

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/329753907>

The Mode of Operation and Challenges of Informal Waste Collection in Ibadan

Article · November 2017

CITATIONS

0

READS

175

2 authors:



Bolanle Wahab

University of Ibadan

52 PUBLICATIONS 320 CITATIONS

[SEE PROFILE](#)



Bayonle Ola

3 PUBLICATIONS 6 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



he Role of Urban and Peri-Urban Agriculture in Enhancing Food Security and Climate Change Resilience in East and West African Cities [View project](#)



Article extracted from MSc. Dissertation [View project](#)



Ibadan Journal of Sociology

The Biannual Journal of the Department of Sociology
University of Ibadan, Nigeria



www.ibadanjournalofsociology.org

IBADAN JOURNAL OF SOCIOLOGY

The Bi-Annual Journal of the
Department of Sociology,
University of Ibadan,
Nigeria.

FOUNDED IN 2014

Volume 6

NOVEMBER 2017

NUMBER 1

ARTICLES

- Sex as a Weapon of Violence: An Examination of the Phenomenon of Domestic Violence Against Men in Ibadan, Nigeria** 5
Busari Dauda & Ifeoluwa Ajao
- Effect of Token Economy Counselling Technique on Disruptive Classroom Communication Behaviour among Secondary School Students in Zaria Metropolis** 27
Ogunwole, E. A, Bello, R.M. & Zakariyah, A.A
- Ire Gbogbo' Political Rhetoric in Nigeria's 2015 General Elections: An Orunmilaist Sociological Perspective** 41
Dauda Busari,¹ Michael Ayomide Owojuyigbe² and Itumeleng Meko³
- Gender Role and Vocational Experiences of Married Women Beer Parlour Operators in Ibadan, Nigeria** 67
Usman A. Ojedokun & A.O. Ademuson
- The Mode of Operation, Challenges and Benefits of Informal Waste Collection in Ibadan** 85
Bolanle Wahab and Akeem Bayonle Ola.

IBADAN JOURNAL OF SOCIOLOGY

Editor-in-Chief

Olutayo Akinpelu Olanrewaju

Professor of Sociology

Department of Sociology, Faculty of the Social Sciences,
University of Ibadan, Ibadan, Nigeria.

E-Mail : lantopamtu@yahoo.com

Tel. : +234-8034006297

Members

Okunola Rashid Akanji,

Department of Sociology,
Faculty of the Social Sciences,
University of Ibadan,
Ibadan,
Nigeria.

Email: mayeloyecaliphate@yahoo.com

Akanle Olayinka,

Department of Sociology,
Faculty of the Social Sciences,
University of Ibadan,
Ibadan,
Nigeria.

Email: yakanle@yahoo.com

Steve Tonah,

Professor of Sociology,
Department of Sociology,
University of Ghana

Email: tonah@ug.edu.gh

Mogalakwe, M,

Professor of Sociology,
Department of Sociology,
University of Botswana,
Botswana

Email: mogalakwe@mopipi.ub.bw

Ogundiran Akin,

Professor & Chair
Africana Studies University of North
Carolina, Charlotte,
USA.

Office: Garinger 113 A

Phone: 704-687-2355

Email: Ogundiran@uncc.edu

Adesina Jimi O,

Professor of Sociology
Department of Anthropology
and Sociology,
University of Western Cape,
Bellville 7535, South Africa.

Email: jotadesina@gmail.com

Frost Diane,

Senior Lecturer,
Department of Sociology,
Social Policy and Criminology,
University of Liverpool,

Eleanor Rathbone
Building, Bedford Street South L69
7ZA, United Kingdom.

Tel: 0151 794 3017

Email: Dfrost@liverpool.ac.uk

If you like to submit manuscript to **Ibadan Journal of Sociology** or make an informal inquiry, please contact
the editor at Department of Sociology, Faculty of the Social Sciences, University of Ibadan, Nigeria.

Instructions to authors are available at the journal's website

<http://www.ibadanjournalofsociology.org>

Subscriptions

Ibadan Journal of Sociology is an open access, peer-reviewed journal that considers Articles from sociology, anthropology and other related disciplines. The journal has a special focus on all aspects of social relations and the impact of social policies, practices and interventions on human relations.

The Journal focuses on the needs of individuals for reporting research findings, case studies and reviews. We offer an efficient, fair and friendly peer review service and are committed to publishing all sound scientific studies, especially where they advance knowledge in any human endeavor.

IBADAN JOURNAL OF SOCIOLOGY

Content

No	Paper Title/Author	Pg.
1.	Sex as a Weapon of Violence: An Examination of the Phenomenon of Domestic Violence Against Men in Ibadan, Nigeria Busari Dauda & Ifeoluwa Ajao	5
2.	Effect of Token Economy Counselling Technique on Disruptive Classroom Communication Behaviour among Secondary School Students in Zaria Metropolis Ogunwole, E. A, Bello, R.M. & Zakariyah, A.A	27
3.	Ire Gbogbo' Political Rhetoric in Nigeria's 2015 General Elections: An Orunmilaist Sociological Perspective Dauda Busari, Michael Ayomide Owojuyigbe & Itumeleng Meko	42
4.	Gender Role and Vocational Experiences of Married Women Beer Parlour Operators in Ibadan, Nigeria Usman A. Ojedokun & A.O. Ademuson	66
5.	The Mode of Operation, Challenges and Benefits of Informal Waste Collection in Ibadan Bolanle Wahab & Akeem Bayonle Ola.	85

This issue is available at:
www.ibadanjournalofsociology.org

Copyright © 2014-2017 Ibadan Journal of Sociology (IJS)

The Mode of Operation, Challenges and Benefits of Informal Waste Collection in Ibadan

Bolanle Wahab & Akeem Bayonle Ola

¹Department of Urban and Regional Planning,
University of Ibadan, Ibadan, Nigeria.
Email: bolanle_wahab@yahoo.com
Tel: +234-807-991-7354

²Department of Urban and Regional Planning,
Federal Polytechnic, Offa, Nigeria.
Email: olabayo22@yahoo.com
Tel; +234-803-799-1615

ABSTRACT

The rapid increase in waste generation in Ibadan without commensurate collection efforts by municipalities and formal private waste service providers have led to the involvement of informal waste collectors in waste collection service in the city. This paper examined the mode of operation of the informal waste collectors (IWCs) and the challenges and benefits of informal waste collection in the city. A structured questionnaire was administered to 253 informal waste collectors in the five municipal local government areas of the city. Both descriptive and inferential statistics were used to analyse the data collected. The challenges facing the IWCs were health (51.7%), social stigma (46.8%), economic constraints (33.6%), and insecurity (56.3%). Job opportunities, income generation, and reduction in uncollected waste were the major benefits of informal waste collection. Although the IWCs experienced challenges in their operations, they desired to address inadequate waste collection and disposal services and were motivated to remain in the business by service demand, job prospects and income earnings. Given the role of IWCs in reducing the problems of uncollected wastes, government needs to review its policy on non-recognition of the IWCs and integrate them into the waste management system in the city.

Keywords: Informal waste collectors, Mode of operation, Challenges, Benefits, Ibadan

INTRODUCTION

Waste management is one of the greatest challenges facing municipal governments in Nigeria. The quantity of waste generated continues to increase at a faster rate than the ability of the authorities to effectively manage it (Akinwale, 2005). In Nigeria, the infrastructure and organizational system of waste management is insufficient (Nzeadibe and Chukwuedozie, 2011). Municipalities and formal service providers can neither provide waste collection service to all households nor guarantee an effective disposal of wastes (Adama, 2011). Less than half of the population in the country is provided with sufficient and regular waste collection services (Ezeah, Fazakerley, and Roberts, 2013). Attempt to fill the gap created by the inability of municipalities and formal waste service companies to ensure total collection of waste has led to the emergence of informal waste collectors in the waste management scheme (Ola, 2016).

