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**The Socio-Economic and Environmental Benefits of Waste Scavenging  
 in Maiduguri, Borno State**

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**ABSTRACT**

This study aimed at assessing the economic and environmental benefits of waste scavenging in Maiduguri, which has been presumably neglected by formal sector. The objectives of the study were to: identify the types of waste materials recovered by scavengers, determine the average monthly income and factors that influence the income of Scavengers and examine the environmental benefits of waste scavenging. Data were collected using Questionnaire and observation checklists. Five wards out of the 15 wards that constituted the study area were purposively selected for the study. 210 scavengers were randomly selected and administer Questionnaire at the depots in each of the sampled wards where they sell recovered materials. The data collected were analyzed using descriptive statistics and chi square test. The study found that scavenging is a male dominated occupation, with a mean age of 20.2 and average monthly income of ₦13, 500. The Chi-square test performed to demonstrate the influence of socio demographic factors on income of scavengers revealed a significant association between Age, Educational attainment, length of practice, marital status and categories of waste scavengers. Gender and alternative occupation were the only insignificant factors. The study also showed that, Scrap metals and aluminum were the major materials recovered by scavengers as ascertain by 65.71%, and that the materials are recovered base on their economic value, quality and state. Seasonal differences also contribute to the pricing of recyclable materials recovered by scavengers. The study also revealed that despite the significant contribution of scavengers to environmental sustenance, economic growth and poverty reduction, their activities is still not acknowledge by local authorities in the study area. The study recommends that Government should recognize their contributions as important stakeholders in the waste management sector in Maiduguri by diversifying the types of recyclables and establishing recycling plants, more permanent employment could be provided for the scavengers and other people, thereby improving the economy. Also, Successful integration of scavengers into a formal programme can help optimize waste collection and recycling in an integrated waste management programme. If well organized, scavengers could be given the necessary training that would enable them overcome the challenges they encounter in their activities, especially those related to vulnerability of hazards.

**1.0 INTRODUCTION**

Wastes are things considered as unfit, unwanted and discarded due to economic reasons or ignorance of alternative technologies to re-use them. (Godwin & Edjere, 2017). In Nigeria the problem of solid waste management has become more complex in recent times due to rapid population growth, urbanization, and industrialization and the rising standard of living. Both the quantity and diversity of waste now being generated have increased. This problem is further complicated by political, economical, and sociological factors (Dunmininu, 2018).

Solid waste is managed at the municipal level by either the state Government agencies or contractors who are involved in waste collection, transfer and transport, and disposal. Usually, waste collection and disposal is restricted to the urban areas and has not been extended to the rural areas. Urban waste management is still fraught with many problems like lack of financial resources, collection and transportation facilities, poorly developed dumping grounds that are potentially threatening to public health and environmental health, and poor management (Abdel-Shafy and Mansour, 2018).

Scavenging is a manual sorting and picking of recyclable/reusable materials from mixed wastes at legal and illegal landfills, dumpsites, street bins and piles, transfer points, as well as waste collection trucks (Igwe, *et al.*, 2018). The term wastes scavengers is interchangeably used as waste pickers, waste reclaimers, garbage pickers, refuse pickers, trash pickers, rubbish pickers, recyclers, waste salvagers among others (O'Hare, 2019) in (Nuhu *et al.*, 2022). Scavenging is a growing phenomenon in big cities in the developing world. The activity is not only a source of jobs for many people in a precarious economic condition, but also a means of sustainable waste management and indeed environmental management. They also help in reducing poverty which is one of the factors influencing environmental problems. Scavenging can render economic and environmental benefits, such as work for unemployed individuals, supplies raw materials for industry, reduces the demand for collection, transport and disposal equipment and facilities. (Medina, 2010; Igwe, *et al.*, 2018). Nyathi *et al.*, (2018) revealed that approximately 2% of the population in developing countries makes a living through scavenging and that Poverty caused by unemployment in developing countries leads to scavenging. The scavengers are involved in both on-site and off-site waste recovery. They recover re-usable and recyclables materials like plastics, aluminium, glass, paper, scrap metals, animal wastes like horn, bones etc. They recover these materials because of their potential value. In some cases, the scavengers also process some of the recovered waste before selling them either to the resource merchants or directly to the recycling industries (Rockson *et al.*, 2013; Auta and Paul, 2020). Despite the significant contributions of scavenging to the economy and in municipal waste management, their activity is still not acknowledged. Most developing countries do not fully realize the social, economic and environmental benefits of the recycling activities carried out by scavengers (Ferronato and Torretta, 2019)

The rapid rate of urbanisation coupled with increase in population and commercial activities in Maiduguri has resulted in high volumes of waste generation which attracts a lot of scavenging

activities at various disposal sites for sorting, cleaning and processing, buying or selling of recovered materials. Despite the contributions of this informal sector, research on waste management in the study area has not focused on their activities and its impact on the environment. It is also important to note that least investigation has been conducted in the Northern part of Nigeria in regard to waste scavenging, the few available research were, however, focused primarily on the socio-economic wellbeing (Nzeadibe, 2009; Lambu, 2016; Adama 2014; Dankani, 2010), and the occupational health of waste scavengers, (Uthman, *et al.*, 2017; Ohajinwa, *et al.*, 2018; Yusuf, *et al.*, 2021; Ali and Yusuf, 2021; Nuhu *et al.*, 2022).

