Researching Single-Use Plastics in Ghana: A Study of the Knowledge, Attitudes and Practice of Consumers of Single-Use Plastics in Ghana

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Executive Summary

This research investigated the use of, attitudes and behaviour towards single-use plastics (SUPs) in Ghana. It focused on the residential and commercial zones in two specific areas, Accra and Winneba, in order to illustrate how local perceptions and attitudes affect both the design and uptake of viable reusable alternatives. There is an excessive use of SUPs within the local context, particularly black polythene bags. It is the most affordable option and has become completely integrated in society, with a multi-purpose use amongst the great majority. The research shows a general awareness amongst the population regarding environmental, economic and social impacts of plastic. Despite this, there is a resistance to change in behaviour. This is partially due to a lack of an effective and affordable alternative, but also due to social norms that favour the convenience of SUPs. Research findings highlight the main characteristics of an SUP that make it the best option, indicating what an alternative needs in order to be adopted in the context. With the results, recommendations are made on government and user level in order to transition away from plastic production and waste into an environmentally friendly society, as well as opportunities for frugal innovation for alternatives to SUPs.

Keywords: Plastic pollution, waste, single-use plastic, frugal innovation

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Chapter 1. Research Introduction

1.1 Introduction

Single-Use Plastics, otherwise known as SUPs, can be considered one of the most harmful products today causing significant pollution on a global level. They are typically defined as plastic products that are only used once before being thrown away, such as plastic bags, plastic water bottles, water sachets, plastic wrapping, straws, cotton buds, and so on.[1] The detrimental effects of plastic on the environment alone are well-known, and the global mass production of SUPs combined with their single-use characteristic make them particularly harmful. In 2018, the global plastic production rate reached 360 Mt with SUPs amounting to 50% of the total production.[2] A recent report published by the OECD revealed that in 2019, plastic production reached 460 Mt, leading to 353 Mt of plastic waste that same year.[3] During the COVID-19 lockdowns and its resulting economic decline there was a slight decrease in the amount of plastic use, yet an increased use of SUPs (mainly in protective personal equipment) and thereby exacerbated plastic littering. It is expected that with an economic rebound there will be a renewed growth of plastic waste and its effects.[4]

Plastic production comes with significant environmental and socio-economic impact. The indiscriminate disposal of plastic, mostly non-biodegradable material of everyday use, pollutes terrestrial ecosystems and often causes serious floodings in cities as it blocks the drainage systems. This form of pollution becomes increasingly problematic when matched with a deficient waste management system and infrastructure.[5] Plastics also cause extreme marine pollution as their numbers have significantly accumulated in lakes, rivers and the ocean. In 2019, the amount of plastic waste that leaked into aquatic environments reached 6.1 Mt.[6] This persistent pollution and high volume of waste does not only negatively impact the environment, it also has socio-economic costs in regards to the impact on tourism, fishermen,

[1] Chen, Yuan, Abhishek Kumar Awasthi, Fan Wei, Quanyin Tan, and Jinhui Li. 2021. "Single-Use Plastics: Production, Usage, Disposal, And Adverse Impacts". *Science Of The Total Environment* 752 (2021): 141772. doi:10.1016/j.scitotenv.2020.141772.
[2] Ibid, 2
[3] Agrawala, S, Dubois, M, Börkey, P, & Lanzi, E. *Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options*. Paris: OECD Publishing, 2022
[4] Ibid
[5] Adam, Issahaku, Tony R. Walker, Joana Carlos Bezerra, and Andrea Clayton. "Policies To Reduce Single-Use Plastic Marine Pollution In West Africa". *Marine Policy* 116 (2020): 103928. doi:10.1016/j.marpol.2020.103928.
[6] Agrawala, Dubois, Börkey & Lanzi, *Global Plastics Outlook*

and health effects in broader society.[7] The detrimental effects of (single-use) plastics are particularly prevalent in developing countries, where the majority of the population use SUPs as they are the most common and inexpensive packaging material.[8]

Several African countries have begun to tackle the plastic problem by implementing nation-wide policies or bans on certain types of SUPs. Tanzania, for example, implemented a national ban on plastic bags in 2019, with the successful result that no plastic bags can be found in the country – tourists are not even allowed to enter the country with a plastic bag.[9] The ban has shown very positive environmental impacts as SUP bags no longer contribute to plastic waste and remain absent from the environment and general society.[10] West African countries have also adopted policies or bans aimed at reducing SUPs, however it still appears to be a persistent problem that is ineffectively addressed. Unfortunately, Ghana is the only country in West Africa to maintain a market-based strategy, and no plastic ban.[11] The lack of action is reflected in the amount of plastic waste observed throughout the country, as well as the noticeable harmful effects of SUPs in particular.

Ghana's capital city, Accra, frequently experiences severe floodings caused by SUPs clogging the waterways, as well as significant marine pollution in coastal areas (see Appendices A and B for visuals).[12] This has further implications for economic costs and health effects. A central challenge is the way SUPs are strongly woven into the daily lives of citizens. Plastic water sachets are the cheapest way to access safe, commercially produced drinking water and plastic bags are provided for free during shopping, sometimes two at a time. Amongst other SUPs, these products are used on a daily basis by the majority of the population.[13] In addition, the situation is deteriorating in many countries like Ghana due to an increasingly rapid process of urbanization and population growth.[14] With the extensive

[7] Adam et al., "Policies To Reduce Single-Use Plastic Marine Pollution In West Africa."
[8] Adam, Issahaku, Tony R. Walker, C. Andrea Clayton, and Joana Carlos Bezerra. "Attitudinal And Behavioural Segments On Single-Use Plastics In Ghana: Implications For Reducing Marine Plastic Pollution". *Environmental Challenges* 4 (2021): 100185. doi:10.1016/j.envc.2021.100185.
[9] Deutsche. "Tanzania Bans Plastic Bags To Clean Up Environment". *DW.COM*, 2019. https://www.dw.com/en/tanzania-bans-plastic-bags-to-clean-up-environment/a-49003120.
[10] Nkya, Elieshi Oberlin. 2020. "Assessment on the Effects of Banning Plastic Bag Carrier in Tanzania: A Case of Ilala Municipal Council" MBA-CM, Mzumbe University.
[11] Adam et al., "Policies To Reduce Single-Use Plastic Marine Pollution In West Africa.", 4
[12] Adam et al., "Attitudinal And Behavioural Segments On Single-Use Plastics In Ghana"
[13] Ibid
[14] Kombiok, Emmanuel, Kingsley Atta Nyamekye, Rita Adjei, and Leslie Danquah. "Determinants Of Unsafe Plastic Waste Disposal Among Households In The Tamale Metropolitan Area, Ghana". *Journal Of Environmental And Public Health* (2021): 1-6. doi:10.1155/2021/9974029.

harmful effects of SUPs on environmental, economic and social spheres, there is a growing urgency to focus on minimizing SUPs and their production as opposed to recycling.

One of the obstacles in reducing SUPs is the lack of inexpensive, reusable alternatives implemented by the government and/or other relevant stakeholders. The current SUP reduction policies in West Africa are questionable in their effect and often provide a one-size-fits-all solution that cannot be applied to the dynamic demographics and local market exchanges in the country.[15] There remains a gap in country-specific knowledge on how to minimize SUPs and implement effective alternatives and frugal innovations, which are understood as quality solutions for low-income consumers and a resource-constrained environment.[16] This research focuses on Ghana in particular and how local alternatives can be implemented in society whilst working towards the minimization of SUPs in coastal communities. It contributes to the existing literature on local perceptions of SUPs and plastic pollution, its effects and relevance in daily lifestyles as well as perceptions on using alternatives and the subsequent consequences. Through understanding consumer interaction with SUPs it seeks to illuminate the necessary characteristics for an effective alternative and processes towards SUP reduction. The main objective of this research is to critically examine local solutions towards SUP pollution as well as alternatives for SUPs in the market and university context of Ghana's coastal communities by understanding the use of, attitudes and behaviours towards SUPs.

Research Objectives:

1. To collate and synthetize information on the use of SUPs in Ghana's local context
2. Identify attitudes, perceptions and behaviour towards SUPs and SUP alternatives in selected localities in Ghana
3. Elucidate on context-specific solutions to minimize SUPs, and contribute to the implementation of affordable and re-usable alternatives in order to support policy development

[15] Adam et al., "Attitudinal And Behavioural Segments On Single-Use Plastics In Ghana"
[16] Hindocha, Chandni N, Grazia Antonacci, James Barlow, and Matthew Harris. "Defining Frugal Innovation: A Critical Review". *BMJ Innovations* 7, no. 4 (2021): 647. doi:10.1136/bmjinnov-2021-000830.

Sub-objectives

a. Identify the array of SUPs on site and the most commonly used, to contribute to sector specific solutions
b. Explore internal and external factors impacting behaviour of Ghanaians towards SUPs
c. Determine impact of SUPs on livelihoods and potential impact of alternatives on end-users in specific commercial spaces in Ghana
d. Determine challenges that arise with suggested alternatives

1.2 Research Question

In what ways do local perceptions and attitudes affect the design and uptake of viable reusable alternatives to SUPs in Ghana's urban areas with a focus on residential and commercial zones?

Specifically:

a. How do consumers process the paradox that exist in knowledge and attitude to the disadvantages of SUPs in Ghana?
b. What kinds of opportunities exist for frugal innovations in the design and uptake of viable alternatives to SUPs in Ghana?
c. Are the barriers to reusable alternatives surmountable, and in what ways can hurdles be overcome?

1.3 Research Design & Methodology

1.3.1. Study Setting

The research was conducted in two coastal communities; Accra and Winneba. As the capital city of Ghana, Accra is an interesting and lively city setting to investigate, whilst Winneba is a significantly smaller fishing town approximately 65km away from Accra. Both areas have a large university and student population, resulting in the presence of an educated youth that are often likely to engage with topics such as climate change whilst remaining heavy users of SUPs in daily lifestyles. Adjoining markets that serve the needs of the teeming university population are also caught in the complexity of packaging of their sales products, for ease of commercial retail transaction in a complicated space where SUPs and locally available bio-degradable packaging intersect. Evaluating the knowledge and attitude base for each of these constituencies (university environment and market), how it informs their practice, and the dilemmas that have to be contended with, helps gauge the positive environmental behaviour

(PEB) and what it means for the uptake of alternatives. The research therefore focuses on the two contexts of university communities and markets in order to increase the validity of data and recommendations.

In specific, the study setting in Accra was the University of Ghana and the London Market. In Winneba, it was the University of Education Winneba, South Campus (UEW) and the Winneba market. Local markets were chosen on the basis of frequent social and economic interaction with university students.

1.3.2 Data Collection

The data collection process consisted of three consecutive phases:

1. Quantitative university-wide survey
2. Focus group discussions (FGDs) with university students on both campuses
3. Semi-structured qualitative interviews with market vendors

The first phase was a quantitative survey across the University of Ghana and the UEW. Respondents ranged in age (18+), gender, background, study background, and involvement in university clubs/associations. The sampling process was done through random sampling, by approaching university students on campus, as well as snowball sampling where students spread the link to the survey across WhatsApp groups and other forms of communication. The combination of both sampling methods enabled a greater diversity among respondents. The survey itself targeted their usage, attitudes and behaviour towards SUPs and pollution as well as suggestions for alternative products.

After collecting data from the survey, the second phase of the research was FGDs. These were semi-structured to allow participants to guide the discussion whilst staying on topic, which also allowed me to observe the wider discussion and knowledge on plastic waste and waste management. In total four FGDs were conducted, one male and one female group per university with 6-9 participants per group. Groups were separated by gender to ensure comfortability and confidence in participation. Participants were sampled through the survey, where they indicated their interest to join. Written consent was collected from each participant whereby they also gave permission to audio record the session for the purpose of

data collection. The FGDs were conducted in English, however a local translator was available to assist when necessary.

The third phase consisted of semi-structured qualitative interviews with local market vendors at the London market in Accra and the Winneba market in Winneba. With the background knowledge gained during the previous two phases, these interviews again targeted the use of, attitudes and behaviour towards SUPs, and questioned possible alternatives in the local market context. The added value of this stage was that market vendors not only use but also sell or hand out SUPs on a regular basis whilst they historically used other products, therefore it was interesting to compare their local expertise with the information previously gathered from university students. It also added the factor of education as an interesting comparison between the respondents. Two interviews were held at each market in order to gain a deeper insight as opposed to collecting a larger sample. Each interview was audio recorded, with verbal consent, and assisted by a local interpreter to minimize the language barrier and avoid wrongful interpretations.

The two different respondent groups allowed for an interesting comparison between education levels as well as the different ways in which the user groups used SUPs and behaved towards them. Particularly regarding potential alternatives, it was interesting to look at the different perspectives and how they reacted towards questions about potential solutions. This will be further elaborated on in chapters four and five. Overall, it was useful to collect data from participants belonging to different segments in order to gather a range of perspectives and recommendations.

Nevertheless, there were some limitations to the research design that must be considered. The main focus was university students who, according to previous research studies, will most likely be potential avoiders due to their educational background.[17] This could influence their response and reported behaviour, which can in turn influence the research results in the third data collection method. As a researcher it was important to be aware of the bias it can give to the research and actively minimize this through continuous reflexivity during the research process (also regarding researcher bias). Another limitation is the sample that was used. The research was limited to two contexts, therefore it is not representative of the wider population

[17] The concept of avoiders will be further explained in chapter 2

but merely an indication of existing perceptions. However, the backdrop of the lack of success of a one-size-fits-all solution makes sectoral analyses such as this imperative. Additionally, limitations of the data collection process are accessibility, diversity and language/cultural differences. Lastly, the survey design could be a limitation due to cultural differences that can result in a misinterpretation of the language used and the framing of the questions. Survey questions were therefore first looked at by a local researcher so as to minimize areas of ambiguities and difficult-to-interpret technical terms.

