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ASSESSMENT OF HOME-BASED ENTERPRISES SOLID WASTE MANAGEMENT: IMPLICATIONS FOR HEALTH HAZARDS IN CROSS RIVER STATE, NIGERIA

INAH, SYLVESTER ABAM
HND, PGDURP, M.Sc.; M.Sc., PhD
DEPARTMENT OF URBAN AND REGIONAL PLANNING
UNIVERSITY OF CROSS RIVER STATE,
CALABAR - NIGERIA
Phone No.: 07033067864
E-MAIL: sylesterinah@unicross.edu.ng

ABSTRACT

Cross River State, with an agrarian economy and rising urbanization, has manifested indices of unemployment, resulting in the proliferation of informal economic activities in its residential houses. The operation of these micro-economic activities, most often referred to as home-based enterprises (HBEs), is characterised by people with low income, low skills and socially marginalised and having impact on poorly managed waste and health hazards. This study examines the environmental problems associated with the operations of HBEs in urban areas of Cross River State. The study used primary sources of data collection with semi-structured questionnaires containing open-ended and closed-ended questions. The sample frame was 1487 households identified with various HBEs. Thus, 30% of households was selected through purposive sampling technique. Data generated from the field survey was analyzed with Descriptive and Inferential Statistics. Results showed that variations in frequency of waste disposal significantly affect environmental conditions of the HBEs in the study area. Results also showed that environmental hazards vary amongst the HBEs due to poor waste disposal habits of the operators of these economic activities. The study concludes by advocating that as HBEs are hubs for alternative employment sources for the urban poor, urban planners should adopt advocacy and inclusive planning approaches to accommodate HBEs in neighborhood schemes that adopt simulated neighborhood layouts designs with HBEs inclusion in its development plan. This innovation will reduce social and economic costs of urban renewal in already developed layouts besides promoting environmental sustainability.

KEYWORDS Home-based enterprises, Health hazards, Waste-management, Informal activities, Livelihood.

1.0 Introduction

Home-Based Enterprises (HBEs) is a fundamental part of the informal economy whose activities are backyard and hardly regarded or recorded in the Gross Domestic Product (GDP) or the national account. They form an essential part of the livelihood system of almost all low-income households (Tipple and Coulson, 2007). They are home-based economic activities that may be irregular underground, residual, non-structured parallel, invisible or subterraneous (Ezeadichie and Ogbazi, 2021). HBEs or house-based work has become a trending subject of discourse because of the widespread phenomenon in urban areas in developing countries, especially in low-income related settlements. Home-based workers engage in economic activities such as small-scale production processes that generates employment, income and varied consumption pattern. The house-based enterprises are sources of livelihood to multidimensional segments of people, the poor, low skills for formal sector jobs, the socially marginalized and those lacking proper social safety nets and unemployment insurance.

In Cross River State, there is an upsurge in the activities of HBEs because it is an easy means of people to sources of livelihood thus attracts large labor force not only peculiar to the urban settlement, but also to the rural areas. Although, the economic activities of HBEs are not easily identified and measured, they are ever dynamic and significantly contributing to the over-all growth of the economy, and household income (Ezeadichie, 2012), besides the emergence of big firms that ultimately dominates the formal industries. However, there are some serious environmental problems confronting HBEs which in (Tripple's, 2005) assessment is seriously related to waste generation and management. In Nigeria and Cross River State in particular, HBEs has resulted in high level of employment with defining characteristics of accommodating large majority of lower-income people and providing means of livelihood. This has led to the increasing establishment of house-based enterprises in most urban areas such as Calabar, Ugep, Ikom, Obudu and Ogoja and accelerated increased solid waste generation noticeable in these urban areas. The aim of this paper is to examine solid waste generation and collection practices in HBEs in urban areas of Cross River State, Nigeria, with a view to suggesting measures towards mitigating environmental health hazards associated with waste emanating from HBEs.

2.0 The Concept of Home-Based Enterprises (HBEs)

UNCHS (1989), ILO (1993) and Bergers and Burinic (1996) have in aggregate, conceptualized the term HBEs since the birth of the informal sector many years ago. Carney (1998) describes HBEs as vital component part of

the livelihood portfolio of many low-income households generating financial asserts through the expenditure of human capital, labour and physical capital, taking advantage of the spatial extent of space. To Prugel and Tinker (1997), HBEs are categorized into four such as industrial homework, craft production, food producers and vendors. The industrial homeworkers by the International Labour Organization (ILO) conventions on homework enterprises are those who work for a firm that produces raw materials and exchange them for finished goods for a piece work rate of payment. Tipple and Coulson (2007) views HBEs as enterprises that operates in and are in the immediate vicinity of the home and such enterprises do not incorporate those that began as homes and later changed into shops which are no longer occupied by their owners; or enterprises for which the house is the headquarters but production activities take place elsewhere. Examples of such enterprises include, street-vending and door-to-door sales. Kellet and Tipple (2000) conceives HBEs from the informality perspectives and argued that two approaches are applicable; the definitional and behavioural approach. Definitional approach refers HBEs as economic activities not recorded in official statistical annual books such as Gross National Product (GDP) and the National Income Accounts. While the behavioural approach captures HBEs from the legal angle and explain it based on whether or not economic activities complies with the established judicial, regulatory and institutional framework (Saavedra and Chong, 1999). This approach does not differentiate between activities that are extra-regulating as in food kiosk without a permit and those that are criminal as in drugs trafficking. Napier and Lieberman (2006) noted HBEs as income generating activities undertaken by residents of housing using home as a base. These activities are predominantly informal in nature and survivalist in scale. Hennon, Loker and Walker (2001) characterized HBEs as work done income in one's home with the worker having no office or consistent workshop elsewhere. The characteristics associated with HBEs include: small in scale with low-operator income, informal labour relations and lack of separation of production from consumption, contributions to poverty alleviation, improve innovation and skills.

The reasons for the increasing growth in HBEs are very obvious. These reasons according to the work of Losby, Kingslow and Else (2003) are the inability to secure formal employment, desire for independence and control, desire for undocumented income, dissatisfaction with formal employment, desire to strengthen neighborhood social support networks and economic conditions, as a preparatory stage to formal employment, being paid in cash without taxation, building of occupational skills, development of entrepreneurial spirit and relaxed employment arrangement.