However, much is not reported on the factors influencing the income of scavengers and the environmental benefits of waste scavenging. It is against this background that this study seeks to identify the socio economic and environmental benefits of waste scavenging in Maiduguri. This study will provide a basis for identifying issues that should be addressed in planning ways of integrating scavengers in the development of waste management plans in the study area.

### 1.1 Aim and Objectives of the study

The aim of the study is to assess the socio economic and environmental benefits of waste scavenging in Maiduguri. The specific objectives are to:

- i. Identify the types of waste materials recovered by the scavengers.
- ii. Identify the average monthly income and factors that determine the income of Scavengers.
- iii. Determine the environmental benefits of waste scavenging.

### 1.2 Study Area and Methodology

#### 1.2.1 Study Area

Maiduguri the Borno state Capital is the largest city in the North eastern part of Nigeria. It is located on latitudes 11° 43' N and 11° 52' N and Longitudes 13° 05' E and 13° 15' E. It has a total area of 543km<sup>2</sup>, with an altitude of 345 meters. It is characterized by low precipitation and high temperature

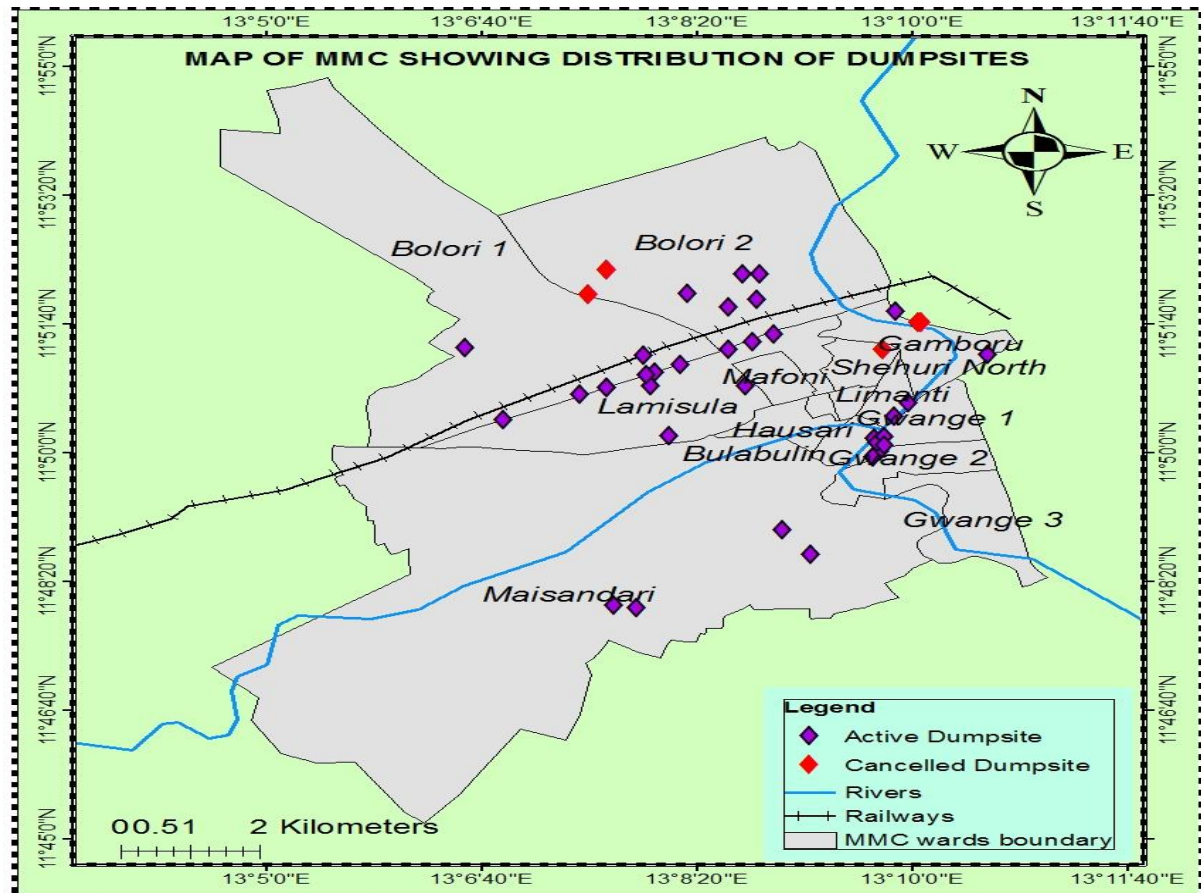


Fig 1.1: Study Area showing dumpsites were scavengers operate  
Source: Field work, (2022)

