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Assessment of the impact of governmental & non-governmental programmes in Kenya through donor funding to control plastic sandals from uplands and coastal communities on marine ecosystem pollution: a case study of Mombasa County

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WORLD MARITIME UNIVERSITY

ASSESSMENT OF THE IMPACT OF GOVERNMENTAL & NON-GOVERNMENTAL PROGRAMMES IN KENYA THROUGH DONOR FUNDING TO CONTROL PLASTIC SANDALS FROM UPLANDS AND COASTAL COMMUNITIES ON MARINE ECOSYSTEM POLLUTION:

A CASE STUDY OF MOMBASA COUNTY

GRACE M. MULI

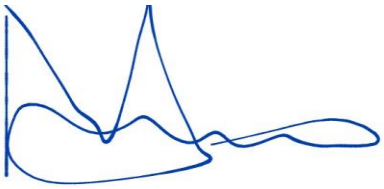
A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the degree of Master of Science in Maritime Affairs

2023

Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.



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Abstract

Title of Dissertation: **Assessment of the Impact of Governmental & Non-Governmental Programmes in Kenya through Donor funding to control Plastic Sandals from Upland and Coastal communities on Marine Ecosystem Pollution**

Degree: **Master of Science**

The maritime environment is being threatened by pollution, particularly plastic pollution, which jeopardizes the viability of the marine ecosystem. This study presents a comprehensive assessment of the impact of governmental and non-governmental programs in Kenya, supported by donor funding, aimed at mitigating plastic sandal pollution from upland and coastal communities and its consequent effects on marine ecosystem pollution in Mombasa County. To address the objectives, a mixed-method research approach was employed, combining quantitative and qualitative data collection and analysis. Quantitative data, gathered through surveys and structured questionnaires, provided numerical insights into the prevalence and patterns of plastic sandal pollution, allowing for regional and demographic comparisons. The fundamental causes and motivations of community behaviour with regard to plastic sandal pollution were further explored in qualitative research through interviews and focused group discussions. This approach offered a richer understanding of participant perspectives and behaviours. The findings indicate a consensus among respondents regarding the negative impact of plastic sandals on marine life, with 45% of survey participants expressing concern. This aligns with existing research highlighting the hazards of plastic waste on marine ecosystems, emphasizing the need for effective waste management strategies in Mombasa. Furthermore, 59% of respondents recognized the importance of proper plastic sandal waste disposal, emphasizing its detrimental effects on the environment. The majority, 72%, strongly agreed that plastic sandal waste poses harm to marine life and ecological systems. These findings underscore the urgency of implementing comprehensive strategies to address plastic pollution along the coast. Regarding donor funding, majority of the respondents believed it had a substantial positive impact on the success of governmental and non-governmental programs targeting plastic sandal waste reduction in Kenya. The study concluded that overreliance on external donor funding, while beneficial in jumpstarting environmental initiatives, can lead to fragility when funding ends or donor conditions dictate actions. To mitigate these issues, establishing a dedicated, long-term budget for sustainability is crucial. The donor perspective underscores the need to balance external support with local-driven efforts. The study's conclusion highlights the significance of capacity-building, empowering local institutions for self-reliance in managing plastic waste. By doing so, the community gains the resilience needed to adapt to changing donor dynamics, ensuring effective, lasting solutions.

KEYWORDS: Assessment, Impacts, Programmes, Donor Funding, Marine Ecosystem, Pollution, Kenya.

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List of Abbreviations

AFP	AGENCE FRANCE PRESSE
BMU	BEACH MANAGEMENT UNIT
CEP	CARRIBEAN ENVIRONMENT PROGRAM
EC	EUROPEAN COMMISSION
EIA	ENVIRONMENTAL IMPACT ASSESSMENT
EPR	EXTENDED PRODUCER RESPONSIBILITY
EU	EUROPEAN UNION
KEMFRI	KENYA MARINE FISHERIES RESEARCH INSTITUTE
LBPP	LAND BASED PLASTIC POLLUTION
ML	MARINE LITTER
NEMA	NATIONAL ENVIRONMENTAL MANAGEMENT AUTHORITY
NGO	NON-GOVERNMENTAL ORGANIZATION
OS	OCEAN SOLE
REC	RESEARCH ETHICS COMMITTEE
ROLAC	REGIONAL OFFICE FOR LATIN AMERICA CARIBBEAN
SDGs	SUSTAINABLE DEVELOPMENT GOALS
SWM	SOLID WASTE MANAGEMENT
UNDP	UNITED NATIONS DEVELOPMENT PROGRAM
UNEP	UNITED NATIONS ENVIRONMENTAL PROGRAM
WMU	WORLD MARITIME UNIVERSITY

CHAPTER ONE

1.1 Background of the study

Marine ecosystems are essential resources for coastal communities and offer a variety of advantages, such as food, livelihoods, recreation, and cultural importance. However, the maritime environment is increasingly threatened by pollution problems, such as plastic pollution, which jeopardizes the viability of the marine ecosystem (Nyangweso Ochieng et al., 2023). Reducing the amount of waste plastic that enters the ocean is one of the main goals of the UN's Sustainable Development Goal 14 Indicator 1 which calls for the reduction of pollution of the marine ecosystems (Ryan, 2020).

Among the different sources of plastic pollution, land-based pollution is a critical environmental issue with far-reaching consequences, particularly when it comes to plastic contamination in marine ecosystems. Astonishingly, approximately 80% of the plastics present in marine systems can be traced back to their origins on land (Jambeck et al., 2015). The impact of this pollution is staggering, causing immense harm to marine life, ecosystems, and even humans (Sheavly & Register, 2007). The proliferation of plastic is a concern that has escalated over the years. Since 1950, an astonishing 8.3 billion metric tons of plastic have been produced on a global scale (Worm et al., 2017). Worryingly, half of this colossal amount has been generated in just the previous 13 years. If current trends continue, this production rate is projected to increase in the coming years, exacerbating the problem further (Jambeck et al., 2018). This rapid increase in plastic production underscores the urgency to address the sources and consequences of land-based plastic pollution.

