commitments. Those who come to dispose of waste when the container is closed have the impression that they are not allowed to use the container, which makes them look for an alternative, easy way to get rid of their waste, and hence dump it illegally.

Another participant from Area A said: 'There is so many people in this area and they share one bin.' This statement highlights the overpopulation reported in Area A. It further brings to light that the issue of illegal dumping cannot only be blamed on the lack of bins but may also be a result of the overcrowded living conditions in the area.

Not knowing what to do with certain waste streams was also cited as contributing to the practice of illegal dumping.^{16,45} Some responses expressed that the plastic bags provided by the municipality do not accommodate heavy and bulky waste, for instance, which is why certain waste streams are dumped illegally. 'If we clean our yards then what do we do with the waste?' This comment refers to the fact that people did not know what to do with the garden waste from their yards as it cannot be put in black bags, so it gets dumped.

The community also cited unemployment as one of the reasons for illegal dumping. Unemployment is associated with an apathetic attitude, as described by Tunnell⁴⁶. Unemployment leads to poverty and contributes to a feeling of apathy and futility among residents. Negative manifestations of apathy include a lack of will to ensure that neighbourhoods are not rendered unsightly by the dumping of waste. One participant said: 'We don't have places to stay, no jobs and also those employed to clean don't do their job.'

The inadequate and inappropriate waste collection was another reason given for illegal dumping. Although this is often blamed on local municipalities using trucks in areas where the roads are not passable⁴, in Fisantekraal, it was blamed on residents who fail to put their bins out on the collection day. 'I think because some of the people are at work so they don't put bins out so that the truck can come and collect it, if they do so the bins get stolen.'

The focus groups with both the community and the municipal officials verified the information provided during the individual interviews⁴³, namely that there is a lack of bins in the area, but it was also added that bins are used for purposes other than waste storage. 'Bins are not used properly (sometimes no wheels), they are used for other things, beer, wood, toys...' Statements like this one alerted municipality officials to various reasons behind illegal dumping that they were not aware of. For instance, they began to learn that people in Fisantekraal felt treated unfairly or that black bags issued to residents are not sufficient for certain types of waste.

The responsibility to clear illegal dumping

Abel⁴⁷ is of the opinion that waste dumped on private land must be taken care of by the owner of the land, and waste dumped on public land is the responsibility of the municipality. However, as pointed out by Crofts et al.^{11,48}, this is also a question of environmental citizenship, where the community must be responsible for their actions and the consequences thereof regarding care of their environment.

In our study, 45% of research participants believed that it is the municipality's responsibility to clear illegal dumping, while 33% agreed that both the municipality and the community have a responsibility to clear illegal dumping. 'Municipal city of Cape Town, they must employ as many people as they can, to help out.'

Many participants were also of the opinion that illegal dumping creates jobs for others: 'People dump waste for street cleaners to get what to do.'

Other perceptions show that illegal dumping is an expression of dissatisfaction that the municipality employs people from other communities and not residents of Fisantekraal: 'Municipality is the one who give jobs to the people (who) don't stay in our community.'

The focus groups with officials and community members confirmed that the responsibility for illegal dumping is shared between the municipality and the community. This again implies some level of continued engagement between the two sides. This is evidenced in the following statements from both the officials and community, respectively: 'Since many services are free in the informal settlement, to change people's behaviour, perceptions some sort of ownership is necessary.' 'The City must employ us.' The above shows that the City needs to engage and monitor what happens in the community while the community also should be open to receiving requests from the municipality. This engagement can only be achieved through conversations in which real pressing issues are discussed and their respective solutions developed by both sides.

When the results were shared with different stakeholders, they also confirmed that engagement from both sides is crucial in allocating responsibilities.

Solutions to illegal dumping

Van den Bergh⁴⁹ and Whitmarsh et al.⁴⁵ confirm that there is no single solution to illegal dumping but rather multiple complementary solutions. Several solutions were suggested for Fisantekraal:

- **The provision of containers and bins**

Research participants stated: 'To put at all three areas the big containers for the different stuff e.g. plastics, gardening, household, etc.' Another stated: 'Set up a dumping area in the community or have more bins in each household. Have separate bins for recycled waste.' And: 'The container must be open at all times and [there] must be someone who is supervising that people throw their rubbish inside the container.'