### 3.0 METHODOLOGY

The study was a cross sectional survey conducted in Maiduguri, the Borno State capital. Questionnaire and observation checklist were used in gathering information for the study. A total of five wards (Lamisula, Bolori II, Maisandari, Mafoni and Gwange I) out of the 15 wards that constituted the study area were purposively selected for the study. These wards were selected due to the intense activities of waste scavengers in the area. 85 respondents were selected in Maisandari being the largest ward, Lamisula 54, Gwange I 31, Bolori II 29 and 11 in Mafoni, making a total of 210 respondents for the study. It is difficult to reach scavengers as they cannot be pinned down to a specific dumpsite at a specific time. The best place to find them is where they sell the recyclables they have collected. This reason, coupled with fear of collecting data more than once from a particular scavenger in a dumpsite warranted the need to reach them in the depot (middlemen' shops) located in each of the sampled wards. Informed consent was obtained in writing from all selected participants before the commencement of the study. Scavengers who

could not write were requested to thumb print in place of their signature. The questionnaires were administered with the help of 2 research assistants from the department of Geography conversant with the language and culture of the local environment. The questionnaire was divided into four parts: the first part dealt with the demographic information of scavengers, the second on economic aspect of waste scavenging, while the third part centred on the environmental aspect of waste scavenging. The questionnaire was pre-tested on 20 scavengers outside the sampled wards before the commencement of data collection and later adjustments and corrections were made on some of the items.

Data for the study were analysed using descriptive statistics and chi square test. The descriptive statistic was used to describe the socio demographic characteristics, average monthly income, types of waste materials recovered and environmental benefits of waste scavenging respectively. Chi square test was performed to examine the extent of association between Income of scavengers and the various factors (age, length

in Practice, marital status, gender, educational attainment, categories of waste scavengers and scavenger's alternative occupation). Significance level was set at  $P < 0.05$ .

#### 4.0 RESULTS AND DISCUSSIONS

##### 4.1 Socio Demographic Characteristics of the Respondents

Table 1 shows the results of the socio demographic characteristics of sampled scavengers. A total of two hundred and ten (210) questionnaires were administered to the respondents whose age ranged between 18 and 49 years (mean age=20.2). Specifically 36.2% of the respondents are < 18years, 22% fall within the age bracket of 18-28years, 13.3% (29-38years), 11% (39-48) years and > 49 years respectively. The study demonstrates that waste scavenging is an activity that requires the energy found in youths because of the daily loads of materials they have to carry. This means that they must have a certain kind of strength to endure and enjoy the trade. Again, this age statistics also shows that the enterprise is one of the few jobs available to teenagers in Nigeria as a means of support, primarily due to persistent unemployment

Scavenging in Maiduguri is a gendered occupation, male have dominated the profession as they constituted 99.5% and Female 0.5%. This shows that more male children engaged in this energy-sapping activity than the females. This finding could be attributed to the culture of the

study area that restricts women from participating in some occupations of the informal sector, also the male dominance in the occupation was not strange because the stress associated with the job makes it unfit for women. The finding is in tandem with other studies in different parts of the world that revealed scavenging as male dominated occupation (Nzeadibe, 2009, Dias, 2011; Asim, *et al.*, 2012; Rockson, *et al.*, 2013, Taiwo *et al.*, 2022; Nuhu *et al.*, 2022 ).

Close to half (43%) of the respondents had no formal education and more than half of the sample (57%) had some knowledge of formal education. This shows that it is possible for some children to attend school while still engaging in waste scavenging. A Similar study conducted in rivers state, Nigeria (Elenwo., 2015), revealed that 59.8% of the scavengers did not have any formal education. The percentages of scavengers that attained primary, secondary and tertiary educations were 11.9%, 34.8% and 10.3% respectively. Similar study in Bauchi reported none of the waste scavengers interviewed attended beyond secondary education (Ali and Yusuf, 2021). This findings contrast with the present study that reported 10.3% of the respondents attained beyond secondary Education. It was observed during the study that scavengers with higher educational qualification are in most cases depot own buyers who purchase recyclables from dump site

**Table 1: Socio Demographic Characteristics of the Respondents**

Variable	Frequency n = 210	Percentage (%)
<b>Age</b>		
< 18 years	76	36.2
18-28 years	59	28
29-38 years	29	13.8
39-48 years	23	11
> 49	23	11
Total	210	100
<b>Education</b>		
No Formal Education	91	43
Primary	25	11.9
Secondary	73	34.8
Tertiary	21	10.3
Total	210	100
<b>Marital status</b>		
Married	66	31.4
Singled	144	68.6
Total	210	100
<b>Gender</b>		