The environmental effects associated with HBEs as suggested by Frijns and Vanvliet (1999) and Jerie and Tevera (2014) are generation of large quantities of wastes signifying poor material efficiency, specifically in home-based food enterprises where huge quantities of biodegradable materials and vegetable wastes are produced and disposed indiscriminately, informal recycling of waste spreads social safety hazards, environmental pollution and health hazards. More so, hazardous wastes such as burnt oil, solvents, bleach lead, acids, mercury, zinc wax, alkalis cyanide, paints toxic glues, came from tailoring, hairdressing, mechanic workshops, dry cleaning, bricks molding, glass and ceramics, photography, metals/wood work, cereal grinding, polythene bag and sachet water making, paintings, etc. are by-products of HBEs (Werna, 1996)

2.1 Concept of Solid Waste Generation and Management

Gilpin (1996) asserted that it is difficult to give a precise definition of what constitute generated waste due to conceptual and theoretical backgrounds of researchers. Solid waste generation has been defined using terminologies that sometimes originates from their sources. Example of such terms are household solid wastes, domestic solid wastes, municipal solid waste, garbage rubbish, commingled waste, yard trimmings and construction wastes. Mazzanti and Zoboli (2008) defined solid waste generation as unwanted materials arising from entirely human activities which are discarded into the environment. While Davies (2008) posits that waste is an unwanted or unusable

material that emanates from numerous sources from industry and agriculture as well as business and households and can be liquid, solid or gaseous in nature and hazardous or non-hazardous depending on its location and concentration. Drawing from the definitions above, solid waste generation as used here is any substance (such as bottles, cans, clothing, disposables, food packaging, foolscaps/newspapers, plastic bags, furniture, toys, ashes and other waste materials generated in the cause of activities of HBEs) discarded into the environment because it is unwanted, which cause significant nuisance or adverse impact in the environment.

Solid waste generation depends on man as an entity with unpredictable behavioural, as man's moral conduct is predicated upon the socio-economic activities, he indulges in around his environment. These economic activities, often creates an unimaginable impact in the form of massive waste generation which results into environmental deterioration (Inah et al, 2017). The desirable outcome of economic growth that is associated with population increase and urbanization leads to increasing formation of HBEs which negatively impact on the residential areas

through massive waste generation, straining residential infrastructure and environmental pollution concomitant with health hazards.

2.2 Environmental Health Hazards

Environmental health hazards (EHHs) refer to any substance, object, equipment, agent, condition, human behavior or factor that is capable of causing injury, disability, diseases, or death in humans or has the potential for polluting or degrading the environment (Olaniran, 1995). EHHs are closely related to occupational health hazards which may be biological, chemical, physical, biomechanical or psychosocial in nature. These hazards emanate from the norms, belief systems and behaviours associated with poor sanitation and shelter, as well as agricultural and industrial contamination of air, water, food and land. EHHs inferred in this study refers to the enormity of the volume of solid wastes generated from residential-based enterprises which due to attitudinal behaviour of residents are indiscriminately dumped without the waste management agencies or stakeholders regulating the sanitary disposal of such waste, which ultimately triggers serious health impacts on the environment.

2.3 Literature Review

Various studies have been conducted on HBEs or economic activities that takes place in the informal sector which tends to serve as a bailout for many households or families that are structured in the lower rungs of the economic ladder. Lawanson and Olanrewaju (2012) studied the phenomenon of HBEs in low-income areas of Lagos metropolis and highlighted the importance of HBEs as major sources of income generation and socialization in urban areas. The study covers the adoption of case-specific planning models, consideration of cultural context in planning and the adoption of local economic development strategies in urban design and development. Emmanuel, Aluko and Oluwoniyi (2015) in their study of fashion design business in the informal sector of Ikeja, Nigeria, noted that fashion business was dominated by a population of youths below the age of twenty-five years due to lack of formal paid employment. The study suggested the facilitation of access to soft loans by the youths and provision of retail and service clusters for those in the business.

Ghafur (2001) as cited in Emmanuel et al (2015) noted the factors that favour the continual establishment of HBEs to include use of personal house properties like home space, vehicles, and furniture's for the business. Ghafur went further to explain how the home space (house) is hierarchically used to suite home-based income generation activities to include, courtyards, lanes or immediate streets to surrounding houses, broader neighbourhoods and public urban spaces.

Studies conducted by Cohen (2004) and Rukmana (2007) stated that HBEs and urbanization are closely linked together. Cohen argued that HBEs thrives progressively well in urban economic areas due to population concentration. Davies argues that the process urbanization has made urban dwellers to develop coping strategies with the formation of HBEs where women and children form the bulk of increased labour force participating in informal economic production. While Rukmana is of the opinion that the growth of HBEs is nourished by the influx of labour migrants in search of work from rural areas surrounding urban industrial agglomeration, especially in most instances where the formal sector is unable to accommodate the large number of these unskilled workers. Rukmana submits that urban planners rather than seeks to eliminate the presence of HBEs, should accommodate this important component of urban economies.

The growing concern in the development of HBEs have stirred research interest on the subject. Earlier studies were on historical formation, legality of existence, financing and credit acquisition, livelihood survival and space requirements. Nevertheless, attention then gradually shifted to environmental concerns of small-scale enterprises located within homes. Prey (1992), Perera and Amin (1996) and Frijins and Vanvhet (1999) studied HBEs as polluters of the environment based on solid waste generation, but with differing views on the positive side, Prey, Perera and Amin argued that HBEs reduce the quantities of waste generated through recycling, demonstrating that HBEs has very little polluting impact on residential homes. While on the pessimist views, Perera and Amin (1996) posited that informal recycling of waste from HBEs spreads health hazards and environmental pollution and are often cited as reasons for stamping out HBEs.

Tipple (2005) examined the perceptions and realities of pollution and waste production in HBEs in developing countries. The result indicated that most of these enterprises generate greater quantities of materials similar to domestic solid waste, while other few enterprises generate dangerous waste which creates health problems within the vicinity of the environment. The study recommended the encouragement of the use of clean processes in goods production to replace the visual negative views associated with HBEs that are held by policy makers. Vernest and Post (2007) in their study on HBEs, livelihood and space in Paramaribo, Suriname; claimed that HBEs are simultaneously affected by the physical attributes of local spaces as well as the organization of social life within these spaces. They identified three dimensions in HBEs to which space was structured: - asset qualities, multi-level nature and the spatialty of social life. The study concludes by attesting to the significance of accessibility and proximity in understanding how the three structured dimensions are deployed within HBEs.