The data acquired through recorded interviews were transcribed and later subjected to content analysis (including observations made during the research process). The survey data was used for a quantitative analysis and a report of the findings to ensure the results were considered in the next phases of the research. The FGDs and interviews used a thematic analysis.

1.4 Research Ethics

Some ethical issues came into play when designing the research. Firstly, all participants were given a participant information sheet beforehand, outlining the aim and purpose of the research to ensure they understood the research they were taking part in and the role they play. Additionally, each participant signed or verbally agreed to a consent form that included anonymity and confidentiality, the implication of the use of video or photography during the research process, as well as their right to withdraw from the research at any point as voluntary participants. For the survey and FGDs, this was done in the form of written consent whilst interviews used verbal consent due to literacy levels. The data obtained was treated anonymously and confidentially, unless explicitly asked permission (for example in the case of photographs). In addition, participants were asked if they would like to be debriefed once the research is complete. If so, they will receive a written or verbal review of the research findings.

Due to my personal background as a researcher, there was an ethical risk of sounding condescending or coming across as a ‘white savior’ imposing a better solution to the customary practices. I did not want participants to feel I was imposing a certain perspective or solution upon them, therefore I had to be careful not only with the wording of my questions and awareness of ethical boundaries, but also if I was hinting at information on

alternatives that exist, or that can be built on, keeping a minimal imposition of external ideas when designing the research documents.

The research did not involve vulnerable groups or any further realistic risks that could harm participants. There were no further risks for myself as a researcher.

1.5 Paper Outline

In order to answer the research question, this thesis is divided into five chapters. The first chapter serves as an introduction to the research and outlines the research objectives, design and ethics. The second chapter consists of a literature review and theoretical framework in which the research is positioned. It will also elaborate on the multi-disciplinary methodology adopted in the research. The third chapter further contextualizes the research through an elaboration on the study setting and relevant background of the location and participants involved. It also considers the positioning of the researcher in the research process. The fourth chapter focuses on data analysis and includes a discussion of the fieldwork results in relation to the research objectives. The fifth and final chapter provides a conclusion and the main recommendations derived from the research, which can be used for further action or research purposes.

Chapter 2: Academic Debate

2.1 Literature Review

The increasing importance and implications of the global rise in SUP production and usage has resulted in a sufficient amount of relevant literature. The recent report published by the OECD on the *Global Plastics Outlook* provides a clear overview of the current challenges related to plastics.[18] Whilst global annual plastic production has doubled from 2000 to 2019, the amount of plastic waste has more than doubled. Looking at plastic waste, only 9% is recycled, 19% is incinerated, 22% is unsafely disposed of in unregulated dumpsites or leaks into the environment and 50% ends up in sanitary landfills.[19] The greatest source of plastic leakage into the environment is mismanaged waste. However, due to the accumulation of plastic waste in aquatic environments it is projected that even if there is a significant reduction in mismanaged waste, there will still be continued leakage into the ocean for several decades. With plastic fragmentation in water it also becomes increasingly difficult and costly to clean up this plastic waste.[20] SUPs therefore present a growing threat to the environment (both terrestrial and marine ecosystems), economy (mainly marine dependent activities such as fishing), and health due to the negative impacts of SUP pollution. Several studies, such as Chen et al., and Adam et al., have looked into SUP production, waste, and consumer behaviour or attitudes towards plastic pollution.

In Africa, a large amount of the total plastic waste consists of SUP waste. Most countries struggle with adequate waste disposal services, whereby uncontrolled dumping is most frequently employed to get rid of plastic waste.[21] With the continuous use and mismanagement of such waste there are heightened environmental and health risks.[22] Poor waste management systems play a central role in the severe and frequent floodings that annually occur across African cities, resulting in many casualties, effects on production

[18] Agrawala, Dubois, Börkey & Lanzi, *Global Plastics Outlook*
[19] Ibid
[20] Ibid
[21] Turpie, Jane, Gwyneth Letley, Yolanda Ng'oma, and Kate Moore. *The Case For Banning Single-Use Plastic Products In Malawi*. Report prepared for UNDP on behalf of the Government of Malawi by Anchor Environmental Consultants in collaboration with Lilongwe Wildlife Trust, 2022.
[22] Embrandiri, Asha, Genanew Mulugeta Kassaw, Abebe Kasssa Geto, Belachew T/yohannes Wogayehu, and Manoj Embrandiri. "The Menace Of Single Use Plastics: Management And Challenges In The African Context". *Waste Management, Processing And Valorisation*, 2021, 1-21. doi:10.1007/978-981-16-7653-6_1.

processes and epidemics.[23] Other developing countries across the world, such as Bangkok and Jakarta, deal with this by investing millions into damage repair, however most African countries lack sufficient financial resources to do the same.[24] Many countries in the African continent have sought to tackle this issue through the implementation of certain laws or legislations targeting SUP use. Since 2014, 26 African countries have introduced plastic bans.[25] However, due to a lack of tangible measures and clear evidence of an overwhelming amount of SUP pollution, the level of enforcement and consequent positive impact remains highly questionable.[26] A study conducted in Malawi indicates that a ban appears to be most effective in dealing with SUPs, however it needs to be paired with campaigns encouraging pro-environmental attitudes and engage stakeholders to stimulate institutional, social and behavioural change.[27] Adam et al. (2020) highlight how, in West Africa, the countries that have implemented legislation to reduce SUPs have been criticized due to the continued persistence of plastic pollution in the region. Ghana is one of the countries that has not yet imposed a ban of any kind whilst the situation of plastic waste is rapidly deteriorating.[28]

A reason for the excessive amount of plastic being produced, particularly in Ghana, can be attributed to population growth and urbanization.[29] Prior to the introduction of plastic, groceries were packaged using leaves, cotton bags and woven baskets. With a growing population and increased migration from rural to urban areas, these products were slowly replaced with plastic whilst product demand kept increasing[30]. In particular, decreasing accessibility to safe drinking water resulted in the common plastic water packaging, causing a surge in plastic production and waste as well as a greater dependency on plastic packaging[31]. Food vendors and small individual businesses dominate the informal economy, using SUPs as their primary packaging material (mostly in the form of plastic wrappers, plastic bags,

[23] Turpie et al., *The Case For Banning Single-Use Plastic Products In Malawi,* 4
[24] Ibid
[25] Embrandiri et al., "The Menace Of Single Use Plastics: Management And Challenges In The African Context.", 1
[26] Ibid
[27] Turpie et al., *The Case For Banning Single-Use Plastic Products In Malawi,* 6
[28] Kombiok et al., "Determinants Of Unsafe Plastic Waste Disposal Among Households In The Tamale Metropolitan Area, Ghana."
[29] Ibid
[30] Teta, Lloyd, Denver Chikokonya, Munyaradzi Madzoma, Nadine Tim, and Marshal Ruzvidzo. *Poor Plastic Waste Management In Accra, Ghana*. Map The System. Ahesi University, 2020, 8
[31] Abrokwah, Sika, Bernard Ekumah, Richard Adade, and Ivy Serwaa Gyimah Akuoko. "Drivers Of Single-Use Plastic Waste Generation: Lessons From Packaged Water Consumers In Ghana". *Geojournal*, 2021. doi:10.1007/s10708-021-10390-w.

water sachets).[32] The demand for plastic is not matched with the right management or waste infrastructure, leading to excessive plastic waste as plastics are disposed everywhere. This demonstrates the current trade-off that has formed around the use of SUPs, where the immediate positives of SUPs are weighed against the long-term negatives. The use of SUPs allows affordable and safe food packaging and water across the population segments.

However, this in turn leads to great environmental pollution due to the waste generation, causing floods and ultimately the destruction of property and lives in urban areas. The OECD report suggests ways to increase the circularity of plastics lifecycle in order to decrease their harmful impact. This includes the development of a recycled plastics market to boost the supply and use of secondary plastics, as well as increased innovation targeting circular solutions for plastics lifecycle whilst reducing overall plastic consumption. It recommends creating more ambitious domestic public policies and strengthening them through for example financial incentives.[33] Globally, the countries that have implemented an SUP ban typically focus on one type of SUP, which results in reduced littering but does not tackle the problem at the source – plastic consumption. These are important to keep in mind when analysing the current situation in Ghana and where relative advice could be applied.

There is a severe lack of waste collection and infrastructure for SUP products in Ghana, as well as limited recycling opportunities. 98% of plastic waste in Ghana leaks into the sea and landfills.[34] The relationship between governments and the plastic industry also plays a role herein, where the power of plastic industry leads to a lack of government action or a limit to plastic-reduction initiatives.[35] Therefore, a multiple management strategy including education, consumer behaviour, and waste disposal can drive positive environmental change.[36] According to Abrokwah et al, (2021), residents are willing to engage in plastic waste segregation, however there is no system available to support such waste collection. It is further recommended to combine top-down and bottom-up approaches towards behaviour in order to influence the entire supply chain and fill existing policy gaps. The problem is multi-

[32] Adam et al., "Policies To Reduce Single-Use Plastic Marine Pollution In West Africa.", 2
[33] Agrawala, Dubois, Börkey & Lanzi, *Global Plastics Outlook*
[34] Ibid
[35] Behuria, Pritish. "Ban The (Plastic) Bag? Explaining Variation In The Implementation Of Plastic Bag Bans In Rwanda, Kenya And Uganda". *Environment And Planning C: Politics And Space* 39, no. 8 (2021): 1791-1808. doi:10.1177/2399654421994836.
[36] Viera, João S.C., Mônica R.C. Marques, Monick Cruz Nazareth, Paula Christine Jimenez, and Ítalo Braga Castro. "On Replacing Single-Use Plastic With So-Called Biodegradable Ones: The Case With Straws". *Environmental Science & Policy* 106 (2020): 177-181. doi:10.1016/j.envsci.2020.02.007.

dimensional, requiring a multi-layered solution. Adam et al. (2021) demonstrates how citizens in Ghana adopt heterogenous attitudes and behaviour towards SUPs, implying the need for unique policies and programmes targeting different segments of the population in order to lead to effective behavioural change. This finding is supported by Clayton's case study in Jamaica.[37] It is therefore important to understand the scope of the problem – the types of SUPs, how they are used and disposed of, factors influencing behaviour in regards to SUPs, and viable alternatives. This can aid policy design in improved environmental management and greater sustainability in the long run, considering the daily lifestyles of the people as well as environmental needs.

Several studies have already looked at the attitudes, behaviors and perceptions towards plastic pollution and waste management. In her case study, Clayton (2021) argues that the only way to tackle the issue of SUPs is by changing consumer behaviour to switch to alternatives and eliminate non-essential SUP use. Populations in Africa and Asia tend to maintain a more favourable attitude towards SUPs compared to Western populations, which can mainly be ascribed to the common use and daily interactions of SUP.[38] To a great extent, attitude drives one's behaviour towards SUPs.[39] This is demonstrated in a study conducted in Ghana which investigated the influence of attitudes on choice of packaged drinking water. The study revealed three main determinants of choice of type of water. First came hygiene and safety, followed by affordability, and convenience (portability). This can explain the growing demand of plastic water bottles and sachets, as the common attitude is held that these products provide the safest water, are indeed the cheapest option, and easy to carry around.[40] It is interesting to note that some West African countries used sanitation and environmental pollution as reasons to implement the SUP bans,[41] showing some discrepancy between public and governmental knowledge or perception. Another study conducted in one of Ghana's West African neighbours, Nigeria, revealed that plastic packaging was preferred due to its characteristics of lightweight, affordability and high resistance to corrosion.[42] Although the study was not conducted in Ghana itself, it indicates the preference of plastic

[37] Clayton, C. Andrea Bruce (2021). "Building Collective Ownership of Single-Use Plastic Waste in Youth Communities: A Jamaican Case Study". *Social Sciences* 10, no. 11 (2021): 412. doi: 10.3390/socsci10110412
[38] Ibid
[39] Adam et al., "Attitudinal And Behavioural Segments On Single-Use Plastics In Ghana"
[40] Abrokwah et al., "Drivers Of Single-Use Plastic Waste Generation: Lessons From Packaged Water Consumers In Ghana."
[41] Adam et al., "Policies To Reduce Single-Use Plastic Marine Pollution In West Africa.", 8
[42] Duru, R. U., E. E. Ikpeama, and J.A. Ibekwe. "Challenges and prospects of plastic waste management in Nigeria". *Waste Disposal & Sustainable Energy* 1, no. 2 (2019): 117-126. doi: 10.1007/s42768-019-00010-2

above other materials due to specific characteristics belonging to the material. Due to the similar lifestyles and circumstances within the countries, it still provides a useful insight into the attitudes and behaviour towards SUPs in Ghana. Additionally, literature has shown that PEB is often paired with higher environmental knowledge.[43] Amoah and Addoah (2020) revealed that in Ghana, households with environmental knowledge will more likely engage in PEB. However, external factors (economic situation, cultural values) play an influential role as well. Adam et al. (2021) stresses the importance of a continuous socialization process to nurture an anti-SUP attitude (such as community sensitization programmes or SUP programmes in schools).[44] A key aspect of waste management is human behaviour.[45] Positively influencing PEB requires a consideration of and balance between both internal factors (such as knowledge) and external factors (socio-economics).[46] Literature continuously shows the need to influence human behaviour through several factors, often mentioning education and awareness, strict policy implementation, and providing alternatives to address the plastic issue.