Male	209	99.5
Female	1	0.5
Total	210	100
<b>Ethnicity</b>		
Shuwa	59	28.1
Kanuri	65	31
Hausa	32	15.2
Babur	15	7.1
Others	39	18.6
Total	210	100

Source: Field work, 2022

#### 4.2 Occupational background information of Scavengers

With respect to Categories of waste scavengers, result indicated that about 24.76% of the sampled are itinerant buyers. Itinerant buyers in this study refers to categories of scavengers who work on fixed routes collecting recyclables from households/businesses using Sack, pushcarts or other collection materials in exchange for payment or barter. 39.52% are depot own buyers and 35.72% are dumpsites pickers. Depot own buyers in this study are categories of scavengers that purchase waste from dumpsite pickers. Dumpsite pickers on the other hand refers to those scavengers that operate solely at the dump sites, picking recyclable materials as they are dumped from disposal vehicles.

The result further showed that more than half (59%) of the respondents have been in the business for a period of 1-5years. The percentages of scavengers that have been in practice for 6-10years, 11-15years, 16-20years and 21years and above were 16.2%, 11%, 6.3% and 7.5% respectively.

With respect to Scavengers' alternative occupation, majority (88.6%) of the respondents picked waste as a full time activity for their

sustenance, while others (11.4%) reported that they combined scavenging with seasonal work and other trades or training to supplement family income. Plastic waste scavengers reported that they enjoyed a boom in the dry season and during festivities. During the raining season for instance, some of them resort to alternative occupation to meet their needs since there is short scarcity of recoverable materials in that season. The opposite holds for metal scrap scavengers. Other alternative occupations engaged by scavengers include Carpentry, petty trading, masonry and construction work, tricycle operation to a small extent, and some of the scavengers interviewed were students as well.

Slightly more than half (53%) of the scavengers surveyed their recyclables in open dumps that are considered to be no man's land, it was closely followed (31%) by purchase. Household and other sources accounts for 14%, and 2% respectively. In case of materials from the households, a token amount is given in exchange for recyclable materials, sometimes new plastic plates, matches box, are given to the household members in exchange. Salvage dealers or depot own buyers purchase the waste from the primary scavengers who roam on the street and sort out recyclables at the dump sites.

Table 2: Scavengers occupational background information

Variable	Frequency n = 210	Percentage (%)
<b>Category of Waste Scavenger</b>		
Itinerant buyers	52	24.76
Depot owned buyers	83	39.52
Dumpsite pickers	75	35.72
Total	210	100
<b>Length of practice in Scavenging</b>		
1-5 years	124	59

6-10 years	34	16.2
11-15 years	23	11
16-20years	13	6.3
21years & above	16	7.5
Total	210	100
<b>Scavengers' alternative occupation</b>		
Full time scavenger	186	88.6
Scavenging with other occupation	24	11.4
<b>Total</b>	<b>210</b>	<b>100</b>

Source: Field work, 2022

#### 4.2 Economic aspect of Scavenging

With respect to monthly earning of waste scavengers, data indicates that one third (31%) of the respondents earn < 10,000 monthly, 34.4% generates 10- 20,000, 18.6% earn 21-30,000 and 16.2% generates above 30,000 monthly. The Mean monthly income of the waste Scavengers in the study area is ₦13,500. This means that on average a waste Scavenger earned N450 daily from his operations. The average quantity of waste materials collected by a scavenger in a day was estimated to be from 5-15kg. It can be deduced that scavenging could help in the reduction of poverty, if the activities are well structured or organized. In other studies, it has also been noted that scavengers earn far better than the minimum wage paid by public service (Rockson *et al.*, 2013, (Larbi *et al.*, 2014; Taiwo *et al.*, 2022). This therefore suggests scavenging could be a profitable business.

However, scavengers in the study indicates that those who scavenged for scrap metals and aluminium were earning higher than their colleagues (N250/kg), copper wire (N2000/kg) have a higher earning potential but very difficult to find in the waste stream, Horns (N200/kg), bones (N150/kg), Tin and cans (N150/kg), and plastic bottles (20/kg). They surveyed recover materials based on their economic value. Generally, bottles are refilled with drugs, drinks, and cosmetics, while plastic and rubber materials are remoulded. Scavengers use machines to grind plastic into small particles and reduce its bulky nature. Broken bottles or glasses are sometimes bought by the glass industry through their agents. Each item has its own market. Some scavengers also sort metal scraps. Such scraps are used in the production of shovels and locally produced cooking pans and musical instrumentals.