Studies on solid waste management practices in the informal sector of Gweru, Zimbabwe (Jerie and Tevera, 2014) revealed that large quantities of waste were generated signifying poor material efficiency in home enterprises, specifically in food market areas where huge quantities of biodegradable materials and vegetables waste were generated and disposed of haphazardly. The study concluded that the current solid waste management system is unsustainable and advocated for the provision of more resources for financing and manpower training to enhance environmentally friendly solid waste management system in the informal sector. Ziraba, Haregu and Mberu (2016) conducted a reviewed framework for understanding the potential impact of poor solid waste management on health in developing countries. Their work identifies group of people at the highest risk of exposure and the looming health consequences. Their study demonstrated the potential burden of ill-health associated with solid waste that is hidden but rapidly and gradually coming to reality without human remediation to arrest the trend. While the study established a link between poor solid waste management and address health outcomes, it calls for action by all stakeholders to understand, prioritize and address the issue of solid waste around the environment to ensure preservation of health. Besides, Al–Delaimy, Larsen and Pezzoli (2014) conducted a cross sectional survey on differences in health problems among residents living near illegal waste dumps sites in LOS Laureles, Canyon, Tijuna, Mexico and found that the impact of solid waste on health varies and depend on factors such as nature of the waste, duration of exposure, the population exposed and availability of prevention and mitigation interventions. Ziraba *et al* (2016), further stated that the health impacts associated with exposure to the various type of solid waste was categorized into four VIZ: infection transmission, physical bodily injury, non-communicable disease and emotional / psychological effects. They argued that while certain health impacts might be immediate, obvious to discern and directly linkable to the solid waste exposure, others may occur in longer term and difficult to attribute the effects to a particular type of waste.

The study found that the long-term health impact of solid waste exposure ranges from mild psychological effects to severe morbidity, disability or death

2.4 The Study Area

Cross River became a state in 1987 and later gave birth to Akwa Ibom state. The state is located between latitude $4^0$28- and $6^0$55 north of the equator and longitude 7^0 50 and $9^0$28 east of the green which meridian. The state has an estimated population of 2, 892, 988 people (NPC, 2006) distributed into the 18 local government areas of the state. It has a total land area measuring about 23,074km^2 which are divided into three senatorial districts, north, central and south. The north senatorial districts have 5 local councils, central 6 and South 7 respectively. Like

many other local Government areas in Nigeria, the economic activities in the 18 local councils of the state are largely agrarian but with tourism as an emerging sector. The negligible growth of the manufacturing sector in the State, coupled with the high cost of securing business locations in the formal sector drives the increase in the use of residential houses for business enterprises and having effect on solid waste management practices within the HBEs. The government institutions in charge of waste management were the Cross River State waste management agency and all the local Government council administration.

3.0 Methodology

The study made use of data from primary sources. The primary sources. The primary, data were sourced mainly through direct field survey and investigations. The target population for the study was primarily household who process economic activities in their homes in the 18 urban areas of State. The sample frame consisted of 1487 households identified with various home economic activities out of which 346 (30%) of households were selected for questionnaire survey in the 3 urban areas sampled. A semi-structured questionnaire containing open-ended and close-ended questions was administered to 346 household in the study area to collect information on socio-demographic characteristics issues relating to types of HBEs nature of solid waste generated, quantity and composition, solid waste management practices and environmental health hazard variables. In sampling the target respondents, the purposive sampling technique was employed. This method was used due to the difficulty in obtaining accurate data on the population of the number of residential houses with enterprises. Each household was represented with a member randomly chosen. The 346 household respondents drawn for the study showed Calabar has (n = 159, Ugep, n=97 and Ogoja, n = 90) that participated in the survey. This is shown table 1.

Table1: Sample method for administration of questionnaires

Study Location	Street Name	No. of Households respondent
Calabar	Atimbo road	16
	Mekenge layout	10
	Atekong drive	15
	MCC road	19
	Murtala Mohammed highway (MMH)	25
	Ekorinim	14
	Anantiga	20
	Paliarmentary extension	13
	Egerton	12

	Abasi Obori	15
	Total	**159**
Ugep	Old market road	18
	Ugep - ikom highway	27
	Aba omega road	22
	Old idom road	14
	Usumotong road	16
	Total	**97**
Ogoja	Abocheche road	19
	Igoli road	20
	Mbube road	24
	Okuku	27
	Total	**90**
	Grand total	**346**

Source: Field survey, 2020

The analysis of data obtained from the respondents were carried out with descriptive and inferential statistics.

4.0 Findings and Discussion

4.1 Socio-Demographic Variables

The data tabulated in table 2 showed the gender, age, marital status, level of education and household size characteristics of the respondents. Amongst the three sampled urban areas of Calabar, Ugep and Ogoja, it is observed that females dominated in the survey with 65% (102) in Calabar, 66% (64) in Ugep and 58% (52) in Ogoja. While the males accounted for 35% (57) in Calabar, 34% (33) in Ugep and 42% (38) in Ogoja.

Table 2: Socio-Demographic Variables of Household Respondents in the Study Area

Particulars	Variables	Calabar		Ugep		Ogoja	
		Freq.	%	Freq.	%	Freq.	%
Gender	**Male**	57	35.5	33	33.7	38	41.9
	Female	102	64.5	64	66.3	52	58.1
Age	Less than 25	32	20	10	10.2	17	19.1
	25 – 35	41	26	12	12.3	21	23.4
	35 – 45	19	12	22	22.5	13	14
	45 – 55	28	17.4	29	29.8	15	16.3
	55 and above	39	24.6	24	25.2	24	27.2

	Total	**159**	**100**	**97**	**100**	**90**	**100**
Marital status	Single	30	19	6	6	11	12
	Married	107	67	69	71	60	67
	Divorced	14	8	18	19	14	15
	Widowed	8	6	4	4	5	6
	Total	**159**	**100**	**97**	**100**	**90**	**100**
Level of Education	Primary	34	21.4	23	24.1	23	25.8
	Secondary	78	49	51	52.7	49	54.1
	Tertiary	47	29.6	23	23.2	18	20.1
	Total	**159**	**100**	**97**	**100**	**90**	**100**
Household size	1 – 6	15	9.3	11	10.9	7	8.2
	7 – 12	32	20.4	21	21.2	20	22.6
	13 – 18	31	19.6	22	22.5	24	26.5
	19 and above	81	50.7	43	45.4	39	42.7
	Total	**159**	**100**	**97**	**100**	**90**	**100**