A fundamental problem with anti-SUP policies or bans in West Africa, and specifically Ghana, is the relative lack and decline of re-usable SUP alternatives. Several alternative materials have been used for the purpose of food packaging, such as paper, glass jars and bottles, leaves (primarily corn and banana), woven plastic sacks and cane baskets.[47] However, the increase in plastic production and usage led to a decrease in use of other materials. The alternatives that are still in place (such as broad leaves) are sectoral whilst plastic involves large industrial production. The West African countries that have implemented a ban have not yet developed a plan for the promotion and development of formal alternatives. The laws fail to identify types of reusable alternatives or strategies to produce and supply such alternatives.[48] In addition, the time between ban announcement and its implementation is

[43] Amoah, Anthony, and Thomas Addoah. "Does Environmental Knowledge Drive Pro-Environmental Behaviour In Developing Countries? Evidence From Households In Ghana". *Environment, Development And Sustainability* 23, no. 2 (2020): 2719-2738. doi:10.1007/s10668-020-00698-x.
[44] Adam et al., "Attitudinal And Behavioural Segments On Single-Use Plastics In Ghana"
[45] Kombiok et al., "Determinants Of Unsafe Plastic Waste Disposal Among Households In The Tamale Metropolitan Area, Ghana.", 1
[46] Ibid
[47] Awusi, Emmanuel, and Sampson Kyei. "Environmental Effects And Waste Management Practices Of Materials For Local Food Packaging In The Birim Central Municipal, Ghana.". *Journal Of Environment And Waste Management* 4, no. 3 (2017): 245.
[48] Adam et al., "Policies To Reduce Single-Use Plastic Marine Pollution In West Africa.", 7

usually less than a year, which is insufficient. There is a lack of national campaigns and consultation during the drafting of such bans, failing to engage stakeholders.[49]

Due to the heavy reliance on SUPs in the wider society, it is imperative to ensure the availability of affordable re-usable alternatives to aid the transition away from SUPs as opposed to merely placing restrictions on the product.[50] Without viable alternatives, such restrictions often lead to the formation and growth of black markets and an overall ineffective policy action. Plastic packaging will continue to grow until an adequate alternative is presented.[51] This research indicates that there is currently no formal industry in the region supplying re-usable products, showing a severe gap in the knowledge and action taken regarding SUP reduction and strategy. The scope of this research will therefore focus on what is needed for the production and implementation of locally viable SUP alternatives.

2.2 Conceptual & Theoretical Framework

An important concept already mentioned in the literature review above is pro-environmental behaviour (PEB). The term can broadly be understood as any behaviour that seeks to protect the environment and minimize one's negative impact on the natural world. It encompasses a range of behaviours, such as recycling, conservation, consumption, and more.[52] Amoah and Addoah (2020) demonstrate the linkage between PEB and environmental knowledge (as well as the relevance of socio-economic factors), therefore educational awareness and campaigns play a key role in achieving long-term sustainability. It encourages individuals and households to engage in PEB and feel accountable towards their society and environment.[53] PEB is typically measured through self-reporting, such as surveys or interviews where respondents subjectively assess their own behaviour.[54] In stimulating behaviour, it is crucial to consider all levels of society and ways in which environmental knowledge can be accessible to all in order to promote PEB.

[49] Adam et al., "Policies To Reduce Single-Use Plastic Marine Pollution In West Africa.", 7
[50] Ibid, 5
[51] Abrokwah et al., "Drivers Of Single-Use Plastic Waste Generation: Lessons From Packaged Water Consumers In Ghana."
[52] Amoah and Addoah, "Does Environmental Knowledge Drive Pro-Environmental Behaviour In Developing Countries? Evidence From Households In Ghana.", 2721-2
[53] Ibid, 2733-4
[54] Ibid

Adam et al., (2021) argue there are three main attitudinal segments on SUPs amongst Ghanaian residents. Each segment holds a certain attitude towards SUPs which in turn influences their behaviour. There are avoiders, potential avoiders, and patrons. Avoiders typically disfavour SUPs and therefore minimize their SUP consumption by adopting alternatives, such as reusable shopping bags. Potential avoiders also adopt an unfavourable attitude towards SUPs however still use them sometimes and therefore have a lower level of avoidance. Patrons favour SUPs and consequently consume them. This theory is particularly interesting for this research as it suggests the need for specialized alternatives according to each attitudinal segment. It argues that a solution for an avoider will not be an effective solution for a patron, therefore previous actions taken by the government are ineffective as they embrace a 'one size fits all' solution, assuming consumers are homogenous, which does not work across different segments.[55] In addition, the study showed how attitudinal segments vary across several socio-demographic factors, such as age. Young residents had an unfavourable attitude towards SUPs whereas older generations did not, implying the need to target the older age categories in educative communication to cause a change in their behaviour (as well as maintain the awareness among the youth). In addition, it demonstrates the need to consider bottom-up and top-down approaches when looking at the internal and external factors that play a role in influencing environmental behaviour across the segments.[56] Therefore, actions and alternatives need to be designed with these attitudinal segments and their differences in mind in order to reach an effective behavioural change.

This relates to another theoretical construct known as the KAB model (Knowledge – Attitude – Behaviour). The KAB model attempts to explain the relationship between knowledge and behaviour. Following this model, it is expected that having environmental knowledge will result in a pro-environmental attitude and therefore PEB.[57] However, this has been criticized by scholars as it neglects the importance of other factors influencing behavior.[58] Environmental knowledge does not result in PEB on its own as there can be economic or cultural factors involved that play a more influential role. Despite limitations of the model, the study conducted by Amoah and Addoah (2020) in Ghana shows that being better

[55] Adam et al., "Attitudinal And Behavioural Segments On Single-Use Plastics In Ghana"
[56] Amoah and Addoah, "Does Environmental Knowledge Drive Pro-Environmental Behaviour In Developing Countries? Evidence From Households In Ghana.", 2732
[57] Ibid, 2724
[58] Robelia, B., and T. Murphy. "What do people know about key environmental issues? A review of environmental knowledge surveys". *Environmental Education Research*, 18, no. 3 (2012): 299-321

informed about the environment will positively influence behaviour as households with greater environmental knowledge demonstrated more PEB. These findings and therefore also the KAB model will serve as an informative background in which this new research can be placed.

As noted in the literature review, these theories must be accompanied by effective policy-making. Although it is important to foster a critical conscience at school in order to generate pro-environmental behaviour in practice, the lack of national and supranational policies on plastic waste management can hinder the positive effects of environmental awareness. The ineffective government SUP reduction policies and inadequacy of alternatives cannot be overlooked.

2.3 Multi-disciplinarity

The study of SUPs crosses several disciplines. First and foremost it involves an environmental perspective, as much of the research conducted on SUPs focuses on their environmental impact as well as environmental attitudes and behaviour. By considering human behaviour, the research also ties into a sociological or anthropological domain, where it looks at people's attitudes, perceptions and behaviour. It considers aspects of cultural norms and spiritual beliefs and how this influences behaviour. The research furthermore crosses the economic discipline as it considers affordable alternatives that seek to minimize the economic (and social) effect of eradicating SUPs in this context. This particular research combines these three disciplines whilst placing extra focus on the sociological approach. The data collected specifically looks at the uses of, attitudes and behaviour towards SUPs. The environmental and economic discipline certainly play a role herein, however by adopting a sociological approach in the foreground it resulted in better insights on how alternatives can be implemented in the researched context and how social behaviour can be positively influenced to meet the needs of other disciplines in tackling the problem of SUPs. Disciplines in the natural sciences (environmental degradation), geography (predictive models of flooding), economics (opportunity costs of SUP alternatives; frugal innovations), and social anthropology (histories and social interrelationships of buyer-sellers in Accra and Winneba market spaces) might have approached this topic from thematic perspectives whilst this research borrows little aspects of each discipline to come to a wholesome, multi-disciplinary conclusion.

Additionally, the research consists of multi-disciplinary methodology due to the combination of quantitative and qualitative research methods described above. By using a multi-disciplinary methodological approach there is an increased validity of the results as different forms of data were collected and used to support the main findings.

Chapter 3: Contextualization

3.1 Background

This chapter will include an expanded description of the study setting, looking at the chosen areas, specific locations and also participants. As mentioned in Chapter 1, the research was conducted in the two coastal communities Accra and Winneba.

3.1.1 Cities

Accra is the capital city of Ghana and also the largest city in Ghana, located on the Gulf of Guinea.[59] It officially became the capital city in 1877, when the British administration transferred the colony's headquarters from Cape Coast to Accra.[60] The name Accra stems from the Akan word, *nkran*, which refers to the black ants found in the area and was applied to the inhabitants.[61] At that time, Accra consisted of two main townships – Jamestown and Ussher Town. It was a flourishing commercial area with much promise for the future, and it continued to grow due to the investment capital put into the town, the increasing volume of trade,[62] and a great influx of people.[63] To support urban development, the Accra Town Council was established in 1898. After Ghana gained independence in 1957, Accra was declared a city in 1961 and therefore the council became the Accra City Council. In 1964, the council was dissolved due to the creation of the Greater Accra area, which was to be led by a special commission.[64] The Greater Accra region is made up of five districts, including the Accra Metropolitan Area, which serves as the anchor of the region.[65]

The urban growth rate more than doubled between the periods 1985-1991 and 1991-2002, also indicating the environmental consequences that come with rapid spatial expansion of a metropole into rural areas.[66] The population of Accra in 2022 is so far 2,605,402, which is

[59] "Accra | National Capital, Ghana". *Encyclopedia Britannica*, 2022. https://www.britannica.com/place/Accra.
[60] "The History Of The Assembly". *Accra Metropolitan Assembly*, 2022. https://www.ama.gov.gh/thehistory.php.
[61] Encyclopedia Britannica, "Accra | National Capital, Ghana".
[62] Dickson, Kwamina Busumafi. *A Historical Geography Of Ghana*. London: Cambridge University Press, 1969.
[63] Quarcoopome, S.S. "A History Of The Urban Development Of Accra: 1877-1957". *Research Review* 9, no. 1-2 (1993): 20. https://www.africabib.org/rec.php?RID=152035613.
[64] Dickson, *A Historical Geography Of Ghana*. 259
[65] "Accra". *New World Encyclopedia*, 2021. https://www.newworldencyclopedia.org/entry/Accra
[66] Aboagye, Dacosta. "Living With Familiar Hazards: Flood Experiences And Human Vulnerability In Accra, Ghana". *Articulo – Revue De Sciences Humaines*, 2012. doi:10.4000/articulo.2110.

already a 1.88% increase from 2021.[67] The increase in population and thereby also its density resulted in a worsening waste management system. This was also paired with the fact that waste in 1920s mainly consisted of biodegradable materials (leaves, paper, wood), which was slowly replaced by more plastic and other chemicals.[68] Currently, the city struggles with waste management at all levels – collection, transportation and disposal. Existing public facilities are insufficient compared to the user population and volume of waste generation.[69] The area is particularly challenged by plastic waste.[70] Of the daily household waste generated, 11% is plastics and rubbers that cause littering and blockages creating environmental hazards.[71]

Figure 1: blocked gutters in Accra

Source: Roos de Raadt, February 2022

Figure 2: Waste dump in Accra, mainly plastic

Source: Roos de Raadt, February 2022

[67] "Accra, Ghana Metro Area Population 1950-2022". *Macrotrends.Net*, 2022. https://www.macrotrends.net/cities/21107/accra/population.
[68] Yoada, Ramatta Massa, Dennis Chirawurah, and Philip Baba Adongo. "Domestic Waste Disposal Practice And Perceptions Of Private Sector Waste Management In Urban Accra". *BMC Public Health* 14, no. 1 (2014). doi:10.1186/1471-2458-14-697.
[69] Ibid
[70] Bening, Catharina R., Sebastian Kahlert, and Edward Asiedu. "The True Cost Of Solving The Plastic Waste Challenge In Developing Countries: The Case Of Ghana". *Journal Of Cleaner Production* 330 (2022): 129649. doi:10.1016/j.jclepro.2021.129649.
[71] Fagariba, Clifford James, and Shaoxian Song. "Assessment Of Impediments And Factors Affecting Waste Management: A Case Of Accra Metropolis". *Preprints*, 2016. doi:10.20944/preprints201609.0012.v2.

As Ghana's capital city, Accra is the economic, administrative and educational centre.[72] The entire metropolitan area is nearly 900km2, with a population density of about 1300 people per km2.[73] It contains the head offices of large banks and firms, houses nationally important buildings such as the national museum and archives, as well as the large open markets that receive the majority of the food supply. There are several tourist attractions, hotels and restaurants. In addition, the top university of the country, University of Ghana, is located in the north of Accra, in Legon. Lastly, the city is a transportation hub whereby it connects all of the country's regions, either by rail, road or air.[74]

Accra's economy relies on financial and commercial sectors, particularly the textile, processed foods, and lumber industries.[75] Looking at the demographics, approximately 56% of the population are below the age of 24, indicating a very high youth population, which is expected to be a continued trend. Around 58% of the total population in the city reside in low-income housing areas.[76] There are three main ethnic groups in the city, Ewe, Ga, and Akan. English is the official language although several dialects are spoken in the area. The major religion is Christianity (83%), followed by a minority of Muslims (10.2%) and a non-religious sector (4.6%).[77] The current trends of population growth and urbanization are expected to continue as Accra maintains its status as Ghana's centre and hub.

Winneba is a much smaller coastal community, located in between Accra and Cape Coast. It is about 65km west of Accra and 140km north of Cape Coast (see figure 3 below).[78] It lies in the central region and, like Accra, along the Gulf of Guinea.[79] Winneba belongs to the Effutu Municipal District and is its capital.[80] The Effutu State goes back a long way, being founded in 1530 AD. The term stems from sailors who often used 'windy bay' to describe the area, as the winds aided them along the Atlantic Coast. This eventually became Winneba.[81]

[72] New World Encyclopedia, "Accra".
[73] "Accra Population 2022 (Demographics, Maps, Graphs)". *Worldpopulationreview.Com*, 2022. https://worldpopulationreview.com/world-cities/accra-population.
[74] Encyclopedia Britannica, "Accra | National Capital, Ghana".
[75] World Population Review, "Accra Population 2022 (Demographics, Maps, Graphs".
[76] Ibid
[77] New World Encyclopedia, "Accra".
[78] Ankrah, Johnson. "Climate Change Impacts And Coastal Livelihoods; An Analysis Of Fishers Of Coastal Winneba, Ghana". *Ocean & Coastal Management* 161 (2018): 141-146. doi:10.1016/j.ocecoaman.2018.04.029.
[79] "Winneba | Ghana". *Encyclopedia Britannica*, 2015. https://www.britannica.com/place/Winneba.
[80] "WODIV/Winneba Background - Background Of The Ewutu Effutu Senya (AES) District". *Wikieducator.Org*, 2009. https://wikieducator.org/WODIV/Winneba_Background.
[81] Ibid

Traditionally, the area is known as Simpa. The coastal savannah region is approximately 20,000km2,[82] yet Winneba town itself is about 3.373km2.[83]

During the colonial period Winneba held the second seat of administration in the Central Province of the formerly known Gold Coast (Ghana).[84] In early independence days, the first president of Ghana, Kwame Nkrumah, established the Ideological Institute in Winneba. Winneba became well-known around Africa for the institute, as independence fighters across the continent would visit to take specific courses (including ambassadors and many public functionaries).[85] Winneba was originally a port for forest products in the area. However, in 1962 all port activities ceased due to the new harbour in Tema. Since 1962, Winneba has therefore primarily relied on fishing activities, agriculture, and little tourism.[86] It also houses several campuses of the University of Education, which will be further explained below.