From the survey, most scavengers recover metals and aluminium (65.71%), plastic bottles and used gallons (12.86%), animal bones (11.05%), tin

(2.38%) and Very few (8%) scavengers are able to recover other material such as cardboard papers, used sack and slippers from the disposal sites. The value of recyclables depends on its quality and state. Other studies also revealed that most scavengers recovered metals such as iron, copper and aluminum (Fahmi, 2010; Rockson *et al.*, 2013; Steuer *et al.*, 2017; Nuhu *et al.*, 2022). The price of recyclables in this study is mainly influenced by the price as determined by the depot owned buyers who will in turn sell to local recycling facility or exporters. It is also notable that seasonal differences contribute to the pricing of recyclable materials recovered by scavengers or itinerant buyers. For example, during the dry season the consumption of water increases relatively, with the accompanying increases in the disposal of drinking water sachets and plastic bottles or beverage bottles. During this period supply outweighs demand and this often results in price reductions. It was observed during the study that there exist some trade linkages between dump sites scavengers, itinerant buyers, depot owned scavengers and local recyclers and/or agents of industries, the dump sites and itinerant scavengers take the collection to the depot (scrap market) where they are sorted, weighed and sold accordingly. The middlemen (depot own scavengers) buy from the dumpsites scavengers and supply the various agents that in turn take upon themselves the responsibility of transporting and supplying these wastes to the various industries which utilize them as raw materials. Similar trade linkages were reported in a related study (Wilson and Cheeseman, 2006).

Furthermore, the scavengers interviewed at the various sites had no organized co-operatives or unions. However, majority (75%) of the respondents reported how they are been neglected in the society even though they are willing to form co operatives with the support and provision of incentives by Government or private bodies, while

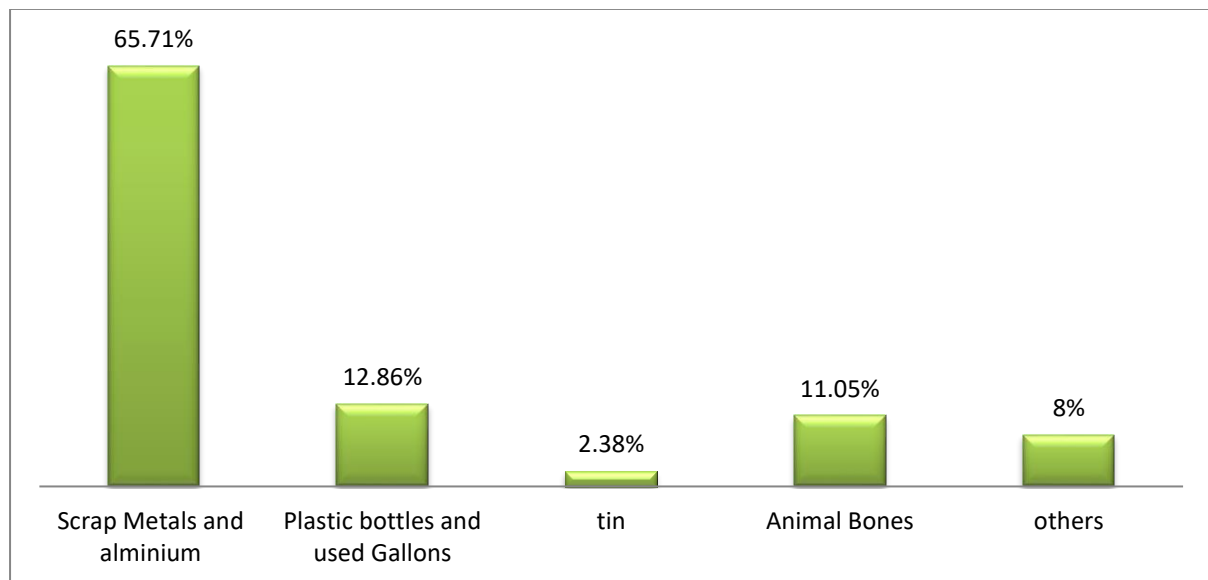
about 25% preferred to be on their own than to join co operatives. Nevertheless, it is a known phenomenon that the scavengers understand their businesses and Know who their clients are in their value chain. Studies from Cairo revealed that scavengers popularly known as Zabaaleen community have form part of the waste

management system and they enjoy a housing aid from Government through their integrated savings and credit groups (Fahmi and Sutton, 2006). This is a remarkable organizational structure that may be rare to other countries such as Nigeria who hardly ever enjoy any benefit from local authorities.

**Table 3: Average Monthly Income of Waste Scavengers**

Variable	Frequency n = 210	Percentage (%)
<b>Income (₦)</b>		
< 10,000	65	31
10,000-20,000	72	34.2
21,000-30,000	39	18.6
> 30,000	34	16.2
Total	210	100

Source: Field work, (2022)



Source: Field work, 2022

**Fig 1.2: Types of material scavenged**

**4.3 Influence of socio demographic factors on income of waste scavengers**

It is important to note that socio demographic characteristics are important parameters associated to income of waste scavengers. Previous studies have shown that the socio-demographic system in most developing countries may influence people’s decision to pick waste for a living (Nzeadibe, 2009; Uiterkamp and Azadi , 2011). Thus, since this work assesses the activities of scavengers in the waste sector, it is imperative that their activities also be contextualized within the socio-demographic system. A chi-square test was performed to demonstrate the association

between age, educational attainment, length of practice (Experience), categories of waste scavengers, marital status and gender of the respondents. The Chi-square result showed a significant association between Age ( $X^2= 20.38, P=0.000$ ), educational attainment ( $X^2= 38.26, P=0.000$ ), length of practice ( $X^2= 86.96, P=0.000$ ), marital status ( $X^2= 11.943, P=0.000$ ) and categories of waste scavengers ( $X^2= 11.048, P=0.000$ ) with income. Gender ( $X^2= 22.41, P=0.542$ ) and alternative occupation ( $X^2= 51.18, P=0.163$ ) were the insignificant factors that determines the income of scavengers.