Informal waste collectors (IWCs) are a group of informal private waste operators involved in the house-to-house waste collection at a fee, using specially built carts, wheelbarrows, head pots or baskets, donkey and horse carts (Meyer, 2008). The IWCs carry out informal collection of wastes in the areas where sanitation services are not delivered by municipalities, especially in developing states (Burcea, 2015). The literature has established the active participation of waste scavengers and informal recyclers in waste management (Medina, 1997; 2001; Mukhtar, 2008; Coleman and Rajabu, 2010). More than 2% of the population in the under-developed and developing states is involved in informal waste collection activities (Medina, 2007), with the essential goal to earn their living and to contribute to the financial support of households and families they are part of (Meagher, 2011). In Male, the capital city of the Maldives, the IWCs provide sanitation services to inhabitants instead of the municipality (Medina, 2005). IWCs contribute significantly to waste management and resource efficiency by collecting, sorting, trading and sometimes even processing waste materials (Medina, 2005). They are highly adaptable, flexible and able to respond quickly to demand-driven forces (Sembiring, and Nitivattananon, 2010). The IWCs constantly initiate adaptive strategies to better access waste and circumvent barriers while at the same time integrating new systems as they emerge (Wilson, Costas and Cheeseman, 2006).

Studies have shown that IWCs are very active in municipal solid waste management in many cities in Nigeria. For instance, Ukoje (2012) reported that IWCs evacuated substantial volume of waste in Zaria; while Muhammad and Manu (2013) similarly reported the active and positive role of IWCs in municipal waste management in the city of Kaduna. Informal

waste collectors were equally found to be active and playing a complementary role in municipal solid waste management in Lagos (Adebola, 2006), Enugu (Nzeadibe, 2009), Ilorin (Adeyemi, Olorunfemi and Adewole, 2013) and Ibadan (Wahab and Ola, 2016). However, less research attention has been given to the operational challenges, benefits and prospects of informal waste collection.

In Ibadan, the inability of the government to effectively deal with the growing heaps of solid waste that is dumped indiscriminately in every nook and cranny of the city led to the engagement of formal private refuse contractors (PRCs) by the Oyo State Solid Waste Management Authority (OYSWMA) (first, between 1985 and 1991 and, later, 1997 to date), who were given specific areas of the city to collect and dispose of the waste generated by residents and commercial operators (Ogu, 2000). However, the duo of public agency and private refuse contractors has been unable to provide adequate solid waste collection service to a large number of waste generators especially in the low-income unplanned residential areas in the city (OYSWMA, 2012; Hammed, Sridhar and Wahab, 2016). This huge gap in waste service delivery to the city residents seemed to have influenced the involvement of the informal waste collectors in waste collection and disposal in the city (Wahab and Ola, 2016). Despite the contributions of IWCs to solid waste management through provision of waste collection services to the high density residential neighborhoods which had hitherto not been favoured in waste evacuation efforts of Oyo State Government (Wahab and Ola, 2016), the IWCs have been largely ignored by the government probably owing to limited knowledge of their mode of operation and the benefits derivable from their involvement in municipal solid waste management. This gap in knowledge is what this paper filled by investigating the mode of operation of the IWCs in Ibadan, the benefits derivable from their involvement in municipal solid waste management as well as the challenges impeding their operation with a view to identifying appropriate and sustainable measures for improved efficiency in their operations.

LITERATURE REVIEW

The labouring bodies that manage wastes are of serious importance to the future of the planet earth (Reno, 2015). Informal waste collectors are a critical part of the waste labour whose services are crucial to the attainment of clean and healthy cities in Nigeria. Poor waste regimes (and discriminatory or non-inclusive waste management policies, as being experienced in Ibadan, Nigeria) contribute to the proliferation of informal waste practices which potentially frustrate the ambition of the local elite for waste reform (Chakrabarty, 1992; Furniss, 2010; Fredericks, 2012). But the

labour of waste management, especially waste collection and disposal services is often dangerous, threatening workers with illness and injury as well as threatening their social identities (Nagle, 2013). According to Gutberlet, (2008), the IWCs possess an inferior social status than the other community members that they serve, working and living in deplorable conditions, and not supported by the authorities. More importantly, working directly with waste or, as expressed by Dumont (1980:93), when exposure to waste becomes part of a professional vocation (as with the informal waste collectors) rather than something done in private, it can raise the possibility of stigma. Waste labour is regarded as a preserve of marginalized social groups who usually end up doing dirty work (Zimring, 2005; Furniss, 2010). This perception is a factor in the stigmatization of the informal waste collectors (IWCs). However, waste work should be seen as affective labour, as part of caring for others (Reno, 2015) and a means of achieving clean communities.

Informal waste collectors face different sets of challenges with regard to social identity, stigmatization, and discrimination in the delivery of their services. This study adopted the theory of social stigma for the discussion of social issues associated with informal waste management business. French sociologist Émile Durkheim was the first to explore stigma as a social phenomenon in 1895, while Erving Goffman developed the theory of social stigma in 1963. Goffman defines stigma as an attribute, behaviour, or reputation which is socially discrediting in a particular way; a phenomenon whereby an individual with an attribute which is deeply discredited by his/her society is rejected as a result of the attribute; a characteristic that is devalued within a social context; a process by which the reaction of others spoils normal identity; and a feature which causes an individual to be mentally classified by others in an undesirable, rejected stereotype rather than in an accepted, normal one (Goffman, 1963). In discussing the individual's relation to a stigma, Smith (2012) presents empirical support for the existence of three categories earlier identified by Goffman (1963): the stigmatized, the normals or stigmatizers and the wise as separate groups. The stigmatized are ostracized, devalued, rejected, scorned and shunned individuals. They experience discrimination and prejudice in the realms of employment and housing (Levin and Laar, 2004). Perceived prejudice and discrimination is also associated with negative physical and mental health outcomes such that members of a stigmatized group often experience psychological distress, self-esteem, academic achievement, and many view themselves contemptuously (Major and O'Brien, 2005). The normals or stigmatizers perceive stigmatization to involve dehumanization, threat, aversion and sometimes the depersonalization of others into stereotypic caricatures. Stigmatizing others can serve several functions for an

individual, including self-esteem enhancement, control enhancement, and anxiety buffering, through downward-comparison—comparing oneself to less fortunate others can increase one's own subjective sense of well-being (Heatherton, Kleck, Hebl and Hull, 2000). The wise normals, according to Goffman (1963), are persons whose special situation has made them intimately privy to the secret life of the stigmatized individual and sympathetic with it, and who find themselves accorded a measure of acceptance by the stigmatized as "honorary members" of the stigmatized group.

Informal waste workers suffer social stigma, discrimination, abuse and harassment from government and members of the public, including some of their clients. In Cairo, the Coptic migrants, the rural pig farmers, called Zabbaleen (meaning "garbage people" in Egyptian Arabic) who collect wastes from inhabitants to feed and sustain their pigs on the organic waste in the city's trash (Wahab and Ola, 2016) were highly marginalized and stigmatized (Iskandar, 2005). Nzeadibe (2009) notes that local authorities avoid the informal waste workers and do not recognize their activities and services to community sanitation. As stated by Gutberlet (2008) and Sembiring and Nitivattananon (2010), the indifference by the authorities to informal waste collection is accompanied by the marginalization and discrimination of informal collectors by the society, and their persecution by public bodies providing security and public order. The hostilities towards the IWCs negatively influence the social status of the IWCs, leading to social exclusion (Wilson et al., 2006).

A study by Adebola (2006) in Lagos, Nigeria showed that informal waste collectors are constantly harassed by government waste management agencies in the course of carrying out their duties owing largely to the belief that the IWCs degrade the environment through indiscriminate dumping of refuse on the streets, open space and drains. Owing to this perception, the Lagos State Government, for instance, outlawed informal waste collection in the state (LAWMA, 2012). However, the ban has not in any way stopped the operation of the collectors. They only avoid the major streets where they can be easily spotted by law enforcement agents.

