

COMMUNICATION AND SUSTAINABLE DOMESTIC WASTE MANAGEMENT PRACTICES AMONG HOUSEHOLDS: INSIGHTS FROM KARU LOCAL GOVERNMENT, NASARAWA STATE

Fiyidi Asabe Makka

Institute of Strategic and Development Communication

Faculty of Arts

Nasarawa State University

fimacc58@gmail.com

<https://orcid.org/0009-0008-1793-4498>

Abstract

Sustainable domestic waste management continues to be a significant concern in developing nations, especially at the household level, where improper waste disposal methods frequently compromise human health and environmental integrity. This study investigates the domestic waste management practices of households in the Karu Local Government Area of Nasarawa State, Nigeria, emphasizing the evaluation of sustainable methods, awareness levels, and infrastructural obstacles. 420 copies of questionnaire were administered and 393 retrieved. The results show that most families use containers and waste bins, but not many use government-approved dumpsites. Instead, a lot of homes still employ old-fashioned methods like pit burial, which shows that the city's waste management procedures aren't working well. The study also found that people strongly oppose dumping trash in drains and open areas, as well as burning trash in open spaces. However, sorting and recycling waste is still not common; this calls for systematic steps to be taken to encourage a culture of recycling. Households know that improper waste management can hurt their health, yet they can't do much about it because of gaps in infrastructure and poor service delivery. This paper suggests a multi-level solution that includes regulatory changes to improve infrastructure, community-based waste programs, and programs to raise awareness about sorting and recycling at home. Taking a comprehensive approach to these problems can greatly help with long-term waste management, better sanitation, and better public health in Karu and places like it.

Keywords: Communication, Sustainable Waste Management, Households Practices, Environmental Sustainability, Community Participation.

Introduction

Communication is very important in waste management. Development communication tools have made waste management easier, less cumbersome and stress free. Effective waste management is no longer perceived merely as a technical issue of collection and disposal but as a development communication concern that requires behavioural change, public awareness, and participatory community engagement. Sustainable waste practices such as recycling, composting, source separation, and reuse depend largely on how information is communicated, understood, and internalized by households and communities (Ferronato&Torretta, 2019). In many developing countries, however, open dumping and open burning remain common disposal methods due to

weak communication systems, poor environmental awareness, and limited citizen participation (Ferronato&Torretta, 2019). In Africa, uncontrolled landfilling remains the dominant disposal route, with minimal integration of communication strategies that promote attitudinal change toward sorting or recycling (Rotich, Yongsheng& Jun, 2006). In Nigeria, household practices such as indiscriminate dumping and burning persist because sustainable waste management has not been effectively driven through communication-led public education, sensitisation, and behavioural change programmes (Bello, Ismail, &Kabbashi, 2016).

Karu LGA faces challenges from rapid population growth and associated waste generation, yet sustainable practices like composting or reuse are rarely practiced at household level. Drainages are blocked with waste, and streets littered with refuse, illustrating a gap between potential sustainable practice and actual behaviour. Exploring how households in Karu manage or fail to manage wastes sustainably gives insights into barriers (economic, infrastructural, knowledge, cultural) and possible levers for intervention to promote more environmentally sound waste practices. It is in view of the above, that this study explored the practices of sustainable domestic waste management by households in Karu Local Government of Nasarawa State, Nigeria.

Domestic waste management has shifted from being understood merely as a problem of collection and disposal to being recognized as a critical dimension of sustainability. Globally, there is increasing emphasis on reducing waste generation, reusing materials, recycling resources, and recovering energy before final disposal (Ferronato&Torretta, 2019). These practices are aligned with the principles of the circular economy and with the United Nations' Sustainable Development Goals (SDG 11 and SDG 12).

In developing countries such as Nigeria, however, sustainable waste management remains underdeveloped. Instead, open dumping, burning, and poorly managed landfills dominate. This review explores sustainable waste management practices at global, regional (African), national (Nigeria), and local (Karu LGA) levels, highlighting gaps and pathways to improve household-level engagement.