Recent studies have revealed that 11% of the plastic garbage produced globally in 2016—roughly 19 to 23 million tonnes (MTs)—entered the oceans (Borrelle et al., 2020; Perumal et al., 2023). The majority of marine litter (80%) comes from land sources like tourists visiting coastal areas and industrial and residential garbage discharged into the water. A sizeable portion of this litter is the product of poorly managed terrestrial waste and rivers (Jambeck et al., 2018).

According to Okuku et al., (2020), in Kenya the contribution to solid waste production varies among different counties. Mombasa County stands out as a significant contributor, generating a substantial 1000 tons of solid trash per day, indicative of a pressing waste management

challenge. Kilifi County, while producing a comparatively lower quantity of 400 tons daily, still adds to the overall waste burden. While the data suggests that Kwale County has significantly lower reported solid waste production compared to Mombasa and Kilifi Counties, indicating potentially more effective waste management practices or relatively lower waste generation, it is essential to note that even with effective waste management, it is unlikely that any region produces absolutely no solid waste. It may be possible that the available data might not fully capture the waste production in Kwale County, particularly from sources such as healthcare facilities. Further investigation or clarification is needed to understand the complete waste management situation in Kwale County. However, the statement also highlights a disturbing issue shared among these counties: the improper disposal or mismanagement of waste, especially plastic waste, into the marine environment. This problem underscores the importance of addressing both waste generation and management practices, as well as environmental protection efforts to mitigate the impact on marine ecosystems in these coastal regions. Ideally, waste management strategies should align with the waste hierarchy. The European Commission outlines this in their Waste Framework Directive (2008/98/EC). The waste hierarchy of that Instrument prioritizes waste prevention at the top, followed by reduction, reuse, recycling, and disposal as a last resort (Di Maria et al., 2020). By focusing on waste prevention and reduction strategies, we can minimize waste generation at the source and significantly reduce the environmental burden in these sensitive coastal areas.

Figure 1.1: Waste Management Hierarchy

Source: (Di Maria et al., 2020)

A portion of the waste enters the marine environment as a result of insufficient enforcement of plastic related laws as well as insufficient human, technical, and financial capability in these counties (Njoroge, Nikam, & Ddiba (2022). In the realm of environmental conservation, monitoring the accumulation of marine litter in marine ecosystems is an indispensable practice. This process allows to gauge the effectiveness of litter management and reduction strategies while also providing valuable insights into the health of marine environments (Fosi et al., 2018). However, a significant challenge emerges when examining the African context, as there is a glaring lack of comprehensive information regarding the origin, distribution, and composition of marine trash in this region (Jambeck et al., 2018).

According to Matthews, Moran, & Jaiswal, (2021), over the last few years, marine plastic pollution has captured attention of people living in Mombasa and generated hundreds of commitments from governments, organizations, and individuals. Numerous non-governmental organizations (NGOs) are actively addressing innovation issues, while a substantial number of new enterprises have emerged. Millions of individuals are also taking action to seek solutions, whether it be through volunteer work as scientists, participating in beach clean-ups, or reducing their personal consumption patterns (Muendo et al, 2017). This collective action shows a widespread commitment to address diverse issues, promote innovation, and develop sustainability. These coordinated efforts, from NGOs to grassroots projects, represent a developing movement for good change and environmental stewardship. Plastic sandals have been recognized as a potential source of marine plastic pollution, particularly in Mombasa County, one of Kenya's coastal areas (Okuku et al., 2021). Governmental and non-governmental projects have been formed, supported by donor financing, to address this issue and reduce the Mombasa County pollution brought on by plastic sandals (Barcelos, 2022).

Figure 1.2: Plastic Sandals Pollution

Source (AFP, 2022)

Figure 1.3: Plastic Sandals collection exercise in Mombasa

The use of plastic sandals is widespread in Kenya, with an estimated 100 million pairs of plastic sandals imported annually, leading to significant environmental consequences (Kitavuthi et al., 2020). According to Rochman, (2018), plastic sandals are usually made of non-biodegradable materials and when they end up in the ocean as pollution, they may harm marine life and damage the ecosystem. In Mombasa County, plastic sandals are a significant contributor to the plastic pollution problem, with studies indicating that over 60% of beach litter comprises plastic waste, with plastic sandals accounting for a significant proportion (Munga et al., 2020)

Source (AFP, 2022)

The Kenyan government has implemented various programmes to control plastic sandals pollution on marine ecosystems. One of the key programmes was the "Beach Management Units" (BMUs), established in 2001 by the government's Ministry of Fisheries Development. The BMUs sought to establish a community-based management system that would promote ethical fishing methods and beach management.

According to studies, Beach Management Units (BMUs) are inefficient at reducing the pollution caused by plastic sandals (Okuku & Mirera, 2018). In spite of government efforts, such as the founding of the "National Environment Management Authority" (NEMA) in 1996 to enforce environmental laws and advance education, plastic sandal pollution remains a serious problem in Mombasa County. NGOs have also taken initiatives to combat this problem. The "Flipflopi Project," launched in 2015 by the Kenyan NGO "The Flipflopi Expedition," aimed to raise awareness of plastic sandal pollution and encourage plastic waste recycling (Ferronato et al., 2023). Additionally, the "Ocean Sole" initiative in Kenya collects discarded plastic

sandals from the ocean, upcycling them into various products, and providing employment opportunities while promoting sustainable waste management practices (Jambeck et al., 2018). However, the effectiveness of this initiative in controlling plastic sandal pollution on marine ecosystems is also uncertain (Johnson et al., 2014)

Donor funding has been critical in supporting governmental and non-governmental programmes aimed at controlling plastic sandals pollution in Mombasa County. Donor funding has been used to finance research, awareness campaigns, and recycling initiatives. For example, the "Flipflopi Project" received funding from various donors, including the European Union, to support its activities. Similarly, the "Ocean Sole" initiative has received funding from donors such as the United Nations Development Programme to scale up its operations (Holt & Littlewood, 2016).