Winneba's reputation as a historic fishing port can still be seen today due to the large reliance on fishing activities. The majority of inhabitants rely on fishing for their livelihoods. Fishing services create employment for most of the people in the area, thereby making fishing the primary economic activity.[87] Currently, the population is about 48,621, with a small majority of females. The average age of people in the area is 22 years.[88] The population in Winneba mainly consists of Guans. Although the indigenous dialect is Effutu, Fante is widely spoken.[89] A major problem around the town is haphazard dumping of household and market waste, also causing considerable pollution in the area.

These two cities are important for the study of SUPs due to their historical background, current economic activities and waste management. Both locations are previous commercial and trading hubs, where Accra kept growing in its central status whereas Winneba's activities declined and are mainly reduced to fishing. However, one of the central impacts of SUPs is

[82] Klutse, Nana Ama Browne, Fred Aboagye-Antwi, Kwadwo Owusu, and Yaa Ntiamoa-Baidu. "Assessment Of Patterns Of Climate Variables And Malaria Cases In Two Ecological Zones Of Ghana". *Open Journal Of Ecology* 04, no. 12 (2014): 764-775. doi:10.4236/oje.2014.412065.
[83] Zhuji World. "Winneba, Ghana — Statistics 2022". *Zhujiworld.Com*, 2022. https://zhujiworld.com/gh/1258901-winneba/.
[84] WikiEducator, "WODIV/Winneba Background - Background Of The Ewutu Effutu Senya (AES) District."
[85] Ibid
[86] Encyclopedia Brittanica, "Winneba, Ghana."
[87] Ankrah, "Climate Change Impacts And Coastal Livelihoods; An Analysis Of Fishers Of Coastal Winneba, Ghana", 141
[88] Zhuji World, "Winneba, Ghana — Statistics 2022".
[89] WikiEducator, "WODIV/Winneba Background - Background Of The Ewutu Effutu Senya (AES) District."

their effect on fishing activities. In addition, although it lost something in national importance, the establishment of a university and education brought people in. This brings commercial interactions, which uses plastics in exchange. Therefore, it proves a highly interesting and relevant study site when looking at SUP use, attitudes and behaviour. Both areas also contain one of the top universities in the country, making it interesting locations when looking at educational levels, relative knowledge and attitudes towards plastic waste. In addition, recent research shows how waste is a core problem in both areas, particularly indiscriminate dumping of plastic. In Winneba this negatively impacts the main economic activity, while in Accra this results in severe drain blockage, causing floods and thereby significant destruction on an annual basis. Due to their differences in size and economic activity but demographic similarities in youthful population and higher educated students, they are interesting regions to compare in this study of SUPs.

Figure 3: Map outlining Gulf of Guinea coastline

Source: Google Maps, June 2022

3.1.2 Study Locations

The research was concentrated in four specific locations. In Accra, this was the University of Ghana and the London market. In Winneba, it was the University of Education (South Campus) and the Winneba market.

The University of Ghana is situated in Legon, northern Accra. It was founded in 1948 as the first university in Ghana, formerly known as the University College of the Gold Coast. It is Ghana's top university, striving to distinguish itself as a research-intensive institution at an

international level. [90] One of the four priority areas in research is climate change adaptation. There are approximately 61,000 students at the university, with a growing number of international students that come from abroad. Males hold a slight majority in total enrolment and graduation rates.[91] There are five campuses linked to the university, with the Legon Campus as the main one. It houses the central administration as well as most of the university's teaching and research.

In 1992, the University of Education (UEW) was established in Winneba.[92] It was first established as a University College, and finally received the status of a full university in 2004.[93] The central aim of the UEW is to train teachers for Ghana's education system. It strives to play a key role in producing scholars that lead the national vision of education alongside Ghana's rapid and social and economic development.[94] The university has three campuses in Winneba (North Campus, Central Campus, South Campus) where the administration office is also located, and three campuses across Ghana, in Kumasi, Mampong and Ajumako.[95] In achieving its university status, UEW combined seven diploma-awarding colleges in different areas into one institution, hence the diverse campuses across the country. The entire university has over 60,000 students. In Ghana, UEW is ranked as the second-best university after the University of Ghana.

Both universities are widely recognized in Ghana as they are considered the top two universities in the country. Both have multiple campuses, indicating their size and also their reach. Students at the universities primarily come from all over the country, however especially in Accra there are international students as well. The choice for these two universities was due to their high rank within the country, the large number of students as well as their location.

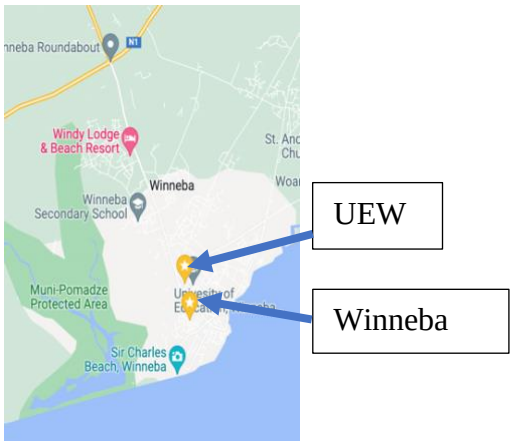
[90] University of Ghana. "Overview". *Ug.Edu.Gh*, 2022. https://www.ug.edu.gh/about/overview.
[91] Ibid
[92] Writer, Staff. "Facts About University Of Education, Winneba And Its Campuses". *SHS Trendz*, 2022. https://shstrendz.com/facts-about-university-of-education-winneba-and-its-campuses/.
[93] University of Education. "Brief History". *Pilot.Uew.Edu.Gh*, 2019. http://pilot.uew.edu.gh/about-uew/brief-history.
[94] Writer, "Facts About University Of Education, Winneba And Its Campuses."
[95] Ibid

Lastly, two market communities were used in the research. The London market in Accra is located in the Jamestown area, which was one of the first main townships in Accra. The Winneba market in Winneba is the main market area in the center of the city, in between the UEW South Campus and the Accra-Takoradi Road to the capital city. Both markets are community markets, where main customers are from the surrounding area. The produce for both markets is bought at a central place in Accra called Agbogbloshie. The market women collect their items there and bring it back to their markets.

Figure 4: Locations in Accra

Source: Google Maps, June 2022

Figure 5: Locations in Winneba



Source: Google Maps, June 2022

3.1.3 Participants

The first two phases of the research consisted of university-wide interviews and focus group discussions. Participants in this process were university students, representing the student body by gathering a mix in gender, study background, background, and age. The choice to start the research with university students was due to the previous finding that a higher educational level correlates with greater awareness of the harmful effects of SUPs. This group is also more often avoiders than patrons, as explained in the conceptual framework. This was useful for the research due to the existing dilemma and contradiction between an awareness of SUP effects, yet a persistent and frequent use of SUPs. Furthermore, the research started with university students as they were mostly consumers of SUPs and could therefore lead the research to the producers.

The survey was successfully completed with 82 respondents in Accra, and 77 respondents in Winneba. The slight difference in number did not impact the results. The FGDs consisted of two discussions per university, with one male group and one female group. The number of

participants per FGD differed between 5-9. In Accra, 5 males and 7 females participated. In Winneba, 6 males and 9 females participated.

The third and final phase of the research was interviews with market vendors. The interviewees were found through snowball sampling, where previous contacts from the research introduced two market women per area. In Accra, one interviewee sold frozen chicken, soft drinks and water while the other sold herbs, spices, rice and flour. In Winneba, one interviewee sold yam and diverse vegetables while the other sold rice, oil, and tinned tomatoes. This demonstrates that in both markets the research interviewed two vendors in a different line of produce to collect a richer set of results and understand the bigger picture in the role of SUPs in markets, and their line of production and consumption.

3.2 Research Position

The research was conducted in the period of January to April, 2022. I personally conducted the research, representing Leiden University whilst fulfilling a research internship for the Ghana Youth Environmental Movement (GYEM). GYEM provided logistical support throughout the research process, constantly having colleagues available to translate during interviews and aiding survey data collection in order to gain more results.

Data collection involved three types of data. The first was a survey, where results were gathered by physically approaching students on campus and requesting them to fill in the research. To gain a variety of respondents, we were able to enter several dorm houses where students lived in order to ask them to fill in the survey. In order to overcome potential misunderstandings regarding the questions, I made sure to stand by the respondent until the survey was completed in case they had any questions. My GYEM colleague followed the same procedure. The interaction with the respondents went well, also due to their English literacy. There were no issues regarding linguistic expressions, and any questions they had could be easily solved when flagged. However, my presence during the survey could have an influence on results. I attempted to remain unbiased in my explanation of the research, however there remains a chance it was clear I was in favour of SUP alternatives. This perhaps influenced their results to disfavour SUPs more than they would have otherwise. To avoid this, I focused on remaining neutral during my explanation as well as in my answers to any questions. In addition, my presence could have resulted in a quicker filling of results due to

feelings of pressure while I stood by and waited. To minimize this, I often took the time to sit down and indicate I was in no rush to make participants feel more comfortable.

The second form of data was FGDs, which were conducted by me and assisted by my GYEM supervisor for translation purposes. The participants were survey respondents, therefore they were already aware of who I was and what the research was. This was positive as they felt more comfortable, however at the start of the discussion they would direct their responses to me. I therefore made clear that I was not a part of the discussion, by mentioning it at the introduction and also slightly removing myself from the circle to indicate I was observing and not partaking in the discussion, stimulating them to interact with each other instead. Due to the education level and English literacy, there were minimal issues regarding a language barrier. Some moments of clarification were necessary however the translator was not needed. In order to remove personal bias, questions were asked in a neutral manner, responses were noted in a neutral manner, and both aspects of SUPs were included to show a reflection on positive and negative aspects.

The final form of data was semi-structured interviews. I was accompanied by my GYEM supervisor and the contact person who introduced me to the market vendors, in order to ensure they were in a comfortable setting with someone they recognized and to minimize language barriers. A limitation in this interaction was my personal background and race. I presented myself as a researcher from the Netherlands, and in some cases this led to the assumption that I would be able to provide the market with financial support. This was quickly resolved through my own explanation of my position as a researcher and support from the translator. At this stage there were considerably more issues in language, where the translator was a vital presence in correctly asking my questions and understanding the respondents.

Throughout the research process it was vital to consider my own positioning as a researcher. I was very aware of my own background and position in the research in order to minimize any potential influences this could have on the results. To overcome cultural barriers and misunderstandings, for every step of the research I sat down with my GYEM colleague and went through the set-up and layout of the questions (for the survey, FGDs, and interviews), to test the questions and if they were context appropriate. My colleagues advised me on particular wordings, cultural sensitivities, and clarity of the questions to elicit the best

responses. In positioning myself as a researcher I was constantly aware of my observer role in collecting data, whether this was as I was walking around the city or during interactions with respondents. I did not actively participate in the research or advocate for a certain response. Most times I would be accompanied by a GYEM colleague in order to ensure neutral research and provide any necessary feedback for the next phase in data collection.

Chapter 4: Results

This chapter will outline the results of the conducted fieldwork. The research question looks at three main aspects; the use of SUPs, attitudes towards SUPs, and behaviour towards SUPs. In order to create an effective overview, the analysis will be split into these three aspects. I will further demonstrate how the thesis objectives were attained with the employed methods.

As a recap, these are the research objectives from Chapter 1:
Research Objectives:

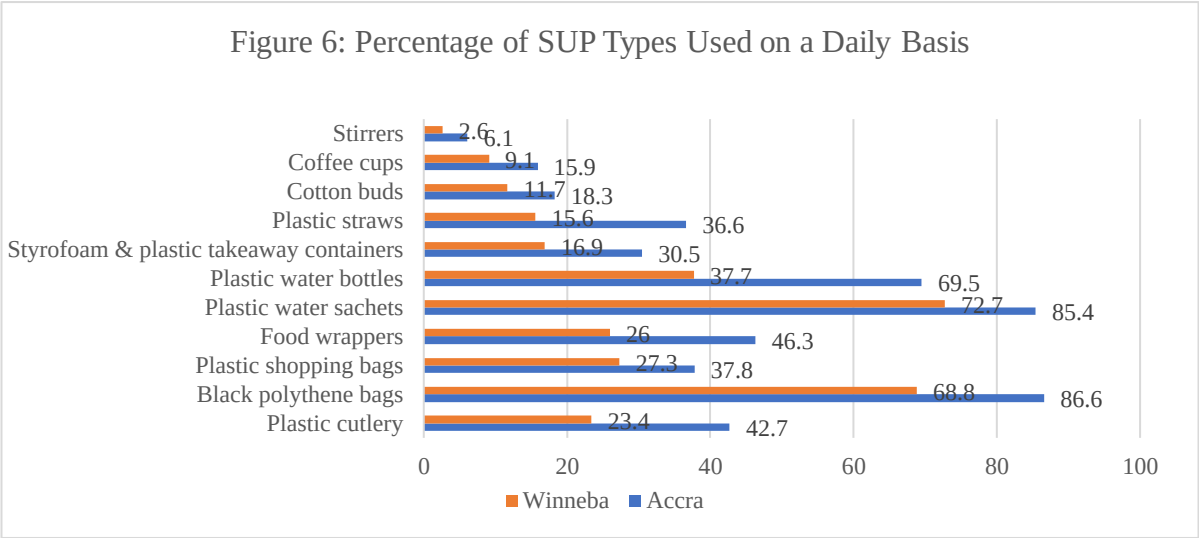
1. To collate and synthetize information on the use of SUPs in Ghana's local context
2. Identify attitudes, perceptions and behaviour towards SUPs and SUP alternatives in selected localities in Ghana
3. Elucidate on context-specific solutions to minimize SUPs, and contribute to the implementation of affordable and re-usable alternatives in order to support policy development

Each subsection below will focus on one of the research objectives in its analysis. These results will only show the important findings from each phase of data collection.
Results from the survey are displayed in graphs. The FGDs and interviews were transcribed and analysed thematically for data analysis purposes. Due to the large overlap in themes and answers, these results are often combined.