Global Sustainable Practices

Sustainable domestic waste management is guided by the waste hierarchy, which prioritizes reduction, reuse, and recycling, followed by recovery and, lastly, disposal (Wilson, Rodic, Cowing, Velis, Whiteman, Scheinberg, &Simonett, 2012). Many developed countries have institutionalized this hierarchy through policies and infrastructure. For example, in Germany, the Green Dot system requires producers to take responsibility for packaging waste, leading to high recycling rates (OECD, 2018). In Japan, households are required to separate waste into multiple categories, supporting national recycling and energy recovery systems (Yoshida & Hirai, 2016). Globally, sustainable practices include:

- **Composting:** Turning organic waste into fertilizer.
- **Recycling:** Processing materials such as plastics, glass, and metals for reuse.
- **Source separation:** Sorting waste at the household level to improve efficiency.
- **Waste-to-energy:** Converting waste into energy, as seen in Scandinavian countries.
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These practices illustrate that sustainability requires not only technology but also community participation, regulation, and public awareness.

Sustainable Practices in Developing Countries

In many developing countries, sustainability is limited by infrastructure, funding, and governance. Informal recycling systems dominate, with waste pickers salvaging materials from dumpsites (Wilson, Velis, & Cheeseman, 2006). Although this provides livelihood opportunities, it is unsafe and inefficient. Ferronato and Torretta (2019), note that more than 50% of waste in developing countries is disposed of in uncontrolled landfills or open dumps. Recycling and composting rates are very low, and burning remains widespread. This undermines public health, contributes to greenhouse gas emissions, and pollutes water systems.

Still, there are promising initiatives. In India, community-based waste recovery projects have demonstrated that household participation in separation and composting can significantly reduce waste volumes (Zurbrugg, Gfrerer, Ashadi, Brenner, Kuhr, & Nagendran, 2012). In South Africa, some municipalities have introduced “separation at source” programs with positive results when coupled with incentives (Simatele & Etambakonga, 2015). These examples suggest that sustainable practices are possible in developing contexts when local realities are considered.

African Context of Sustainable Waste Management

African cities face unique sustainability challenges due to rapid urbanization, weak infrastructure, and cultural practices. In many cases, land filling and open burning remain the dominant disposal methods (Rotich, Yongsheng, & Jun, 2006). Waste segregation at the household level is rare, and recycling industries are underdeveloped.

Liyala (2011), notes that waste management in East Africa is heavily centralized, with little community participation. This creates inefficiencies and discourages household involvement in sustainable practices. Informal recyclers and scavengers provide most of the recycling, but often under hazardous conditions. At the same time, there are cultural practices that could be harnessed for sustainability. In some African communities, organic waste is composted for use in small-scale agriculture. However, these practices are sporadic and not formally integrated into waste management systems. The gap between potential and practice highlights the need for culturally sensitive sustainability strategies.

Sustainable Waste Management in Nigeria

Nigeria generates millions of tonnes of waste annually, yet sustainable practices remain limited. Ogwueleka (2009), found that household-level waste separation is rare, and recycling rates are low. Most waste is either dumped in open spaces or disposed of in poorly managed landfills. Bello, Ismail, and Kabbashi (2016), argue that the lack of awareness about recycling and composting contributes to unsustainable practices. Many households consider waste as worthless rather than a potential resource. Poverty also discourages investment in sustainable practices such as buying bins for separation.

Nonetheless, there are emerging initiatives. In Lagos, the Lagos Waste Management Authority (LAWMA) has introduced recycling programs and partnerships with private firms. However,

these remain limited to urban centres and are not widely replicated in smaller cities or semi-urban LGAs. Similarly, the Nasarawa State government has a monthly sanitation that is compulsory for all but this only make the residents to suspend their activities for a period of time before resuming.

The Role of Communication in Sustaining Domestic Waste Management

The continuation of unsustainable domestic waste management practices, such as open dumping, waste incineration, and inadequate household involvement in sorting or reusing, has prompted scholars to reconceptualise waste management as not merely a technical or infrastructural concern, but also as a challenge of communication and behavioural change. Communication is deemed essential for converting awareness into action and for maintaining family involvement in sustainable practices. The foundational insight in the topic originates from the research of Kala, Bolia, and Sushil (2020), who established a Waste Management Communication Policy (WMCP) framework to bridge the communication gap between citizens and government in municipal solid waste management (MSWM). Their multinomial logistic regression models indicated that effective communication channels should be tailored to the socio-economic categories of individuals, and that citizen awareness and engagement are profoundly influenced by the design and implementation of communication. Their research emphasises that infrastructure or regulatory enhancements are inadequate without effective communication techniques that properly engage households.