1.2 Statement of the problem

According to Greenpeace, discarded plastic sandals rank as the second most prevalent items on Kenyan beaches, with an annual influx of over 400,000 plastic sandals littering the coast (Greenpeace, 2019). The marine ecosystem in Kenya is confronting a critical menace stemming from escalating pollution driven by the indiscriminate disposal of plastic items, including plastic sandals by both upland and coastal communities. This reckless discarding of plastic items, including sandals, along beaches, waterways, and into the ocean, has precipitated the degradation of marine biodiversity, habitat degradation, and a pronounced decline in water quality (Barcelos, 2022). The response to this environmental challenge has seen the involvement of both governmental and non-governmental entities, who have initiated diverse initiatives to counter this pollution, primarily with the backing of donor funding. However, the actual impact of these well-intentioned programs on the Kenyan marine ecosystem remains obscured, necessitating a comprehensive assessment to unravel their efficacy. This not only tarnishes the visual allure of the beaches but also poses severe threats to marine life, which can ingest or become ensnared in these discarded items. The ramifications of marine pollution on biodiversity and human well-being are profound (Papworth et al., 2021). Moreover, the socio-economic reverberations, such as dwindling fishery yields, notably impact the sustenance of coastal communities (Nzuki et al., 2021). Addressing this gap, this study will meticulously scrutinize the influence of donor-funded governmental and non-governmental endeavours on mitigating the pollution originating from discarded plastic sandals within both upland and coastal communities. Through this assessment, crucial insights will be gleaned, offering

guidance on the most efficacious approaches to combat marine pollution and to instrumentalise donor funding in Kenya, and thereby safeguarding the delicate balance of the marine ecosystem.

1.3 Significance of the study

This study is significant because it will evaluate the effectiveness of governmental and non-governmental programs aimed at controlling plastic sandals from upland and coastal communities on marine ecosystem pollution in Mombasa County. The study will determine the extent to which donor funding has contributed to the effectiveness of these programs and identify the key factors that influence the implementation and sustainability of these programs. The findings of this study will provide valuable insights for policymakers, program implementers, and donors in designing and implementing effective programs to control and prevent pollution in the marine ecosystem and therefore contribute to increased environmental protection.

1.4 Objectives of the Study

The general objective of the study is to assess the impact of governmental and non-governmental programmes in Kenya through donor funding to control plastic sandals from upland and coastal Communities on marine ecosystem pollution. The specific objectives were;

i. To evaluate the effectiveness of the governmental and non-governmental programs aimed at controlling plastic sandals from upland and coastal communities on marine ecosystem pollution in Mombasa County.

ii. To determine the extent to which donor funding has contributed to the effectiveness of the governmental and non-governmental programmes aimed at controlling plastic sandals from upland and coastal communities on marine ecosystem pollution in Mombasa County.

iii. To identify the key factors that influence the implementation and sustainability of this programmes aimed at controlling plastic sandals from upland and coastal communities on marine ecosystem pollution in Mombasa County.

1.5 Research Questions

i. What is the impact of governmental and non-governmental programmes on the situation awareness towards plastic waste management?

ii. How has the availability of donor funding affected the implementation and sustainability of governmental and non-governmental programmes aimed at controlling plastic sandals from upland and coastal communities in Mombasa County?

iii. What are the challenges faced in implementing governmental and non-governmental programs aimed at controlling plastic sandals from upland and coastal communities on marine ecosystem pollution in Mombasa County?

1.6 Scope of the study

This study focused on Mombasa County, which is one of the counties in Kenya's coastal region. The study evaluated the effectiveness of both governmental and non-governmental programs aimed at controlling plastic sandals from upland and coastal communities on marine ecosystem pollution. The study will also examine the role of donor funding in supporting these programs. Additionally, the study will identify the key factors that influence the implementation and sustainability of these programs in Mombasa County.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review serves as a critical foundation for understanding the existing body of knowledge and research pertaining to a specific topic or research question. It offers a comprehensive overview of relevant studies, theories, and findings, helping to identify gaps, trends, and key insights in the field. This review provides a roadmap for the current study, showcasing the historical context, theoretical frameworks, and methodologies employed by previous researchers. By examining the strengths and limitations of prior work, the literature review guides the reader towards a deeper understanding of the subject matter and underscores the significance of the new research within the broader academic discourse.

2.2 Effects of Plastic Sandals on Marine Life

Numerous research efforts have explored the substantial impact of plastic sandals as a source of marine plastic pollution, considering both global and regional contexts. A seminal global study conducted by Greenpeace shed light on the pervasive issue of plastic debris in oceans, with discarded plastic sandals being identified as a prominent contributor to this (Tonning et al., 2010). This research underscored the worldwide significance of the problem and the urgent need for targeted solutions.