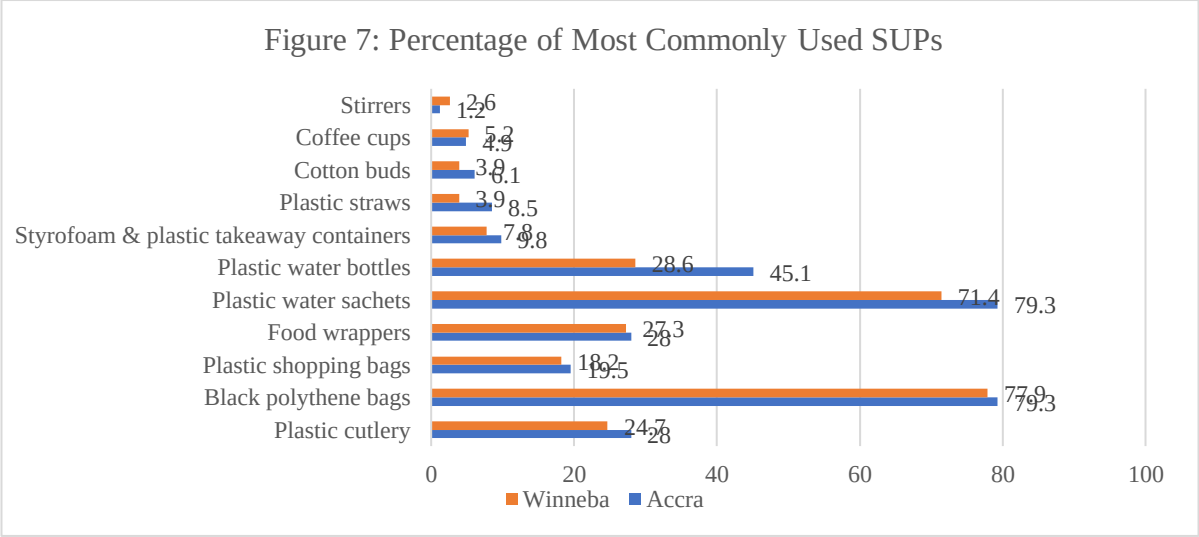
4.1 Understanding the Use of SUPs

The use of SUPs was first researched through the surveys. The survey contained general questions on the types of SUPs used and frequency of use, in order to gain a better understanding of SUPs in the targeted context.

In the graphs presented below, results are displayed as a percentage of respondents.



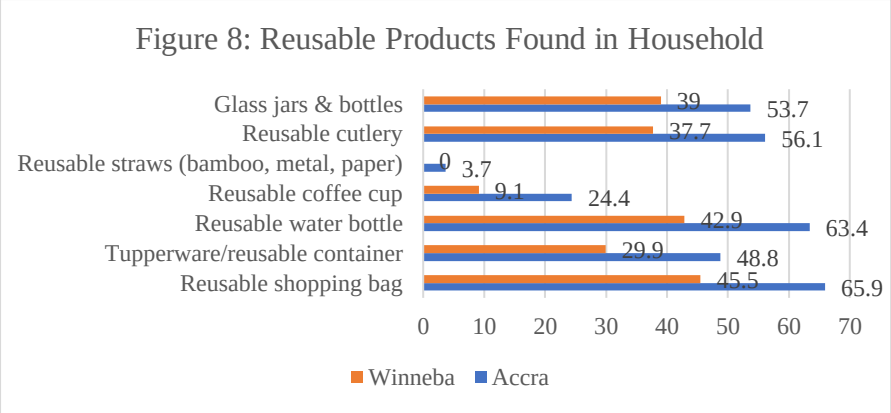
Source: Primary data fieldwork, February 2022



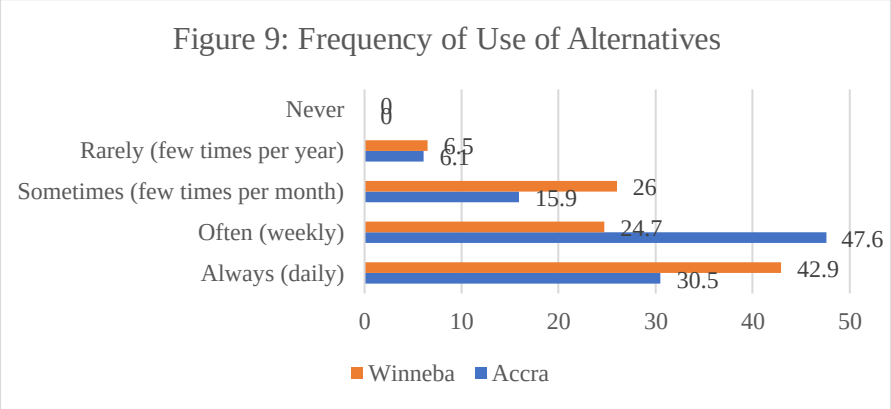
Source: Primary data fieldwork, February 2022

These graphs indicate that in both Accra and Winneba, there are three most commonly used SUPs as well as the types used daily. The top three are black polythene bags, plastic water sachets and plastic bottles. This shows that besides the issue of plastic water packaging, the main SUP type used in both regions is the black polythene bags, indicating the importance to target this product in the next phases of the research in order to find effective alternatives.

Additionally, respondents were asked about their use of SUP alternatives for comparative purposes.



Source: Primary data fieldwork, February 2022



Source: Primary data fieldwork, February 2022

Figure 8 indicates an already frequent use of SUP alternatives amongst university students in both regions. All of the respondents indicated they had all of the reusable alternatives mentioned in the list apart from reusable straws. It is interesting to note that the most common reusable product found in their households was a shopping bag, whilst the most frequently and commonly used SUP is the black polythene bags. If the majority owns a reusable alternative, what is causing the frequent use of the black plastic bags?

In addition, Figure 9 shows that alternatives are used on a weekly rather than daily basis in Accra, whilst respondents in Winneba claimed alternatives were used daily. The discrepancy with this graph is that it is unclear which alternative is used, therefore it could either be products only used at home (metal cutlery) or a mobile alternative, like the bags, which can make a big difference.

In phase three of the research, market women were also asked about their SUP use before researching attitudes and behaviour. All four of the interviewees indicated they almost solely

used plastic bags to package and sell their products. Plastic bags are convenient in their occupation as they are sold cheaply in bulks. The interviewees explained that they buy plastic bags in bulk on either a daily or weekly basis due to the high frequency of usage. Bulks can be bought in different sizes, where a bulk of small plastic bags costs approximately 1GHC,[96] a medium bulk costs 4-5GHC, and the large bags in bulk cost 6GHC. A bulk consists of about 100 pieces. They buy their products using either cardboard boxes or they pay someone to help them transport their products due to the large amounts they buy from the marketplace. However, once their products are installed at their market stand they use black polythene bags to package their products and give it to customers.

As a consumer at the market, a black plastic bag is given for free for every product that is bought. Products sold to a customer will be wrapped in at least one plastic bag, sometimes two. If a bag rips, it will be replaced for free. Only one out of the four interviewees indicated she sometimes refused to give more plastic bags than necessary due to the environmental damage they cause. Yet she also indicated that typically, market vendors do not limit their customers in how many plastic bags they get with their product. For packaging, the black bags are mainly used. Some products are initially wrapped in transparent packaging (such as onions, garlic, spices, etc.) so that customers can see the amount and quality of the product they want to buy. This is mostly done for frozen meat and small products that are bought in larger quantities (see Figure 10). There are pre-packaged products laid out in transparent bags in different sizes so that the customer can choose (see Figure 11).

Figure 10: Frozen chicken at the market

Source: Roos de Raadt, March 2022

Figure 11: Onions wrapped in transparent plastic

Source: Roos de Raadt, March 2022

[96] GHC is the Ghanaian currency, known as Ghanaian cedi.

However, once a customer buys this it will be wrapped in another black plastic bag. No product is given to a customer without a black plastic bag, including drinks, unless a customer specifically refuses one. Some customers will even ask for an extra bag if they are carrying a heavy load.

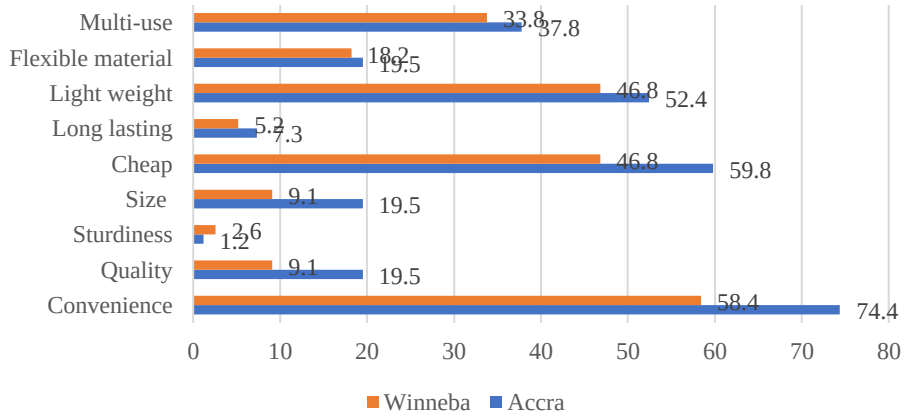
4.2 Attitudes and Behaviour towards SUPs and SUP Alternatives

After understanding the use of SUPs, it was important to identify attitudes and behaviours towards both SUPs and SUP alternatives to attain the research objective. For this objective, all three methods were used to gain an in-depth understanding. This subsection will therefore be further divided into two parts – attitudes and behaviour towards SUPs.

4.2.1 Attitudes towards SUPs

The survey collected the first data on attitudes towards SUPs and potential alternatives. In order to understand respondents' perspective and behaviour, they were first asked about useful characteristics of SUPs.

Figure 12: Most Useful Characteristics of SUPs



Source: Primary data fieldwork, February 2022

The results in Figure 12 show how both universities indicate the same top three characteristics belonging to an SUP. First and foremost, **convenience**, followed by **cheap pricing**, and **light weight**. These were clearly the majority, which also immediately highlights the necessary characteristics for an effective alternative. In order for it to be adopted on a wide-scale, an alternative will need to match these three characteristics to be effective in this particular context.

Data from the FGDs and interviews further indicated the general perspective on positive and negative characteristics of the material of SUPs, outlined in Table 1 below:

Table 1: SUP Characteristics

SUP Characteristics	
Positive	**Negative**
Multi-use	Hard to dispose of
Convenience	
Low maintenance (no washing)	
Size (different sizes according to product bought)	
Cheap (for both consumers and vendors, who buy in bulk)	
Lightweight (easy to carry long distances)	
Accessibility	
Quality (no tear, no spillage, elastic, prevents stains)	
Portable/mobile (can travel with it)	

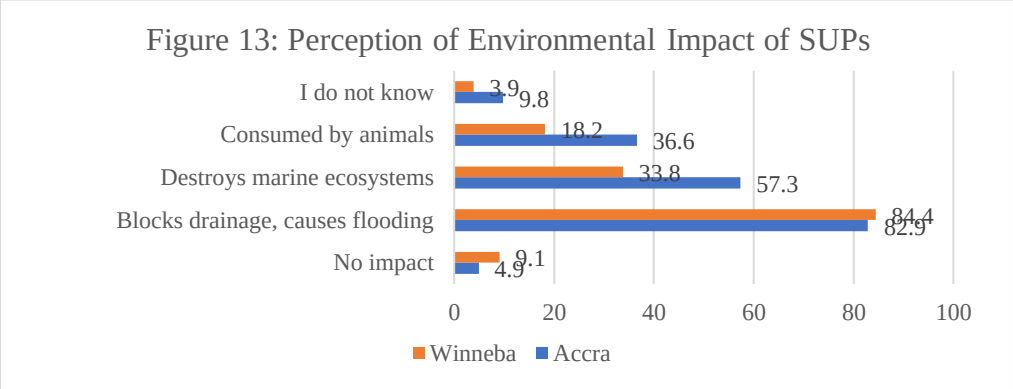
Source: Primary data fieldwork, March 2022

Throughout the discussions and interviews, there was a lot of mentioning of the positive aspects of using an SUP. Both consumers and market vendors frequently use them on a daily basis. They also compared SUPs to previously used alternatives, such as leaves or baskets, whereby SUPs held a clear advantage in terms of useful characteristics apart from their disposal and the negative impact they have. In the discussion of negative characteristics of SUPs, participants mainly mentioned the difficulty to dispose of them and then further highlighted the environmental, economic and social impact this has. They demonstrated an awareness of the consequences of indiscriminate disposal of SUPs, therefore although there was only one obvious negative characteristic, there was a lot of discussion on the consequences of this – demonstrating greater knowledge on the overall subject.

