TETRA PAK CHALLENGE

A PROJECT REPORT

BY

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LIST OF ABBREVIATIONS

CSO- CENTRAL STATISTIAL OFFICE

CBO- COMMUNITY BASED ORGANISATION

ECZ- ENVIRONMENTAL COUNCIL OF ZAMBIA

GDP- GROSS DOMESTIC PRODUCT

GRZ- GOVERNMENT OF REPUBLIC OF ZAMBIA

INESOR- INSTITUE OF ECONOMIC AND SOCIAL RESEARCH

JICA- JAPAN INTERNATIONAL COOPERATION AGENCY

LCC- LUSAKA CITY COUNCIL

LCMS- LIVING CONDITIONS MONITORING SURVEY

LWMP- LUSAKA WASTE MANAGEMENT PROJECT

NGO- NON GOVERNMENTAL ORGANISATION

NTBC- NATIONAL TECHNOLOGY AND BUSINESS CENTRE

PUSH- PERI URBAN SELF HELP

RDC- RESIDENT DEVELOPMENT COMMITTEE

UNZA- UNIVERSITY OF ZAMBIA

WMU- WASTE MANAGEMENT UNIT

ZDA- ZAMBIA DEVELOPMENT AGENCY

ZEMA- ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY

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EXECUTIVE SUMMARY

Zambia's cities and Towns over the years have lost their natural beauty due to the rapid increase in garbage disposal, a situation that has resulted into outbreaks of waterborne diseases. This rapid accumulation of waste can be attributed to Zambia's rapid population growth and industrialization as the country seeks to develop and uplift the living stands of its people. Despite local authorities making great steps to clean up the cities and implementing the "Make Zambia Clean" campaign which was thought to have the answer to the seemingly impossible garbage crisis. Nonetheless, there has not been positive yield yet. Additionally, even with legislation in place indiscriminate disposal of waste continues to deface the beauty of Zambia's major cities. Currently plastic is the only main waste product that is being recycled. However, it was noted that Tetra Pak cartons which are used to store liquid food for up to one year without refrigeration was a typical common product found at garbage sites, markets and even households especially in high density areas that had untapped and unexploited opportunities. Given the waste management crisis in high density areas as well as most parts of Zambia there was need to find to solution to enhance waste management that can potentially empower the youths in various communities. Therefore, the aim of this research was to investigate opportunities in the Tetra Pak recycling value chain.

This research was conducted in 6 high density areas in Zambia's capital city Lusaka. The research sample consisted of two groups; Target group A consisted of 76 youths who were the primary target group while target group B consisted of 2 inspectors from LCC and ZEMA who provided expert opinion on the subject matter. In addition, two data collection Tools were used namely; focus group discussion for target group A and interview guides for target group B. It was established that Tetra Pak recycling in Zambia is unexploited and unexplored. In addition, it was established that high value products that can be made out of Tetra Pak recycling include roof shingles, wall tiles and furniture. Furthermore, it was established that there was no clearly stated opportunities in the Tetra Pak value chain. In addition, it was also established that there was no market demand for Tetra Pak recycled products as currently, there was no recognised business or individuals manufacturing or selling Tetra Pak recycled Products. However, it was noted that despite lack of established market there existed potential market and customers and these included; locals, tourists and industries.

Additionally, it was also established that majority of the youths perceived it to be a lucrative business and were willing to venture into Tetra Pak recycling Business. It was also established that the youths and communities can be integrated into the waste management streams so that a recycling value chain can be established from domestic level unlike savaging at the dumpsite as well as being able to receive guidance from ZEMA. Furthermore, it was established that the challenges that can be anticipated in the development of the Tetra Pak recycling value chain were market demand and social norms. In addition, other challenges include health Hazard as materials will be picked from garage sites; Raw materials may become scarce in the future or may attract a charge that will be as a result of demand, and operational costs. Consequently,

there is need to conduct campaigns as well as awareness of Tetra Pak recycling. Secondly, there is need to incorporate institutions such as ZEMA and LCC Waste Management Unit in order to be integrated in the waste stream so that recycling value chain can be established at domestic level. Further to enhance policy formulation by implementing recycling bins for easy collection of recyclable materials. Thirdly, to set up research and development facilities that can be used by the youths and communities at large to enhance innovation in Tetra Pak recycling as well as facilitate built ups in Tetra Pak recycling during science fairs and JETS. Additionally, there is need to advocate for production of high value goods by empowering youths with skills in Tetra Pak recycling as well as signing a MOU with Tetra Pak UK Ltd to assist with establishing recycling centres as it is one of their cooperate responsibilities.

1.0 INTRODUCTION

The natural beauty of townships and central business districts of cities in Zambia have been spoilt over the years by increasing amounts of garbage that can be attributed to industrialisation and rapid population growth. Across the country, beautiful cities and towns such as the tourist capital, Livingstone, and Copperbelt towns Ndola, Chingola and Kitwe are not as clean as they used to be. During the rainy season this garbage causes blockages in drainages which results in water stagnation causing outbreaks of waterborne diseases. Therefore, there is a need to find a solution to enhance waste management, such a solution can potentially empower the youth in various communities by incorporating them into the recycling business. Currently, plastic is the only main waste product that is being recycled. However, there does exist a waste product that has untapped and unexploited opportunities. Beer Tetra Paks are a typical common product found at garbage sites especially in high density areas and markets, milk and drink Tetra Paks are not as common but instead are a typical household waste.

Tetra Pak cartons are the most common name for aseptic cartons, which are used for liquid food items so they can be stored for up to one year without refrigeration. Aseptic means "free from pathogenic micro-organisms", so this packaging process eliminates harmful elements from the food and packages them in a pre-sterilized container. This type of packaging also blocks light completely, in order to preserve vitamins A, B2, B6, B12, C and K, which are all photosensitive and would become damaged in the presence of light. Tetra Paks are constructed from 6 layers of materials. Tetra Pak cartons are fully recyclable, which unfortunately does not mean much in locations where carton recycling facilities do not exist. Given that the waste management problem in high density areas as well as most places in Zambia is a broad and vast issue, Zambia can benefit from recycled Tetra Paks as it is a common waste product found in high density areas, markets and even households. Conversely, the Tetra Pak project can yield high quality value products from recycled Tetra Paks which can be sold on the market to earn income and create employment. In addition, the Tetra Pak project can produce raw materials which can be used in industries enhancing forward and backward linkages with other sectors thus fostering economic growth. However, it faces challenges which include; unclear value preposition for Tetra Pak recycled Products, additionally, markets are not clearly defined for recycled products. Furthermore, the value chain in Tetra Pak Recycling is still unestablished. There has not been sufficient investment in the area of research and development of recycling products. It is for this reason that this project sought to explore opportunities in the Tetra Pak recycling value Chain.

2.0 PROBLEM STATEMENT

Zambia has been experiencing the problem of proper management of solid waste, a situation that has resulted in drainages being clogged, and creating floods especially during the rainy season which causes outbreaks of waterborne disease such as Cholera, Malaria, Typhoid and Dysentery. Countrywide the local authorities have made great steps in cleaning up the city by implementing the "Make Zambia Clean' campaign which is thought to have had an answer to the seemingly impossible garbage crisis. However, there has been no positive yield yet. Even with legislation in place, indiscriminate disposal of waste has continued to deface the beauty of Zambia's major cities. However, Zambia has little awareness of recycling as currently only plastics are being recycled. Conversely, it has been observed that there has been an increase in Tetra Pak waste especially in high density areas due to the mushrooming of numerous bars and taverns in these areas. This product is recyclable yet it lacks exploitation in terms of opportunities in the value chain as there does not exist an established effective way of collecting and sorting Tetra Pak waste that can enhance the recycling process which can in turn create employment for the youth. Furthermore, Zambia lacks infrastructure and institutions that focus on research and development of high value products that can be made from Tetra Pak's. In addition, there are unestablished markets for Tetra Pak recycled products in Zambia. This creates a need to investigate opportunities in the Tetra Pak recycling value chain. Given the devastating effects of indiscriminate disposal of waste to humans and the environment and untapped and unexploited opportunities in Tetra Pak recycling value chain, there is need to come up with practical and effective measures aimed at curbing the trend cannot be overstressed. It is for this reason that this project explored Tetra Pak recycling as a means for waste management and creating youth employment through community engagement.

3.0 AIM AND OBJECTIVES

3.1 AIM

The aim of the research study is to investigate opportunities in the Tetra Pak recycling value chain.

3.2 OBJECTIVES

To profile products that can be made through Tetra Pack recycling.

To access opportunities in Tetra Pak recycling value chain.

To investigate market demand for Tetra Pak recycled products.

To examine youths perception of business opportunities in Tetra Pak recycling.

To access challenges that can be anticipated in the development of a Tetra Pak recycling value chain.