Source: Field survey, 2020

Table 2 also showed that 26% (41) respondents were between 26 to 35years of age in Calabar; in Ugep, those in this age bracket were 12% (12) while in Ogoja only 23% (21) accounted for this respondent. Also, the respondents within the 55 years of age bracket, were in Calabar 25% (39). in Ugep, 25% (24) and in Ogoja, the respondents were 27% (24). Other ages of respondents that were sampled for the study are those less than 25years and were 25 (20%) in Calabar, 10 (10%) Ugep and 17 (19%) in Ogoja. In addition, respondents between 46 to 55 years accounted for 47 (29%) in Calabar, 51(52%) in Ugep and 28 (30%) in Ogoja respectively. Table 2 also reflects the marital status of household respondents. Married households in the population of study in Calabar were higher with 107 (67%), followed by those single with 30 people (19%), divorced 14(8%) and those who lost their wife/husbands forming 6%. Comparatively in Ugep and Ogoja those married were 6 (6%) and 11(12%) and those widowed were 4(4%) and 5(6%) respectively. The analysis indicated that the households that attended both primary and secondary education in Calabar stood at 112(70.4%), in Ugep at 84(76.8%) and in Ogoja at 72 (79.9%). While 47 (29.6%) household respondents had tertiary education in Calabar and 23 (23.2%) in Ugep as against at 18(20.1%) in Ogoja. The data on household size revealed that the highest household size was (19-above) people in Calabar were 81 (50.7%), seconded by (2-12) with 32 (20.4%), then (13-18) people with 31(19.6%) and least (1-6) people stood for 15(9.3%). In Ugep, the household size was in that order starting with (19-above) household size accounting for 43(45.4%), then (13-18) people with 22 (22.5%), (17-12) people with 21 (21.2%) and (1-6) people with 11(10.9%). While in Ogoja, the household size of (19-above) had 39 (42.1%), then (13-18) people had 24 (26.5%) (7-12) people with 20(22.6%) and (1-6) people having 7 (8.2%).

4.2 Distribution of types of HBEs in the Study Area

The field survey reveals that they were a total of 159 HBEs in Calabar, 97 in Ugep and 90 in Ogoja, which were categorized into 26 enterprises that was identified in the sampled urban areas. These HBEs were conspicuous major and can be referenced to home locations. But there are some HBEs whose activities are illegal and so operate in a clandestine manner, such HBEs included illegal sales like banned narcotics, marijuana and brothels. However, as presented in table 3 the 26 classified HBEs within the study area concentrate on economic activities such as small shop daily sales of household necessities to small light scale craft industrial processing.

Table 3: Types of HBE in the survey

S/N	HBE types	Sampled urban areas		
		Calabar	Ugep	Ogoja
1.	Automobile Services	12 (7.5%)	9 (9.3%)	8. (9.0%)
2.	Beauty saloons/barbing shops	8 (5%)	7 (7.2%)	6.(7%)
3.	Block/bricks molding	7(4.4%)	4 (4.4%)	3 (3.2%)
4.	Bread /baking accessories	(2.5%)4	(2.1%)	1 (1.0%)
5.	Cassava grinding mills	(1.9%)3	8(8.2%)	6 (7%)
6	Cereal s grinding mills	(2.5%)4	1(1%)	4 (4.4%)
7.	Craft/artist	6(3.8%)	1(1%)	2 (2.2%)
8.	Dry/laundry cleaning	5(3.8%)	2 (2.1%)	3 (3.2%)
9.	Enamel/glass works	7(4.4%)	2 (2.1%)	4 (4.4%)
10.	Fish/meat sales and processing	5(3.1%)	4 (4.1%)	4 (4.4%)
11.	Iron glaze firing	3(1.9%)	1 (1%)	2 (2.2%)
12.	Leather/upholstery works	8 (5%)	4 (4.1%)	3(3.2%)
13.	Metal works, casting wielding	6 (3.8%)	2 (2.1%)	3 (3.2%)
14.	Painting	4(2.5%)	2 (2.1%)	3(3.2%)
15.	Personal services	6(3.8%)	3(3.1%)	2 (2.2%)
16.	Photograph y	6 (3.8%)	3(3.1%)	2 (2.2%)
17.	Plastic rubber works	4 (2.5%)	2 (2.1%)	1 (1.0%)
18.	Polythene bags making	10(6.3%)	7 (7.2%)	5 (5.6%)
19.	Print/electronic repairs	3(1.9%)	4 (4.1%)	2 (2.2%)
20.	Processing of local drinks	5(3.1%)	2 (2.1%)	4 (4.4%)
21.	Pure water packaging	13(8.2%)	8 (8.2%)	7.(7.8%)
22.	Repair shop	3(1.9%)	3 (3.1%)	2 (2.2%)
23.	Sale of food and drinks	10(6.3%)	7 (7.2%)	6 (7%)
24.	Shoe repairs / making	6(3.8%)	4 (4.1%)	2 (2.2%)

25.	Tailoring/ textile dyeing	7(4.4%)	(5.2%) 5	4 (4.4%)
26.	Wood carving	4(2.5%)	1(1%)	2 (2.2%)
		159 (100)	97 (100)	90(100)

Note: HBEs were not exhaustive in the sampled urban areas, HBEs =Home-Based Enterprises

Figures in Parenthesis are in percentages

Source: Field Work, 2020

From table 3 in order to analyses the spread of the most common HBEs in the samples, the extent of distribution was expressed in percentages. The table reveals that in Calabar, Ugep and Ogoja, the highest percentage frequency distribution of the HBEs ranged from 3-8% in Calabar, 4-9 % in Ugep, and 3-9% in Ogoja. In Calabar the 9 categories of HBEs with dominating spread, listed in descending order include pure water packaging 13(8.2%), automobile services 12(7.5%), polythene bags making and sales of food and drinks, each 10 (6.3%) in numbers. other HBEs were beauty salons and leather upholstery work 8 (5%) each, block/bricks molding 7 (4.4.%), enamels glass works 7(44%), tailoring/ textile dyeing 7 (4.4%), craft/artist, metal works, personal services, photography and shoe repairs /making, each 6 (3.8%), dry laundry/cleaning, fish/meat sales and local drinks processing had 5 (3.1%) each, then bread/baking accessories, cereal grinding mills, painting, plastic/rubber works, wood carving was 4 (2. 5%) each and followed by cassava grinding mills, iron glaze firing, print/electronic repairs and repair shops each with 3 (1.9%), form the last category of HBEs in Calabar.