These quotes show that there is a need for a common and bigger facility for, particularly, bulky waste and that the facility should be surveilled. In other words, someone should be employed to look after the facility.

In the focus groups, it was confirmed that bulky waste is one of the major waste problems which the communities cannot deal with and that the facility provided should be in the form of a skip that can accommodate bulky waste and which should be difficult to move for criminals, in order not to be stolen.

- **Issuing of fines**

Some research participants suggested introducing fines to prevent illegal dumping. However, if fines are lower than the cost of legal dumping, this solution will not be effective. 'I dump I get fined with R2 500, and it cost me R10 000 to formally dump, which one do I choose?'

Both individual and focus group interviews confirmed that if law enforcement is effective and fines are higher than the cost of a disposal fee, this solution would likely curb illegal dumping.

- **Education**

Education was also suggested as a possible solution to illegal dumping. Awareness campaigns should happen consistently and with the support of municipal officials and will aid the community to learn positive waste management practices through praxis.^{25,27,29} For example, one participant asked, 'If we clean our yards then what do we do with the waste?' This statement suggests that the community is not yet educated about waste management practices and can still learn about reuse and recycling practices, as well as about income-generating opportunities, such as garden waste being turned into compost. The compost can then be sold or used in gardening.

Strategies to sustainable solutions

The participants differentiated solutions from strategies, arguing that strategies used to curb illegal dumping can sometimes become

or translate into sustainable solutions. To attain a certain level of sustainability, the strategy should have the potential to change people's long-term behaviour with regard to illegal dumping. Figure 4 outlines the frequencies of suggested solutions to the issue of illegal dumping. It shows that the majority of participants proposed providing facilities (bins and containers) as solutions to illegal dumping (Figure 4a). The majority of participants also argued that education (Figure 4b) is not only a simple solution but a sustainable one as it will change people's perceptions in terms of recycling, reuse, etc.

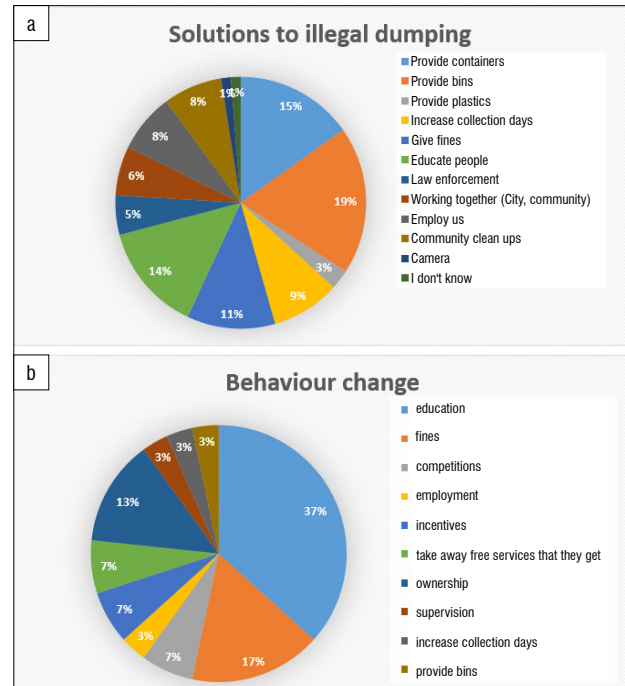


Figure 4: Comparative responses in regard to (a) solutions to illegal dumping and (b) strategies for behavioural change.

It is important that any solutions are arrived at through a knowledge-generation process by the community itself, as this will aid communities' self-awareness in defining which strategies and solutions can work best for them.^{25,27}

It is important to note that the community's statements made the municipality realise that solutions have to be implemented with careful consideration of the community's expectations. It is therefore clear that the voices of the community, through the medium of participatory interviews, have the potential to influence important decisions if policymakers engage with the community.