4.0 BACKGROUND ANALYSIS

In Zambia, the problem of solid waste management cannot be over emphasized. Today Zambia is producing more waste than ever before. Solid waste problems rank highly among environmental factors contributing to the ill health of most people living in the high density informal residential areas (Mayeya and Mukosa 1997). According to the social action programme, the magnitude of solid waste problem is worse in high density areas where roads are impassable by solid waste freighters. (Nchito, 2003). Most dumpsites are inaccessible and dustbins are too expensive to be obtained by residents in the informal settlements (Mayeya and Mukosa 1997). The increase in quantities of waste generated is as a result of industrialisation and population growth since the attainment of independence (GRZ, 1994).

According to the Zambia 2010 Census of Population and Housing National Analytical Report, Zambia's population in 2010 was 13,092,666 which increased from 9,885,591 in 2000 with the male population at 6.5 million representing 49.3 per cent while that of female was 6.6 million representing 50.7 percent of the total population with Lusaka recording the highest density with 100.1 persons per square kilometre while the lowest population density was recorded in North-Western province at 5.8 persons per square kilometre. In addition, Zambia experienced its record growth with a GDP of 7.3 % by the end of 2013 and it's currently at 7.1 %. This increase in population and the growing demand for consumer goods have increased the per capita rate of waste generated in cities resulting in serious strain on the environment.

The public sector has been playing the double role of regulating waste management and actually carrying out the work of managing waste itself. The level services provided by the public sector has deteriorated and the hardest hit are the peri urban areas. The population in these areas is poor and does not have adequate resources and therefore cannot afford to pay the city council garbage collection user fee (LCC and ECZ, 1997). For instance, Majority of Zambians has continued to live in poverty. Results from the 2006 and 2010 Living Condition Monitory Surveys (LCMS), show that poverty levels have remained high despite recording a decline between 2006 and 2010. The proportion of the population falling below the poverty line reduced from 62.8 percent in 2006 to 60.5 percent in 2010. The percentage of the extremely poor marginally declined from 42.7 percent to 42.3 percent. Poverty in Zambia has continued to be more of a rural than urban phenomenon. The level of rural poverty is three times that in urban areas. In 2010, rural poverty was estimated at 77.9 percent compared to urban levels at 27.5 percent; therefore many cannot afford to pay for refuse fees (LCMS, 2006 and CSO, 2010).

The need for an effective, yet cost efficient waste disposal strategy in peri urban areas has become a priority for the local authority in Lusaka. The Lusaka City Council (LCC) has installed collection receptacles such as skips in some of the peri urban areas and market places that act as

communal dump sites. Households near these receptacles dump their waste in these skips. The idea is to locate the receptacles in areas that are easily accessible to most residents. The introduction of the skips has greatly reduced accumulation of waste in some of the peri urban areas. In view of the difficulties faced by the LCC to carry out refuse removal, the local communities through various Non- Governmental Organisation (NGOs) and Community Based Organisation (CBOs) have been involved in waste management. NGOs that have been involved in removal of waste from some peri urban areas include Care international working in George, Kanyama and Chipata compounds, Peri Urban Self Help (PUSH) Zambia working in Chaisa, Chawama, Mtendere, Bauleni, Kalingalinag and Garden compounds (LCC and ECZ, 1997).

A study was conducted in Garden compounds focused on prospects of community participation in solid waste management. It revealed that the local community was willing to make contributions to solid waste management in the area (Milanzi, 2002). The community through individual households made contributes in form of money ranging from K1000 to about K 5000 unrebased. The introduction of Resident Development Committee (RDC) helped organise the community. The effort of RDC was to be supplemented by the LCC. However, it was discovered that the council could not provide vehicles for secondary waste collection from the communal dumpsite, this lead to the failure of program (Milanzi, 2002). A private company could not be engaged in the community due to the low-income levels could not afford to pay economical rates to sustain the service provision (Milanzi, 2002).

The LCC has since developed a new waste management system with the support of the Lusaka Waste Management Project (LWMP). The new waste management system was to be implemented by the Waste Management Unit (WMU) of the LCC in partnership with the private sector with funding from the Danish Government. In the new system of waste management private sector companies are awarded contracts to collect waste in a part of the city and are also responsible for the collection of fees. The WMU is responsible for the collection of waste in the central business district and some parts of the districts (LCC, 2004 www.wmulusaka.gov.zm) accessed March 2004. Under the new waste management system for Lusaka, there are two main areas; one concentrates on conventional residential areas and the other on peri urban areas. The system for conventional areas aims at collecting waste from individual households. Private companies have been given contracts to collect waste from these areas. To facilitate their intervention, the city has been divided into 12 waste management districts.

In addition, countrywide the local authorities have made great steps in cleaning up the city by implementing the "Make Zambia Clean' campaign which is thought to have had an answer to the seemingly impossible garbage crisis. But no positive yields yet, as current statistics show that only 40 percent of the waste in Lusaka’s population of three (3) million is collected posing a serious health and economic risk (Changemakers, 2014). Therefore, waste collection services by the local authority are virtually non- existent due to a lot of constraints faced by the councils. This situation has become a source of concern to be public as the uncollected waste is a potential source of diseases such as cholera and other diarrhoeal diseases. The uncollected waste has also

caused a general deterioration in the quality of the environment. It has been further observed that there has been an increase in the Tetra Pak waste especially in high density areas and markets and this has further contributed to the waste crisis.

Therefore, a solution is to enhance waste management is by empowering the youth through community engagement by incorporating them into the recycling business. As youth unemployment is also a major problem in the country as the unemployment rate involving youths between 15 to 35 years include; 7.5 per cent from rural areas, 22.0 per cent in urban. In provinces, Muchinga recorded 7.7 per cent, unemployed youths, Northern 7.9 per cent, Luapula 9.3 per cent, Western 10.1 per cent, Eastern 10.4 per cent, North-Western 13.3 per cent, Southern 14.8 per cent, Central 16.2 per cent, Lusaka 25.1 while Copperbelt was at 29.6 per cent. Furthermore, the Zambia 2010 Census of Population and Housing National Analytical Report states that 4.3 million persons were in labour force, out of which 2.4 million were males and 1.8 million females countrywide.

Furthermore, plastic is the only main waste product that is being recycled. Tetra Pak recycling is an untapped and unexploited waste product that Zambia can benefit from. At present there is no waste management system that presents sustainable employment opportunities for the youth in Tetra Pak recycling. Although there are many systems for adding value to the waste itself, Zambia lacks an effective way of collecting and sorting waste that can enhance recycling in order to manage its waste products, generate income and create employment. It is for this reason that this project sought to investigate the opportunities in the Tetra Pak value chain.

6.0 RESEARCH HYPOTHESIS

The assumption was that the Tetra Pak project would yield high quality value products that can be made through Tetra Pak recycling and that could be sold on the market to earn income and create employment.

In addition, the Tetra Pak project would produce raw materials which can be used in industries enhancing forward and backward linkages with other sectors thus fostering economic growth.

7.0 RESEARCH QUESTION

What products can be made out of Tetra Paks?

What opportunities exist in Tetra Pak recycling value chain?

Are Tetra Pak recycled Products Marketable?

What business opportunities are there for youths in Tetra Pak recycling?

What challenges can be anticipated in the development of a Tetra Pak value chain?

8.0 RESEARCH METHODOLOGY

8.1 SECONDARY DATA

Secondary data mainly depended on journals, books, articles and previous research done on the subject matter. This was collected from various sources including; the University of Zambia (UNZA) main library, Institute of Economic and Social Research (INESOR) library in Chudleigh, Lusaka City Council (LCC), National Technology and Business Centre (NTBC) Resource Centre, Central Statistical Office (CSO), Zambia Environmental Management Agency (ZEMA) resource centre, Zambia Development Agency (ZDA) and from the internet. Secondary data was used to provide information on the subject matter thus supporting the researcher to discover the depth of existing knowledge on the subject matter. This assisted in establishing weakness in past research that called for further research as well as to avoid duplication of work. Furthermore, information obtained assisted in justifying the need to carry out this research.

8.2 PRIMARY DATA

This research mainly depended on primary data that was collected from the field. This was done through the use of data collection tools which included; focus group discussions and interviews. This was conducted in high density areas as well as key identified institutions.

8.3 TARGET GROUP AND SAMPLING METHOD

TARGET GROUP A

This group consisted of 20 youths per area from 6 high density areas in Lusaka. Each focus group discussion consisted of 5 respondents. Therefore, 4 discussions were to be held per area. This was the main target group. This group was sampled using purposive sampling.

TARGET GROUP B

The target group comprised of individuals from 3 selected institutions who would give expert opinions on the subject matter. These included; Japan International Cooperation Agency (JICA) Lusaka City Council (LCC) Waste Management Unit (WMU) and ZEMA. Purposive sampling was used for this target group.

8.4 DATA COLLECTION TOOLS

Focus Group Discussion: This tool was used to collect data from Target Group A, who were youths in high density areas. This tool gave an opportunity to interact and gain in-depth information on subject matter.

Interview Guide: this was used to supplement the Focus Group Discussions findings and provided additional information, as this tool was to be used for target group B who were experts on the subject matter.