Specifically, the results showed that age of scavengers determine their income. It implies that older scavengers in Maiduguri are more likely to earn more than their younger colleagues. This means that aged scavengers have knowledge of materials that are in high demand and get a good price for it. Higher numbers of educated scavengers generate more income compared to their less uneducated counterparts, and this is not surprising because educational attainment facilitates easy assimilation of instruction. This might also be attributed to the reported high number of scavengers who attained formal education in the study area.

Similarly, experienced scavengers who have been in the occupation for a long period of time generate more income compared to their inexperienced counterpart who have not been in

practice for a long period of time. On marital status, higher proportions of married scavengers work hard and earn more money to cater for their family compared to their unmarried counterparts.

Furthermore, a higher proportion of scavengers that are categorised as Itinerant buyers, who collect recyclables from households/businesses in exchange for payment or barter are more likely to earn more compared to depot own buyers and dump site pickers who operate solely at the depot and dump sites, picking recyclable materials as they are dumped from disposal vehicles

Lastly, gender and alternative occupation were the only insignificant factor that determined income of scavengers. This might be attributed to the fact that male have dominated the profession as they constituted 99% of the business.

**Table 4: Chi square result of the influence of socio demographic Factors on the Income of waste scavengers**

Variable	Frequency n = 210	Percentage (%)	X <sup>2</sup>	P- Value
<b>Age</b>				
< 18 years	76	36.2		
18-28 years	59	28		
29-38 years	29	13.8		
39-48 years	23	11	203.80	0.000
> 49	23	11		
Total	210	100		
<b>Education</b>				
No Formal Education	91	43		
Primary	25	11.9		
Secondary	73	34.8	38.26	0.000
Tertiary	21	10.3		
Total	210	100		
<b>Marital status</b>				
Married	66	31.4		
Singled	144	68.6	119.43	0.000
Total	210	100		
<b>Gender</b>				
Male	209	99.5		
Female	1	0.5	22.41	0.524
Total	210	100		
<b>Categories of Waste Scavengers</b>				
Itinerant buyers	52	24.76		
Depot owned buyers	83	39.52	110.48	0.000
Dumpsite pickers	75	35.72		
Total	210	100		
<b>Length of practice in Scavenging</b>				
1-5 years	124	59		
6-10 years	34	16.2		
11-15 years	23	11	86.96	0.000
16-20years	13	6.3		

Total	210	100		
<b>Scavengers alternative occupation</b>				
Full time scavenger	186	88.6		
Scavenging with other occupation	24	11.4	51.18	0.163
Total	210	100		