Input and impact from results sharing

It is important to note that, although most of the suggestions given by the community have been reported to work in a few parts of the world as referenced, in Fisantekraal, this account can only be confirmed after the implementation stage (subsequent article).

In the meeting with the ward leaders on 19 May 2019, it was confirmed that the community needs consistent reminders from law enforcement not to illegally dump their waste as well as surveillance of illegal dumping hotspots. They agreed that venues would be provided for meetings and workshops in order to teach the community about illegal dumping, as door-to-door campaigns are not effective.

During the feedback session on 21 January 2020, it was advised that it is important to determine not only the quantity of the waste but also the size of the dumpsites. A visit to the study area was then arranged to measure the size of the illegal dumps. This new information helped the community and other audiences to understand the extent of the land damage caused by illegal dumping.

The municipality officials learned, at the meeting held with them on 10 March 2020, that if people do not have bins, issuing them bins will not automatically solve the problem. Many participants stated that they do not put their bins out in fear of them getting stolen.

The municipality officers confirmed at this meeting that 'engagement' with the community could potentially lead to solutions to illegal dumping.

The fact that many community members had stated that they needed more bins and skips to accommodate bulky waste was also discussed at this meeting. It was suggested that the community should help to figure out how this would be implemented. A skip cannot just be put there. They must advise, for instance, who will look after the skips and for how many hours that person should work. This will create a spirit of ownership within the community and allow them to take responsibility for the cleanliness of their own space.

During the webinar with academics and other stakeholders held on 22 May 2020, the question was raised about why people assume they should be paid to keep their living space clean.

It was further suggested that the research team expand their data collection when sharing the results with the community. The expansion will include conducting in-depth interviews with a subset of participants, which will help the research move to a broadly descriptive theory based on descriptive answers.

This process would involve questioning research participants again and attempting to gain a deeper understanding of their answers. For instance, what exactly is meant by 'a lack of awareness'? Awareness of what? How much is this lack of awareness linked to dissatisfaction with government services? Could there be a wilful or performative element to this 'ignorance' that is in fact an expression of their dissatisfaction with government services?

After communicating all the feedback to them, the community displayed motivation to find solutions to their problems with or without the intervention and support of the authorities. This demonstrates the importance of this research project, because it has inspired the community to take ownership of their environment.

The first concrete action the community decided on was to start a vegetable garden in order to curb illegal dumping by beautifying the area and making the area functional. The vegetable garden was launched on 26 March 2021.

Conclusion

The interactive, collaborative and participatory approach applied in this study through PAR helped to acquire new knowledge²³ on the intersection between illegal dumping, environmental citizenship and employment. It also enhanced communication between the community, local government and other relevant and interested stakeholders on inclusive solid waste management.

It was expressed by various stakeholders that illegal dumping can be curbed if the community and the authorities support each other. The community expects that the City provides the same service as that offered in adjacent suburbs so that they do not feel left in the margin, while the City also expects the community to take responsibility for what is available.

This study revealed that communities participate in illegal dumping when they feel that they are left behind, or the authority does not care or cater for them. This makes them feel less useful and worthy and they ignore their responsibility to keep their space tidy. They leave all the responsibility to the authorities which in turn only work on a fixed schedule as they service area to area. This behaviour could not be interpreted and understood by either side until both parties were brought to the table and intentionally engaged on the issue.

In this study, engagement and conversation were revealed to be the channels through which the issue of illegal dumping and its contributory factors could be resolved.

The participatory interviews revealed the community's most pressing problems – such as poverty, unemployment, lack of housing

(overpopulation) and exclusion – are associated with the occurrence of illegal dumping. For many community members, the problem of illegal dumping is, therefore, a concern but not a priority.

The PAR process used in this study facilitated the complementary engagement on illegal dumping between the community, academics, local government and other interested stakeholders.²³ Van den Bergh⁴⁹ emphasised that, for an environmental problem, a centralised discussion is not enough. Instead, there is a need for ongoing pressure, involvement and follow-ups and for different approaches and the inclusion of multiple stakeholders in this process.⁴⁹ It is therefore recommended that multiple avenues and spaces for engagement be considered when attempting to resolve societal problems. The methods presented here present a way of including multiple voices from stakeholders who are otherwise often left on the margins of their circumstances.