8.5 RESEARCH SITE

This research was conducted in Lusaka the capital city of Zambia, specifically high density areas which included; Linda, Bauleni, Kalinglinga, Kanyama, Chazanga and Chawama compounds. The following high density areas were chosen due to the waste management crisis in the areas that is exacerbated by the numerous bars found in the market area that predominately sell beer packaged in Tetra Pak's. Furthermore, these areas were also observed to have some recycling activities and have high rates of youth unemployment.

9.0 DATA ANALYSIS

Data analysis was done manually by using of tally tables, thematic analysis and content analysis.

10.0 ETHICAL CONSIDERATION

The researchers put into consideration all ethical issues such as:

The right of informed consent: the participants in the project were entirely informed about the aim of the research, its exploration and what would occur to the data collected from them.

Voluntary participation and the right to withdraw at any time from the research: the researcher informed the participants that participation in the research would be voluntary and should they wish to discontinue their participation in the project they could withdraw from the research at any time without stating motives, withdraw any data that they give should they want to do so. In addition, they were informed that should they experience any physical or psychological discomfort or distress they have the right to stop their participation.

Confidentiality: the right to privacy and confidentiality of the respondents was taken into consideration, names of the respondents were not recorded, and information gathered would be purely used for NTBC's market research assessment.

Avoidance of harm to participants: The researchers made considerable energy to prevent and avoid placing all his participants at any kind of risk physical, emotional, social, political or psychological during the period of the research.

11.0 RESEARCH LIMITATIONS

- Lusaka has numerous high density areas; resources and time do not permit the research in all the high density areas of Lusaka.
- Some high density areas in Lusaka are hostile and have high levels of criminal activities therefore this poses a safety challenge to conduct research from such areas.

12.0 RESEARCH OUTCOMES

This research aimed to explore the opportunities in Tetra Pak recycling value chain. This was to enable NTBC to make a market assessment and recommendations on the Tetra Pak challenge. In addition, this gave an insight to the opportunities as well as knowledge on how best Zambia can benefit from recycling as a means to manage its waste and empower its youth through community engagement in the recycling business. Findings of this research would also be able to influence policy in the areas of waste management and Entrepreneurship for the unemployed youth in high density areas as it would enhance them to take part in recycling and manufacturing of high value products made from Tetra Pak recycling.

13.0 RESEARCH FINDINGS

This section presents and discusses the findings of the research according to the specific objectives, research questions and major themes that were identified from the focus group discussions and interviews. The presentation begins with the characteristics of respondents, thereafter; it shall present the research findings according to the specific objectives of the research and giving a discussion of the research findings at the end of each specific objective. This research aimed to investigate opportunities in the Tetra Pak recycling value chain.

13.1 CHARACTISTICS OF THE SAMPLE

This research was conducted in 6 high density areas in Lusaka namely, Bauleni, Kanyama, Chazanga, Chawama, Linda and Kalingalinga. The respondents of Target Group A consisted of 76 Youths. 25 women and 51 men took part in the focus group discussions, of the 76 youths, 40 youths from Kalingalinga and Chawama were enrolled into a youth skills training center. 7 respondents in Chazanga were still in school, 2 in Kanyama were informal employment and 27 of the respondents from Linda, Bauleni, Kanyama and Chazanga were not employed. It was noted that Chazanga has an Environmental Awareness Club that is currently embarking on implementing a Tetra Pak recycling project.

Target Group B consisted of 2 experts from Zambia Environmental Management Agency (ZEMA) and Lusaka City Council Waste Management Unit. The experts consisted of 1 woman and 1 man; both the experts were inspectors at their respective institutions.

13.2 TO PROFILE PRODUCTS THAT CAN BE MADE THROUGH TETRA PAK RECYCLING

PRODUCTS THAT CAN BE MADE OUT OF TETRA PAKS

Target Group A

Respondents from Baueleni, Kanyama, Kalingalinga, Chawama and Chazanga identified the following products that can be made out of Tetra Paks and these include; Toys, Drums, Baskets, Mini Shops “Tuntemba”, roofing sheets, mats, flower pots and egg trays. Chazanga had the most identified products. However; some individuals from the high density areas could not identify any product with Linda compounds recording no identification of any Tetra Pak recycled products.

Secondary Data

ROOF SHINGLES (PRESENTLY MADE IN BRAZIL)

These roof shingles are used in low income houses as well as farm houses in Brazil. They have a huge advantage over corrugated asbestos or aluminum roof shingles. The Tetra Pak roof shingles do not transfer noise when it rains, avoiding disturbance and presents heart attacks for farm animals. Furthermore, the green shingles are superbly waterproof, inflammable, and unbreakable

and have a heat transfer of 30% lower than shingles made from asbestos cement. They are 50% lighter saving on construction and are 30% cheaper than the existing alternatives. View image 1 in appendix 18.4.

FURNITURE (CURRENTLY MADE IN INDIA)

Saahas an NGO working with solid waste in association with Tetra Pak India limited makes furniture from recycled Tetra Paks. Tetra Pak sheets can be converted into chairs, desk tables. The advantages of these sheets include; they are unbreakable, fire proof and all weather materials. They also have excellent illumination capacity which can save power at the same time they have low heat absorption property. View image 2 in appendix 18.4. Other types of furniture include; playful outdoor furniture designed by New York designer Stephen Burks and manufactured by Dedon. The pieces are hand-woven with fiber that is made of 75% recycled packages from Tetra Paks mixed with recycled polyethylene. View image 3 in appendix 18.4.

WALL TILES (MADE IN DES MOINES IOWA USA)

Using a European technology, Iowa based manufacturer Rewall turns poly coated products into recycled wall boards, tile backers, sheathing and decorative panels. Its line of 100% post-consumer recycled materials includes naked board, which is suitable for supporting tiles in wet areas, and essential boards, which can be substituted for drywall. The process is environmentally friendly as it uses no added glue, water or chemicals in manufacturing. View Image 4 in appendix 18.4.

Additionally, other products that can be made out of recycled Tetra Paks include; Paraffin, Aluminum, baskets, handbags, wallets, toys, and Tetra Pak lamps. View images 5-8 in appendix 18.4.

Target Group B

FAMILIARITY WITH TETRA PAK RECYCLING

Both experts from ZEMA and Lusaka City Council (LCC) Waste Management Unit (WMU) were not familiar with any Tetra Pak recycling in the country. An inspector at (LCC) stated *"I have not come across or heard of any company or person recycling Tetra Paks; it has not come to my attention"*.

Discussion

The aim of the first specific objective was to profile products that can be made through Tetra Pak recycling. Therefore, from the data collected it can be noted that Tetra Pak recycling in Zambia is unexploited and unexplored. This can be seen by the expert opinion given by the inspectors from LCC and ZEMA who stated that they were not familiar with any Tetra Pak recycling in the country. Furthermore, the youths from Linda as well as other compounds could not identify any

products that can be made from Tetra Pak and this can be attributed to the lack of information and knowledge on Tetra Paks as well as the recycling sector that was not fully exploited. Chazanga identified the most products and this can be attributed to the fact that they have an environmental awareness club that is currently embarking on implementing a Tetra Pak recycling Project. In addition, Responses from the youth indicated low value products that can be made out of Tetra Paks. However, secondary data shows that high value products such as Roof Shingles, wall tiles and furniture can be made from Tetra Paks.

13.3 TO ACCESS OPPORTUNITIES IN TETRA PAK RECYCLING VALUE CHAIN

OPPORTUNITIES IN THE TETRA PAK RECYCLING VALUE CHAIN

Target Group A

Respondents couldn't state opportunities as majority had little or no knowledge about Tetra Pak recycling. However, two individuals from Bauleni and Chazanga were able to identify opportunities in Terta Pak recycling. The individual from Chazanga said "*for us young school leavers it's better to engage ourselves into such a business in order for us to make money"*. While the individual from Bauleni stated that "*I am found with people who drink, so I can be making bags. You find that visitors would want something to remember so I can be selling them souvenirs"*. Conversely, an individual from Kanyama disagreed saying "*I don't see any opportunities, I think they just cause a lot of dirt because unlike "Junta bottles" when you wash them you can reuse them but Tetra Paks can't be taken back to the breweries for repackaging or reused for other purposes"*.

Target Group B

Both experts from LCC and ZEMA did agree that Zambia was ready and able to benefit from the opportunity. An inspector at ZEMA said "*well recycling is relatively new and people in Zambia are recycling, we have been trying to have people who recycle registered in our new Act the Environment Management Act No 12 of 2011 so that we could work hand in hand as this could assist in championing our cause"*. The Inspector from WMU stated "*if only people understood the economic benefit of recycling and get organized and involved we can benefit as Zambia is ready. Waste is a very huge problem.*

OPINION OF THE MOST EASILY RECYCLED PRODUCT IN ZAMBIA

Target Group B

Plastics and bottles were cited as the most easily recycled product in Zambia by both experts. An inspector at ZEMA stated "*it's hard to tell, but what I have heard is that the most rampant recycled product is plastic and bottles into what we are yet to find out"*. In addition, the experts were asked if this was a viable business with huge returns. It was established that both agreed that they saw it as a viable business but could not quantify it in monetary terms. A ZEMA

inspector stated "*yes it can be a viable business, firstly it takes care of the environment and if we can have different things recycled it would be a plus"* while WMU inspector stated that "*I think it's a viable business with huge returns because for somebody to be in such type of business means that they are getting something because no one would want to be in a business where they are making losses. The material is readily available at a minimal cost"*.