In addition, the survey gathered information on perspectives towards the environmental, economic, and social impact of SUPs. The results remain surprisingly similar between both areas, indicating an overall similarity in knowledge at both universities. A clear majority

understands the environmental damage caused by SUPs. The questions on economic and social impact showed a lesser majority, however there was an overall understanding that it negatively affects fishing activities and therefore the economy, and the health hazard caused by toxic fumes and plastic leakage. Students demonstrated a broad awareness of how SUPs impact their environment and society, further outlined below.

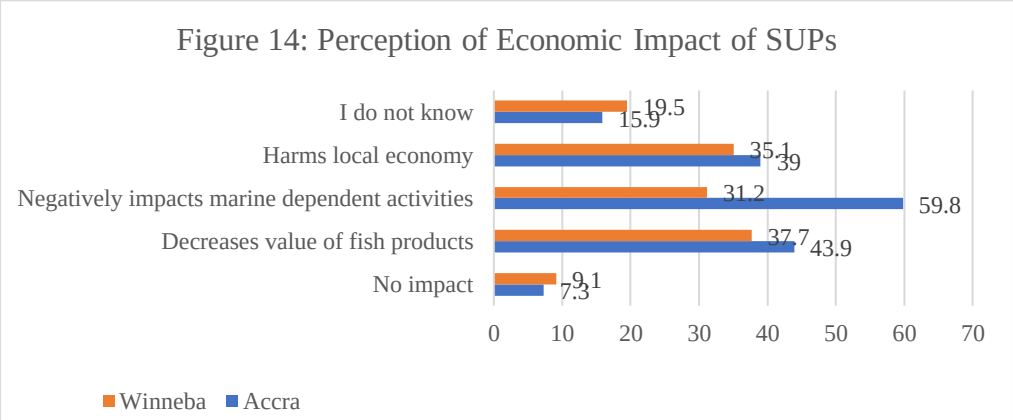
Environmental Impact



Source: Primary data fieldwork, March 2022

Participants in the FGDs and interviews further elaborated on the environmental impact of SUPs. Firstly, it blocks gutters and drainage which causes flooding and pollutes waterways. Pollution on land leads to a dirty environment, destroying natural beauty. In addition, it is often consumed by animals – both terrestrial and marine life, which impacts animals but in the long run also humans as we consume them. Plastic littering can affect crop production by ruining the soil, whereby plastic blocks nutrients from entering the roots. Materials like paper are degradable, but plastics stay in the ground for a thousand years. Lastly, they mentioned air pollution as an important impact of SUPs. Many people burn SUPs in order to dispose of them, which depletes the ozone layer due to chemicals released in the process.

Economic Impact



Source: Primary data fieldwork, March 2022

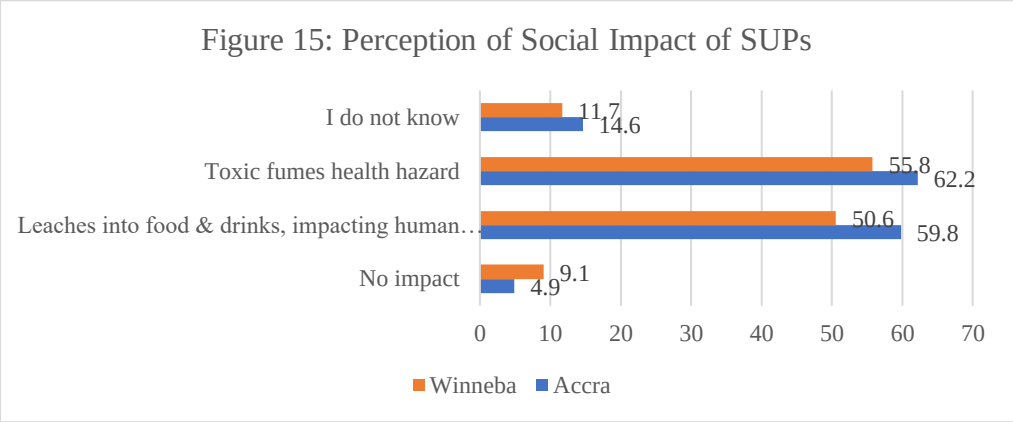
Participants mentioned the economic incentive of using SUPs. For both consumers and market vendors it is more economically viable to get SUPs. Interestingly, a 24-year-old male business student who participated in the FGD in Accra mentioned the fact that even natural alternatives will cost more;

"It is very affordable to get the black polythene bags. If you go to the villages, where people used leaves, you will now see plastics. In the city, if you were to use the leaves it will cost you more money if you are not in the village. To get plantain leaves is hard in the cities, unless you go to the farms outside. So people prefer using the polythene bags because of affordability"

Participants explained how especially in cities like Accra, every alternative will be more expensive than SUPs, even if they are natural products like leaves. These leaves would have to come from somewhere and be paid for in order to use them, resulting in a higher price than buying SUPs in bulk from the nearby retailers. Another economic benefit is the job creation in plastic production, as well as the minimal cost for producers in plastic production.

However, they also mentioned how SUPs have a negative economic impact. It decreases the value of fish products, harming the local economy as some communities rely on fishing activities. It ruins tourist sites, making these a lot less attractive and appealing due to the amount of pollution. Lastly, it was mentioned how cleaning up all the pollution requires a large sum of money from the government on a consistent basis. This money could be used elsewhere if plastic was properly disposed of.

Social and Health Impact



Source: Primary data fieldwork, March 2022

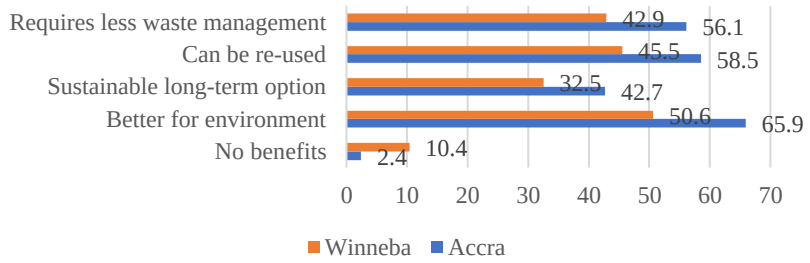
Regarding the social and health impact of SUPs, these responses often overlapped with previous categories. For example, how the burning of plastics releases toxic fumes and plastics leach into consumable products, impacting human health. In addition, when carried in plastic, hot products can melt into the plastic which is also harmful for consumption. The pollution creates a dirty environment, again ruining tourist sites – particularly beaches littered with plastic. As a result of blocked gutters causing flooding, there is frequent loss of property and even lives. In addition, all the pollution requires clean-up exercises and initiatives that take up a lot of time otherwise well-spent on other issues.

Yet the discussions also mentioned positive social and health impacts. Particularly the black polythene bags were discussed as they offer privacy upon consumption, where others cannot see what you bought. This was brought up during every FGD and interview, indicating its significance. It will also be touched upon in the next section. Another interesting positive impact was improved sanitation of SUPs. Participants explained how plastic cutlery is a more sanitary option than metal or other cutlery as it is used once and thrown away, eliminating any chance of disease contamination when re-washed or re-used. This was important due to the lack of a stable and safe water supply in many areas, whereby people do not trust the cutlery is properly washed and would much prefer the safer option of an SUP.

4.2.2 Attitudes towards SUP Alternatives

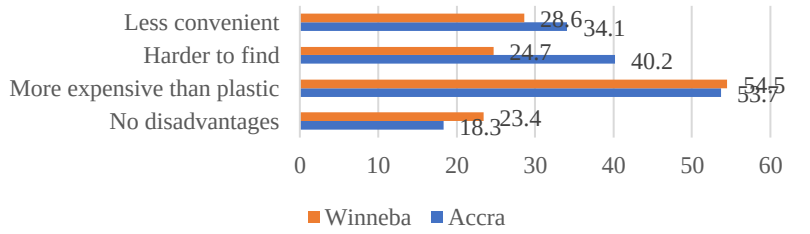
The research also looked into attitudes towards SUP alternatives, in terms of the benefits and disadvantages of using alternatives.

Figure 16: Benefits of Using SUP Alternatives



Source: Primary data fieldwork, March 2022

Figure 17: Disadvantages of Using SUP Alternatives



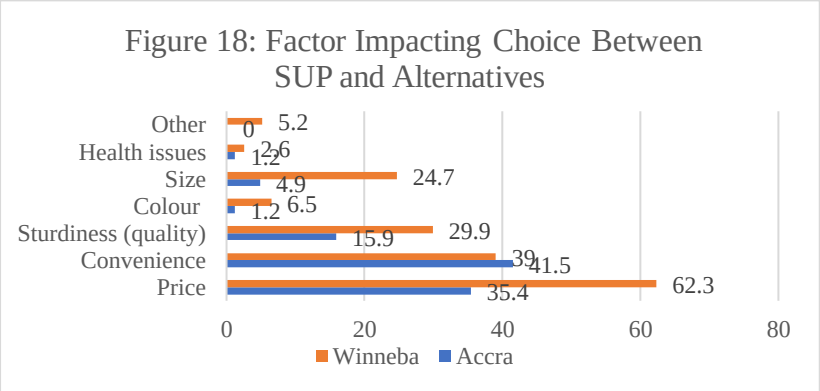
Source: Primary data fieldwork, March 2022

Overall, survey respondents agreed that the main benefits of using an alternative were; better for the environment, re-usable, and requires less waste management. The three main disadvantages were expensive pricing, less convenient, and that alternatives are harder to find.

During the latter two phases of the research, participants indicated an overall unawareness and unavailability of SUP alternatives as a large disadvantage. In addition, they remarked that alternatives often take up space, which is why an SUP remains so useful. A basket for example will take up more space than a flexible SUP which can be moulded according to the purpose. Alternatives are also often heavier to carry around and have reduced quality compared to SUPs – for example alternatives like paper can easily tear when carrying heavy products, whilst an extra plastic bag will add sturdiness. Other disadvantages related to the general convenience of an SUP, where an alternative will cost extra time (due to the need to wash it or carry it around), and is often less portable (for example carrying fufu or a soup-like

substance is convenient with an SUP whilst other alternatives do not provide the same mobility). Lastly, participants mentioned the debate between reusability and price. Alternatives are usually more expensive than SUPs, but the question is how re-usable they are in return. Participants indicated a willingness to pay for an alternative if it will indeed last longer, but some options such as paper will be more expensive and are less reusable than plastic bags as they do not carry the same qualities and are therefore more fragile.

When looking at the factors impacting choice between an SUP or an alternative, the main influential factor was clearly price (especially in Winneba, which is considered a more rural area than the capital city Accra), followed by convenience, sturdiness (quality), and size.



Source: Primary data fieldwork, March 2022

Lastly, participants in the FGDs and interviews were asked which SUP they felt should be replaced first. The most common answer across all groups and areas was the black polythene bags. There were several reasons for this; because the black bags have a serious effect and is the most common SUP used in society, because of the pollution they cause, and the fact that the plastic bags have destructive chemicals released in hot foods, posing immediate health challenges. Many participants discussed the opportunities around using paper bags or leaves as alternatives to overcome these disadvantages. Other participants also mentioned the need to replace cutlery first with a more re-usable option, and styrofoam takeaway containers as they have the shortest lifespan and cannot be re-used at all as opposed to other forms of SUPs. A male FGD participant in Winneba studying Science Education in particular brought it down to the mindset that is the most difficult yet most important thing to replace first; *"Moving from comfort to another place is uncomfortable. The mindset is the most difficult".*

4.2.3 Behaviour towards SUPs

The FGDs and interviews allowed participants to answer more questions related to their behaviour towards SUPs and alternatives, answering the final part of this research objective. Behaviour was related to four main themes; convenience and availability, cultural/spiritual beliefs, social norms, and economics.

The first and most common theme throughout the research was again convenience. Due to a significant lack of bins and other disposal opportunities, it is much easier and therefore common to throw SUPs away in local buses (trotro's), or in gutters around the marketplace. SUPs are also convenient by saving time. There is no need to wash a container or bag in order to reuse them, SUPs are always available to use once and throw away, also easily replaced by another. In households it is convenient to line dustbins with plastics so that these do not need to be washed. In addition, SUP bags preserve food in the fridge longer than any other alternatives, for example 'banku' is often kept in small transparent plastic bags. Lastly, the sheer availability of SUPs gives it an overwhelming advantage and much too easy of a choice compared to finding alternatives. They are found and used at every market stand, every shop, every street vendor, supermarket, etc. They are always readily available and require no extra thought or work – besides the obvious issue of disposal.

"The fact that they're so convenient, it really doesn't allow people to see further and think of alternatives because it is such an easy solution to things. I think it's a huge barrier, to have them"- 22 year old female participant in Accra, in her final year of her studies.

Secondly, behaviour towards SUPs was linked to cultural or spiritual beliefs. Culturally, households are now accustomed to using SUPs on a regular basis for daily tasks, such as lining the bin, preserving food, storing products, etc. In addition, people are aware of the cheap value of an SUP. A participant mentioned how plastic bags with unknown content will not be stolen, whereas if something is wrapped in paper the likelihood of theft increases as people know a paper bag is a more expensive material, therefore it can indicate a product of higher value or that the owner belongs to the middle/upper class. This relates to an important feature of SUP bags, which is its non-transparency. Herein lies the spiritual dilemma. In Ghanaian culture, privacy of bought goods is highly valued. People do not like others seeing what they buy, therefore SUPs are highly convenient. Whether you are carrying rubbish, food, or other products, it remains unknown to those around you. This also ties into a

common spiritual belief known as ‘evil eye’. The cultural norm and value of a non-transparent plastic bag stems from the spiritual belief that one can charm your food or drink by looking at the contents of your bag. It was commonly believed that by carrying your consumable products without a transparent cover, there was a chance of being poisoned. Although this belief is not held by everyone anymore, it still exists in society and it has influenced cultural norms in what is acceptable behaviour. Market vendors want to protect their customer from the charm and do not want to offend or disrespect them, therefore all products are given with a free black plastic bag to offer non-transparency and therefore privacy and security.