Similarly, the IWCs are not officially recognized by the OYSWMA to operate in Ibadan. As noted by one OYSWMA official (Wahab and Ola, 2016:87), this is because "the extant waste management law does not recognize the IWCs and so they are operating illegally." The statutory body responsible for waste management in the city is the Oyo State Solid Waste Management Authority (OYSWMA) under the Ministry of Environment and Habitat. OYSWMA waste collection and disposal activities are

complemented by private refuse companies (PRCs) licensed by the state government to undertake waste collection, particularly in the low-density areas of the city (OYSWMA, 2013). There were 259 PRCs in 2013 (OYSWMA, 2013) which increased to 400 in 2016 (Hammed, Sridhar and Wahab, 2016). Sadly, the combined activities of both the public actor (OYSWMA) and the organized private refuse contractors have not translated into effective waste management services in Ibadan, as only 10% of the 485,860,260 kg of solid waste generated annually in the city is evacuated (OYSWMA, 2011; Hammed, Sridhar and Wahab, 2016). However, the informal private sector is found to be very active in solid waste management scheme of the city (Wahab and Ola, 2016).

World Health Organization (WHO) (2009) claims that formal workers involved in the waste management show higher injury rates than those in industrial work, globally. The situation of informal workers in developing countries is evidently worse. For instance, *Cointreau (2006) argues that*, in many developing countries, the practice of sorting waste at source is almost non-existent even for high-risk waste, such as sharps generated from medical facilities. The presence of sharp objects, such as broken glass in waste, poses a high risk of injury to informal waste collectors who mostly do not use protective wear (Domingos, 2001). In his study on Ibadan, Sridhar (2009) reported that health care wastes were largely mixed with general waste, thereby exposing waste handlers, such as the IWCs, to potentially harmful microorganisms and sharps-inflicted injuries. Pharmaceutical and industrial chemicals as well as obsolete pesticides, and old batteries that contain chemicals that are dangerous to human life are often disposed of through open burning in many developing countries (Cointreau, 2006). As noted by Bjerlik (2005), fumes from burning chemicals at dump sites may cause respiratory, allergic and other complications. Also, injuries from physical contact with improperly disposed chemicals by the informal waste collectors can be in the form of skin burns, inhalation burns, explosions and intoxication (Mueller, 2005). Also, Sridhar and Coker (2009) aver that, due to the genotoxic nature of radioactive waste, exposure to it may have severe consequences, such as radiation burns and poisoning, destruction of tissues, in addition to causing diseases, including headache, dizziness and vomiting.

Similarly, Ciocoiu and Târțiu (2012) observe that informal waste workers generally use basic equipment and very simple methods of protection. Dump pickers with their unprotected hands and feet are at particular risk of injury from needles in health care waste, broken glass and projecting nails. Moreover, informal waste workers often contract skin and eye infections and respiratory diseases as they work in dusty and smoky

locations. They are also bitten by dogs and rats which are in or around dumpsites and waste bins (Katusiimeh, Burger, and Mol, 2013). Equally, recycling of e-waste considerably increases health risks in the informal sector. E-waste contains toxic materials such as lead and mercury. The workers (often without being aware of the danger) are exposed to these materials when dismantling computers and other electronic equipment and they breathe in smoke from melting of metals which contain arsenic and cyanide (TransWaste, 2012). The unsatisfactory working conditions associated with informal waste collection business may lead to shorter life expectancy among the IWCs going by the WHO's claim that, while the average life expectancy in Mexico is 67 years, for waste workers, it is only 39 years (WHO, 2009).

Apart from the health challenges of informal waste collection reported above, socio-economic challenges of informal waste collection have equally received attention in the literature. A major social challenge of informal waste collection in Ibadan is the stigma attached to any work related to waste servicing by members of the society. The earlier group of waste workers, popularly called "night soil men" (*agbépòd*), faecal waste collectors, operated at night, in order to use the cover of the dark to carry out their activities without being identified by their people (Wahab, 2004). Although with the advent of modernity the situation has greatly improved, people still have their reservation to work in the waste servicing business. Studies have addressed the issue of social stigma in informal waste collection. Riverine Development Associates (2006) reported low social acceptance of IWCs in Lusaka (Zambia) and a similar situation was observed in Quezon City (Philippines) by SWAPP (2006). Because IWCs are mostly recent migrants from rural areas with no education or technical skills in search of employment in the urban centers (Rogerson, 2001), it has been argued that IWCs are often faced with limited capital to acquire adequate operational tools which consequently reduce their income from the business (Samson, 2010). Similarly, Spies (2010) also asserts that informal waste collection business is a survivalist undertaking with meagre income accruable to the IWCs. He, however, attributes this to the reluctance of the IWCs to invest the required capital on the business for expansion and more financial reward.

Despite the problems facing the IWCs as outlined above, the sector presents a number of opportunities and benefits. Gunsilius (2011) notes that the informal waste collection business not only provides an income opportunity for as much as 1% of the urban population in many countries, but also serves the protection of natural resources and the environment by recovering up to 20% of municipal wastes in a self-financing system.

According to Hallowes and Munnik (2008), the informal waste collectors achieve high recovery rates (about 80%), because the ability to recycle is vital for the livelihoods of the people involved. Consequently, a huge variety of recyclables is segregated and can be further processed in accordance with new demands and technological advancements in the recycling industries (Dilata, 2008). Through their recycling and composting activities, the IWCs contribute to the reduction of greenhouse gases. The informal waste collection activities create jobs, reduce the quantity of stored wastes, preserve primary resources and energy, reduce the pollution caused by waste (Monirozzaman et al., 2011), contribute to the provision of public health and to the improvement of household and street sanitation (Gerold, 2009), and reduce the costs of waste collection to municipalities.

The literature on informality in waste management (Medina, 1997; 2001; Coleman and Rajabu, 2010) and in Nigeria tend to focus on waste scavenging (Adeyemi *et al.*, 2001; Afon, 2007, 2012; Magaji and Dakyes, 2011) and recycling (Mukhtar, 2008; Nzeadibe and Iwuoha, 2008; Nzeadibe, 2009), while the contributions of the IWCs have received less research attention. The literature on solid waste management in Ibadan (Sridhar and Ojediran, 1983; Sridhar *et al.*, 1985; Sridhar, 2005; Ayorinde *et al.*, 2010; Mudashiru, 2014) revealed a gap in scholarship on the informal waste collectors and their role in solid waste management in the city. In the same vein, the emerging studies on informal waste collectors in Ibadan (Wahab and Ola, 2016; Ola, 2017) did not cover the challenges and benefits of the informal waste business on the operators, government and the society.

A common feature of the studies reviewed above (with the exception of Lagos State Government ban on informal waste collection) is that they are too general, without taking into consideration the peculiar characteristics of each country, such as the socio-cultural structure of the people as well as economic development and different ethnic sections of each country, which may affect the mode of operation of IWCs, and the challenges and benefits accruable from informal waste collection business. The benefits which the IWCs and the city derive as well as the challenges hampering their effective operation are not yet reported in the literature. This gap in knowledge is what this paper filled by investigating the mode of operation of IWCs, and the benefits and challenges of informal waste collection in Ibadan with the aim of suggesting sustainable measures to address the problems.

The Study Area

The study was conducted in Ibadan, the largest indigenous city in tropical Africa and the capital of Oyo State. It is located between longitudes $7^{\circ}20'E$ and $7^{\circ}40'E$ and latitudes $3^{\circ}35'$ and $4^{\circ}10'$. It is 145km north-east of Lagos and 345km south-west of Abuja, the federal capital. The development of Ibadan has been influenced by the traditional and colonial urbanization. It was founded in 1829 and occupied by immigrants who moved into the city in search of security from inter-tribal wars in Yoruba land (Fatokun, 2011). Since it was founded, Ibadan has had rapid growth both spatially and demographically; the developed land area in 2011 covered 463.33km^2 (Hoekstra, 2012). The 2013 estimated population, using 2.83% growth rate (National Population Commission, 2007), was about 3million. Ibadan is made up of 11 local government areas (LGAs), namely: Ibadan North East, with its headquarters at Iwo Road; Ibadan North, with its headquarters at Agodi; Ibadan South East with its headquarters at Mapo; Ibadan South West, with its headquarters at Ring Road; Ibadan North West, with its headquarters at Onireke; Egbeda, with its headquarters at Egbeda; Lagelu, with its headquarters at Iyana Offa; Ona-Ara, with its headquarters at Akanran; Oluyole, with its headquarters at Idi-Ayunre; Ido, with its headquarters at Ido; and Akinyele, with its headquarters at Moniya (Fig. 1). Five of the eleven LGAs are municipal LGAs, with varying number of localities, viz: Ibadan South West – 27 localities; Ibadan North East – 24 localities; Ibadan South East – 25 localities; Ibadan North West – 32 localities; Ibadan North – 22 localities (Fig. 1).