Secondary Data

Opportunities in Tetra Pak recycling can exist at 3 stages namely; Waste Generator stage - Tetra Paks can be collected from the consumers who use these products, Collection Stage - at this stage Tetra Paks can be collected by designated Council workers and garbage collectors and finally at official dumpsites. Therefore, waste pickers can benefit in this chain as the product can easily be obtained at any stage. In addition, this material can be sorted and cleaned, processed and polished into high value products which can be distributed to consumers. Consequently, job opportunities and businesses can be created at any stage in the chain. Below is the Tetra Pak recycling Value chain.

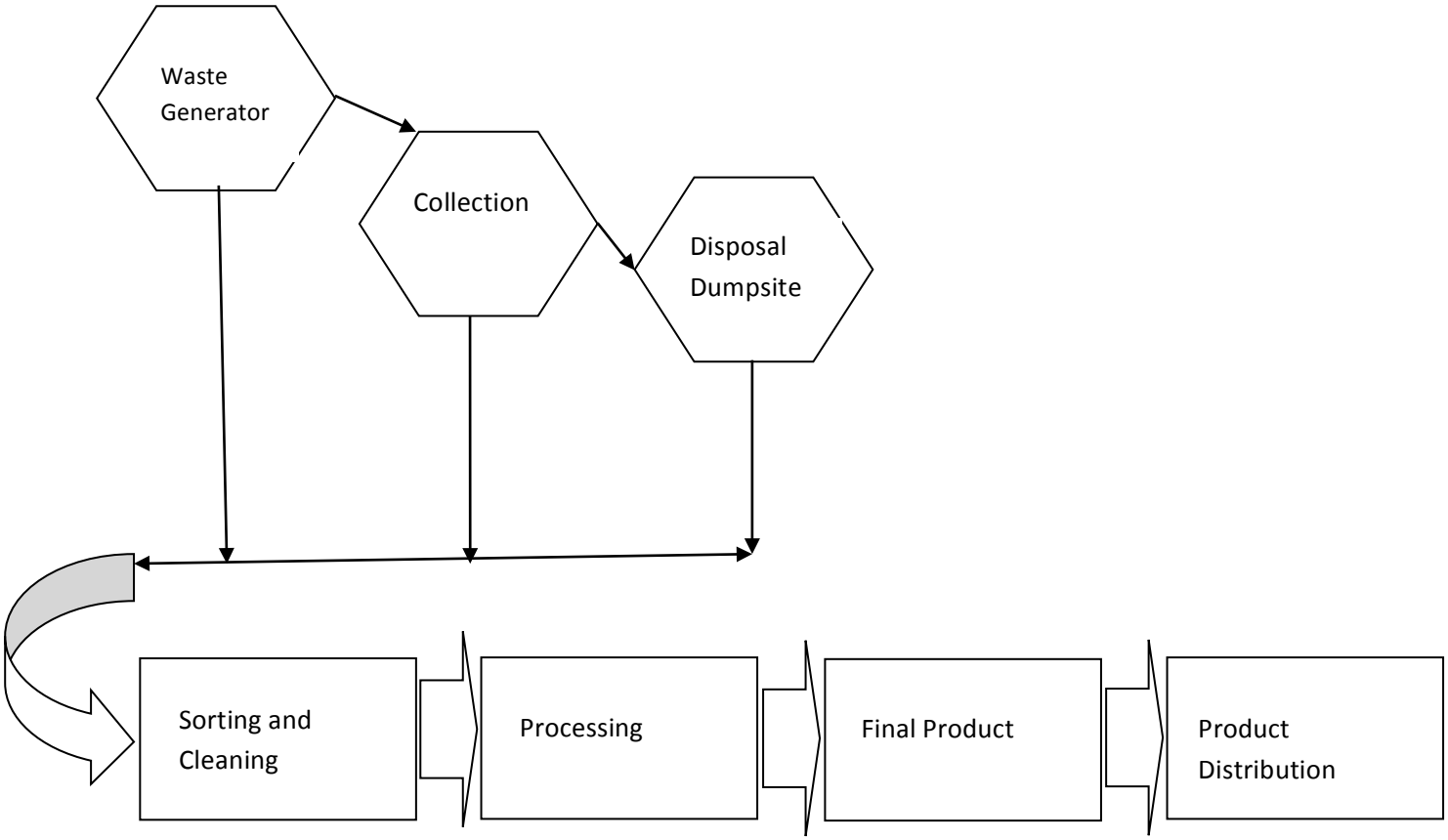


Diagram 1: TETRA PAK RECYCLING VALUE CHAIN

Supporting waste pickers in Brazil

Recycling is considered an efficient solution to the problem of urban waste in many locations, but it is often more than just about doing the right thing for the environment. It is also an opportunity to socially integrate the legions of local waste pickers, an essential part of the recycling chain. Waste pickers collect recyclable materials from the waste stream, either for their own personal use or to sell on. This practice is particularly prevalent in developing and emerging countries, where infrastructure may struggle to keep pace with the amount of waste produced by a fast-growing population. In more recent times, Latin American countries Brazil included, have led the way in forming workers' groups, setting up micro-enterprises and establishing partnerships with businesses and governments to reflect the significant contribution of waste pickers to job creation, public health and mitigating climate change. In 2013, Tetra Pak consultants provided training to 14 cooperatives from the São Paulo, Goiás and Paraná states, reaching more than 450 waste pickers. Their goal was to encourage a more professional performance of the waste picker cooperatives to transform them into real raw material producers.

Used carton collection in India

In parts of the world with limited packaging and waste regulations or infrastructure, such as India, there is no sorting of waste by households or door-to-door collections. Street waste pickers pick through the waste that accumulates by the roadside and at local dumps, selling what they can to scrap dealers, while 'wet' and non-recyclable waste get left for landfill. Legislation introduced in 2011 advocates that manufacturers support local authorities in setting up collection centers to improve the recovery and recycling of plastic waste. Tetra Pak India has brought together waste pickers, scrap dealers, NGO collection organizations and recyclers to make the collection and sorting of used beverage cartons much more efficient. Having identified the main godaams (hubs) of waste pickers, we are using Paryavaran Mitra (Friends of the Environment) clubs, 'health check camps' and even social events like cricket matches to build rapport and educate them that our used beverage cartons are a different grade of waste to paper and are sought after by waste collectors and recyclers if separated. We're also strengthening our relationships with new NGO collection partners through workshops, street plays and leaflets.

However, challenges in the value chain include, health risks- handling waste poses many health risk to workers. These are even greater for informal workers due to their daily unprotected exposure to contaminants and hazardous materials. In addition, treated as nuisances by authorities and with disdain by the public, waste pickers are usually ignored within public policy processes and frequently suffer low social status and self-esteem.

Discussion

The aim of the second objective was to access opportunities in the Tetra Pak recycling value chain. It was established that youths in target group A showed that they could not clearly state opportunities in the Tetra Pak recycling value chain, this could be attributed to lack of an established value chain and the sector not being fully exploited. According to secondary data opportunities can exist at 3 stages namely waste Generator Stage, collection stage and disposal dumpsite stage. Consequently, job opportunities and businesses can be created at any stage in the chain. For instance, In more recent times, Latin American countries Brazil included, have led the way in forming workers' groups, setting up micro-enterprises and establishing partnerships with businesses and governments to reflect the significant contribution of waste pickers to job creation, public health and mitigating climate change. Additionally, experts at LCC and ZEMA further stated that Zambia was ready and able to benefit from these opportunities as currently, plastics and bottles were already being recycled in Zambia.

13.4 TO INVESTIGATE MARKET DEMAND FOR TETRA PAK RECYLED PRODUCTS

MARKET FOR TETRA PAK RECYCLED PRODUCTS

Target Group A

Potential Market for Tetra Pak recycled products include; local communities, markets, shopping malls and industries. An individual from Bauleni said *"shopping malls during Sunday market where you find different classes of people because if I sold to the locals in my area they wouldn't buy as that is a product that they are very familiar with and see every day so they would not just be interested".*

CUSTOMERS FOR TETRA PAK RECYCLED PRODUCTS

Target Group A

The respondents cited Tourists, locals and well as people in construction as potential customers for Tetra Pak products. A Chawama youth said "*for instance if you can make a basket out of Tetra Pak you can take them to Livingstone and sell them to the tourist without loss because these are stuff that you just see lying around".*

MARKET FOR TETRA PAK RECYCLED PRODUCTS

Target Group B

Both experts from LCC and ZEMA could not identify any potential market for Tetra Pak products. An inspector at LCC said; "*unfortunately, am not familiar with Tetra Pak recycling nor heard anyone or any company that is specialised in that business. Therefore I cannot state any potential market for a product that am not familiar with".*