In Ugep the order in which the frequency with the most spotted HBEs occur was auto mechanic workshops 9 (9.3%), cassava grinding 8 (8.2%), pure water packaging 8 (8.2%) and beauty/ barbing saloons 7 (7.2%). Other HBEs were polythene bags making 7 (7.2%), sales of food and drinks 7 (7.2%) and tailoring and textile dyeing 5 (5.2%). HBEs whose distribution was minor were blocks/bricks molding 4 (4.1%), fish/meat sales and processing 4 (4.1%), leather/upholstery works, 4(4.1%) print and electronics repairs 4 (4.1%) and shoe making/repairs 4 (4.1%). While in Ogoja, besides mechanic workshop which ranked first with 8 (9%) as the most common HBE, agricultural processing HBEs like cassava grinding and cereal grinding followed with 6 (7%)' Others within the processing category were fish/meats sales (4.4%), local drinks packaging (4.4%), pure water (7.8%), polythene bags (5.6%) and food vendors (7%). Other spotted HBEs were enamel/glassworks 4.4%, tailoring/textile dyeing 4.4% metalworks 3.2%, leather /upholstery 3.2% and laundry 3.2%.

A close work at the distribution of the HBEs does not present sharp variation in their types except in concentration due to population within the towns. Thus, as the types of HBEs in the towns studied are similar, they all tend to

generate waste of the same kind but of varying quantities and composition. The range of solid and liquid wastes generated include vegetable matter, used packaging paper of many sorts and sizes, aluminum foil wraps, plastic bottles and corks, glass bottle, cans, waste fat and organic substances from meat sales, dirty water and fumes littering into the air in the form of smoke. These particulates act as allergens and health hazards to people suffering from ailments such as asthma. The different types of wastes generated, composition and generation rate are presented in table 4.

Table 4: HBEs Waste Composition and generation rate in the study area

HBE Types	Types of Waste	Item Composition	**Percentage of waste**		
			Calabar %	**Ugep %**	**Ogoja %**
Automobile workshops	Metals glass paper leather used oil	Metal scraps wires, windscreen, used cartoons, car floor carpet, liquid solvents	5..1	4.3	4.4
Generation rate (kg)			0.0338	0.025	0.0244
Beauty /barbing shops	Plastic acidic liquids	Polythene/sachet water bags, liquid solvent	7.17	6.1	6.17
Generation rate (kg)			0.0241	0.0313	0.0343
Block/bricks moulding	Paper inert waste	Sack bags, sand nylon bags	6.5	4.25	3.15
Generation rate (kg)			0.022	0.014	0.012
Bread /baking accessories	Food waste, plastic papers	Flour remnants, used sack bags, polythene, cans, used cartoons	20.3	22.7	23.2
Generation rate (kg)			0.130	0.170	0.158
Cassava/cereal grinding mills	Food waste	Vegetable matter	10.2	15.3	11.2
Generation rate (kg)			0.068	0.1035	0.095
Craft/wood carving	Plastic foam, bad cuts woods, inert waste	Sawdust thinner cans, glue cans, paint cans, rubber cans	2.75	2.22	2.34
Generation rate (kg)			0.014	0.013	0.011
Dry cleaning /laundry services	Inert waste	Bleach, rubber cans, ashes and sand, poisonous waste water	4.42	4.63	4.67
Generation rate (kg)			0.007	0.010	0.009
Enamel glass works	Metal glass	Bad utensils scraps metals , rubber broken glass, selenium cans	6.5	6.3	6.8
Generation rate (kg)			0.020	0.022	0.023
Fish/meat sales and processing	Food waste	Burnt tyres, waste fat, dirty water, organic substances	8.5	6.2	6.5

Generation rate (kg)			0.023	0.021	0.019
Metal works	Metal	Scrap iron/metals, caustic soda, poisonous acids, silica cans, chrome cans	2.3	2.1	2.4
Generation rate (kg)			0.011	0.012	0.014
Leather / upholstery work, painting	Used cloth, leather wood	Scrap iron, unused wood, wood dust, paint cans	4.1	4.8	4.3
Generation rate (kg)			0.013	0.015	0.016
Photography	Paper	Acidic solvents empty rubber containers, silver papers	3.1	3.99	3.2
Generation rate (kg)			0.025	0.018	0.023
Plastic rubber, polythene bags, works	Plastic sacks	Worn tyres, toxic and volatile materials bottles, jars, sack bags	3.2	2.8	2.8
Generation rate (kg)			0.017	0.018	0.016
Print/electronic repairs	Rubber	Computer scraps, scratch cards used electrical/ electronic goods, lead compounds TV screen	2.0	2.2	2.3
Generation rate (kg)			0.006	0.005	0.004
Processing of food, local drinks and sales of food	Food waste	Leaves, vegetables, sacks and bags, broken glasses food remnants	3.47	3.52	4.04
Generation rate (kg)			.0180	0.016	0.020
Pure water packaging	Plastic sacks	Sachet water bags, cartoons, bottles, poisonous liquid	4.45	4.61	5.29
Generation rate (kg)			0.013	0.011	0.010
Shoe works	leather	Foot wears, cobbler cuttings, cans of toxic dyes and glues	3.58	3.44	4.2
Generation rate (kg)			0.008	0.006	0.00
Tailoring textile dyeing	Fabric paper, plastic inert waste	Waste cloths, threads, poisonous waxes, chair cool, ashes	2.36	1.54	2.
Generation rate (kg)			0.02	0.012	0.007
Grand Total for generation rates			**0.4599**	**0.5278**	**0.501**

Source: Field Work (2020)

Table 4 shows that the 26 enterprises recorded in table 3 being further grouped into 18 enterprises and was categorized based on the different types of waste they generate but having varying compositions and generation rate Amongst the waste types generated are: food waste, paper, metals, glass, textile, leather, inert waste and toxic or poisonous liquids and solvents. The waste composition and generations rate from the HBEs in the three towns indicate major component to be food waste with 42 .5% in Calabar, 47.8% in Ugep and 44.9% in Ogoja and with the average composition of

45.10%. The four enterprises generating these wastes include bread/baking shops, cassava/cereal grinding mills, food and drinks vendors and fish/meat processing. The generation rate of food waste varies from 0.60kg/food services enterprises/day in Calabar to 0.078kg/food services enterprise/day in Ugep and 0.073kg /food services enterprise/day in Ogoja.