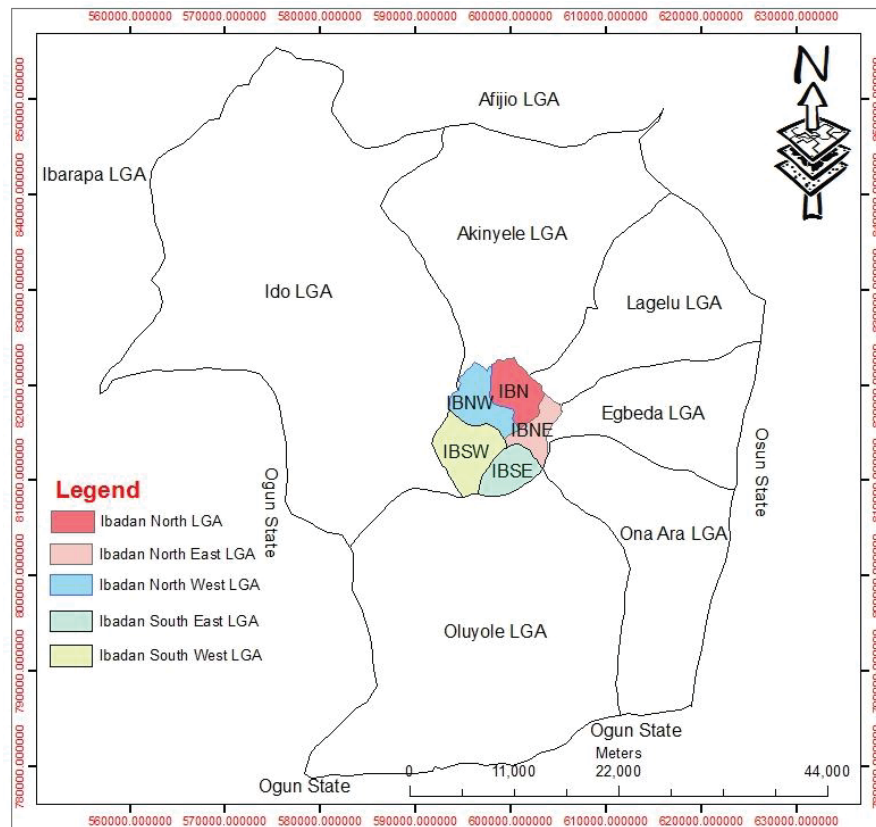


Fig. 1: The Local Governments in Ibadan

Source: Oyo State Ministry of Physical Planning & Urban Development, Ibadan (2012)

METHODOLOGY

A cross-sectional survey approach was adopted for the study, with questionnaire and interview guide being the primary instruments of data collection. Preliminary investigations revealed that the IWCs were more concentrated in the five municipal LGAs of Ibadan. Thus, the five LGAs were selected for survey. Also, based on preliminary enumeration of the IWCs in all the localities, three localities with the highest number of IWCs in each LGA were selected for survey. As a result of the difficulty in obtaining ready data on the number of IWCs due to their non-registration with the government, the snowball technique was used in identifying a total of 506 informal waste collectors in the selected localities out of which 253 (50%)

were randomly selected for survey. A pretested structured questionnaire was then administered to them. The questionnaire was designed to collect information on the socio-economic characteristics and mode of operation of IWCs, the challenges associated with informal waste collection business and the benefits accruable from the business. The questionnaire was prepared in English and administered by four trained field assistants who were graduates and could translate the questions into the native language of the respondents who did not understand English. Questionnaire administration was conducted between 8am and 6pm daily for six days from Saturday to Thursday. Completed copies of the questionnaire for each day were checked for any error or ambiguous responses. All the 253 copies of the questionnaire administered were returned for analysis. Descriptive statistics (frequency and simple percentages) and inferential statistics (Pearson Product Moment Correlation Analysis) were used to present data obtained from the field work. This was done with the help of the Statistical Package for Social Sciences (SPSS). Ethical issues were given due consideration, with regard to the purpose of the study, contents of the research instrument, acceptance of respondents' right to privacy, and confidentiality of the data; and the informed consent and willingness of the respondents to answer question was obtained.

RESULTS AND DISCUSSIONS

Socio-economic Characteristics of the Informal Waste Collectors

Findings on the socio-economic status of the sampled informal waste collectors revealed that 192 (75.9%) were male, while 61 (24.1%) were females. About 8.3% of the IWCs were teenagers (17-19 years old), 19% and 7.1% were in the 30-39 years and 40-49 years' age categories, respectively, while 5.0% were above 60 years of age. About 27.9% of the IWCs had primary education; 35.8% had secondary education; those with tertiary education (NCE and ND) accounted for 2.0%, those with Quranic education were 6.3%; and only 7.1% had no formal education. Analysis of marital status of the IWCs revealed that 58.1% were married; those not married accounted for 38.7%; while the widows, divorced and separated from spouse accounted for 2.0%, 0.8% and 0.4%, respectively.

Mode of Operation of the Informal Waste Collectors

The study established that informal waste collectors (IWCs) in Ibadan largely restricted their operation to high-density residential neighbourhoods (90.9%) and a few medium-density neighbourhoods (9.1%) where demand for their services was very high (Table 1). This is probably due to the less attention given to those neighbourhoods by the Oyo State Waste Management Authority (OYSWMA) and the registered private refuse contractors in their waste evacuation efforts (Ola, 2017). About 70.4% of the waste collectors operated daily, 17.3% worked only during the weekend, while 7.1% and 5.2% worked daily except Friday and Sunday, respectively (Table 1). Waste collection fees depended on the volume and type of waste to be collected. The fees ranged from ₦30 for a sack of waste (a fully-loaded medium-size sack cost between ₦30 and ₦40) to ₦2000 (for the waste that could not be measured through sack, such as scrap metals/aluminum). While the service fees were collected at the point of collecting the waste, 25.3% of the IWCs collected waste on credit for some of their clients and received the fees on an agreed date as a way of ensuring consistent patronage by the clients (Table 1). In case of payment default, the IWCs often appealed to the defaulting clients, but if the appeals failed, they usually stopped providing services to such clients. On average, an informal waste collector evacuated about 8000kg of wastes monthly. The collected wastes were disposed of in the public stationary waste containers (71.1%), and illegal dumpsites (28.9%), which included rivers and streams (13.8%), nearby bush (8%), any available open space (5.9%) that characterized the high-density residential neighbourhoods in the city (Table 1).

Table 1: Mode of Operation of the Informal Waste Collectors

Mode of Operation	Frequency	Percentage
Neighbourhoods of Operation		
High density	230	90.9
Medium density	23	9.1
Total	253	100.0
Period of Operation		
Daily	178	70.4
Weekend	44	17.3
Daily, except Friday	18	7.1
Daily, except Sunday	13	5.2
Total	253	100.0
Mode of Payment for Collection Fees		
At the point of collection	189	74.7
Payment on an agreed date	64	25.3
Total	253	100.0
Mode of Waste Disposal		
Public waste container	180	71.1
Streams	35	13.8
Illegal dumpsites	38	15.1
Total	253	100.0

Source: Authors' Field Survey, 2016

Challenges of Informal Waste Collectors

This section focuses on the challenges of informal waste collection practice in Ibadan. The specific challenges addressed in this section are health, social, economic and security challenges.