Discussion

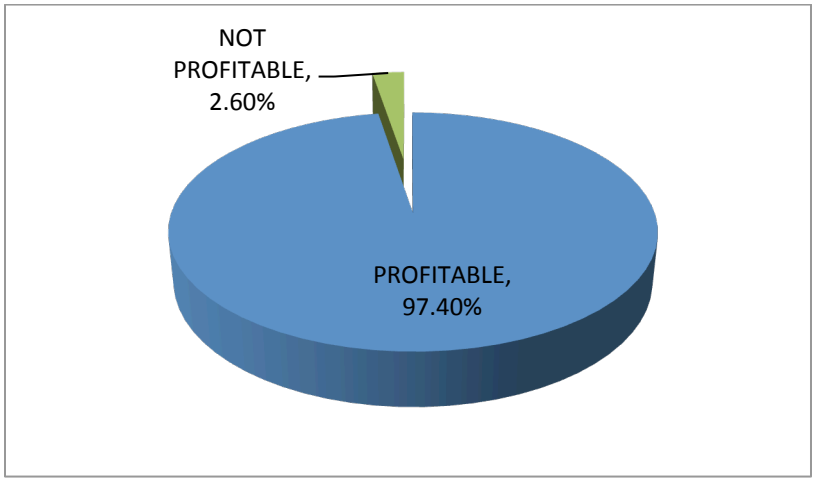
The aim of the third objective was to investigate market demand for Terta Pak recycled products. It was established that, there was no market demand for Tetra Pak recycled products in Zambia. This can be attributed to that fact that currently there was no established business or individuals that were manufacturing or selling Tetra Pak recycled products. In addition, it can also be attributed to the fact that there is lack of knowledge and awareness of Tetra Pak recycling. However, despite the fact that the sector was unexplored and unexploited, the sector was identified to possess potential. Therefore, identified potential market for Tetra Pak recycled products that were noted include, local communities, markets, shopping malls and industries. Additionally, potential customers for recycled products were also identified and these include; locals, tourists and industries.

13.5 TO EXAMINE THE YOUTHS PERCEPTION OF BUSINESS OPPORTUNITIES IN TETRA PAK RECYCLING

OPINION OF TETRA PAK RECYCLING AS A PROFITABLE BUSINESS

Target Group A

The figure below shows the cumulative frequency of opinion of youths to Tetra Pak recycling as a Profitable Business.

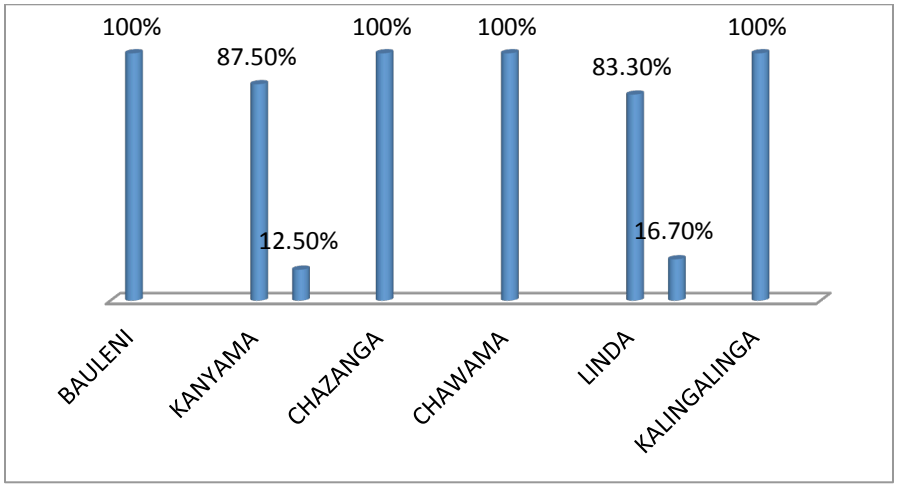


Source: Field Data

FIGURE 1: CUMULATIVE FREQUENCY OF YOUTHS OPINION

74 out of 76 respondents (97.4%) stated that Tetra Pak recycling business was profitable, while 2 out of 76 respondents (2.6%) did not think Tetra Pak recycling was a profitable business.

Additionally, the figure below shows responses of opinions of youths to Tetra Pak recycling as a profitable business according to high density area.



Source: Field Data

FIGURE 2: OPINION OF YOUTHS IN HIGH DENSITY AREA

10 out of 10 respondents (100%) from Bauleni thought Tetra Pak recycling is a profitable business. The respondents further stated that it was a profitable business as raw materials were free and readily available. One respondent from Bauleni said "*it is profitable as the materials are free it's just a matter of walking past a bar or tavern but if people began to know the value of the paks they could start attracting a charge as demand grows I can even engage kids to help picking for a small fee".*

7 out of 8 respondents (87.5%) from Kanyama thought it was a profitable business. They further stated that the raw materials were easily accessible and free but argued that products have to be made.One respondent stated that "*the Shake Shake Paks are everywhere but unless things are made from them then it can be a profitable business.* However, one individual representing 12.5% disagreed. He stated that "*you see unlike other bottles Tetra Paks cannot be put in the fridge once used or reused as they become soft hence I didn't think it can be a profitable business to recycle them.*

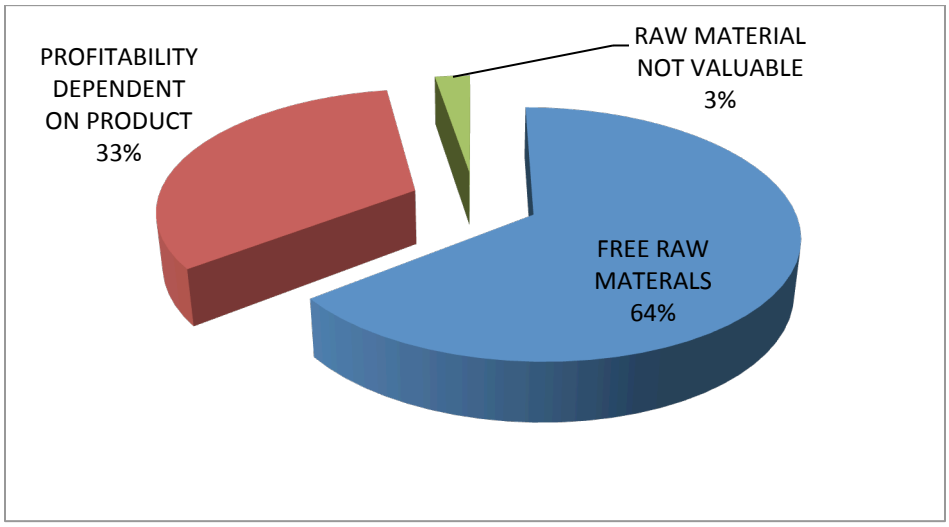
12 out of 12 respondents (100%) from Chazanga thought it was a profitable business. They further stated that it was a profitable business as one did not need capital or machinery to start a business. One respondent said "*yes, it can be a profitable in the sense that you do not need capital for it to start the business".*

20 out of 20 respondents (100%) from Chawama thought it was a profitable business. They further stated that the raw materials was free and hence was profitable. One respondent said "*Yes, because you do not buy them, so if you make something out of it you will be able to make a profit out of your product.*

5 out of 6 respondents (83.3%) from Linda thought it was a profitable business. They further stated it was a matter of introducing a product on the market and being taught the skill. One respondent said "yes*, it can be a profitable business only if we are able to learn how to make these products out of Tetra Paks"*. However, one respondent representing 16.7% did not think it was a profitable business he said "No*, what can you make and where do you sell you can't make money from those things that's why they are just laying around"*.

20 out of 20 respondents (100%) from Kalingalinga thought it was a profitable business. They argued that profitability would depend on products being made. One individual said "*if you can make roofing sheets out of these chibuku Paks I think it would be profitable"*.

The figure below shows cumulative frequency of youth's responses.



Source: Field Data

FIGURE 3: CUMULATIVE FREQUENCY OF RESPONSES

49 out of 76 respondents (64%) from Bauleni (10 respondents), Kanyama (7 respondents), Chazanga (12 respondents) and Chawama (20 respondents) stated that Tetra Pak recycling business was profitable because the raw materials were free and easily accessible. In addition 25 out of 76 respondents (33%) from Kalingalinga (20 respondents) and Linda (5 respondents) stated that Tetra Pak recycling was profitable but was dependent on the products being made and sold. However, 2 out of 76 respondents (2.7%) from Kanyama and Linda stated that Tetra Pak recycling business was not profitable as they perceived that the raw materials were not valuable.