Wang and Lin (2023), investigated the influence of social marketing techniques and communication design on household waste-sorting intents in China, transitioning from policy frameworks to message design. The study revealed that message content emphasising the advantages and methodologies of garbage sorting, along with effectively crafted communication tools, significantly influenced intentions through attitudes, perceived norms, self-efficacy, and hope. Their findings emphasise that communication should not only convey information but also be persuasive, aesthetically engaging, culturally tailored, and integrated within a framework of behavioural change, specifically utilising the Theory of Planned Behaviour.

Although mass media and policy-level communication are significant, recent research highlights interpersonal or household-level communication as a crucial factor. Mühlenhoff, Herzig, Zöller, and Bruns (2024), conducted a quasi-experimental study examining the impact of door-to-door communication on the separation of household organic waste in Germany. Research indicated that human contact can positively affect behaviour in voluntary programs; however, its efficacy was constrained in mandatory contexts. This indicates that communication strategies must account for context, motivation, and the type of engagement (voluntary versus imposed).

In addition to individual families, communication channels and community engagement are essential for maintaining domestic waste habits. Research, including Dwivayani&Almalita (2024), demonstrates that environmental communication utilised by community cooperatives has both constitutive and pragmatic roles, indicating that communication influences identification regarding waste and facilitates practical engagement. Similarly, mass media programs have demonstrated a substantial impact in slum environments; for instance, Morara, Djongana, and Awuor (2023), discovered that mass media greatly enhanced awareness of solid waste management in Nairobi.

Nonetheless, significant deficiencies persist, particularly concerning the contexts of developing nations (e.g., Sub-Saharan Africa). Many studies primarily concentrate on urban settings in wealthy countries, hence restricting their applicability to households in low-income nations with infrastructural deficiencies. Secondly, there exists a paucity of research that clearly links communication theory (e.g., intersectionality, power dynamics, social justice) with household waste practices in developing environments. Third, although behavioural theories such as the Theory of Planned Behaviour and social marketing are prevalent, there is a paucity of longitudinal research on sustained behaviour (beyond mere intention) and the impact of two-way participatory communication over time. Ultimately, there is no research examining how communication interventions intersect with institutional and infrastructural limitations, particularly in situations where households are eager yet unable to act due to insufficient support.

Local Context: Karu Local Government Area

Karu LGA faces unique challenges due to its proximity to Abuja and the rapid migration that has expanded settlements such as Mararaba, Ado, and New Nyanya. The population explosion has overwhelmed waste infrastructure, leading to clogged drainages, littered streets, and open dumping (Adamu, 2014).

Sustainable practices at the household level are minimal. Studies show that most residents are unaware of composting or recycling benefits (Saliman, 2021). Organic waste that could be turned into manure is often burned or dumped, while plastics and nylons are discarded rather than reused. The perception of waste as valueless discourages innovation. Cultural practices also shape outcomes. Communal dumping and burning remain common, reinforcing unsustainable patterns. Weak institutional support and absence of formal recycling systems leave households with few alternatives.

Barriers to Sustainable Practices in Karu

The literature identifies several barriers to sustainable domestic waste management in Karu:

1. **Knowledge gaps:** Limited awareness of recycling and composting.
2. **Cultural attitudes:** Persistence of traditional practices such as burning.
3. **Economic constraints:** Poverty limits investment in bins or private services.
4. **Weak infrastructure:** Absence of regular collection or designated recycling centres.
5. **Policy gaps:** Lack of integration between national/state policies and local realities.

These barriers create a cycle where households default to unsustainable practices, further undermining environmental and public health.

Pathways to Sustainability

Despite challenges, several pathways could promote sustainable practices in Karu:

- **Community inclusion:** As Posmaningsih, Aryasih, Made, Hadi, Marwati and Mallongi (2018) emphasize, involving residents in waste management enhances participation.
- **Behaviour change communication:** Awareness campaigns can shift perceptions of waste from “worthless” to valuable.
- **Infrastructure development:** Provision of bins, recycling centres, and regular collection is essential.
- **Economic incentives:** Programs that reward recycling or composting can encourage adoption.