Health Challenges

Injuries and cuts appeared to be the major health challenge, as indicated by 39.1% of the respondents. This confirms Sridhar's (2009) observation that waste handlers in Ibadan were unduly exposed to sharps-inflicted injuries and also Domingo's (2001) assertion of high risk of injury to IWCs by the presence of sharp objects in the waste that they handled. Common ailments for which the informal waste collectors visited health care centres, as presented in Table 2, were cough and catarrh (12.6%), pneumonia (7.5%), dysentery (6.3%), cholera (3.1%), diarrhea (2.8%), tetanus (2%), worm infestation (2%), and malaria (1.6%). A total of 23% of the waste collectors, however, claimed that they had never been afflicted by any

disease. The findings above agree with the findings from Domingos (2001), Bjerkli (2005) and Mueller (2005). The authors note that there are considerable physical dangers and health risks associated with the informal waste collection business.

Table 2: Health Challenges Suffered by the Informal Waste Collectors

Health Challenges	Frequency	Percentage
Injuries and cut	99	39.1
Cough and catarrh	32	12.6
Pneumonia	19	7.5
Dysentery	16	6.3
Diarrhea	7	2.6
Tetanus	5	2.0
Worm infestation	5	2.0
Malaria	4	1.6
Cholera	8	3.1
No ailment	58	23.0
Total	253	100.0

Source: Authors' Field Survey, 2016

Over a half (54.9%) of the IWCs did not use any personal protective equipment, such as boots, gloves, masks, eye glasses and helmets, while 45.1% used personal protective equipment (Table 3). Furthermore, 59.3% of them did not use disinfectants, soap, detergents or ash to wash hands, while 40.7% used disinfectants, soap, detergents or ash to wash hands (Table 3). Of those IWCs who used disinfectants or soap, 78.2% did so after the day's work, 12.9% did so after every disposal, 8.9% did so when about to take their meals (Table 3).

Table 3: Occupational Safety Measures Adopted by the Informal Waste Collectors

Measures	Frequency	Percentage
Use of protective equipment	139	45.1
Non-usage of protective equipment	114	54.9
Total	253	100.0
Use of disinfectants/soap	152	59.3
Non-usage of disinfectants/soap	101	40.7
Total	253	100.0
Time of use of disinfectants/soap		
After the day's work	79	78.2
After every disposal	13	12.9
When to take meals	9	8.9
Total	101	100.0

Source: Authors' Field Survey, 2016

Duration of Sickness of the Informal Waste Collectors

The average duration of the sampled waste collectors' sicknesses ranged from one day to six months, but the modal period was two days (36.4%). This was followed by three days (16.6%), one day (11.8%) and one week (7.9%). A total of 1.2% of the respondents stated that their afflictions normally lasted about six months (Table 4).

Table 4: Duration of Sickness of the Informal Waste Collectors

Duration of Sickness	Frequency	Percentage
One Day	30	11.8
Two Days	100	39.5
Three Days	42	16.6
One Week	20	7.9
Six Month	3	1.2
No Ailment	58	23.0
Total	253	100.0

Source: Authors' field survey, 2016

Social Challenges

Analysis of data from the field survey revealed that 46.8% of the sampled waste collectors had experienced and still experiencing social stigma as one of their major occupational challenges. This might be due to people's aversion to the work, which is erroneously regarded as a "dirty job", especially in Yoruba land, which is the study area. Some 53.2% of the IWCs did not suffer any stigma (Table 5). This finding on the non-stigmatized IWCs showed that a part of the society recognized and accepted the waste collection service rendered by the IWCs. This is a slight departure from the situations reported by Riverine Development Associates (2006) and SWAPP (2006) on IWCs in Lusaka (Zambia) and Quezon City (Philippines), respectively. Further analysis revealed that, despite the stigmatization, discrimination and harassment challenges, the majority (61.7%) of the IWCs were still not willing to quit the business, while only 38.3% were willing to quit the business owing to the stigma experienced but "provided that they secured a better alternative" (Table 5). This corroborates Major and O'Brien's (2005) assertion that many people with stigmatized attributes have high self-esteem, are happy and appear to be quite resilient to their negative experiences.

Table 5: Social Challenges of the Informal Waste Collection

Social Challenges	Frequency	Percentage
Experienced social stigma	135	46.8
Not experienced social stigma	118	53.2
Total	253	100.0
Response to Stigma		
Not willing to quit the work	156	61.7
Willing to quit the work	97	38.3
Total	253	100.0

Source: Authors' field survey, 2016

Economic Challenges

The economic challenges relate to capital inadequacy to effectively establish the business, low income from the business and payment default by clients. Some 42.3% of the sampled waste collectors claimed not to have adequate fund to purchase operational tools (Table 6). They rented most of the tools they used, which consequently reduced the income accruable to them from the business. This explains why 40.4% of the IWCs indicated low returns from the waste collection business as their second major economic challenge, while 17.3% indicated the refusal of some clients to pay

appropriate collection fees as their third economic challenge (Table 6). The findings on capital inadequacy and low income from informal waste collection business confirm the assertion of Spies (2010) that the business is a survivalist undertaking, with meagre income accruable to the IWCs. The finding on payment defaults by clients of the IWCs in Ibadan, which consequently reduced their income, is similar to what Zelalem (2006) reported in his study of informal waste collection in Addis Ababa.

Table 6: Economic Challenges of the Informal Waste Collection

Economic Challenges	Frequency	Percentage
Inadequate fund	107	42.3
Low returns from waste collection	102	40.4
Refusal of clients to pay appropriate fees	44	17.3
Total		100.0

Source: Authors' field survey, 2016

To empirically determine the influence of low returns from waste collection business on the inability of IWCs to purchase operational tools, the following hypothesis was tested:

- H₀: There was an inverse relationship between revenue from waste collection business and expenditure on the purchase of operational tools used by IWCs.
- H₁: There was a positive relationship between revenue from waste collection business and expenditure on the purchase of operational tools used by IWCs.

Pearson Product Moment Correlation Analysis was applied. Revenue from waste collection business was correlated to purchase of operational tools. The result is presented in Table 7. The correlation between the variables, "revenue from waste collection business" and "expenditure on the purchase of operational tools", was 0.36 (see Table 7). This correlation showed that there was a positive relationship between low revenue from waste collection business and low investment on operational tools. What this implies is that there is positive correlation between the two variables and the probability of this correlation coefficient occurring by chance is more than 0.05 (5 per cent). This correlation was, therefore, significant. The correlation analysis indicated that the P-value of 0.565 > 0.05. This meant the rejection of the null hypothesis (H₀) and acceptance of the alternative hypothesis, that there was a positive relationship between revenue from waste collection business and expenditure on the purchase of operational tools used by the IWCs. In other words, low revenue obtained from waste

collection has significant impact on the amount of money expended on operational tools. Thus, the inability of the IWCs to generate adequate funds from their business explains their inability to own operational tools and consequently resort to renting of the tools.

Table 7: Pearson Product Moment Correlation Analysis (Low Returns vs Purchase of Tools

		Low returns	Purchase of tools
Low returns	Pearson Correlation	1	.036
	Sig. (2-tailed)		.565
	N	102	253
Purchase of tools	Pearson Correlation	.036	1
	Sig. (2-tailed)	.565	
	N	253	102

Source: Authors' Analysis, 2016

Note: The ordinal variables were transformed before analysis.

Security Challenges

Security challenges are categorized into two: insecurity from touts and extortionists; and insecurity through government harassment. The waste collectors' ability to freely earn adequate income from the business was constrained by miscreants and some retired IWCs who claimed to be "landlords" and forcefully collected varying sums of money referred to as "*isakole*" (royalty, settlement) at the disposal sites from 52.8% of the waste collectors before they were allowed to dispose of their wastes (Table 8). For instance, at the community dumpsites at Oke-Oluokun, Oniyere and Labo, as well as the government waste containers at Oke-Itunu and Agbokojo, waste collectors were forced to pay at least ₦20 per day to the miscreants, apart from the normal community levies of ₦30 per day at Labo and ₦20 per day at Oniyere.

Another security challenge was the incessant harassment of the IWCs owing to the non-recognition of their activities by the officials of Oyo State Waste Management Authority (OYSWMA) and the Local Government

Environmental Health Services Departments (LGEHSDs), as claimed by 47.4% of the sampled waste collectors (Table 8). Harassment of IWCs by local authorities, including the police and waste management officials, was also reported in a number of cities, like Cairo, Egypt (Aziz, 2004); Durban, South Africa (McLean, 2000; Mueller, 2005); Metsimaholo, South Africa (Hallowes and Munnik, 2008; Samson, 2008a; 2008b), Msunduzi, South Africa (Hallowes and Munnik, 2008; Samson, 2008a).