YOUTH AND COMMUNITY INTERGRATION INTO THE TETRA PAK RECYLING BUSINESS

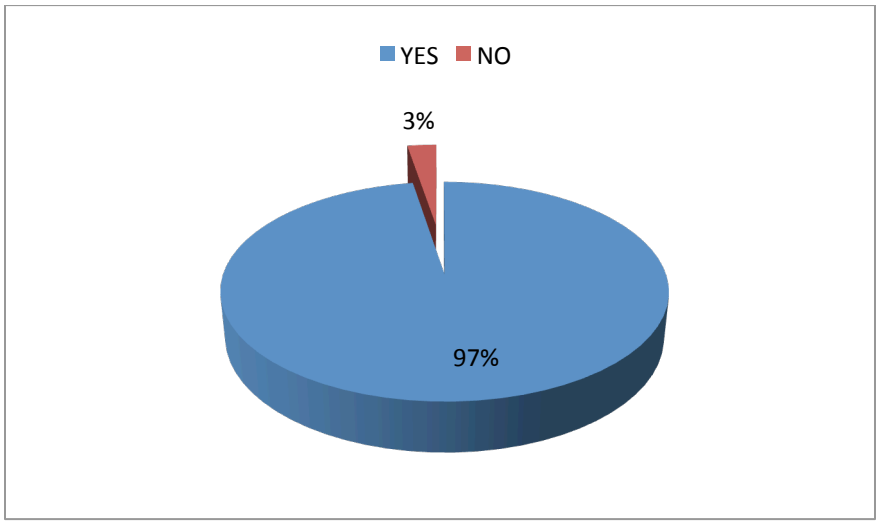
Target Group B

The WMU inspector stated *"we have been looking for individuals to come to get licenses to recycle or to even collect garbage from households or even the dumpsites so that they can be added to the waste stream that has been developed"*. While ZEMA inspector stated *" I think if someone can find something to do in recycling we would welcome them, they can come forward for guidance and how exactly they can make sure that what they are doing is environmentally friendly our doors are always open"*.

WILLINGNESS TO VENTURE INTO TETRA PAK RECYCLING BUSINESS

Target Group A

The figure below shows the cumulative frequency of responses by youths to willingness to venture into Tetra Pak recycling business

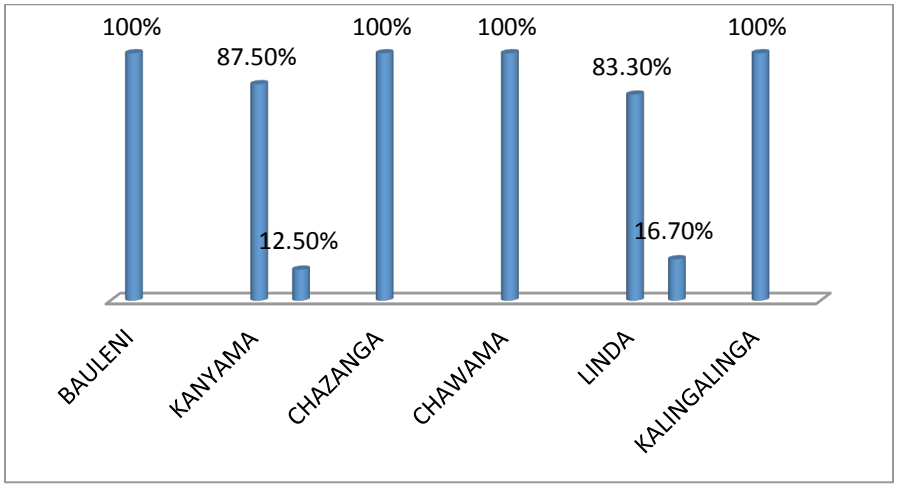


Source: Field Data

FIGURE 4: CUMULATIVE FREQUENCY OF WILLINGNESS

74 out of 76 respondents (97%) were willing to venture into Tetra Pak recycling, while 2 out of 76 respondents (3%) were not willing to venture into Tetra Pak recycling business.

In addition, the figure below shows responses to willingness to venture into Tetra Pak recycling business.



Source: Field Data

FIGURE 5: WILLINGNESS TO VENTURE INTO TETRA PAK RECYLING BUSINESS

10 out of 10 Respondents (100%) in Bauleni were willing to venture into the business. The major reasons were that they perceived it as a lucrative business. One respondent said "*if the money we will be getting is worth it and it makes me feel good and if the work is not hard so that interest does not finish".* Another respondent stated that "*yes I am willing because I believe if you make stuff for kids you can make money because the kid will be crying when they see the product so you will just be forced to buy it and I will make my money".*

7 out of 8 respondents (87.5%) from Kanyama were willing to venture into the business. The major reason was that they wanted to learn a skill and were not employed. One respondent "*yes, because I don't have things to do otherwise we are willing, its empowerment I would love to learn the skill".* However, one respondent representing 12.5% was not willing to venture in the business. His said *" No, I can't be playing with Chibuku Paks at my age, that stuff is for kids am too old for such things people can't take me seriously".*

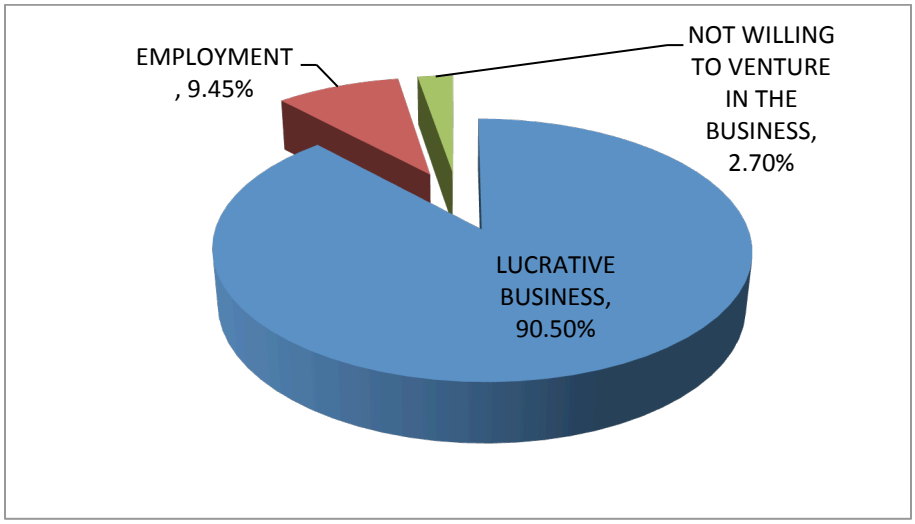
12 out of 12 respondents (100%) from Chazanga were willing to venture into business. The major reason was there perception of it being a lucrative business. One respondent said "*yes, am willing because it is a simple method of making money and also to keep Zambia clean".*

20 out of 20 respondents (100%) from Chawama were willing to venture into the business. The major reason was their perception of it being a rewarding business in monetary terms as well as keeping Zambia clean. One respondent said "*yes am willing, it will help me not only to make money but also to keep Zambia clean. It will also create opportunities not only for us but for other youths as well".*

5 out of 6 respondents (83.3%) from Linda were willing to venture into the business. The major reason was their perception of it being a lucrative business. One respondent representing 16.7% said "*bad kind, looking at the same business it looks like I will be able to generate some income and change my life.* However, one individual was not willing he stated *"No, they are better ways to make money than picking up shake shake Paks me awe I can't".*

20 out of 20 respondents (100%) from Kalinaglinga were willing to venture in Tetra Pak recycling. The major reason was that raw materials were easy accessible and therefore was lucrative and that they it would assist in making Zambia clean. One respondent said "*yes, it will be cheaper for me to do business because the commodity is easy to acquire ".* While another youth said "*Zambia is being a development country so we just have to recycle, if we do not then it will be a country were human beings cannot live'.*

The figure below shows cumulative frequency of youth's responses.



Source: Field Data

FIGURE 6: CUMULATIVE FREQUENCY OF RESPONSES

67 out of 74 respondents (91%) from Bauleni (10 respondents), Chazanga (12 respondents), Chawama (20 respondents), Linda (5 respondents) and Kalingalinga (20 respondents) stated that they were willing to venture into Tetra Pak business as it was a lucrative business raw materials were easily accessible and did not require capital or machinery to start a business. Additionally, 7 out of 74 respondents (9%) from Kanyama were also willing to venture into the Tetra Pak business as they were not employed and were seeking employment. However, 2 out of 74 respondents (2.7%) were not willing to venture into the business as they perceived it not to lucrative.

Discussion

The aim of the third objective was to examine youth's perception of business opportunities in Tetra Pak recycling. It was established that 97.4% of the youths stated that Tetra Pak recycling was a profitable business and 90.5% were willing to venture into the Tetra Pak recycling business as raw materials were easily accessible. This can be attributed to the fact that is evident in the numerous bars and taverns in high density areas that sell beer packaged in Tetra Paks. View Appendix 18.5 for pictures of Tetra Pak waste that were taken during the research in Linda and Chazanga compounds just beside the road. Additionally, 9.45% of youth were also willing to venture into the Tetra Pak recycling as they were unemployed. These responses can be attributed to high levels of unemployment among the youths in Zambia.

However, 2.7% of the respondents stated that Tetra Pak recycling was not profitable and stated that they were not willing to venture into the business. Furthermore, they stated that is was due to the fact that they perceived it to be of no value and therefore were not interested. These responses can be attributed to the fact that there is limited information and knowledge of Tetra Pak recycling as it is an unexplored and unexploited sector in Zambia. In addition, it was established that youths and communities can be integrated into the Tetra Pak recycling business by obtaining licenses to be integrated into the waste management streams as well as providing opportunities for them to seek guidance from ZEMA as the institution has an open door policy which youths and individuals can freely walk in to get assistance or information from their resource centre.