"Plastic sandals contain a wide range of chemicals, both those utilized in manufacturing and those that accumulate from the maritime environment (i.e., ambient seawater). Plastics are made from a variety of potentially hazardous compounds that can seep into the environment (Lithner et al., 2017). Certain plastics, as indicated in studies, contain substances such as phthalates and flame retardants that may be detrimental to fish, animals, and mollusks (STAP, 2017). Experimental research has shown that phthalates and bisphenol-A (BPA) have a deleterious impact on reproduction in all species studied, stunt amphibian and crustacean growth, and produce genetic defects in general (Karanja, 2022). Recent studies also suggest that high levels of additives and microplastics can affect organisms' ability to perform ecophysiological tasks (Wright et al., 2018).

Zooming in on specific regions, various studies have provided valuable insights into the role of plastic sandals in marine pollution. Notable among these are assessments conducted in the Caribbean and Mediterranean. These regional studies by (Bucci, and Rochman, 2019) elucidated the scale of the issue in these areas, emphasizing the need for comprehensive waste management strategies to address the mounting problem of marine litter ("Marine Litter Assessment in the Caribbean," 2017; "Marine Litter Assessment in the Mediterranean," 2019). According to Graham (2022), the UN Environment Caribbean Environment Programme (CEP) established a collaboration known as the Trash Free Waters Initiative in partnership with the U.S. Environmental Protection Agency (EPA), Peace Corps, and UN Environment's Regional Office for Latin America and the Caribbean Sub-Regional Office (UN Environment SRO). This initiative was launched with initial activities conducted in Panama and Jamaica, aiming to unite various stakeholders in identifying essential actions to reduce and prevent the inflow of land-based trash into watersheds, coastal waters, and the Caribbean Sea.

In Jamaica, the Sandals Foundation takes the lead in implementation, with technical assistance provided by the National Environment and Planning Agency (NEPA). In February 2018, approximately 200 labelled bins were distributed across 34 locations in the Bluefield’s and Whitehouse communities on Jamaica's southern coast. Subsequently, during the latter part of 2018, the initiative conducted 20 outreach events and conducted surveys in both the community and schools (UNEP, 2019).

In Panama, UN Environment's Regional Office for Latin America and the Caribbean (ROLAC) leads the initiative, with support from ANCON, a non-profit organization dedicated to preserving Panama's biodiversity and natural resources for present and future generations. ANCON has been responsible for coordinating pilot project activities in the coastal community of Juan Diaz. Since July 2018, educational institutions have provided training in solid waste management and pollution prevention to teachers and students. Additionally, volunteers have received training in waste separation (UNEP, 2019).

Within Kenya, a critical study conducted by Greenpeace highlighted the considerable impact of plastic sandals on the country's marine ecosystem. Greenpeace's research revealed that more than 400,000 plastic sandals wash up on Kenyan shores each year, significantly contributing to the degradation of coastal environments (Plastic Debris on Kenyan Beaches," Greenpeace, 2019). Additionally, another study delved into the socio-economic implications of marine

pollution in Kenya, linking the presence of plastic sandals to decreased fishery production and its cascading effects on coastal livelihoods (Nzioka, 2021).

According to the study conducted by Galgani and Loiselle in 2021, a striking 94% of plastic waste that finds its way into the ocean doesn't remain suspended in the water column but rather descends to the seafloor. This statistic underscores the depth of the issue, as it suggests that the majority of marine plastics are not easily accessible for removal or clean-up efforts. This submerged plastic can have far-reaching consequences for marine ecosystems, potentially affecting benthic organisms and altering seafloor habitats. Conversely, only a mere 1% of marine plastics are observed floating near or at the ocean's surface, which is the most visible and easily detectable fraction. This surface-floating plastic often captures public attention due to its impact on marine life, including entanglement and ingestion by marine animals. Another 5% of marine plastics eventually wash up on beaches, where they become more noticeable and pose a direct threat to coastal environments, wildlife, and human activities.

However, amidst these valuable insights, several research gaps remain to be addressed. Notably, the existing literature lacks a comprehensive exploration of effective management strategies specifically targeting plastic sandals in Kenya. Moreover, studies primarily focusing on prevention measures, including behaviour change campaigns and policy interventions, are relatively scarce. The dearth of comprehensive monitoring and assessment of the impact of governmental and non-governmental interventions on plastic sandal pollution constitutes a significant research gap in Kenya. Finally, while global and regional studies provide crucial insights, the unique socio-cultural and economic dynamics of Kenya's coastal communities necessitate localized research efforts to inform tailored solutions.

According to Barcelos (2022), the use of plastic sandals in Kenya has become a significant source of marine ecosystem pollution. Both governments and NGOs have acknowledged the gravity of plastic pollution, leading to the enactment of policies, public awareness campaigns, and investments in waste management infrastructure. Legislative measures include bans on single-use plastics and regulations on plastic waste disposal (Xanthos & Walker, 2017). Public awareness initiatives have prompted reduced plastic consumption and better waste disposal practices. Improved waste management infrastructure aids in proper disposal. Research and innovation focus on alternative materials and recycling technologies. NGOs play a pivotal role in awareness, advocacy, and community projects. International cooperation is fostering global

commitments to combat marine plastic pollution. These changes signify recognition and action, although long-term impact assessment is ongoing. The implementation of these programs has been supported through donor funding. The assessment of the impact of these programs is crucial in ensuring that the funding is utilized effectively to achieve the desired results. In this theoretical review, two theories will be used to assess the impact of governmental and non-governmental programs in Kenya through donor funding to control plastic sandals from upland and coastal communities on marine ecosystem pollution.