- **Policy alignment:** Local government must adapt national policies to reflect Karu's cultural and socio-economic context.
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Successful models from India and South Africa suggest that sustainability is possible when households are empowered and infrastructure is accessible (Zurbrugg et al., 2012; Simatele&Etambakonga, 2015).

Theoretical Insights

The shift toward sustainable waste practices can be understood through the circular economy theory, which views waste as a resource to be reintegrated into production cycles. The concept of circular economics was introduced in 1989 through the publication of the book "Economics of Natural Resources and the Environment" by David Pearce and R. Kerry Termes, released by Johns Hopkins University Press. This book elucidates the interconnection between the economy, natural resources, and the environment, detailing the integration of the ecosystem with the economy and the significant deviations within the ecosystem along with their economic repercussions. The authors differentiate between the linear economy, characterized by unrestricted resource consumption, and the circular economy, which aims to regenerate capital be it financial, industrial, human, social, or natural while enhancing resource yield through the recycling of products, components, and raw materials, thereby ensuring a continuous flow of technical and biological materials.

The Circular Economy (CE) is characterized as an industrial system that is intentionally and design-wise restorative or regenerative. It substitutes the end-of-life paradigm with restoration, transitions to renewable energy sources, eradicates toxic chemicals that hinder reuse and reintegration into the biosphere, and aspires to eliminate waste through the enhanced design of materials, products, systems, and business models (Hobson, 2016).

A circular economy is an economic and industrial framework centred on the reutilization of goods and raw materials, as well as the regenerative potential of natural resources. It seeks to reduce value destruction within the overall system while maximizing value creation at each link in the system (Bastein, Roelofs, Rietveld, &Hoogendoorn, 2013). This is in line with what this study is advocating for, converting waste to wealth instead of using it to create more harm to the society. Sustainable practices are uncommon in Karu LGA; residents instead rely on open dumping and burning. But there is a chance: organic garbage might be composted, plastics could be recycled, and families could separate their trash at the source. To be sustainable, you need to bring together community involvement, communication that changes behaviour, infrastructure, and legislation.

Methodology

This study on domestic waste management practices among households was quantitative research design grounded in development communication principles. It was carried out through the administration of copies of questionnaire to the respondents in the area of the study. A sample size is simply the selected group from a population, which is considered as an adequate representation of the whole population. Hence in determining the sample size of the given population of 333,800, the statistical formula was used. The research followed the Yamane formula for determining a sample size.

$$n = \frac{N}{1 + N(e)^2}$$

Where:

N = Total Population

E = Level of precision or error limit = 5% or 0.05

n = Sample size

Therefore

$$n = \frac{333,800}{1 + 333,800(0.05)^2}$$

$$n = \frac{333,800}{835.5} = 399.5$$

Approximately 400

$$n = 400$$

Creating room for inaccurate filling of questionnaire and drops out (5%)

$$5 \times 400$$

$$100 = 20$$

$$400 + 20 = 420$$

Therefore, for a population of 333, 800 respondents, the researcher administered 420 copies of questionnaire randomly to the residents of Karu Local Government Area.

The practices of sustainable domestic waste management by households within Karu LGA of Nasarawa State, Nigeria

s/n	Items	Strongly agree	Agree	Strongly disagree	Disagree
1	Containers are used in the collection of domestic waste in my household.	156 (39.7)	117 (29.8)	40 (10.2)	80 (20.4)
2	Dumping of domestic waste in the drains, gutters and open places is not a bad habit.	40 (10.2)	40 (10.2)	195 (49.6)	118 (30.0)
3	Domestic waste container is used to store waste in my household.	80 (20.4)	157 (39.9)	78 (19.8)	78 (19.8)
4	We regularly burn our domestic waste openly because it does not have a negative effect on health of humans.	80 (20.4)	40 (10.2)	156 (39.7)	117 (29.8)
5	Domestic waste is normally transported to the approved government dumping sites by my household.	80 (20.4)	79 (20.1)	156 (39.7)	78 (19.8)
6	Waste bins are used in my household for proper storing of waste.	120 (30.5)	156 (39.7)	78 (19.8)	39 (9.9)
7	Pits are used in burying domestic waste in my household.	159 (40.5)	39 (9.9)	117 (29.8)	78 (19.8)
8	I use government approved waste sites for disposals.	80 (20.4)	79 (20.1)	156 (39.7)	78 (19.8)
9	The deployment of effective domestic waste management has kept my households in good state of health.	159 (40.5)	117 (29.8)	78 (19.8)	39 (9.9)
10	Domestic wastes are sort in my household before disposing	80 (20.4)	40 (10.2)	195 (49.6)	78 (19.8)