A third theme regarding behaviour towards SUPs is social norms, which also slightly overlaps with cultural norms. In society, plastic bags are considered more ‘appropriate’, presumably due to the cultural integration of these SUPs. This makes it increasingly uncomfortable to use alternatives as people are no longer used to it, and it results in a feeling of ‘strangeness’ when adopting an alternative. Amongst the participants it was agreed that there is now a social consciousness in using certain alternatives. For example, it is strangely looked upon when bringing your own tupperware container to a local food bar. One of the participants even asked advice about how to overcome this as he struggled with the judgement that comes with bringing in your own alternative versus using the SUP. Coming with your own bowl ‘looks weird’ and seems ‘not professional’.

In addition, black plastic bags are accepted in all aspects of society in Ghana. They can be used in all settings, whether informal or formal, as it is such an embedded product used at all levels and for such a wide range of purposes. This makes it an easy option for everyone as it is so commonly accepted. For market vendors in particular it is a necessary product for all customers as it will be considered offensive if they do not offer one. Providing a black plastic bag shows respect, therefore people will return to the same market stand. By not providing a plastic bag vendors will either lose customers or lose profit by offering a more expensive alternative. This brings us to the last point regarding social norms, which is that participants agreed it was difficult to implement change without offering a financial incentive.

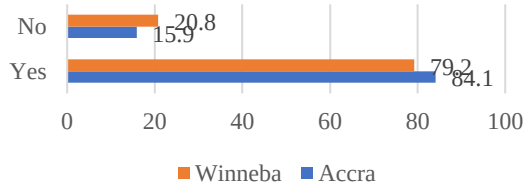
The fourth and final theme regarding behaviour is economics. Price has been highlighted as an important aspect, also in considering price difference versus convenience. SUPs are not only the cheapest option, but in many cases they can even be re-used as well if necessary

(such as the plastic bags or cutlery), which is beneficial to people with a lower income. In addition, the affordability for consumers and producers is unmatched. Plastic bags are easy and cheap to buy in bulk, for both households and vendors. Vendors will not easily switch to an alternative because they can offer plastic bags for free. If they choose to use an alternative, their product price will increase or profits decrease while those around them maintain lower prices. It is therefore not an economical option. In addition, some market vendors pay rubbish pickers at the market in order to keep their area clean and reduce pollution, however many choose not to do so as it will decrease their income. Therefore, they opt to throw it in the gutter.

4.2.4 Behaviour towards SUP Alternatives

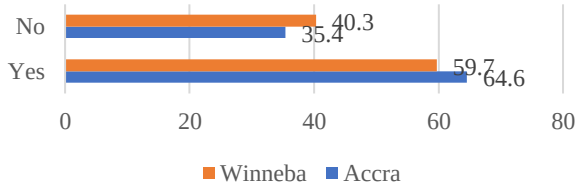
The survey attempted to understand common behaviour towards SUP alternatives by looking at the willingness of respondents to switch to alternatives.

Figure 19: Willingness to Switch from SUP to Alternative



Source: Primary data fieldwork, March 2022

Figure 20: Willingness to Pay Extra for an Alternative



Source: Primary data fieldwork, March 2022

Respondents indicated a clear willingness to switch to a re-usable alternative, however a smaller majority was willing to pay extra. This is an indication of behaviour as we can see that with an appropriate alternative there is a readiness amongst the population to adapt behaviour, however this needs to be in line with certain requirements such as price.

The FGDs and interviews further investigated behaviour towards SUP alternatives. The research showed an overall agreement across the FGDs that an alternative should not exceed the price of 1GHC more than an SUP. If it will cost more than 1GHC per product, it cannot be considered an effective alternative as the majority will not change their behaviour and consistently buy or use the alternative versus resorting to the convenience of plastics.

In addition, the data showed that according to the participants there is currently no proper alternative available. The most common example of a cheap and local alternative was the recycled flour sack bags (see Figure 21 below), however due to the white colour this option is at a greater disadvantage. Market vendors indicated it would be more effective with a darker colour for privacy of consumption, however this would then increase the production price of the alternative as it will cost extra to change the colour.

Figure 21: Recycled flour bags

Source: Roos de Raadt, March 2022

4.3 Determining Context-Specific Solutions to Minimize SUPs and Implement Affordable, Re-usable Alternatives

Throughout the last two phases of the research, participants brainstormed and discussed possible solutions to the issue of SUPs and potential alternatives, or ways to implement alternatives. By analysing the data of the FGDs and interviews, the main recommendations by participants are outlined in bullet-point form below. These will be further discussed in chapter five.

- Charge extra for takeaway containers
- Government ban on SUPs
- Create awareness and educate – through social media, broadcasting
- Encourage alternatives (for example providing a discount when customers bring their own reusable bag, charge extra for plastic bags)
- Increase clean-up efforts

- Increase accessibility to bins everywhere
- Introduce waste segregation through separate bins
- Increase worker fares for employees in waste management
- Increase funding in sustainable/environmental engineering and plant-based manufacturing processes and materials
- Educational program in elementary and high schools
- Enforce schools and restaurants to use alternatives in order to stimulate use
- National recycling policy or waste management system to properly dispose of collected plastics
- National system of waste collection, also from households. Perhaps by creating financial incentive whereby people are paid to collect their waste on a weekly basis
- Limit plastic production whilst simultaneously introducing affordable alternatives
- Introduce small bins/baskets in taxis and other local transport to dispose of plastic
- Add aesthetic value to alternatives to make it more attractive
- Sanctions for people that litter on the streets or in the ocean, through fines or policies
- Implement community watchers or environmental officers at markets to enforce sanctions
- Improve image of Zoomlion[97] workers to change the attitude towards waste pickers
- Solutions need to be enforced by the government in order to create change
- Hold plastic producers (like Voltic, BelAqua) responsible for their brand waste. Producers should place bins and implement a system of waste pickers to collect their brand waste on a weekly basis

4.4 General Discussion

The three phases of the research process demonstrate an overall consensus between the two areas of Accra and Winneba. The survey indicates a similar use of and attitudes towards SUPs and alternatives, whilst the FGDs and interviews showed similar knowledge and understanding of the research topic. The central findings and themes considered most relevant for this research will be highlighted below.

[97] Waste management service in Ghana

4.4.1 Accessibility

"Just the accessibility to them. Because if you want a takeaway container you go to literally anywhere, or any vedor, but if you want a reusable container you have to deal with washing, and you have to carry it with you there, and back, and you have to go to a specific store to buy that container as well. Same with the bags, anything that's reusable its not as available as the single use plastics"- 22 year old female student in Education and Leadership, at the University of Ghana FGD

A central theme throughout the research was the large accessibility and therefore convenience of SUPs. They are found everywhere, and their accessibility on such a large scale makes it the most obvious and easiest choice regardless of the product bought. This highlights the significant lack of alternatives, and more importantly the low accessibility of good alternatives. The research showed that alternatives can often only be found in larger supermarkets, individual initiatives, or businesses focused on sustainable production or plastic waste reduction (which often comes at a price). Restaurants using paper or other alternatives are generally more expensive, resulting in a limited reach as this automatically excludes the large lower class in Ghana.

4.4.2 Waste Infrastructure

A key finding repeated throughout the research was the lack of decent waste infrastructure in Ghana. The data clearly showed how students and market vendors are missing appropriate waste disposal opportunities and general waste infrastructure, such as bins and waste collection on a regularly basis. The most obvious aspect is the lack of bins around cities. Students complained that despite their willingness to properly dispose of plastic, there is often no opportunity to do so due to a lack of options. Many resort to carrying plastic waste in their pockets or backpacks for several hours until reaching home or another formal establishment. This leads to indiscriminate plastic disposal in gutters, on the ground, or in local transport. In addition, there is no systematic structure for waste collection. At universities for example, there are few dustbins around and waste is collected weekly whilst the bins are often filled on the first day due to their limited number. This indicates the ineffectiveness of the current system in place. Students mentioned the discomfort and lack of hygiene as a result of the stench and dirtiness around the few dustbins near their dorm rooms, in addition to the rest of the garbage that will not fit in the dustbin and will be thrown

elsewhere. This is also a problem for households, where they often resort to burning plastic waste to get rid of it as there is no other available option. Despite an overall awareness of the negative effects of burning plastic, many see no alternative to get rid of their waste and cannot keep it lying in their houses indefinitely. Slums and households along the coastline see the beach or ocean as their only and most convenient option to remove waste.

In addition to the lack of waste management infrastructure, participants mentioned the disregard for waste segregation. There is no opportunity nor incentive to segregate plastic waste from other waste as it is unlikely to make a difference in the way waste is picked up and dealt with. An exception to this is the prevalence of several plastic recycle plants, especially in Accra. People can collect plastic bottles and water sachets in particular and bring them to a recycling company for a small sum of money. Some markets, such as the London Market, have a few market vendors who will pay waste pickers a small amount to bring their plastic waste to such companies as well. However, despite this being a growing business, it is done by few and in limited areas. This entire informal business was not mentioned during the FGDs, indicating the little impact it has on the wider population and general awareness.

Lastly, in relation to poor waste management infrastructure there is a lack of clean-up efforts. Though there are some small initiatives (at universities or in some specific communities), it does not occur on a large scale and there is very little motivation for people to voluntarily join such initiatives. During the research I participated in a few clean-up efforts, where it was clear that fewer people showed up than expected, and every clean-up effort needed some form of incentive (usually a snack and a drink) to stimulate people to join. In addition to getting volunteers to clean up, the people in communities that were asked to collect plastic waste weekly so that it could be picked up, often asked for a small sum in return for collecting and keeping their own household waste. This indicates both the attitudes and behaviour towards SUPs and waste management as well as the lack of incentive or motivation to adapt behaviour for a positive long-term impact.

4.4.3 Economic Impact

Economics is a central aspect regarding SUPs that was constantly raised in the research process, both at the individual and group level. There are two sides to the economic impact of SUPs that was highlighted in the research. On the one hand, research participants were aware of the economic disadvantage of SUPs. The government needs to spend large amounts of money on cleaning efforts and ways to tackle the plastic waste due to excessive waste production. For example, annual floodings that occur as a result of plastic waste blocking drainage in gutters require large reparation costs and efforts to fix the destruction caused. Such finances could be avoided with proper waste management. In addition, the aesthetic environment is compromised by the amount of SUPs lying around. This severely impacts touristic sites, particularly Ghana's coastline, resulting in a lower financial income in the tourist industry whilst enduring high costs in clean-up efforts and damage repair.

On the other hand, SUPs are considered economically beneficial due to cheap production processes. Plastic production also offers employment opportunities whilst minimizing producer and vendor costs in cheap(er) manufacturing processes. Participants pointed out that natural alternatives, such as leaves, are often more expensive in cities as the materials now have to be transported from rural areas. Overall, plastic is definitely the cheapest option in all sectors and population segments. Vendors can buy SUPs in bulk for a very low price, allowing consumers to receive SUPs for free with their product (plastic bags, cutlery), or paying a minimal price compared to alternatives. Therefore, vendors will not easily switch to a more expensive alternative as it would require a raise in product price to match the difference, whereas consumers will not easily choose to buy an alternative versus receiving free quality packaging. In addition, consumers consider price versus product convenience and quality, making plastic the preferred option in almost all situations.

"Before making an alternative, you need to think about how reusable the item will be. If it is an alternative that you can only use once but is more expensive, I won't buy. If I buy a more expensive one but I know I can reuse it several times, then I may make a shift to another alternative" – 24 year old male participant at the FGD in UEW, studying Communications and Foreign Languages

4.4.4 Attitudes and Social Norms

An important finding is the attitudes and social norms towards waste, waste management and disposal. Research revealed an overall negative attitude towards waste pickers. They are often looked down upon and it is not considered a worthy form of employment. Children are raised with the idea that they need to go to school to not end up as a waste picker. This negative attitude can impact willingness to participate in waste management activities and forms of employment. There is also a common attitude amongst citizens where SUPs, particularly plastic bags, are considered socially acceptable in all settings.

In addition, respondents indicated the unlikeliness of public participation in waste disposal without a financial incentive. The interviews at the markets showed that many market vendors do not collect and properly dispose of their rubbish as it would cost more money than it would bring. The few that do collect plastic waste are required to pay a small sum to a waste picker who brings it to a larger recycling initiative. Several women work together in order to split the costs. Despite basic knowledge and awareness of the negative effects of SUPs and the 'dirty', 'ugly' environment it creates, this does not appear to be enough motivation to change the behaviour towards it. Many participants suggested financial incentives as an effective solution.

4.4.5 Characteristics for an Alternative

A crucial aspect of the research looked at the necessary characteristics needed for an alternative to effectively replace an SUP. The main characteristic needed is convenience. The name 'SUP' already says it – single-use. This was something participants highly valued as it makes SUPs convenient, practical, mobile and sanitary. Society is becoming increasingly mobile, including much traveling time and traffic. The portability of an SUP becomes a major benefit to both consumers and hawkers (street vendors) that are constantly on the move.

"Difficult to find an alternative to styrofoam containers depending on the food you have. Like if you have fufu, how do you package in something other than plastic? If you travel and you are hungry, it needs to be portable." – 26-year-old male participant at UEW

This ties into the key characteristic of lightweight. Former alternatives like woven baskets, cardboard boxes, and even modern backpacks are less favourable as they take up more space

and are always heavier than a simple black polythene bag, a styrofoam container, or plastic cutlery (just to name a few). Furthermore, SUPs are convenient due to their low maintenance. As it is only used once, there is no need to wash, clean, or store it, making it easily manageable. Research also showed how, despite negative health impacts of plastic waste, SUPs are considered more sanitary than alternatives. Specifically, regarding plastic cutlery and plates, it is cleaner to use an SUP that will only be used once and thrown away compared to metal/aluminium alternatives that require a clean water supply to wash and re-use them. Due to a lack of a clean, consistent water supply in many households and local food bars there is a sense of distrust towards reusable cutlery as it could result in disease contamination.