2.3 Theoretical Framework

The United Nations Environment Programme (UNEP) defines marine litter as any persistent, manufactured or processed solid material that is discarded, disposed of, or abandoned in the marine and coastal environment. Marine litter encompasses a wide range of materials, including but not limited to plastic, glass, metal, wood, rubber, paper, and textiles. It can originate from both land-based and marine-based sources, and its presence in oceans, seas, and coastal areas poses significant environmental, economic, and social challenges (UNEP, 2019). Addressing marine litter is crucial for maintaining the health and sustainability of marine ecosystems and ensuring the well-being of coastal communities worldwide (Gonzalez-Fenandez& Hanke, 2020). The following theories analyses the theoretical framework in the study;

2.3.1 Network Theory

This theory proposes three historical research traditions related to the development of network governance theory, including policy networks, service delivery and implementation, and management networks (Partelow et al., 2020). In addition, network governance theory takes into account theories about how information is disseminated as well as social learning and cultural exchange. Network governance theory bases a major tenet on the idea that governance process results would be influenced by the traits or qualities of governance networks.

The use of specific indicators developed throughout time is one of the most widely used techniques for establishing environmental pollution targets or permits (Ciardiello et al., 2019). The generation, acquisition, and diffusion of resources and information, resource mobilization and allocation, alignment and maintenance of commitment to common rules, conflict resolution, and trust-building have all been the focus of assessment studies of networks used in natural resource management (Ruzol et al., 2017). It is not just the number of connections that matter; it is also the kinds of connections, the network's structure, and how significant those ties are for

the actors involved (Partelow et al., 2020). Network theory is therefore crucial in this study for the development of policy network, strengthen service delivery and ensure implementation, and management networks in curbing the issue of plastic sandals pollution in the marine ecosystem.

The objective to evaluate the effectiveness of governmental and non-governmental programs aimed at controlling plastic sandals from upland and coastal communities aligns closely with the essence of network governance theory. The theory underscores that the traits and qualities of governance networks significantly influence their outcomes. In this context, the assessment of program effectiveness delves into the dynamics of collaborative networks formed by government agencies, NGOs, and other stakeholders. It examines how the interactions, coordination mechanisms, and information flows within these networks contribute to or hinder the success of plastic sandal pollution control initiatives. Network governance theory, with its focus on governance processes influenced by network qualities, provides a robust analytical framework to dissect these complex relationships.

Secondly, the objective to determine the extent to which donor funding has contributed to the effectiveness of the governmental and non-governmental programs further underscores the relevance of network governance theory. The theory emphasizes resource mobilization and allocation within governance networks (Castells, 2011). In this specific objective, the study investigates how donor funding, as a critical resource, shapes the dynamics of the networked approach to plastic pollution control. It examines whether the allocation of funds, the alignment of donor priorities with program objectives, and the dissemination of resources within the network play pivotal roles in enhancing or hindering the success of these programs. Network governance theory's emphasis on the role of resources within networks provides a theoretical lens to analyze the influence of donor funding on the effectiveness of plastic sandal pollution control initiatives in Mombasa County. In essence, it facilitates a comprehensive understanding of the interplay between stakeholders and resources in the governance of this environmental issue.

2.3.2 Stakeholder Theory

The stakeholder theory is receiving more and more attention in sustainability and circular economy research, policy, and practice due to its growing significance in explaining the enormous number and significance of stakeholders in complex systems (Gerassimidou et al., 2021).

The theory has developed within the management community to comprehend how businesses work and their impact on value creation and sustainability, as well as to educate businesses on ethics, duty, and accountability in protecting the environment. This theory aids in identifying and classifying stakeholders into groups based on their responsibilities, priorities, and areas of interest (Grist &Coleby, 2020).

In order to broaden the relevance and implementation of stakeholder theory in sustainable management, a conceptual framework is created based on the analysis (Hörisch et al., 2014). This analysis identifies three obstacles to managing stakeholder relationships for sustainability: enhancing stakeholders' specific sustainability interests; developing shared sustainability interests based on these specific interests; and enabling stakeholders to serve as intermediaries for nature and sustainable development. This can be resolved through the use of three interconnected mechanisms, namely, regulation, value generation for stakeholders based on sustainability, and education (Bacq & Aquilera, 2021).

Stakeholder Theory asserts that organizations have a responsibility to consider the interests of all stakeholders, including the community, employees, customers, suppliers, and the environment, in their decision-making process (Freeman, 2010). In the case of plastic sandals pollution in Kenya, the stakeholders include the government, NGOs, donors, the community, and the marine ecosystem. The implementation of programs to control plastic sandals pollution should consider the interests of all stakeholders.

The objective to evaluate program effectiveness acknowledges the critical role of various stakeholders in collaborative efforts to combat plastic sandal pollution. Stakeholder Theory encourages the identification and classification of stakeholders based on their responsibilities, priorities, and areas of interest. This approach aligns with the study's aim to assess how these diverse stakeholders interact within governmental and non-governmental programs and how their interests impact the effectiveness of pollution control initiatives.

Secondly, when determining the extent to which donor funding contributes to program effectiveness, the study essentially examines the relationship between donors and other stakeholders in the network. Stakeholder Theory underscores the importance of organizations considering the interests of all stakeholders, including the environment, in their decision-making process. In the case of donor-funded programs, this perspective becomes pivotal in

evaluating how the allocation of resources and priorities align with the sustainability interests of all stakeholders involved, thus linking directly to the study's objective to assess the impact of donor funding on plastic sandal pollution control. By applying Stakeholder Theory, the research seeks to provide insights into how these various interests and responsibilities within the network influence the success of initiatives aimed at curbing plastic sandal pollution in Kenya's marine ecosystem.