Table 8: Security Challenges of the Informal Waste Collection

Security Challenges	Frequency	Percentage
Harassment and extortion by miscreants	133	52.8
Harassment by government officials	120	47.4
Total	253	100.0

Source: Authors' field survey, 2016.

Benefits of Informal Waste Collection

The benefits of informal waste collection can be discussed from two perspectives: the benefits derivable by the IWCs and those derivable by the society. From the perspective of the informal waste collectors, the sector provided job opportunities to them, as claimed by all (100%) the sampled waste collectors (Table 9). Also, the informal waste collection business provided income to the waste operators as indicated by all (100%) the IWCs (Table 9). Informal waste collectors' participation in waste management scheme translated to reduction in the volume of uncollected waste in Ibadan. A total of 95.2% of the IWCs claimed that they collected waste mainly from households, 2.6% stated that, in addition to household's waste, they were equally engaged by community development associations to evacuate waste from illegal neighbourhood dumpsites, while 2.2% of the IWCs indicated that they collected institutional waste (such as schools, hospitals) and waste from places of worship (Table 9).

Table 9: Benefits of the Informal Waste Collection

Benefits	Frequency	Percentage
Employment opportunity	253	100.0
Income	253	100.0
Reduction in the volume of uncollected household waste	241	95.2
Reduction in the volume of waste at illegal dumpsites	7	2.6
Reduction in the volume of uncollected institutional waste	5	2.2

Source: Authors' field survey, 2016

Conclusion and Recommendations

This study established that informal waste collectors provided waste collection services to residential households, community development associations, schools and health care facilities in Ibadan. It also identified a number of health, social, economic and security challenges facing informal waste collection in the study area. Investigation of the health challenges revealed that injuries and cuts, cough and catarrh, pneumonia, dysentery, diarrhoea, tetanus, worm infestations and malaria were prevalent among the informal waste collectors. Injuries and cuts, which were the most reported cases, could be attributed to the non-usage of protective wears, such as boots, gloves, nose covering, eye glasses, helmets as well as disinfectants by most (54.9%) of the informal waste collectors. Social stigma was a social challenge of informal waste collectors in Ibadan. Social stigma is a major issue in waste management because of the people's aversion for the work which is erroneously regarded as a "dirty job". Goffman (1963), in his theory of social stigma, discussed earlier, posits that stigma causes an individual to be mentally classified by others in an undesirable, rejected stereotype rather than in an accepted, normal one. The pattern of behaviour of the people of Ibadan towards the IWCs was in tandem with Goffman's postulation. The decision of the majority (61.7%) of the IWCs to continue with the waste collection business despite the stigma equally satisfies the expected pattern of reaction by the stigmatized to stigmatization. According to Goffman (1963), individuals actively cope with stigma in ways that vary across stigmatized groups, across individuals within stigmatized groups, and within individuals across time and situations.

IWCs experienced inadequate capital to acquire own operational tools and resorted to renting, and spent the bulk of their income on food, clothing and shelter, with little or no savings to meet operational needs. The

IWCs were also faced with security challenges in terms of illegal charges or extortion and harassment. Capitalizing on the hostile attitude of OYSWMA and LGEHSDs toward the informal waste collectors, touts and miscreants regularly extorted IWCs by harassing, cowing and forcing them to pay “security fees” or be prevented from disposing of their waste. This practice was particularly rampant at some locations of public stationary containers and open spaces, and caused reduction in the income accruable from informal waste collection.

Based on the findings of this study, the paper concluded that, although the IWCs experienced challenges in their operations, they were wanted and sought after in Ibadan to address inadequate waste collection and disposal services and were equally motivated to remain in the business by service demand, job prospects and income earnings.

Since waste management is considered as the sole responsibility of the government and given the fact that government has not been able to effectively discharge this responsibility, there is the need for the Oyo State Government to consider the informal waste collectors as partners in waste management in Ibadan by providing an enabling environment for them to operate. This can be done by according the IWCs official recognition and integrating them into the existing waste management scheme. The integration will afford the IWCs wider areas of operation translating into more clients and higher income. With a higher income, the IWCs will be able to acquire additional equipment. Organizing awareness programmes for them on hygienic practices in waste management is imperative to reducing their health burden and making them more productive and efficient.

The Oyo State Government, through the Ministry of Commerce and Cooperatives, should also encourage the informal waste collectors to form a functional association which will serve as a platform for communicating government policies on environmental sanitation to the collectors and monitoring their activities to prevent any of the IWCs degrading the environment through indiscriminate waste dumping. Doing this will create a more effective, enduring and sustainable solid waste management systems in Ibadan; promote mutual working relationships between IWCs and government; and create mutual benefits to government and society; rather than criminalizing and or stigmatizing the IWCs operations.

Implementing these measures requires that government generate data on the activities performed by informal waste collectors and recyclers as done in Brazil, where 229,000 persons were found to be involved in informal waste collection and capitalization activities in 2008 (Dias, 2011). The

association of IWCs could be used as a platform to secure loans for the acquisition of vital equipment towards efficient operations. The city's security apparatus should be strengthened and engaged to curb the activities of touts and miscreants who routinely extort money from the informal waste collectors while undertaking their legitimate business in the city. There is the need for the IWCs to ensure that they correct the impression of government on their activities by avoiding improper disposal of waste. The citizens should also see informal waste collection as a big business capable of launching the IWCs into the middle class and possibly high class if adequately explored. Therefore, the view of waste collection as a dirty job and the stigma attached to it should be reconsidered.

REFERENCES

- Adama, O. (2011). The politics of informality: An insight into the informal solid waste recycling sector in Kaduna, Nigeria. In: *Papers presented at the 4th European Conference on African Studies "On Whose Terms?"* Uppsala, Sweden: The Nordic African Institute. Pp. 15–18.
- Adebola O.O. (2006). The role of informal private sector in integrated solid waste management in Lagos, Nigeria. *Paper presented at the 21st International Conference on Solid Waste Technology and Management*. Philadelphia, P. A., USA. March 26th-29.
- Adeyemi, A.S., Olorunfemi, J.F. and Adewoye, T.O. (2001). Waste scavenging in third world cities: A case study in Ilorin, Nigeria. *The Environmentalist*, 21: 93-96.
- Afon, A. O. (2007). Informal sector initiative in the primary sub-system of solid waste management in Lagos, Nigeria. *Habitat International*, 31(2): 193-204.
- Afon, A. O. (2012). A survey of operational characteristics, socio-economic and health effects of scavenging activities in Lagos, Nigeria. *Waste Management & Research*; 30(7), 664-671.
- Akinwale, A. (2005). Waste management in Nigeria local governments. *Paper presented at the International Conference on Energy, Environment and Disasters*. Charlotte N.C., USA, 24th – 30th July.
- Ayorinde, D., Sridhar, M.K.C., Wahab, B., Asamu, S. and Tairu, T. (2010). Waste characterization in Ibadan. A report prepared for Oyo State Ministry of Environment and Water Resources/In Went.
- Aziz, H. (2004) Improving the livelihood of child waste pickers: Experiences with the 'Zabbaleen' in Cairo, Egypt. Evaluative field study for WASTE, Gouda, The Netherlands.
- Bjerkli, C. L. (2005). The cycle of plastic waste: An analysis of the informal plastic recovery system in Addis Ababa, Ethiopia. MSc. Thesis. Department of Geography, Norwegian Institute of Science and Technology.