The second type of waste generate high volume were plastics of different sorts, papers of different make, metals glass and toxic water liquids and solvents. The composition for plastics was 17.5% in Calabar, 15.7% in Ugep and 16.6% in Ogoja and the generation rate ranged from 0.026kg/ plastic enterprises/day in Ugep to 0.24kg/plastic enterprises/day in Ogoja to 0.022kg/plastic enterprises in Calabar. Other proportions of the waste stream from the enterprises were paper with compositions and 13.28% and generations rate of 0.02kg/enterprises/day in Calabar, 13.6% composition and generation rate of 0.019kg/paper enterprises/day in Ugep, Ogoja with a generation rate of 0.021kg/paper enterprises/day, metals 9.32% in composition 0.018kg/metal enterprises/day in Calabar, 9.7% in composition 016kg/metal enterprise /day in Ugep and 8.5% in composition 0.014kg/metal enterprise /day in Ogoja.

Glass compositions and generation rates were 5.5.%, 0.0108kg / glass enterprises / day in Calabar, 4.54%, 0.098kg/ glass enterprise day in Ugep, and 5.2%, 0.01012kg/ glass enterprise/ day in Ogoja. Leather and cloths had a composition of 5.1%, 0.007kg/leather enterprise / day/ in Calabar, 3.8%, 0.004kg/ leather/day in Ugep and 4.55%, 0.009kg/ leather /day in Ogoja.

Furthermore, wood composition and generation rates were as follows: 4.48%, 0.003kg/wood enterprise/ day in Calabar, 3.3.%, 0.013kg/wood enterprise/day in Ugep and 4.1%, 0.0043kg/ wood enterprise day in Ogoja. While inert waste composes of 2.32%, 0.011kg/enterprise/day in Calabar, 2.56%, 0.004kg/enterprise /day in Ugep and 3.45%, 0.071kg/enterprise/day in Ogoja.

4.3 Waste Collection Methods and Disposal Services in the study area

Waste collection methods and disposal services varies amongst the HBEs in the sampled urban areas. In Calabar, amongst the 159 respondents involved in HBEs activities 27 (18%) respondents accepted the use of open dumps as a means of getting rid of waste from their enterprises, 16 (10%) of the respondents resorted to open burning 11 (7%) adopts burying , 64 (40%) use private or rented individuals to dispose waste. While 24 (15%) agreed government agencies collect and dispose the waste generated from the HBEs. In Ugep, the most dominant means of waste collection is open dumping with 48 (49%) respondents accepting the use of this method, this is followed

by 25 (26%) respondents that use burning method, 17 (18%) used the burying method. While 5 (5%) resort to the use of private or rented individuals to evaluate waste and 2 (2%) respondents agreed that government agencies dispose their waste. In Ogoja, the burning method is a common practice with 50% (56%) respondent, seconded by 27 (30%) respondent using the open dump method others include 7 (8%) people burying their waste, 4 (4%) accepting the use of government agencies and 2(2%) hiring private individual for waste disposal.

From the survey of the HBEs in the study, the frequency of waste collection by government agencies in charge of waste management is examined and presented in table 5. The table shows that an average 64% of the household respondent observe that the service providers only use one day in a week within each neighborhood to evaluate waste from the informal enterprises.

While 30% of the respondent observe that the service, providers use two days in a week, 40% of the respondent agree that the service providers use three days in a week. The implication of this is that un-evaluated wastes from these enterprises remain unattended to for reasonable long time.

Table 5: Frequency of waste collection by government Agencies from HBES in a week

Location	**1 (day)**	**2 (days)**	**3 (days)**	**4 (days)**	**Total**
Calabar	75 (48%)	73 (46%)	9 (5%)	2 (1%)	159
Ugep	74 (75%)	19 (20%)	2 (2%)	2 (2%)	97
Ogoja	71 (78%)	11 (12%)	5 (6%)	3* (4%)	90
Total	220	103	16	7	364
% Distribution	(63.6%)	(29.8%)	(4.6%)	(2%)	(100%)

Source: Field Work (2020): Figures in parenthesis are in percentages

In terms of managing the solid waste in the HBEs, our investigation reveal that the waste generated by the HBEs, use various containers to store them before they are disposed. In Calabar 87 (54.5%) out of 159 enterprises use closed containers, while in Ugep and Ogoja the enterprises that use closed containers for waste collection were 28 (19. 1%) and 22 (30.4%) out of the enterprises in the survey. Also, in some of the enterprises, in the survey 68 (42.9%) in Calabar, 67 (68.8%) in Ugep and 61 (77.4%) in Ogoja showed that they collect their waste in non-durable containers such as polythene bags, nylon sacks, cane baskets, condemned drums, tires and buckets.

4.4 Environmental Conditions due to poor waste collection

The investigation from three urban areas reveals the state of environmental conditions surrounding the HBEs. In Calabar 96 (60.4%) of the enterprises responded that they experience drainage blockage which is associated with flooding, 24 (15.6%) agreed that they experience dirty environment with evidence of stench and the sight of marauding scavenging animals; more so, 20 (12.8%) of the enterprises responded witnessing increasing in the presence of mosquitoes and cockroaches, and 19 (11.2%) of the enterprises witness poor drainage system showing stagnant water which habours rats and flies. In Ugep, 46 (47.4%) of the enterprises accepted witnessing dirty environment accompanied by foul smell emanating from abandoned uncollected waste, 28 (28.9%) from the enterprises reveal noticing increase of flies, mosquitoes and cockroaches, 15 (15.5%) of the enterprises reported cases of increase in households suffering from cholera, malaria, dysentery and typhoid and 8 (8.2%) respondents of the enterprises witness cases of cholera which are transmitted through contaminated food and water. In Ogoja, 41(45.6%) of households of the enterprises complained about the risk of injury form sharp objects of the waste dumped indiscriminately and left uncollected waste, 23(25.6%) of the households attributed the destruction of their property, damaged sewage systems and homes to floods associated with blockage of drainage system from inappropriate dumping of waste. 14 (15.5%) of the households complained of environmental contamination arising from air pollution of burnt waste dumped within the vicinity of some HBEs. While 12(13.3%) of the household were not satisfied with the sanitary condition of the surrounding HBEs as they noted infestation of rodents which act as pathogenic organisms to transmit diseases.