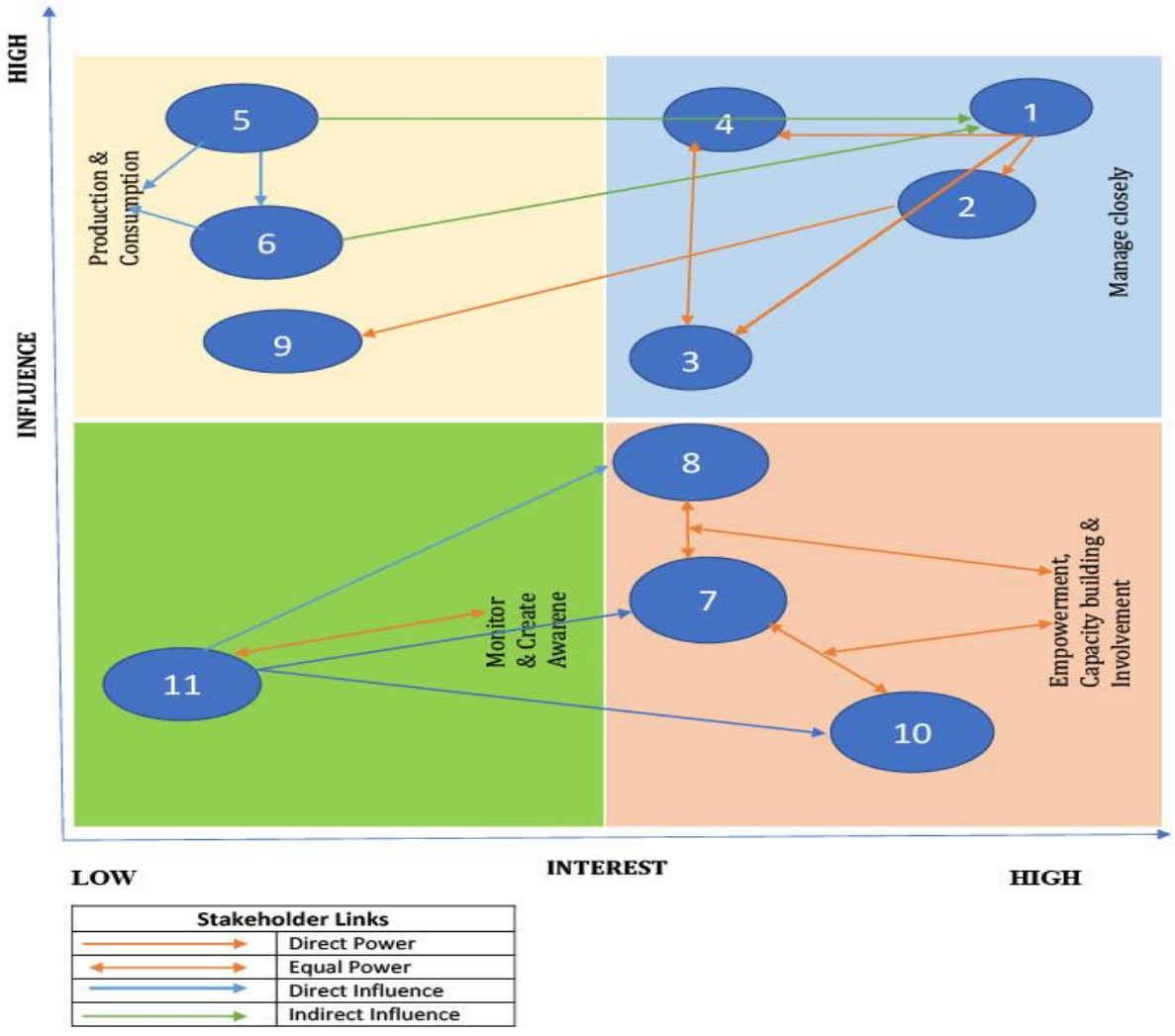
Table 2.1: Stakeholder Analysis

No.	Group
1.	**Government Ministries**
	Ministry of Environment, Forestry and Climate Change
	Ministry of Mining, Blue Economy & Maritime Affairs
	Ministry of Tourism and Wildlife
2.	**Government Agencies**
	National Environment Management Authority (NEMA)
	Kenya Marine Fisheries Research Institute (KEMFRI)
	Kenya Wildlife Service
3.	**Non-Governmental Organizations & International Organizations**
	Global Ocean Observing System
	Ocean Sole Africa
	Greenpeace
	United Nations Environment Programme (UNEP)
	World Health Organization (WHO)
4.	**Donors**
	Surfrider Foundation
	Greenpeace International
5.	**Private Companies/ Industries**
	Manufacturing Companies
	Export Companies
6.	**Market Sellers**
	Buyers
7.	**Local Communities**
	The Flip-flop Project
8.	**Beach Management Unit**
9.	**Waste Management**
	Go Green Garbage Collectors
10.	**Marine Scientist**
	Oceanographers

11.	**Media**
	Print media (newspapers, magazines), Television

Source: The Author

Figure 2.1: Stakeholder Mapping, Level of Interest & Influence



Source: The Author

Stakeholder analysis can be used to gather information on the pertinent actors in order to comprehend their actions, intents, relationships, agendas, interests, and the power or resources they have exerted or could exert over the decision-making processes (Brugha & Varvasovszky, 2000). This knowledge can then be applied to create management strategies for these stakeholders, facilitate the implementation of certain decisions or organizational goals, or comprehend the context of policy and evaluate the viability of future policy initiatives.

The effective application of stakeholder analyses aids in framing problems that can be resolved in ways that are technically possible, socially acceptable, and beneficial to everybody (Bryson, 2007).

2.4 Research Gaps

The introduction of this research sets the stage by highlighting the pervasive issue of plastic sandals as a significant contributor to global and regional marine plastic pollution, with a specific focus on Kenya. It underscores the urgency of addressing this environmental challenge. The end of chapter one signifies the transition from problem identification to the exploration of solutions and research objectives. However, as we delve into chapter two and begin to explore into the existing literature, it becomes evident that there are critical gaps in our understanding of effective management strategies, prevention measures, and the comprehensive assessment of intervention impacts related to plastic sandal pollution.