- Burcea, S. G. (2015). The economic, social and environmental implications of informal waste collection and recycling. *Theoretical and Empirical Researches in Urban Management*, 10.3: 14-24.
- Chakrabarty, D. (1992). Of garbage, modernity and the citizen's gaze. *Economic and Political Weekly*. 27(10-11): 7-14.
- Charmes, J. (2002) The contribution of informal sector to GDP in developing countries: assessment, estimates, methods, orientations for the future. *Paper presented at the fourth meeting of the expert group on informal sector statistics*, Geneva, 28-30 August.
- Ciocoiu, C.N. and Târțiu, V.E. (2012). The role of informal sector within WEEE management systems: A Romanian perspective, *Theoretical and Empirical Researches in Urban Management* 7(1): 27-38.
- Cointreau, S. (2006). Occupational and environmental health issues of solid waste management with special emphasis on middle- and lower-income countries. Washington, D.C.: The World Bank Group.
- Coleman, T.M. and Rajabu, N. (2010). The informal system of solid waste removal in Dar-es Salaam: an enquiry. Mimeo. Tanzania: Wits Centre for Urban and Built Environment Studies.
- Dias, S.M. (2011). Statistics on waste pickers in Brazil. WIEGO Statistical Brief No. 2, May 2011, available from: http://wiego.org/sites/wiego.org/files/publications/files/Dias_WIEGO_SB2.pdf, March 2016.
- Dilata, X. (2008). The conditions of employment of waste collectors: A case study of waste paper collectors in Dobsonville, Soweto. Mimeo: Industrial Sociology, University of the Witwatersrand, Johannesburg.
- Domingos, L. J. (2001). Informal recycling and resource recovery at a municipal open dumpsite – a case study of Hulene dumpsite. Thesis for Master's degree in Environment and Development, University of Natal, Pietermaritzburg.
- Dumont, L. (1980). "Homo hierarchicus: the caste system and its implications". Chicago and London: Chicago University Press.
- EU (2004). Statistical analysis of socio-economic costs of accidents at work in the European

- Union. Final report, July 2004. Available at:
<http://epp.eurostat.cec.eu.int>. Accessed on September 22, 2016.
- Ezeah, C., Fazakerley, J.A. and Roberts, C.L. (2013). Emerging trends in informal sector recycling in developing and transition countries. *Waste Management* 33: 2509-2519.
- Fatokun, J. (2011). "Ibadanland: facts and figures". Ibadan: Positive Press.
- Fredericks, R. (2012). Devaluing the dirty work: Gendered trash work in participatory Dakar. In *Economies of recycling: Global transformations of materials, values and social relations*. C. Alexander, J. Reno (Eds.), pp. 119-142. London: Zed Books.
- Furniss, J. (2010). Private sector reform of Egyptian solid waste management. In *Participation for what: Social change or social control?* G.M. Gomez, A.A. Corradi, P. Goulart, R. Namara (Eds.), pp. 52-75. The Hague: ISS and Hivos.
- Gerold, A. (2009) Integrating the informal sector in solid waste management systems: Basic aspects and experiences. Retrieved from:
<http://www2.gtz.de/dokumente/bib-2009/gtz2009-0909en-solid-waste-informal-sector.pdf>. March 2016.
- Goffman, Erving (1963). *"Stigma: Notes on the Management of Spoiled Identity"*. London: Prentice Hall.
- Government of Vietnam, Ministry of Labour, Invalids and Social Affairs (2006). *Report on occupational accidents in 2006*. Available at:
<http://www.antoanlaodong.gov>. Accessed on September 4, 2017.
- Gunsilius, E. (2011). Role of the informal sector in solid waste management and enabling conditions for its integration: Experiences from GTZ. Report prepared for The German Technical Cooperation Agency (GTZ).
- Gutberlet, J. (2008). Empowering collective recycling initiatives: video documentation and action research with a recycling coop in Brazil. *Resources, Conservation and Recycling*, 52: 659-670.

- Hämäläinen, P., Takala, J. and Saarela, K. L. (2006). Global estimates of occupational accidents. *Safety Science*. 44: 137-156.
- Hammed, T. B., Sridhar, M. K.C. and Wahab, B. (2016). Enhancing solid waste collection and transportation for sustainable development in the Ibadan Metropolis, Nigeria. *European Journal of Research in Social Sciences*. 4(7): 23-32.
- Hallowes, D. and Munnik, V. (2008). Wasting the nation: Making trash of places and people. Mimeo, University of Natal, Pietermaritzburg.
- Hart, K. (1973). Informal income opportunities and urban employment in Ghana. *Journal of Modern African Studies* 11: 61-89.
- Heatherton, T. F., Kleck, R. E., Hebl, M. R. and Hull, J. G. (2000). *The Social Psychology of Stigma*. London: Guilford Press.
- Hoekstra Inc. (2012). Urban agriculture in Ibadan. Retrieved on 10th October, 2012 from: www.hoekstra.org.
- ICLS (2005) *Local agenda 21 model communities programme*. Toronto: International Council for Local Environmental Initiatives.
- ILO (2002). "Women and men in the informal economy: A statistical picture". Geneva: International Labour Office.
- ILO (1996). "Your health and safety at work: A modular training Package". Geneva: International Labour Office.
- Iskandar, L. (2005) Urban waste managers in Cairo: waste collectors, traders and recyclers. Proceedings of the Tenth International Waste Management and Landfill Symposium, 3-7 October 2005. Sardinia, Italy.
- Joint Learning Initiative (2004). "Human resources for health: Overcoming the crisis". Cambridge: Harvard University Press.
- Kapoor, R. (2005). The impact of globalization on the informal economy. Mimeo, Geneva, ILO.
- Katusiimeh, M.W., Burger, K. and Mol, A.P.J. (2013). Informal waste collection and its coexistence with the formal waste sector: The case of Kampala, Uganda. *Habitat International* 38: 1-9.

- LAWMA (2012). Waste management in Lagos State. Available at: www.lawma.gov.ng/insidelawma. Retrieved on 06 November, 2013.
- Magaji, J. and Dakyes, S. P. (2011). An assessment of socio- economic impact of waste scavenging as a means of poverty alleviation in Gwagwalada, Abuja. *Confluence Journal of Environmental Studies*, 6(1): 42-56.
- Major, B. and O'Brien, L. T. (2005). The social psychology of stigma. *Annual Review of Psychology*, 56 (1): 393-421.
- Marjit, S. and Maiti, D. (2005). Globalisation, reform and the informal sector: Expert group on development issues. Helsinki: United Nations University.
- McLean, M. (2000). Informal collection: a matter of survival amongst the urban vulnerable. *Journal for Development Administration and Politics*, 30(2): 8-26.
- Meagher, K. (2011). Informal economies and urban governance in Nigeria: Popular empowerment or political exclusion? *African Studies Review*, 54(2): 47-72.
- Medina, M. (1997). "Collection of solid wastes in developing countries: Issues and constraints". Tokyo: United Nations University Institutes of Advanced Studies Working Paper No.24
- Medina, M. (2001). Globalization, development and municipal solid waste management in third world cities. Mimeo. Tijnana, Mexico: El colegio de la frontera Norte.
- Medina, M. (2005). Waste picker cooperatives in developing countries. Paper prepared for WIEGO/Cornell/SEWA Conference on Membership-Based Organizations of the Poor, Ahmedabad, India, January 2005.
- Medina, M. (2007). "The world's scavengers: Salvaging for sustainable consumption and production. Lanham: AltaMira Press.
- Meyer, G. (2008). Waste recycling as a livelihood in the informal sector: the example of refuse collectors in Tripoli. *Applied Geography and Development*, 39(2): 78-94.