3.6 TO ACCESS CHALLENGES THAT CAN BE ANTICIPATED IN THE DEVELOPMENT OF A TETRA PAK RECYCLING VALUE CHAIN

CHALLENGES ANTICIPATED IN THE TETRA PAK VALUE CHAIN

Target Group A

Bauleni

- Market for products. One respondent said "*if you make the stuff and can't sell them that would be a loss"*.
- Health hazard. One respondent said " *you find that the areas were these chibuku Paks are found are dirty places as we don't even like washing our hands, you find a friend with food you beg and just eat forgetting you were ain a dumpsite that will be a health challenge.*
- Demand for Tetra Paks in the Future. One respondent said *"were will be picking if bar owners noticed that these Paks had monetary value they will be demanding for a payment for the collection of these Paks and we will not be allowed to pick them up unless you give a little something"*.

Kanyama

- Market for Products. One respondent said "*where to sell the products made, it can be a big problem, because of the way the economy is it can be difficult to identify potential customers.*
- Raw material location. One respondent said "*where to find these Tetra Paks it means going round to find and pick them".*

Chazanga

- Market demand. One respondent said " *it might not be easy for us to have more customers since the business is new"*
- Social norms. One respondent said *"people will think that we are crazy when they see us picking up the Tetra Pak in the garbage"*. While another said "*people who are too religious may not buy the product because of what it looks like for example chibuku or shake shake which is common".*
- Health Hazard. One respondent said *"in terms of Hygiene you might get diseases from picking up the Paks".*

Chawama

- Social norms. One respondent said "*people will be laughing at me that I am mad"*. While another said "*people will see me as crazy picking up Paks since I do not drink beer".*
- Operation costs. One respondent said *"transport cost is the other issue, collecting them from one place to another"*. While another said "*you will need other facilities for to produce high value products".*

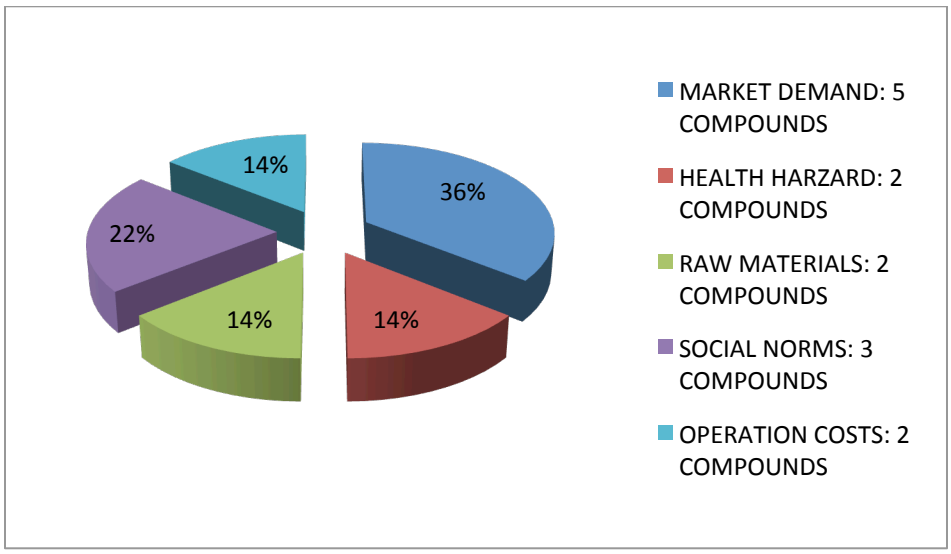
Linda

- Market Demand. One respondent said "*the only challenge I can face is the market since it's a new product".*

Kalingalinga

- Social norms. One respondent said "*it wouldn't look decent ladies to go around bars picking up the Tetra Paks".*
- Operation costs. One respondent said "*products such as hand bags will need extra materials such as cotton to produce a final product".*
- Market Demand. One respondent said "*some ladies wouldn't love to be moving around with a pamalat bag".*

The figure below shows a cumulative frequency of challenges anticipated by all high density areas.



Source: Field Data

FIGURE 7: CUMULATIVE FREQUENCY OF CHALLENGES

The major challenges that were anticipated in developing a Tetra Pak recycling value chain was market demand and social norms. Additionally, other challenges anticipated include; health hazard, raw materials and operation costs.

CHALLENGES IN RECYCLING GENERALLY

Target Group B

A WMU inspector stated that "*The challenge is that people that are doing the recycling business they are supposed to fit into the waste stream which is currently in place but the problem we have is that most of the people in recycling go to the dumpsite to collect what has already been taken that side, so to separate the materials from those that are non-recyclable becomes a challenge.* A ZEMA inspector argued that "*knowing who they are and what they are doing is the greatest challenge".*

CHALLENGES ANTICIPATED IN THE TETRA PAK VALUE CHAIN

Target Group B

The challenges anticipated in the development of Tetra Pak recycling value chain were adherence to rules and regulations and lack of established collection and separation of waste in its different categories.

A WMU inspector stated that "*you find that Tetra Paks after they have been soiled and contaminated with other waste, it would be challenging to separate them and coming up with the quantity need to subject to recycling might also be challenging because most people who drink these things would just throw them in undesignated places so by the time you get them they are denatured.* While the ZEMA inspector stated *"them adhering to rules and regulations as we do not know where they will established they could be burning out in the open this could result in risk for the environment as well as themselves.*

Discussion

The aim of the fourth objective was to access challenges that can be anticipated in the development of a Tetra Pak recycling value chain. It was established that the major challenges anticipated in developing a Tetra Pak value chain were market demand and social norms. Furthermore, health hazard, raw materials and operation costs were also cited as challenges anticipated. These responses can be attributed to the fact that Tetra Pak recycling in Zambia is still relatively new and is unexploited and unexplored sector. Therefore the youths anticipated these challenges based on the knowledge they have as well as experiences from other products that are being recycled such as plastics and bottles.

14.0 RESEARCH CHALLENGES

- Equal representation of gender.
- Hostility during organisation of focus group discussions as gatherings were perceived to be election campaigns.
- Strict information policy restricted researchers from obtaining information from certain institutions.

15.0 RECOMMENDATIONS

Firstly, it should be noted that Tetra Pak recycling is a relatively new concept especially in the high density areas there is a need to conduct campaigns as well as awareness of the benefits of Tetra Pak recycling.

Secondly, there is need to incorporate institutions such as ZEMA and LCC Waste Management Unit, in order to be integrated into the waste management stream so that the value chain can be established unlike savaging recyclable materials from the

dumpsite. Furthermore, to enhance policy formulation and implementation that will assist in effecting recycling bins throughout Zambia that will facilitate easy collection of recyclable materials.

Thirdly, there is need to set up Research and Development facilities that can be used by the youths and communities at large to enhance innovations in Terta Pak recycling as well as facilitate built ups in secondary schools during sciences fairs as well as during Junior Engineers Technicians (JETS) fairs.

Finally, there is need to advocate for production of high quality goods by empowering youths through skills training in Tetra Pak recycling as well signing a Memorandum of understanding (MOU) with Tetra Pak Uk Ltd to assist with establishing recycling centres as it is their cooperate responsibility.

16.0 CONCLUSION

In conclusion, the aim of this research was to investigate opportunities in Tetra Pak recycling value chain. Therefore, it was established that Tetra Pak recycling in Zambia is unexploited and unexplored. This can be attributed to the lack of information and knowledge of Tetra Pak as the recycling sector in Zambia is not fully exploited. In addition, it was established that high value products can be made out of Tetra Pak recycling and these include roof shingles, wall tiles and furniture. Furthermore, it was established that there was no clearly stated opportunities in the Tetra Pak value chain and this could be attributed to the lack of an established value chain. In addition, it was also established that there was no market demand for Tetra Pak recycled products as currently, there was no recognised business or individuals manufacturing or selling Tetra Pak recycled Products. However, it was noted that despite lack of established market there existed potential market and customers for Tetra Pak recycled products and there include; locals, tourists and industries.

Additionally, it was established that majority of the youths perceived it to be a lucrative business and were willing to venture into Tetra Pak recycling Business. They further stated that they perceived it to be lucrative as raw materials were easily and readily available and therefore starting up would not be costly. It was also established that the youths and communities can be integrated into the waste management stream so that a value chain can be established unlike savaging at the dumpsite as well as being able to receive guidance from ZEMA. Furthermore, it was established that the challenges that can be anticipated in the development of the Tetra Pak recycling value chain were market demand and social norms which can be attributed to the fact that Tetra Pak recycling is a sector that has not been exploited and explored. In addition, other challenges include health Hazard as materials would be picked from garage sites; Raw materials may become scarce in the future or may attract a charge that would be as a result of demand, and operational costs. Consequently, there is need to conduct campaigns as well as awareness of Tetra Pak recycling. Secondly, there is need to incorporate institutions such as ZEMA and LCC Waste Management Unit in order to be integrated in the waste stream so that value chain can be

established. Further to enhance policy formulation by implementing recycling bins for easy collection of recyclable materials. Thirdly, to set up research and development facilities that can be used by the youths and communities at large to enhance innovation in Tetra Pak recycling as well as facilitate built ups during science fairs and JETS. Additionally, there is need to advocate for production of high value goods by empowering youths with skills in Tetra Pak recycling as well as signing a MOU with Tetra Pak UK Ltd to assist with establishing recycling centres as it is their cooperate responsibility.