Acknowledgements

We acknowledge the participants of the PAR, the community in Fisantekraal especially the MRCT, the City of Cape Town officials who participated as well as the Audience with whom the results were shared. We acknowledge the funding support for the preparation of this paper from the South African National Research Foundation (NRF) and Department of Science and Innovation (DSI), through the Waste Research, Development and Innovation Roadmap managed by the Council for Scientific and Industrial Research (CSIR) (grant no. CSIR/IU/WRIU/2018/019).

Competing interests

We have no competing interests to declare.

Authors' contributions

R.V.N.: Conceptualisation; methodology; investigation; data collection; writing – original draft preparation; writing – reviewing and editing. C.J.S.: Conceptualisation; methodology; investigation; supervision; resources; writing – reviewing and editing.

References

1. Liu Y, Kong F, Gonzales EDRS. Dumping, waste management and ecological security: Evidence from England. *J Clean Prod.* 2017;167:1425–1437. <https://doi.org/10.1016/j.jclepro.2016.12.097>
2. Kim GS, Chang YJ, Kelleher D. Unit pricing of municipal solid waste and illegal dumping: An empirical analysis of Korean experience. *Environ Econ Policy Stud.* 2008;9:167–176. <https://doi.org/10.1007/BF03353988>
3. Brandt AA. Illegal dumping as an indicator for community social disorganization and crime [master's thesis]. San Jose, CA: San Jose State University; 2017.
4. Mbiba B. Urban solid waste characteristics and household appetite for separation at source in eastern and southern Africa. *Habitat Int.* 2014;43:152–162. <https://doi.org/10.1016/j.habitatint.2014.02.001>
5. Sotamenoua J, De Jaeger S, Rousseau S. Drivers of legal and illegal solid waste disposal in the Global South – the case of households in Yaoundé (Cameroon). *J Environ Manage.* 2019;240:221–230. <https://doi.org/10.1016/j.jenvman.2019.03.098>
6. Wilson DC, Rodic L, Scheinberg A, Velis CA, Alabaster G. Comparative analysis of solid waste management in 20 cities. *Waste Manag Res.* 2012;30:237–254. <https://doi.org/10.1177/0734242X12437569>
7. United Nations Environment Programme (UNEP). Africa waste management outlook. Nairobi: UNEP; 2018.
8. Nzeadibe T, Madu I. Open dump. In: Zimring CA, Rathje WL, editors. *Encyclopedia of consumption and waste: The social science of garbage.* Thousand Oaks, CA: SAGE Publishing; 2012. p. 632–633. <https://doi.org/10.4135/9781452218526.n242>
9. Lynch MJ, Long MA, Barrett KL, Stretesky PB. Is it a crime to produce ecological disorganization? Why green criminology and political economy matter in the analysis of global ecological harms. *Br J Criminol.* 2013;53(6):997–1016. <https://doi.org/10.1093/bjc/azt051>
10. Siegmunt O. Mediating role of social disorganization: A case study of Russian neighborhoods. *Revija Za Kriminalistiko in Kriminologijo.* 2015;66(4):342–352.