- Monirozzaman, S., Bari, Q. și Fukuhara, T. (2011). Recycling practices of solid waste in Khulna City, Bangladesh. *Journal of Solid Waste Technology and Management*, 37: 1-15
- Mudasiru, M. (2014). Space, population and waste management in Ibadan. *Journal of Pan African Studies*, 7(4): 23-36.
- Mueller, A. W. (2005). A value chain analysis of cardboard collection in inner city Durban, South Africa. Durban: Mimeo, School of Development Studies, University of KwaZulu-Natal.
- Muhammad, M. N. and Manu, H. I. (2013). Gender roles in informal solid waste management in cities of northern Nigeria: A case study of Kaduna metropolis. *Academic Research International*, 4(5):142-153.
- Mukhtar, M. (2008). Analysis of plastic waste recycling in Kano, Nigeria. Unpublished Ph.D. Thesis, submitted to the Dept. of Economics, Bayero University, Kano, Nigeria.
- Nagle, R. (2013) "Picking up: On the street and behind the trucks with the sanitation workers of New York City". New York: Farra, Straus and Giroux.
- National Population Commission (NPC) (2007). "Population and housing census of the Federal Republic of Nigeria". Abuja: National Population Commission
- Nzeadibe, T.C, and Iwuoha, H. C. (2008). Informal waste recycling in Lagos, Nigeria. *Communications in Waste and Resource Management*, 9(1): 24-31.
- Nzeadibe, T. C. (2009). Solid waste reforms and informal recycling in Enugu urban area, Nigeria. *Habitat International*, 33(1), 93-99.
- Nzeadibe, T.C. and Chukwuedozie, K.A. (2011). Development impact of advocacy initiatives in solid waste management in Nigeria. *Environment, Development and Sustainability* 13(1): 163-177.
- OECD (2002). "Measuring the non-observed economy: A handbook". Paris: OECD

- Ogu V.I. (2000). Private sector participation and municipal waste management in Benin City, Nigeria. *Environment and Urbanization* 12(2): 103-117.
- Ola, A. B. (2016). Informal waste collectors in municipal solid waste management in Ibadan, Nigeria. Unpublished Ph.D. thesis in the Department of Urban and Regional Planning, University of Ibadan, Ibadan, Nigeria.
- Ola, A. B. (2016). Patronage pattern of informal waste collectors' in Ibadan, Nigeria. *Ibadan Planning Journal*, 5(1): 47-63.
- OYSWMA (2013). *Waste management in Oyo State*. Ibadan: Oyo State Solid Waste Management Authority.
- Portes, A., Castells, M. and Benton, L. (1989). World underneath: The origins, dynamics and effects of the informal economy. *The Informal Economy: Studies in Advanced and Less Developed Countries*. Portes, A., Castells, M. and Benton, L. Eds. Baltimore: Johns Hopkins University Press.
- Reno, J. (2015). Waste and waste management. *Annual Review of Anthropology*, 44: 557-572.
- Riverine Development Associates (2006). Economic aspects of informal sector activities in solid waste management–Lusaka Zambia City Report. Report prepared for The German Technical Cooperation Agency (GTZ) and The Collaborative Working Group on Solid Waste Management in Low and Middle Income Countries.
- Rogerson, Christian M. (2001). The waste sector and informal entrepreneurship in developing world cities. *Urban Forum*, 12(2): 247-259.
- Samson, M. (2008a). Reclaiming livelihoods: The role of reclaimers in municipal waste management systems. Mimeo. University of Natal, Pietermaritzburg.
- Samson, M. (2008b). Wasted citizenship? Reclaimers and the privatized expansion of the public sphere. *Revised version of the Paper read at CODESRIA 12th Assembly, December 7-11, 2008, at Yaoundé, Cameroon.*

- Samson, M. (2010). Reclaiming reusable and recyclable materials in Africa: A critical review of English language literature. WIEGO Research Report No. 6.
- Schneider, F. (2002). Size and measurement of the informal economy in 110 countries around the world. Canberra: Australia National University.
- Sembiring, E. and Nitivattananon, V. (2010). Sustainable solid waste management towards an inclusive society: Integration of the informal sector. *Resource, Conservation and Recycling*, 54: 802-809.
- Sethuraman, S. V. (1997). Urban poverty and the informal sector: A critical assessment of current strategies. Available at www.ilo.org/public/english/employment.
- Levin, S. and Laar, C.V. (Eds.) (2004). Stigma and group inequality: Social psychological perspectives". Claremont Symposium in Applied Psychology. Mahwah and London: Lawrence Erlbaum Associates.
- Sindzingre, A. (2006). The relevance of the concepts of formality and informality. Oxford: Oxford University Press.
- Smith, R. (2012) Segmenting an audience into the own, the wise, and normals: a latent class analysis of stigma-related categories. *Communication Research Reports*, 29(4): 257-265.
- Solid Waste Management Association of the Philippines (SWAPP) (2006). Economic aspects of informal sector activities in solid waste management - City Report for Quezon, Philippines. Report prepared for The German Technical Cooperation Agency (GTZ) and The Collaborative Working Group on Solid Waste Management in Low and Middle Income Countries.
- Spies, S. (2010). Health risks related to solid waste management. *Solid Waste Management in World's Cities*. London: Earthscan for UN Habitat.
- Sridhar, M. K. C. and Ojedian, O. (1983). The problems and prospects of refuse disposal in Ibadan city, Nigeria. *Journal of Environmental Health*, 46:28-36.
- Sridhar, Mynepalli, K.C. (2005). Private sector participation in water

and waste management services: A Nigerian perspective. *Journal of Environmental Health*, 2:75-85.

Sridhar, M.K.C, and Coker, A.O. (2009). Treatment and disposal of healthcare wastes management. In: *Healthcare Wastes Management- A Handbook for Developing Countries*. Sridhar, M.K.C., Wahab, W.B., Agbola, S.B. and Badiane, A. (Eds.). Pp. 91-117. Ibadan: Ibadan University Press.

Stillwell, F. (1985) Counting the invisible workforce: The case of home-based workers. *World Development*, 14(3): 603-610.

Swedish Agency for Health Technology Assessment (2017). Occupational health and safety– Chemical exposure. Available at: www.sbu.se. Accessed on 20 June, 2017.

Tanzi, V. (1999). Uses and abuses of estimates of the underground economy. *Economic Journal*, 109(4): 338-347.

TransWaste (2012). “Social effects of informal collection and formalisation strategies”. 8th period of the TransWaste Project funded by Central Europe Programme. Available at: <http://www.transwaste.eu>. Accessed on 04 March, 2015.

Ukoje, J. E. (2012). Informal sector solid waste collection and recycling in Zaria, Nigeria. *Journal of Environmental Science and Engineering*, B 1: 649-655.

UN (2007). “Globally harmonized system for the classification and labeling of chemicals”. United Nations: New York and Geneva.

UN (2001). Declaration of commitment on HIV/AIDS, United Nations General Assembly Resolution, A/RES/S-62/2, June.

Unni, J. (2008). Informal sector and informal employment: The Indian Workshop, 20 – 23 May.

US Centre for Disease Control (2014a). Insects and scorpions– Workplace safety and health. Available at: www.cdc.gov. Accessed on 20 June, 2017.

US Centre for Disease Control (2014b). Venomous snakes, venomous spiders and poisonous plants–Workplace safety and health. Available at: www.cdc.gov. Accessed on 20 June, 2017.

- US Centre for Disease Control (2014c). Veterinary health care and poultry industry workers–workplace safety and health. Available at: www.cdc.gov. Accessed on June 20, 2017.
- US National Institute for Occupational Safety and Health (NIOSH) (2014). “Seasonal influenza (Flu) in the workplace– Guidance”. Available at: www.cdc.gov. Accessed on 20 June, 2017.
- US Occupational Safety and Health Administration (OSHA) (2012). Solutions to control hazards. Available at: www.osha.gov/SLTC/ergonomics/controlhazards. Accessed on 20 June, 2017.
- Wahab, Bolanle (2004). African traditional religions and environmental health and sanitation in rural communities. *The Environscope* 1(1): 1-9.
- Wahab, B. and Ola, A. B. (2016). The activities of informal waste collectors in municipal solid waste management in Ibadan, Nigeria. *Journal of Environmental Design and Management*. 8 (1 &2): 80-91.
- Wilson, D., Velis, C. Şi, and Cheeseman, C. (2006). Role of informal sector recycling in waste management in developing countries. *Habitat International*. 30: 797-808.
- World Bank (2010) Informal sector. Available at: www.worldbank.org/eca Retrieved 26 May, 2010.
- World Health Organization (2009) *Global health risks: Mortality and burden of disease attributable to selected major risks*. Geneva: WHO special report.
- Zelalem, F. C. (2006). Controlling the informal sector: solid waste collection and the Addis- Ababa city administration, 2003-2005. M.Phil. Thesis, Department of Geography, Faculty of Social Sciences and Technological Management, Norwegian University of Science and Technology Trondheim, Norway.