Similarly, the methods analyzed from the field survey used to disposed waste generated from the HBEs in Calabar is as presented. It depicts that 80 (62%) of the HBEs agreed that they carry their waste to the neighborhood collector dust bins for government agency in charge of waste to the town's disposal sites. It also indicated that 22 (17%) and 19 (15%) of the sampled HBEs get rid of their waste by open dumping in public drains or uncompleted buildings and employing the services of private individuals to collect waste from their household enterprises either burn or bury their waste. A breakdown of the methods of waste disposal in Ugep showed that 25 (36%) of the HBEs engage in indiscriminate open dumping of waste, while 28 (30%) of the HBEs use the public dust bins to disposed waste. The remaining 34 (34%) of the HBEs either burn, bury or use the services of private waste pickers to remove their waste. Furthermore, in Ogoja. 32 (36%) of the HBEs openly disposed their waste in streams, surrounding bushes, road sides and gutters, while 25 (27%) of the HBEs dispose their waste in public waste bins. Of the remaining 33 (37%) of the HBEs, 18 (20%) of them throw their waste by burning and 9 (10%) dispose their waste by burying. While 6 (7%) engage the service of informal waste pickers.

4.5 Hazards associated with poor waste disposal in HBEs

4.5.1 Research Hypothesis

The hypothesis stated that the variation in the frequency of waste disposal does not significantly affect environmental conditions of the HBEs in the study area. To test this hypothesis one-way ANOVA was used to test the variation efficiency in waste disposal among the sampled HBEs in the study area. In this ANOVA, the frequency of waste collection acted as factor and environmental characteristics from the HBEs such as (stench, odors, flies, dirty surroundings, rampaging rodents, air pollution, vermin breeding grounds, scavenging parasites etc.) as dependent variables. The F-ratio and Fishers least significant difference (LSD) test was used to test for significance. Table 6 summarized the results obtained. Table 6 revealed that the mean variation in frequency of waste disposal amongst HBEs in the study area was the highest in Calabar followed by Ogoja and the least was Ugep. However, the F-test did not specify which of the possible sub-groups mean difference between samples are significant. To specify which sub-groups are significant, the post-hoc comparisons techniques was applied to identify which sample population differs from others.

Table 6: ANOVA test results of variation in waste disposal frequency and environmental condition among the sample HBEs.

	Sum of Squares	**df**	**Mean square**	**F**	**Sig**
Between Groups	32757.9082	2	16378.9541	26.701	.000
Within Groups	68089.731	111	613.421		
Total	**100847.6392**	**113**			

Source: Field Work, 2020

(R – Square .077 (adjustment R-square = -013 * significant at .05 level, P <.05).

Table 7 provides a comparison of means for each HBE against others HBEs in the study area. This table compare HBEs in Calabar with Ugep and Ogoja in the first row, the second row compare HBEs in Ugep with Calabar and Ogoja and the last row compares HBEs in Ogoja with Calabar and Ugep. The areas of environmental significance showed the exact differences between any two groups of environmental characteristics in the study area and is indicated in column two with the figures *(asterisks).

Table 7: Post-hoc multiple comparisons of variations in the frequency of waste disposal amongst the HBEs in the three Towns.

Dependent variable: Environmental conditions of the HBEs among the urban areas.

Urban Areas (1) Urban Areas		**Means difference (i-j)**	**Std Errors**	**Sig**	**95% confidence internal**	
					Lower bound	Upper bound
Calabar	Ugep	.0378	.03683	.307	-0357	.1135
	Ogoja	.0237*	.03755	.000	-0513	.1018
Ugep	Calabar	-0378	.03755	.307	-1135	.0351
	Ogoja	-0131*	.03683	.000	-0897	.0615
Ogoja	Calabar	-0237*	.03755	.000	-1018	.0522
	Ugep	-0131*	.03683	.000	-0615	.0897

*Based on observed means The error term is mean square (Error) = .018

Source: Field work 2020

The asterisked values showed a significant difference between variations environmental conditions of the two samples being compared at a significant level of 0.05. From the asterisks values, significant differences exist between the average environmental conditions for each of the following pair-wise (sub-group) comparison *Calabar by Ogoja* and Ogoja by Ugep. That is for each sub-group combinations, we can reject the hypothesis that variation in the frequency of waste disposal does not significantly affect environmental conditions of the HBEs in the study area.

Inference from the table further show that the higher the average cluster of HBEs in a residential pattern and location, the more pile-up of indisposed heap of waste are noticeable and subsequently trigger environmental deterioration.

4.5.2 Research Hypothesis

This hypothesis states that environmental health hazards (EHHs) do not vary according to poor waste disposal habits amongst HBEs in the study area. The testing of the hypothesis was based on sample respondents living within the vicinity of the HBEs. The results are shown in table 8.