11. Crofts P, Morris T, Wells K, Powell A. Unofficial waste disposal and crime prevention: A case study of Ash Road, Liverpool Council public space. *J Law Soc Justice*. 2010;5(4):1–23. <https://doi.org/10.5130/psj.v5i0.1904>
12. Niyobuhungiro RV, Schenck CJ. A global literature review of the drivers of indiscriminate dumping of waste: Guiding future research in South Africa. *Dev South Afr*. 2022;39(3):321–337. <https://doi.org/10.1080/0376835X.2020.1854086>
13. South African Department of Environmental Affairs (DEA). National waste information baseline report. Pretoria: DEA; 2018.
14. Statistics South Africa. General household survey 2019 [document on the Internet]. c2020 [cited 2021 Aug 28]. Available from: <http://www.statssa.gov.za/publications/P0318/P03182019.pdf>
15. Lederer J, Ongatai A, Odeda D, Rashid H, Otim S, Nabaasa M. The generation of the stakeholders' knowledge for solid waste management planning through action research: A case study of Busia, Uganda. *Habitat Int*. 2015;50:99–109. <https://doi.org/10.1016/j.habitatint.2015.08.015>
16. Polasi LT. Factors associated with unofficial waste disposal in the Zondi Area, City of Johannesburg, South Africa. Paper presented at: WasteCon; 2018 October 15–19; Johannesburg, South Africa.
17. Dladla I, Machete F, Shale K. A review of factors associated with indiscriminate dumping of waste in eleven African countries. *Afr J Sci Technol Innov Develop*. 2016;8(5–6):475–481. <https://doi.org/10.1080/20421338.2016.1224613>
18. Olukanni DO, Akinyinka OO, Ede AN, Akinunwi II, Ajanaku KO. Appraisal of municipal solid waste management, its effect and resource potential in a semi-urban city: A case study. *J S Afr Bus Res*. 2014;2014, Art. #705695. <https://doi.org/10.5171/2014.705695>
19. Godfrey L, Ahmed MT, Gebremedhim KG, Katima JHY, Oelofse S, Osibanjo O, et al. Solid waste management in Africa: Governance failure or development opportunity. London: IntechOpen; 2019. <https://doi.org/10.5772/intechopen.86974>
20. Gutberlet J, Jayme de Oliveira B, Tremblay C. Arts-based and participatory action research with recycling cooperatives. In: Rowell L, Bruce C, Shosh J, Riel M, editors. *The Palgrave International Handbook of Action Research*. New York: Palgrave Macmillan; 2017. p. 699–715. https://doi.org/10.1057/978-1-137-40523-4_41
21. Godfrey L, Oelofse S. Historical review of waste management and recycling in South Africa. *Resources*. 2017;6(4), Art. #57. <https://doi.org/10.3390/resources6040057>
22. Niyobuhungiro RV, Schenck JC. The dynamics of indiscriminate/illegal dumping of waste in Fisantekraal, Cape Town, South Africa. *J Environ Manag*. 2021;293(1), Art. #112954. <https://doi.org/10.1016/j.jenvman.2021.112954>
23. McDonald C. Understanding participatory action research: A qualitative research methodology option. *Can J Action Res*. 2012;13(2):34–50. <https://doi.org/10.33524/cjar.v13i2.37>
24. Argyris C, Schon DA. *Die lernende organisation [The learning organisation]*. 3rd ed. Stuttgart: Klett-Cotta; 2006. German.
25. Ledwith M. *Community development in action, putting Freire into practice*. Bristol: Policy Press; 2016. <https://doi.org/10.2307/j.ctt1t895zm>
26. Reason P, Bradbury H. *The SAGE handbook of action research: Participative inquiry and practice*. Thousand Oaks, CA: SAGE Publishing; 2013.
27. Freire P. *Pedagogy of the oppressed*. New York: Herder and Herder; 1970.
28. Hope A, Timmel S. *Training for transformation: A handbook for community workers*. Revised 1995. Bradford, UK: ITDG Publishing; 1984. <https://doi.org/10.3362/9781780446271>
29. Rahman A. *Peoples' self-development: Perspectives on participatory action research, a journey through experience*. London: Zed Books; 1993.
30. Arcaya MC, Schnake-Mahl A, Bineta A, Simpson S, Super Church M, Gavindon V, et al. Community change and resident needs: Designing a participatory action research study in metropolitan Boston. *Health Place*. 2018;52:221–230. <https://doi.org/10.1016/j.healthplace.2018.05.014>