In the literature, there is a noticeable dearth of comprehensive studies that examine the full spectrum of interventions required to combat plastic sandal pollution effectively. While some research highlights the extent of the problem, little attention has been given to identifying and evaluating strategies that could mitigate this issue. This gap impedes the development of practical solutions and hinders the creation of a holistic framework for tackling plastic sandal pollution.

Moreover, existing studies often lack a nuanced examination of the socio-environmental impact of plastic sandals on coastal communities and marine ecosystems. While the problem's magnitude is acknowledged, a deeper exploration of the repercussions on both the environment and the livelihoods of local populations is required. Understanding these dynamics is essential for crafting effective policies and interventions.

As we progress to the literature review, it is evident that this research gap is not merely a matter of academic interest but a critical void that needs to be addressed urgently. By bridging these gaps in knowledge, this research aims to provide a more comprehensive understanding of plastic sandal pollution and offer actionable insights to mitigate its detrimental effects on marine ecosystems and coastal communities. It is through the examination of these research gaps and their subsequent exploration that we can work toward a more sustainable and responsible approach to managing this pressing environmental issue

CHAPTER THREE

METHODOLOGY

3.0 Introduction

A research methodology is a field that deals with how to carry out scientific research. It is utilized to methodically arrive at a solution to the research challenge by analyzing the procedures used during the investigation and the reasoning behind them. According to research methodology, the processes used to gather data for database building were referred to as research methodologies

3.1 Research Design

A research design, which is a thorough plan that consciously and rationally combines numerous parts to tackle the specific research problem at hand, is required for the study findings. (James, 2015). The mixed-method approach, consisting of both quantitative and qualitative data collection and analysis, was employed to ensure a well-rounded understanding of the complexities surrounding plastic sandal pollution in Kenya. Quantitative data, gathered through surveys and structured questionnaires, enabled the collection of numerical data regarding the prevalence, distribution, and patterns of plastic sandal pollution. This quantitative component provided statistical insights into the magnitude of the issue and allowed for comparative analyses across different regions and demographic groups within Kenya.

This integration of mixed techniques played a pivotal role in effectively addressing and answering the research questions (Kabir (2016). The study's instruments were semi-structured interviews and a questionnaire. In all research, the use of mixed techniques aided in answering the study questions.

According to Berg and Howard (2012), qualitative research was defined to mean concepts, definitions, metaphors, symbols, and descriptions of objects. These strategies were used in data gathering to provide an accurate representation of the participants in the study. The qualitative research approach, characterized by participant observation and focused group discussions, enhances our understanding of behaviour for several reasons. Firstly, participant observation allows researchers to immerse themselves in the natural settings of the study, providing an in-depth view of how individuals interact in their real-life contexts. This method captures nuances, non-verbal cues, and unscripted behaviours that may not be apparent through other research

methods. As a result, the qualitative research methodology generated a wealth of information about actual individuals and conditions in the research area.

A quantitative research approach, according to Bryman (2001), was one that emphasized numbers and figures in data collection and analysis. A quantitative research approach was, by definition, scientific. Using statistical data for research summaries and analysis saved the researcher time and effort in describing the study's findings.

3.2 Data Collection

The great majority of the data were provided by the targeted demographic. Primary data were gathered through interviews and questionnaires, with only information pertinent to the study collected. The questionnaire was created on Google Forms, and the link was shared via emails and WhatsApp. Questionnaires were distributed at random to individuals, with the majority of responders coming from the community living around Mombasa's shore. Additional questionnaires were circulated to provide donor organizations with an overall picture of the suggested marine environment pollution mitigation measures (Gao et al., 2023).

A small number of interviews were conducted to acquire a better understanding of the underlying causes and motives for people's opinions, preferences, or behaviour regarding the research topic. The process of conducting the survey involved asking respondents a series of questions to gather data and make judgments. Respondents were interviewed in person, on paper, over the phone, and online, with online surveys being a particularly cost-effective method for collecting input from a large number of people at minimal cost and with little effort (Busetto, Wick & Gumbinger, 2020).

During one-on-one verbal sessions, one interviewer spoke to one interviewee at a time while asking a series of questions to elicit information. Interviews took place in person, over the phone, or online. Interviews were time-consuming due to their one-on-one nature, allowing the researcher to delve deeper into specific concerns by asking follow-up questions or clarifying responses provided by respondents during the study.

3.3 Data Analysis and Interpretation

According to Saunders (2012), data analysis involved the process of organizing, categorizing, and arranging the obtained data to facilitate easy and effective communication of the results. The statistical package for social sciences (SPSS) program, version 25, was used to examine the data gathered during the study. The data was also checked for clarity, completeness, and compatibility with the study's objectives. Both statistical and qualitative evaluations were conducted on the data before presenting them in the form of charts, bars, and graphs.

3.4 Population and Sample Size

Every item in every field of inquiry, according to Kothari and Garg (2014), is a portion of a population, and a census inquiry or census survey is a full count of every item in the population. A sample, on the other hand, is a collection of observations that represents only a portion of the population (Danscombe 2008). The study's target group was 70 respondents who are residents of communities in Mombasa County in the coastal region. The census was used in the study because the population is small and controllable.

3.5 Ethical Consideration

Prior to the collection of the data, the researcher obtained an approval from the WMU Research Ethics Committee which was given vide REC DECISION # REC-23-056 (M) dated 24th July, 2023. The participants were assured of their confidentiality and anonymity to the data collected. As noted by Mugenda & Mugenda (2013), confidentiality ensured that participants' information was kept secure and not disclosed to anyone without their consent. This ethical principle was strictly adhered to throughout the study to build trust with the participants.