17.0 WORK PLAN

The Research will be broken down into the following activates;

Activity One: Proposal Formulation

Description: this will involve formulation of the research proposal and submission to the supervisor.

Duration: 8 Days (5th November to 14th November, 2014)

Activity Two: Data Collection

Description: This will involve collection of data from the field. This will also include a pre-test of Data collection.

Duration: 12 Days (20th November to 5th December, 2014)

Activity Three: Data Entry and Analysis

Description: This will involve data entry as well as analysis of data collected from the field and analysis of the research findings.

Duration: 5 Days (8th December to 12th December, 2014)

Activity Four: Report Writing and Submission

Description: This will involve writing the report and submission of the final research Report.

Duration: 5 Days (12th December to 17th December, 2014)

REFERENCES

Changemakers. (2014). *Another Man's Trash is Our Treasure: How Lusaka's waste problem can be turned into opportunity.* http://www.changemakers.com/discussions/entries/www.aimwith.org: accessed on 7/11/2014.

CSO. (2010). *Census of Population and Housing National Analytical Report.* Lusaka: Central Statistical Office.

GRZ. (1994). *The National environment Action Plan* . Lusaka: MTENR.

LCC. (2004). *Municipal Solid Waste Management Strategy.* Lusaka: (www.wmu-lusaka.gov.zm) accessed 7/11/2014.

LCC, & ECZ. (1997). *Solid Waste Management Master Plan Project for The City of Lusaka.* Lusaka: Zambia.

LCMS. (2011). *Living Conditions Monitoring Survey Report 2006 and 2010.* Lusaka: Central Statistical Office.

Mayeya, L., & Mukosa, C. (1997). *An Investigation into the Problem of Refuse Upon Health. A Case of Mtendere Compound.* Ministry of Finance and Economic Development: Zambia.

Milanzi, J. (2002). *Prospects of Community Participation in Solid Waste Management. A Case of Garden Compound.* Lusaka: Unpublished Geo 474 Project report UNZA.

Nichito, W. (2003). *Four Caveats for Participatory Solid Waste Management in Lusaka.* Lusaka: Unpublished Report UNZA.

18.0 APPENDIX

18.1 FOCUS GROUP INTERVIEW

APPENDIX 1: FOCUS GROUP DISSCUSSION GUIDE

FOCUS GROUP NO……..

RESEARCH TOPIC: TETRA PAK RECYCLING CHALLENGE

Dear Sir/Madam

I am market researcher from the National Technology and Business Centre (NTBC). I am conducting a market assessment on the above topic.

The focus of this research is to investigate opportunities in Tetra Pak recycling value chain. Arising from the need to conduct a market assessment, I would like you to be part of this research by consenting to be interviewed and having the interview recorded for data analysis. Please note that if you agree to be part of this research you are at liberty to withdraw from the research at any time without pressure to provide reasons. I also guarantee that any information collected either personal or professional will be regarded as absolutely confidential. This is purely a market assessment for NTBC.

Your Co-operation will be highly appreciated.

DATE OF INTERVIEW: ……..…..

RESPONDENTS SIGNITURE: ……

1. What products can be made from recycled Tetra Pak?
2. Where can you sell Tetra Pak recycled products?
3. Who can you sell tetra Pak recycled products?
4. What opportunities exist in tetra Pak recycling?
5. Do you think Tetra Pak recycling is a profitable business?
6. Would you be willing to venture into Tetra Pak recycling?

   – If yes state why?
7. What challenges can one face in Tetra Pak recycling all things being equal?

18.2 INTERVIEW GUIDE

APPENDIX 2: INTERVIEW GUIDE

INTERVIEW GUIDE NO……..

RESEARCH TOPIC: TETRA PAK RECYCLING CHALLENGE

Dear Sir/Madam

I am market researcher from the National Technology and Business Centre (NTBC). I am conducting a market assessment on the above topic.

The focus of this research is to investigate opportunities in Tetra Pak recycling value chain. Arising from the need to conduct a market assessment, I would like you to be part of this research by consenting to be interviewed and having the interview recorded for data analysis. Please note that if you agree to be part of this research you are at liberty to withdraw from the research at any time without pressure to provide reasons. I also guarantee that any information collected either personal or professional will be regarded as absolutely confidential. This is purely a market assessment for NTBC.

Your Co-operation will be highly appreciated.

DATE OF INTERVIEW: ……..

NAME OF INSTITUTION: ……

JOB TITLE OF INTERVIEWEE: ……...

RESPONDENTS SIGNITURE: ……..

EXPERT OPINION

1. Are you familiar with Tetra Pak recycling?
2. Given the opportunities in Tetra Pak recycling, do you think Zambia is ready to exploit some of these opportunities?
3. In your opinion what is the most easily recycled product in Zambia?

   -Do you see this as a viable business with huge returns?
4. In your opinion where can you sell Tetra Pak recycled Products?
5. How do you think the youth and communities can be integrated into the Tetra Pak recycling business?
6. What challenges exist in recycling generally?
7. What challenges would you anticipate in the development of the Tetra Pak recycling value chain?

18.3 FEEDBACK FORM

THE TETRA PAK CHALLENGE

TETRA PAK RECYCLING VALUE CHAIN

Feedback Form

NAME:

……

CELL:

……..

AREA OF RESIDENCE:

…….....

1. What stages are you interested in the Tetra Pak recycling value chain?
   ……
   ……
   ……
   ……
2. Why are you interested in the stage chosen above?
   ……
   ……
   ……
   ……

THANK YOU FOR YOUR FEEDBACK

18.4 IMAGES OF PRODUCTS MADE OUT OF TETRA PACK

IMAGE 1: ROOF SHINGLES MADE OF TETRA PAKS

IMAGE 2: CHAIRS AND DESK TABLES MADE OUT OF RECYCLED TETRA PAKS

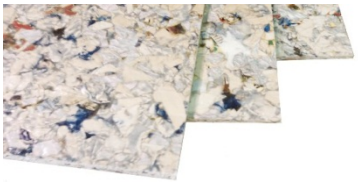


IMAGE4: TILES MADE OF TETRA PAKS

IMAGE 3: CHAIRS MADE OUT OF TETRA PAKS BY DEDON DESIGNED BY STEPHEN BURKS

IMAGE 4: BASKET AND WALLET MADE OUT OF RECYCLED TETRA PAKS

IMAGE 5: HANDBAGES MADE OF RECYCLED TETRA PAKS

IMAGE 6: TILES MADE FROM RECYCLED TETRA PAKS

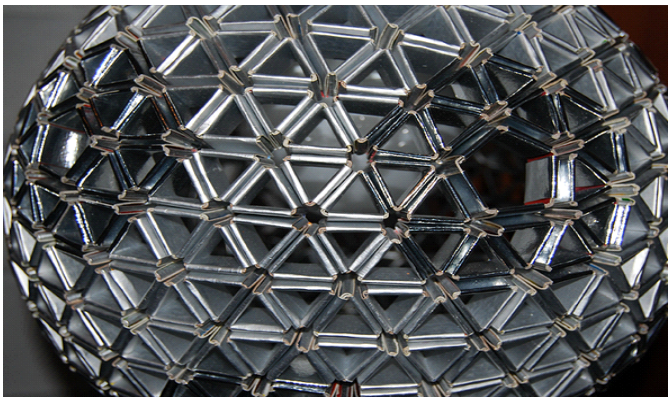


IMAGE 7: ORGAMI TETRA PAK LAMP

HOW TO MAKE ORGANI TETRA PAK LAMP: http://www.recyclart.org/2013/05/origami-tetra-pak-lamp/

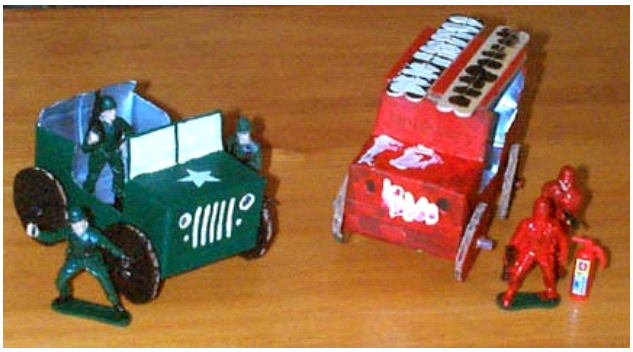


IMAGE 8: TOYS MADE OUT OF TETRA PAKS

18.5 IMAGES OF TETRA PAKS IN HIGH DENSITY AREAS DURING THE RESEARCH

IMAGE 1: PICTURE OF TETRA PAKS TAKEN IN CHAZANGA COMPOUND: 03/12/2014

IMAGE 2: PICTURE TAKEN FROM LINDA COMPOUND:02/12/2014