31. Nel H, Louw H, Schenck C, Skhosana R. *Introduction to community practice*. Pretoria: Unisa Press; 2021.
32. Mordock K, Krasny ME. Participatory action research: a theoretical and practical framework for EE. *J Environ Educ*. 2001;32(3):15–20. <https://doi.org/10.1080/00958960109599140>
33. Raymond CM, Cleary J. A tool and process that facilitate community capacity building and social learning for natural resource management. *Ecol Soc*. 2013;18(1), Art. #25. <https://doi.org/10.5751/ES-05238-180125>
34. Dougall MC, Banjade, RM. Social capital, conflict, and adaptive collaborative governance: Exploring the dialectic. *Ecol Soc*. 2015;20(1), Art. #44. <https://doi.org/10.5751/ES-07071-200144>
35. Apparg JM, Cohen PJ, Ratner BD, De Silva S, Buisson MC, Longley C, et al. Identifying opportunities to improve governance of aquatic agricultural systems through participatory action research. *Ecol Soc*. 2017;22(1), Art. #9. <https://doi.org/10.5751/ES-08929-220109>
36. Kawabe T, Roseboom W, Nishida S. The sense of agency is action-effect causality perception based on cross-modal grouping. *Proc Biol Sci*. 2013;280, Art. #20130991. <https://doi.org/10.1098/rspb.2013.0991>
37. Keahey J. Sustainable development and participatory action research: A systematic review. *Syst Pract Action Res*. 2021;34:291–306. <https://doi.org/10.1007/s11213-020-09535-8>
38. Athayde S, Silva-Lugo J, Schmink M, Kaiabi A, Heckenberger M. Reconnecting art and science for sustainability: Learning from indigenous knowledge through participatory action research in the Amazon. *Ecol Soc*. 2017;22(2), Art. #36. <https://doi.org/10.5751/ES-09323-220236>
39. Schaefer I, Bär G. The analysis of qualitative data with peer researchers: An example from a participatory health research project. *Forum Qual Sozialforschung*. 2019;20(3), Art. #3350. <https://doi.org/10.17169/fqs-20.3.3350>
40. Yang W, Fan B, Desouza KC. Spatial-temporal effect of household solid waste on illegal dumping. *J Clean Prod*. 2019;227:313–324. <https://doi.org/10.1016/j.jclepro.2019.04.173>
41. Joo Y, Kwon Y. Urban street greenery as prevention against illegal dumping of household garbage: A case of Suwon, South Korea. *Urban For Urban Green*. 2015;14:1088–1094. <https://doi.org/10.1016/j.ufug.2015.10.001>
42. Gaymans H, Maskoen Y. *Community self-survey*. PLA Notes CD-ROM 1988–2001, RRA Notes, 18:15–20. London: IIED;1993.
43. Collins K. *Participatory research: A primer*. Cape Town: Prentice Hall South Africa;1998.
44. Shamrova DP, Cummings CE. Participatory action research (PAR) with children and youth: An integrative review of methodology and PAR outcomes for participants, organizations, and communities. *Child Youth Serv Rev*. 2017;81:400–412. <https://doi.org/10.1016/j.childyouth.2017.08.022>
45. Whitmarsh LE, Hagger P, Thomas M. Waste reduction behaviors at home, at work, and on holiday: What influences behavioral consistency across contexts? *Front Psychol*. 2018;9, Art. #2447. <https://doi.org/10.3389/fpsyg.2018.02447>
46. Tunnell KD. *Illegal dumping: Large and small scale littering in rural Kentucky [webpage on the Internet]*. c2008 [cited 2021 Jul 22]. Available from: http://encompass.eku.edu/cjps_fsresearch/8
47. Abel DJ. *Perceptions on unofficial waste disposal in the Ethekwini Municipality [master's thesis]*. Bloemfontein: University of Free State; 2014.
48. Schild R. Environmental citizenship: What can political theory contribute to environmental education practice? *J Environ Educ*. 2015;47(1):19–34. <https://doi.org/10.1080/00958964.2015.1092417>
49. Van den Bergh J. Environmental regulation of households: An empirical review of economic and psychological factors. *Ecol Econ*. 2008;66(4):559–574. <https://doi.org/10.1016/j.ecolecon.2008.04.007>