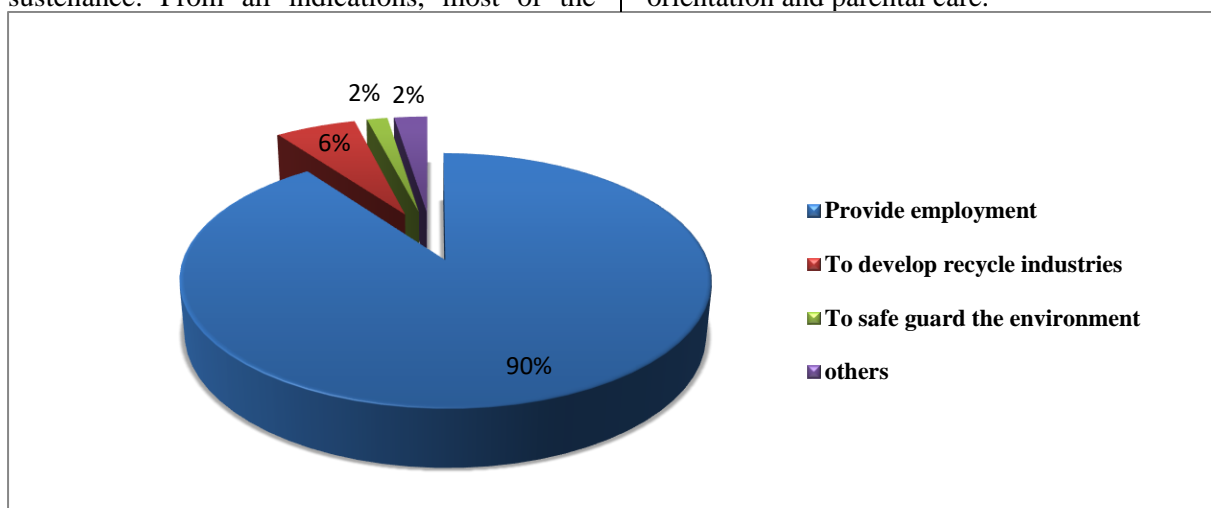
Source: Field work, 2022

#### 4.5 Reasons for Engaging in Waste Scavenging

The major reason (90%) that attracted the people into scavenging is due to income and employment it provides to them as a result of poverty. Overall joblessness and economic considerations as found in this study dominated the discussions in other studies as to why they engage in the activity ((Nzeadibe, 2009; Lambu, 2016; Adama 2014; Dankani, 2010; Yusuf, 2021; Ali and Yusuf, 2021). Scavengers revealed loss of hope and disappointment as result of the difficulty in securing job in the formal sector make them struggle and sift through the mountain of refuse for sustenance. From all indications, most of the

scavengers are in the occupation not by choice, but due to increased levels of unemployment and poverty. For this reason, they considered the occupation as a stepping stone whereby after acquiring some money, they might move to a more dignified profession.

A fraction of the scavengers (8%) are into the business to Safe guard the environment and develop recycling industries. Other responses (2%) are due to personal interest, by chance, lack of career guidance and due to their low social status which includes lack of shelter, education orientation and parental care.



Source: Field work, 2022

Fig 1.3: Reason for engaging in Scavenging

#### 4.6 Environmental benefits of waste scavenging

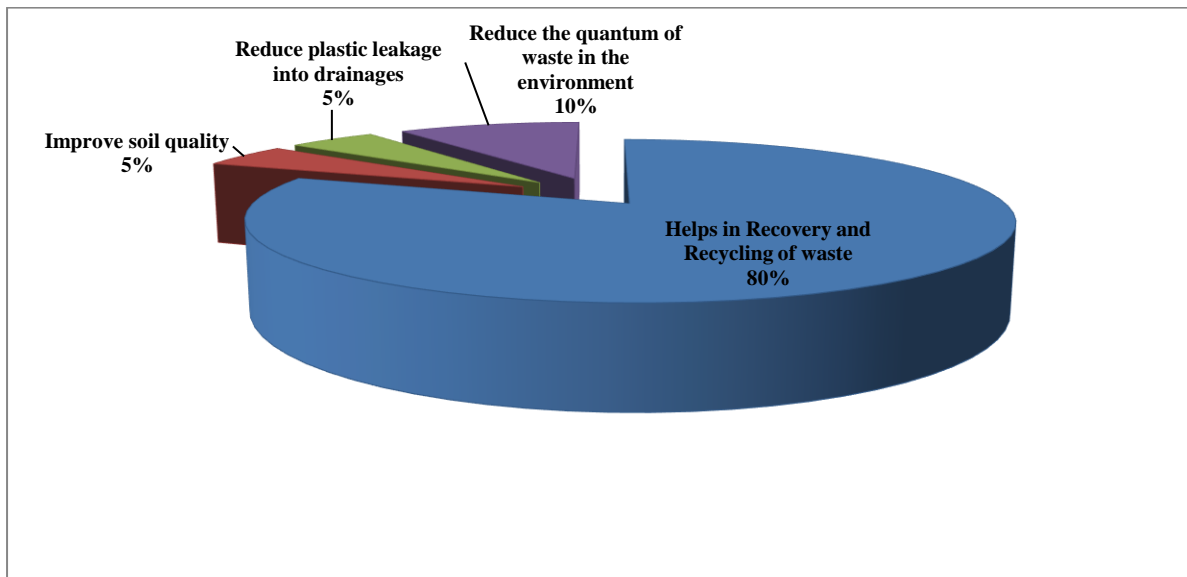
The environmental benefits of scavenging activities could be considered in terms of diversion of significant amounts of waste from disposal, amount of disposal space saved by recovery of materials, and the reuse and recycling of secondary raw materials. The finding in figure 1.4 revealed that, majority (80%) of the respondents believe that scavenging helps in recovery and recycling of waste, 10% believes that it reduces the quantum of waste in the environment, 5% of the respondents claimed that scavenging improve

soil quality while 5% believe that it reduces plastic leakages into drainages.

Waste scavenging benefits the environment through waste recycling and recovery of materials largely from dumpsites, commercial centres and household. They put the materials through some form of physical processing before selling them to the middlemen or companies. They recover scrap metals and plastic waste released into the environment through industrial/human activities that may leach into the soil from where they can be taken up by plants as food, there by entering the

food chain. If these materials are not recovered by the scavengers, they can also lead to contamination of underground water, overall change in activity of the soil microbial communities and blockage of drainages, thereby leading to flood. Moreover, rain water can wash these materials into streams and rivers thereby posing a threat to the aquatic environment.