4.4.6 Non-Transparency

A final characteristic that specifically makes black polythene bags favourable in the researched context is their non-transparency. This was a recurrent theme in the research and therefore regarded as highly significant when considering alternatives and the use and behaviour towards this form of SUPs. The importance and value of non-transparency is founded on former spiritual beliefs that are still frequently upheld or otherwise respected in Ghanaian society. Everyone is aware of the 'evil eye' concept, whereby one can 'charm' (poison) any food or drinks simply by looking at them. To avoid the poisoning of food and drinks, consumption must be carried in a non-transparent bag as a form of protection. Although this belief is not carried by all citizens, it has impacted social and cultural norms and what is considered appropriate behaviour, particularly in cities. Market vendors and hawkers always provide black polythene bags to offer privacy and show respect to their customers. Not doing so is a form of disrespect and will result in a loss of customers. If customers are not automatically given a plastic bag with their product, they will actively ask for them as it is not appropriate to walk around with food in transparent bags or bare arms.

Throughout the research, participants either specifically mentioned the concept of 'evil eye' in describing the value of this characteristic, whilst others (mostly in Accra) used the concept of privacy. In any case, the value lies in other people not seeing what you buy for your own use. This does not only relate to evil eye, but also because it made people feel uncomfortable if others can see what they bought. It could indicate a level of class or reveal products people would rather keep to themselves. The black bags hide the value of your product and provide economic security as others cannot judge your level of income. Since these bags are being

used for anything, you could be walking around with rubbish, food, or an expensive product – no one can tell. Whilst discussing several alternative options for the black polythene bags, participants were given the choice between a few different prototypes. The most popular option was the provided alternative with the darkest colour or otherwise thickest material, paired with the justification that it would prevent people from seeing what they would buy.

These central findings highlight what needs to be considered when producing and implementing an effective alternative in the researched context.

Chapter 5: Conclusions and Recommendations

5.1 Conclusion

This chapter will first provide a brief summary of the research, followed by the main recommendations derived from the research.

This research investigated the use of, attitudes and behaviour towards single-use plastics in Ghana's residential and commercial zones. The purpose of the research was to explore the ways in which local perceptions and attitudes affect the design and uptake of viable reusable alternatives to SUPs in Ghana's urban areas. In order to answer the research question, there were three main research objectives:

1. To collate and synthetize information on the use of SUPs in Ghana's local context
2. Identify attitudes, perceptions and behaviour towards SUPs and SUP alternatives in selected localities in Ghana
3. Elucidate on context-specific solutions to minimize SUPs, and contribute to the implementation of affordable and re-usable alternatives in order to support policy development

In addition, four sub-objectives guided the research:

a. Identify the array of SUPs on site and the most commonly used, to contribute to sector specific solutions
b. Explore internal and external factors impacting behaviour of Ghanaians towards SUPs
c. Determine impact of SUPs on livelihoods and potential impact of alternatives on end-users in specific commercial spaces in Ghana
d. Determine challenges that arise with suggested alternatives

In order to attain these objectives, the research process followed three distinct phases and therefore sources of data. The first consisted of a university-wide survey at the University of Ghana, Accra, and the University of Education, Winneba, in February 2022. This resulted in 159 respondents overall, 82 in Accra and 77 in Winneba. The second phase consisted of two FGDs per university (four in total), divided into one male and one female group per location with 5-9 participants. These were semi-structured discussions that allowed a deeper insight into quantitative data from the survey. During the final phase, semi-structured qualitative

interviews were held with four different market vendors, two per market. The data for phases two and three were collected in March 2022.

These three sources of data combined allowed for a deeper understanding and insight into the issue of SUPs in Ghana. Despite previous research and articles on this topic, SUPs remain a prevalent and increasingly urgent problem in Ghana's urban society. Particularly cities struggle with the environmental impact caused by SUPs, and there is a growing awareness of their economic and social impact. The coastal location of Accra and Winneba has implications for their plastic waste disposal and therefore its impact, specifically regarding fishing activities. Despite the awareness of SUPs harmful effects, it appears that SUPs are still too embedded in society for it to cause a change in behaviour. The main SUP products such as black polythene bags, styrofoam takeaway containers, water sachets, are integrated in people's daily activities to such an extent that previously used alternatives are no longer viable options.

The research indicates two main challenges in tackling SUPs in Ghana. The first, is the lack of decent waste infrastructure. Without a proper system of waste management and disposal, SUPs will continue to plague the environment and its citizens. The second challenge, is the lack of an effective, affordable alternative that is appropriate for the local context. This leads to the preliminary conclusion that without immediate action, SUPs will still be used in many years to come. However, the research also shows room for change. There are several ways in which the research results can support the design and uptake of viable reusable alternatives. The main question is, who will lead this change and what does it mean? This question will be answered in the form of nine recommendations that can be taken into consideration for further public and policy action.

5.2 Recommendations

The research has resulted in nine main recommendations for the gradual elimination of SUPs and simultaneous introduction of appropriate alternatives in Ghana's urban zones.

1. **Implementation of decent waste infrastructure**

Prior to implementing a ban on SUPs, it is crucial that the government in Ghana first looks at developing sufficient waste infrastructure in order to allow proper waste disposal and management. Without a decent system of waste management, SUP waste will merely be replaced by alternative forms of waste and not tackle the root issue.

This consists of placing enough bins around the residential and commercial areas to allow appropriate waste disposal for all citizens, as well as a systematic waste management system where bins are emptied on a regular and consistent basis and waste is brought to a disposal area where it is taken care of in an environmentally friendly manner.

In order to achieve this, the research points to several suggestions;

- Introduce a national system of waste collection, perhaps by scaling up Zoomlion or establishing a government-subsidized waste management initiative that supports waste collection activities. This should include collection from households and general urban areas
- Creating financial incentives for users to stimulate participation and proper waste disposal. For example, paying households a small fee if they collect their plastics on a weekly basis. This does not need to be a necessary requirement, however it has proven to be an effective method
- Involve different sectors in the process to increase sustainability. For example, implementing supporting policies whereby taxis, restaurants, trotro's or other public establishments are required to have a dustbin and have access to a proper waste disposal area. This will stimulate users to properly dispose of waste when moving around, whilst owners of the vehicle or establishment are able to appropriately deposit the collected waste at the end of the day. Again, a financial incentive could be considered to increase effectiveness and quick implementation

2. **Waste segregation**

A follow-up recommendation regarding waste management is introducing waste segregation, whereby plastics are kept separate from other forms of waste (such as organic waste, paper waste, compost waste, etc.). This is highly relevant due to the negative environmental and health effects of burning plastic whilst burning is acceptable for alternative materials.
In order to achieve waste segregation, this can be integrated in the waste infrastructure. This can be done by placing special bins for plastic waste next to regular bins, having a separate team in a waste management company responsible for collecting and disposing of plastic waste, separate disposal sites for plastic waste, or even a separate waste management organization fully responsible for plastic waste with branches across the country's main cities. This could be followed up by a widespread campaign to spread the name and reputation of the plastic waste collectors so that it becomes a well-known process on a national level.

3. **Increased funding for the production of alternatives**

To minimize the impact of banning SUPs on livelihoods, increase funding in sustainable/environmental engineering and plant-based manufacturing processes and materials. A steady build-up of this production sector will lead to increased employment opportunities in this area of work. As a result, the production of plastic can be gradually scaled down. The goal is to maintain a balance in employment opportunities whereby plastic production will be increasingly limited with the rise of alternative production processes, minimizing economic risks and negative impacts on social structures and people's livelihoods. In addition, the disadvantages of reusability and costs of bio-degradable replacement of SUPs signpost opportunities for frugal innovation in the materials industry. The scope may be initially capital intensive, but in the long run, the scale of use has the potential to scale down the cost of environmentally sensitive products.

4. **Encourage alternatives**

To support SUP reduction in society, it is crucial to actively stimulate different alternatives for specific plastic products (such as alternative shopping bags). With this recommendation, it is important to consider different population segments and sectors, whereby the ultimate goal would be to encourage alternatives across the wider population to reach a larger audience. The research findings propose several methods of encouragement:

- Encouragement through education and awareness. This can start at elementary schools and be further integrated in high schools and further education. The educational sector can play a key role in spreading knowledge and awareness about SUPs and available alternatives. It would be recommended to include a mandatory environmental subject or perhaps short program on a national level, to ensure the next generations are raised with the idea of moving away from plastics and towards an SUP-free future. With increased and repeated education on this topic, people will gradually feel more comfortable with the suggested alternatives and hopefully slowly adapt their attitudes and behaviour as well.
- Social media and public campaigns are useful tools in spreading awareness on a large scale. Social media will target the younger population as well as more middle- or high-class citizens, whilst public campaigns and general broadcasting tools can reach the lower classes and all ages. A mixture of methods allows wider reach in encouraging the use of certain alternatives and appropriate waste disposal.
- The consistent adoption of alternatives in certain sectors. For example, by having schools or restaurants adopt a certain SUP alternative, all their customers will automatically interact with alternatives on a daily basis, normalizing its use and practice. This would also result in an association with these sectors and the adopted alternative, which can change general attitudes towards new products as well. Therefore, consistency is an important aspect of this recommendation, as it would require a consistent use of an alternative in order to effectively change attitudes or behaviour. By having an entire sector replace an SUP with an alternative, it will largely spread and encourage the use of the alternative above a preferred SUP.
- Use influential figures in encouraging SUPs. Besides social media campaigns and other forms of advertisement, it is a common practice to have specific people promote certain products or brands. Therefore the media sector would be a great area to spread the use of alternatives in replacing SUPs. This can be done by social media influencers, artists, performers, and the film industry as well (for example having movies produced in Ghana only use alternative shopping bags). Not only will this raise awareness on alternatives, it can also subconsciously nudge people to adapt their behaviour. Such examples can change the way households are run and normalize alternative products in Ghana’s society (or at least in particular communities).

- Add aesthetic value to alternatives. This would target another area of the population, as by making alternatives more aesthetically appealing it can attract more people to use them instead.
- Financial encouragement is considered a highly effective incentive and therefore strong method of encouragement. This would contribute to a change in use of and behaviour towards SUPs, but can also cause a shift in attitudes and social norms towards practices, such as bringing your own reusable bag or container to a local food bar. These things are still considered 'strange' or inappropriate, however it could become the social norm if incentivized to. This can be done in several ways, by for example;
    - Providing a discount if someone brings their own reusable bag or tupperware containers
    - Implementing a small fee on plastic bags and styrofoam containers instead of giving them away for free
    - Ensure that the production of alternatives remains affordable and comparable to the costs of SUP production

5. Increase clean-up efforts

Increasing clean-up efforts on a national scale can improve attitudes and behaviour towards SUPs. It contributes to the awareness of how SUPs impact the environment, and how to properly dispose of or behave towards such products. This can be implemented from either government level or plastic producers, such as water bottle companies. The important aspect of this recommendation is ensuring a certain group of people are held responsible for organizing several clean-up events on an annual basis, and that there is an allocated budget to fund such activities and events. In addition, it is important to promote such events to encourage more people to join, by for example making it a fun day with music and a snack. It could also be achieved in the form of a national campaign, whereby a designated team moves around the country each year to organize a clean-up event across the major cities. The key is consistency, so that the initiative can grow annually and gain popularity among citizens.

6. **Improve the image of waste pickers**

Due to the relatively negative image of waste pickers, it is recommended to actively change the attitude towards people working in waste management. This can be achieved by; increasing their income (financial incentive), or through social media, broadcasting, campaigns, or by including it in school and environmental programs. The importance is to highlight the crucial role waste pickers hold in society and the value of their employment as it benefits the wider population.

7. **Introduce consequences for polluting**

To stimulate and regulate appropriate disposal of plastic waste, it is recommended to implement rigid consequences for people that litter on the streets or in gutters. This could take the form of fines, or perhaps mandatory community service hours where if someone is caught littering they must participate in a clean-up event. To enforce such consequences, community watchers or environmental officers can be employed and stationed in certain areas. This can at the same time move employees in the plastic industry to an environmentally conscious employment, tackling both the employment gap that would appear after banning SUPs as well as increased awareness and education amongst the wider population.

8. **Hold plastic producers accountable**

By holding plastic producers responsible for the waste produced it will relieve some of the pressure on the government to take action. If the government is struggling to provide proper bins and waste management on a large scale, waste producers (such as Voltic or BelAqua) can support this. Such companies can be asked (or forced through policies) to place waste bins across busy regions and implement a system of waste pickers that collect their brand waste weekly. By encouraging such behaviour, it can also incentivize companies to recycle the waste they collect (either through their own recycling platform or by selling it to another recycling company).

9. Ban certain types of SUPs

The final recommendation is to consider implementing a ban on certain types of SUPs, such as black polythene bags. However, this should be done once an affordable alternative has been introduced that matches the needed characteristics for it to be considered effective. In addition, the ban should consider the impact on livelihoods for those working in plastic so that this can be minimized and acted upon at an early stage. Once the alternative has been introduced into society with a manufacturing and production process whereby employment is created, the transition away from plastic will be quickened through a ban on a specific SUP. A ban has been employed in various African countries, proving its effectiveness and positive environmental impact, therefore it is an important final recommendation once earlier steps have been taken towards SUP reduction and alternative production.

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Appendices

The appendices include extra figures that illustrate the context and urgency of SUP pollution in Ghana.

Source for all photographs: Roos de Raadt, March 2022

Appendix A

Photographs of blocked gutters in the city Accra

Indiscriminate disposal of plastic waste, blocking drainage

These pictures depict the current situation in Accra regarding SUP waste that blocks drainage systems, causing flooding. Most of the waste in the gutters is plastic.

Appendix B

Photograph of plastic pollution on Accra's coastline

This picture illustrates the marine pollution on the coastline. It is the environment many fishermen work in.

Appendix C

Photographs of SUP pollution besides roads

These pictures show the amount of SUP pollution found across the city and several communities, both near the coast and further into the city.