Source: Researcher's fieldwork in Karu LGA, 2023.

The table above shows the practices of sustainable domestic waste management by households within Karu Local Government Area of Nasarawa State, Nigeria. The number of sampled respondents was 420 but the retrieved copies of the questionnaire are 393 and it was used for this analysis. The first item on the table has it that 156 (39.7) of the study's respondents strongly agree that containers are used in the collection of domestic waste in their household, substantiating the above, 117 (29.8), respondents also agree with the above view. In a different purview, 40 (10.2), respondents strongly disagree with the above view, similarly, 80 (20.4), respondents also disagree with the above claim. Inferring from the table it can therefore be deduced that the highest number of the study's respondents strongly agree that containers are used in the collection of domestic waste in their households.

The second item on the table shows that 40 (10), respondents of the study strongly agree and agree that dumping of domestic waste in the drains, gutters and open places is not a bad habit. In contrast with the above view point, 195 (49.6), respondents of the study strongly disagree that dumping of domestic waste in the drains, gutters and open places is not a bad habit, agreeing with the above 118 (30.0), respondents also disagree. It can therefore be observed from the table that the highest number of the study's respondents strongly disagree that dumping of domestic waste in the drains, gutters and open places is not a bad habit.

The third item on the table shows that, 80 (20.4), respondents strongly agree that domestic waste container is used to store waste in their household, similarly, 157 (39.9), respondents also agree with the above point. Creating a contrast, 78 (19.8), respondents strongly disagree and disagree respectively that domestic waste container is used to store waste in their household. It can therefore be infer from the table that the highest number of the study's respondents agree that domestic waste container is used to store waste in their household.

The fourth item shows the regularity of burning domestic waste, 80 (20.4), respondents of the study strongly agree that they regularly burn their domestic waste openly because it does not have a negative effect on health of human beings, supporting the above view, 40 (10.2), respondents agree with the above view. In a different purview, 156 (39.7), respondents strongly disagree that they regularly burn their domestic waste openly because it does not have a negative effect on health of human beings. Similarly, 117 (29.8), respondents also disagree to the claims of regularly burning domestic waste openly due to the fact that it does not have a negative effect on health of people.

The fifth item on the table shows that, 80 (20.4) respondents of the study strongly agree that domestic waste is normally transported to the approved government dumping sites by their household. Supporting the above, 79 (20.1), respondents also agree with the above view. In a deviation from the above point of view, 156 (39.7), and 78 (19.8), respondents strongly disagree and disagree to the above view respectively. It can therefore be deduced from the table that the highest number of the study's respondents strongly disagree that domestic waste is normally transported to the approved government dumping sites by their household.

The sixth item on the table has it that, 120 (30.5), respondents strongly agree that waste bins are used in their household for proper storing of waste, similarly, 156 (39.7), respondents also agree with the above view. In a different purview, 78 (19.8), and 39 (9.9), respondents strongly

disagree and disagree with the above view. It can therefore be inferred from the table that the highest number of the study's respondents agrees that waste bins are used in their household for proper storing of waste.

The seventh item on the table depicts that, 159 (40.5), respondents of the study strongly agree that, pits are used in burying domestic waste in their household, similarly, 39 (9.9) respondents also agree with the above point. In a different view, 117 (29.8), respondents strongly disagree with the above viewpoint and 78 (19.8), respondents also disagree. It can therefore be observed from the table that the highest number of the study's respondents strongly agree that pits are used in burying domestic waste in their household.