The activities of scavengers have in no doubt contributed to environmental management through the diversion of materials from dumpsites and resource recovery and recycling, it is therefore important for local authorities to recognize their contributions as important stakeholders in the waste management sector in Maiduguri.



Source: Field Work, 2023

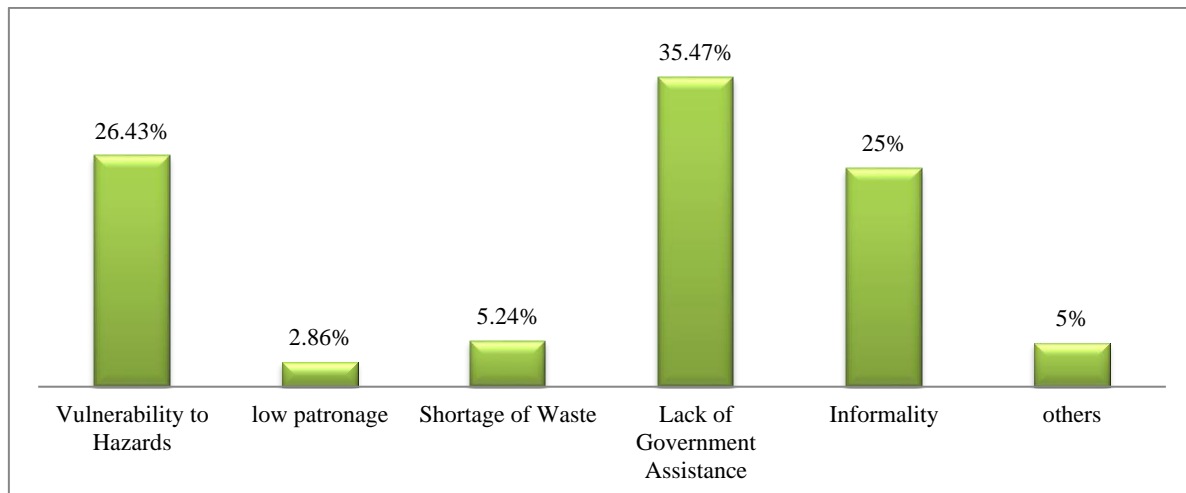
Fig 1.4: Environments Benefit of Waste Scavenging

#### 4.7 Challenges Associated with Scavenging

Scavenging like any other economic activity has challenges. Data in Figure 1.5 indicated that notable challenges cited include: Vulnerability of hazards (26.43%) such as odour from landfill, cuts/injury from broken bottles and metals, houseflies and insects bites on the sites. It was also observed during the study that none of the scavengers was found using personal protective devices. lack of Government assistance was also a challenge encountered by scavengers in the study area as ascertain by 35.47, informality (25%), Inadequate dry recyclables at dumpsites for recovery (5.24%), and other Challenges (5%) such as lack of respect for the job, lack of capital to increase material recovery, especially with itinerant buyers, unstable prices of recovered materials and lack of good storage facilities for storing recovered materials, resulting in theft of

stored items/materials at the site by fellow scavengers

The challenges cited by the scavengers in this study have been found among scavengers in other developing countries. The health hazards mentioned by the respondents in Maiduguri are common in other developing countries (Afon, 2012; Santa, 2014). Reducing the vulnerability of hazards associated with scavenging could be considered one of the major areas of intervention needed by the Government to effectively formalise the activities of these economically viable group through integrating their activities into the formal waste management system in Maiduguri, the system pay no attention to the group despite the skills, endurance and resourcefulness of these people.



Source: Field Work, 2023

Fig 1.5: Challenges Facing Scavengers

## 5.0 CONCLUSION

In this study it has been established that scavenging in Maiduguri contributes in its own little way to environmental sustenance, economic growth and poverty reduction. The activities of scavengers have played an important role in the recovery of materials from the waste stream. The occupation represents an important survival strategy in which individuals recover materials from waste to meet their needs.

Neglecting scavengers in this study is disturbing and needs to be urgently reversed despite their contributions to environmental sustenance and poverty reduction. It is therefore recommended that local authorities to recognize their contributions as important stakeholders in the waste management sector in Maiduguri by diversifying the types of recyclables and establishing recycling plants, more permanent employment could be provided for the scavengers and other people, thereby improving the economy. In Cairo for instance, waste recycling provides an income for 16,000 people while protecting the environment. Similarly, in Mexico City more than 10,000 people make their living on the city's dump (Agunwamba, 2003). This advantage could also be enjoyed in Maiduguri. Also, Successful integration of scavengers into a formal programme can help optimize waste collection and recycling in an integrated waste management programme. If well organized, scavengers could be given the necessary training that would enable them overcome the challenges they encounter in their activities, especially those related to vulnerability of hazards. Further study should be conducted on

scavengers' awareness of hazards and use of safety measures.

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