Table 8: Anova test results for spatial variation in EHHs

Environmental hazards		**Sum of squares**	**df**	**Mean square**	**F-ratio**	**Sig.p**
Contaminate ground water	Between groups Within groups **Total**	2300.000 5130420 **5132720**	2 111 **113**	1150 46220	0.025	0.133
Air contamination	Between groups Within groups **Total**	7560 8019887.862 **8027447.862**	2 111 **113**	3780 72251.242	0.052	0.169
Block water drains and cause floods	Between groups Within groups **Total**	1865 2590886.853 **2592751.853**	2 111 **113**	932.5 23341.242	0..040	1.410
Pesticides	Between groups Within groups **Total**	1282 5920327.857 **5921609.857**	2 111 **113**	641 53336.287	0.012	.445
cause irradiation cancer	Between groups Within groups **Total**	8900 810201.32 **819191.111**	2 111 **113**	8900 810201.32	0.065	.017
Cause water borne disease eg Malaria	Between groups Within groups **Total**	2664 2274646.188 **2277310.188**	2 111 **113**	1332 202492.308	0.001	.175
Increase in rodents, flies and Cockroaches infestation	Between groups Within groups **Total**	1488 897652.173 899140.173	2 111 **113**	744 8086.957	0.092	.244

Source: Field work, 2020

The results of the hypothesis test showed that there is no significant variation in environmental health hazards among the HBEs and across the three urban areas for the study. The null hypothesis (Ho) that the mean values for each health hazard in the HBEs did not vary significantly both within and across the urban areas is retained. However, the Levene statistics used to test whether the variances between the towns were the same.

Table 9: Homogeneity test result for EHHs variation in the HBEs

EHHs	Levene Statistic	df1	df2	Significance
Contaminate Ground Water	2.835	2	111	0.006*
Air contamination	1.154	2	111	0.017*
Block drains/floods	1.366	2	111	0.234*
Stir pesticides	3.154	2	111	0.005*
Water Borne Disease/ Malaria	1.243	2	111	0.001
Cause irradiation/cancer	1.717	2	111	0.213
Cause flies, cockroach infestation	1.454	2	111	0.652

Source: Field Survey, 2020

From the table, the results of the Levene test showed significant variation in health hazards with the figures asterisked as follows: contaminate ground water $p < 0.006$, air pollution $P < 0.017$, block drains and cause floods

P < 0.234, water borne diseases like malaria P < 0.001 and cause increase in flies cockroaches infestation P < 0.652. Thus, we conclude that the variances are significantly different.

5.0 Discussion

The study showed that as urbanization trend increases in Cross River State, it is accompanied with spatial expansion and economic growth. The economic growth manifest in formal and informal sectors of livelihood. While the formal is associated with government, organized private sector and industrial sector employment, the informal sectors is linked to the unorganized small and micro HBEs attracting patronage from large population of the low-income earners. In urban areas of the state there has been a surge in HBEs formation arising from the urban poor resolve to seek for means of livelihood. The study has shown that there are 346 HBEs distributed in three urban areas sampled in the survey. Given that the HBEs formation act as alternative economic sources of livelihood for the urban poor with subsistence income generation, it also pose environmental and health challenges because of the poor waste management practices adopted by both HBEs stakeholders and the government agencies saddled with the responsibilities to handle the waste management.

The study also showed that the waste generated from the HBEs are characterized by high organic content which makes it fertile medium for pathogens to thrive. Besides, the un-sorted waste within the vicinity of the HBEs makes recycling difficult and hazardous to handle. Also, the study identified many injurious waste management practices by the HBEs that poses environmental contamination to include, waste littering, hazard pockets of open dumpsite, burying and burning as the most common methods of disposal and poor maintenance of waste handling facilities by government operators. The study also established the environmental and health risks that can sprout from the surroundings of the HBEs which can be associated with dwellers continuous exposure to pathogenic organisms; rats, rodents, flies' bacteria, viruses etc. which are causative agents to diseases like cholera, typhoid, mosquito infestation via malaria and hepatitis virus infections. Others psychological and emotional challenges can be attributed to socio-economic costs are flooded drains stench, sight of marauding scavenging animals and birds. Also the social stigma of living in such environment and heavy metal poisoning can be distressing and affect mental health.

5.1 Conclusion

In this study, I have argued that there is an increasing in surge for informal activities in cross river state due to tends in population growth with no corresponding formal employment. The study showed that there are 346 HBEs

which were categorized into 26 enterprises in the study area. The HBEs were characterized by the nature of space availability, livelihood survival and spatiality of social life within a neighborhood. The study noted that the merits associated with those who operate HBEs are that of employment generation for the low-income earners, yield income to households, stir potentials for micro economic growth and development, provide HBEs operators opportunities to utilize their skills, interact socially, and enjoy an active life. While HBEs economic and social merits are enormous, there are demerits of HBEs: they generate waste whose poor disposal methods and management practices constitutes health hazards to the public and HBE stakeholders. This study has been able to determine that of the 346 HBEs in the study area, 159 have waste generation rates of 0.46kg per day, showing an average of 0.0029 kg per day in Calabar. While in Ugep the generation rates were 0.53kg per day for 97 HBEs indicating daily average 0.0054kg per HBEs per day and Ogoja with 90 HBEs the generation rate was 0.50kg per day and with an average daily rate of 0.0056 kg per enterprise per day. Also from the study, its statistically established that variation in frequency of waste disposal amongst the HBEs exist and acted as a factor that stir poor deplorable environmental conditions within HBEs surroundings. The study as well as established that significant variations in health hazards exist amongst the three towns of Calabar, Ugep and Ogoja. Besides, the study equally established that environmental hazards and poor waste management practices around HBE locations are statistically linked with environmentally related illness in urban areas of Cross River State.

5.2 Recommendations

While HBEs provide veritable means of employment and sources of livelihood for the vulnerable population in urban areas on one hand, its operators are indirectly involved in neighborhood distortion which impact negatively on the existing land uses creating land use change, pollution environmental contamination, illnesses and health hazards. Thus, it behooves on all stakeholders, planners and government to synergize and accommodate HBE operations through adopting collaborative approaches that streamline their activities specifying minimum space and site standards requirement for registration and costs regularization of HBEs formation.

Secondly, through residential land use planning, urban planners should adopt advocacy and inclusive planning approaches that tends to accommodate HBEs in physical plans preparation by introducing guided adjustment of buildings that reduce the negative effects of plan alteration in the residential layouts and maximizes HBEs operation while enhancing environmental sustainability. The state waste management institutions should be equipped appropriately in the proper handling, enforcement and management of waste emanating from all segment of the urban areas including neighborhood with HBEs. Strict surveillance should be maintained by environmental

agencies and all stakeholders for defaulters around the vicinity of the HBEs location who form the habits of indulging in indiscriminate littering and dumping of waste, such culprits should be penalized based on environment laws. Government should adopt a policy that ensures that all HBEs include environmental management plan that specifies the handling of waste generated from HBEs. This will engender operators of HBEs to give waste management from their economic activities the priority it deserves.

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