The eighth item on the table shows that, 80 (20.4), respondents strongly agree that they use government approved waste sites for disposals. Similarly, 79 (20.1), respondents also agree to the above point. In a different view, 156 (39.7), respondents strongly disagree with the above stands and 78 (19.8), respondents also disagree. It can therefore be noted from the table that the highest number of the study's respondents strongly disagree that they use government approved waste sites for disposal.

The ninth item on the table have it that, 159 (40.5), respondents strongly agree that the deployment of effective domestic waste management has kept their households in good state of health, similarly, 117 (29.8), respondents agree with the above view point. In contrast to the above view, 78 (19.8), and 39 (9.9), respondents strongly disagree and disagree with the above view point. It can therefore be deduced from the table that the highest numbers of the study's respondents strongly agree that the deployment of effective domestic waste management has kept their households in good state of health.

The tenth item on the table shows that 80 (20.4), respondents of the study strongly agree that domestic wastes are sort in their household before disposing, similarly, 40 (10.2), respondents also agree with the above view point. In a different purview, 195 (49.6), respondents strongly disagree that domestic wastes are sort in their household before disposing and 78 (19.8), also disagree with the above claim. It can therefore be noted from the table that the highest number of the study's respondents strongly disagree that domestic wastes are sort in their household before disposing.

Results

The examination of home habits concerning domestic waste management in the Karu Local Government Area, derived from 393 valid questionnaire responses, produced the following principal findings:

1. Most of the respondents use containers to collect household waste. This shows that fundamental waste containment measures are widely implemented.
2. The respondents not intoned with the disposition of trash in drains, gutters, and open spaces. This shows that they know about the health and environmental consequences of dumping trash wherever.
3. Home garbage containers are used to store waste, which shows that households try to keep their waste clean before throwing it away.
4. A large number of people strongly disapproved with the practice of open burning of rubbish, showing that they knew it was bad for their health and the environment.

5. Most people strongly disputed that rubbish is often taken to government-approved disposal locations. This shows that official waste infrastructure is not being used much.
6. Waste bins are used for proper storage, which shows that people are trying to keep their trash orderly at home.
7. A substantial number of people strongly agreed that pits are used to bury household waste. This shows that people still rely heavily on traditional disposal methods because of gaps in infrastructure.
8. There is no easy access to and they don't use government approved dump sites.
9. A lot of people who answered strongly agreed that good waste management helps keep homes healthy. This shows that they know that sanitation and public health are connected.
10. Most people strongly disagreed that they sort their trash before throwing it away. This shows that there isn't a culture of separating and recycling trash in most homes.

The results show that people in Karu LGA are aware of the health risks of waste and try to store it properly, but there is a big gap in the use of formal waste management systems. Instead, they rely on traditional methods like pit burial and don't sort or recycle their waste very often.

Recommendations

The following recommendations are made to improve the long-term management of home garbage in Karu LGA based on the findings above:

1. The government should make it easier for people to go to trash collection and disposal sites so that they don't have to rely on informal ways as much.
2. Neighborhood cooperatives should be set up to handle trash disposal together.
3. Households should start sorting their trash using simple ways like color-coded bins.
4. Families should be taught not to do things that are bad for the environment in the long run, including burning and burying things.
- 5.

Conclusion

The findings of this study reveal that while households in Karu LGA possess a relatively high level of awareness regarding the health and environmental consequences of improper waste management, this awareness has not translated into sustainable waste practices due to infrastructural limitations, weak policy implementation, and lack of coordinated communication strategies. This exposes a clear knowledge–practice gap, which is fundamentally a development communication challenge rather than merely a technical or infrastructural one.

To bridge this gap, there is a need for strategic, communication-driven interventions that combine policy reform, community-based sensitisation, and household-level behavioural change campaigns. Government policies must not only provide infrastructure but also embed communication frameworks that educate, motivate, and mobilise citizens toward sustainable practices. Equally, community-led participation, environmental advocacy, and consistent information dissemination are critical in reinforcing positive behaviour change. By situating household waste management within a development communication approach, this study highlights that sustainable domestic waste solutions in Karu LGA depend not only on resources and infrastructure but also on how effectively communication is used to influence attitudes, shape practices, and sustain collective action for environmental health and public well-being.

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