The main argument for protecting respondents' privacy was to avoid respondents providing false information or even declining to submit crucial information for the study.

In both the qualitative and quantitative analysis, ensuring the validity and reliability of the research process was of paramount importance, following the guidelines of Western Michigan University (WMU). Validity referred to the accuracy and truthfulness of the research findings, while reliability concerned the consistency and stability of the research process and results.
To enhance the validity of the qualitative analysis, rigorous methods such as member checking were employed. Member checking involved sharing the research findings with participants to validate the accuracy of their representation and interpretations. This iterative process helped to

ensure that the qualitative data accurately reflected the participants' perspectives and experiences.

For the quantitative analysis, various techniques were utilized to establish the reliability of the research instruments, such as the questionnaires. Test-retest reliability was conducted by administering the same questionnaire to a sample of respondents on two separate occasions and comparing the results for consistency. Additionally, Cronbach's alpha coefficient was calculated to assess the internal consistency of the questionnaire items.

A consent form illustrated in Appendix IV was issued to those willing to participate in the study. The researcher also acknowledged the contributions of other researchers by citing and referencing their work appropriately, following the guidelines set by Kothari (2007). This practice ensured the ethical handling of existing knowledge and research in the field.

3.6 Preliminary Conclusion

Governments, in collaboration with donors, investors, individuals, communities, and non-governmental organizations (NGOs), have the ability to drastically modify the trajectory of plastic sandal pollution releases into the ocean, offering an opportunity to address other overlapping social and environmental challenges. Innovative laws, funding, investments in wastewater and solid waste infrastructure, and a shift in mentalities and behavioural patterns will all help to find solutions. Many businesses will unavoidably argue that enacting these reforms will only result in the loss of jobs, earnings, and economic growth if they are faced with rising expenses or are required to take responsibility for charges that they have previously imposed on others.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1: Demographic Characteristic of the Respondents

Demographic characteristics of the 70 respondents surveyed from Mombasa, Kwale, and Lamu on how to control plastic pollution in the ecosystem were examined. Initially, the researcher distributed 70 questionnaires, and 47 of these questionnaires were returned.

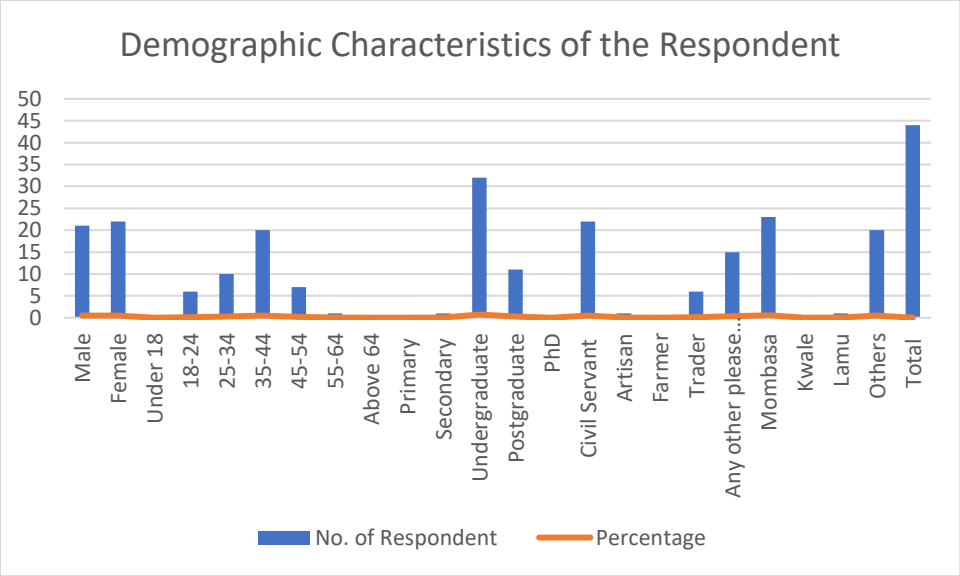
Table 4.1: Demographic Characteristic of the Respondents

Demographic Variable	No. of Respondent	No. of Respondent	Percentage
Gender			
	Male	24	49%
	Female	23	51%
Age	Under 18	0	0%
	18-24	7	14%
	25-34	10	23%
	35-44	20	45%
	45-54	8	16%
	55-64	2	2%
	Above 64	0	0%
Education	Primary	0	0%
	Secondary	2	2%
	Undergraduate	33	73%
	Postgraduate	12	25%
	PhD	0	0%
Occupation	Civil Servant	23	50%
	Artisan	2	2%
	Farmer	0	0%
	Trader	7	14%

	Any other please specify, fisherfolk	15	34%
County	Mombasa	24	52%
	Kwale	0	0%
	Lamu	2	2%
	Others	21	45%
	Total	**47**	**100**

Source: Survey, (2023)

Figure 4.1: Demographic Characteristic of the Respondents



In accordance with Table and figure 4.1 the total number of male respondents who participated in the study was 24, which represented 51% of the sample population, while the total number of females who participated in the study was 23 which was a 48% representation. From the study, it was concluded that the number of males' response was much more than those of females. The age bracket of respondents was factored in during the study with those between ages 35-44 having the highest number at 20 while the least being 55-64 years being 2 respondents. According to data collected and analysed on the level of education

Table 4.2: Type and Frequency of Plastics in Kenya

What kind of plastic materials do you use frequently in the household?		
Plastic bags	10	21%
Plastic bottles	15	32%
Food packages	10	21%
Clothing	6	13%
Foot-wears	5	11%
Others (please specify)	1	2%
Total	**47**	**100%**

Figure 4.2: Type and Frequency of Plastics in Kenya

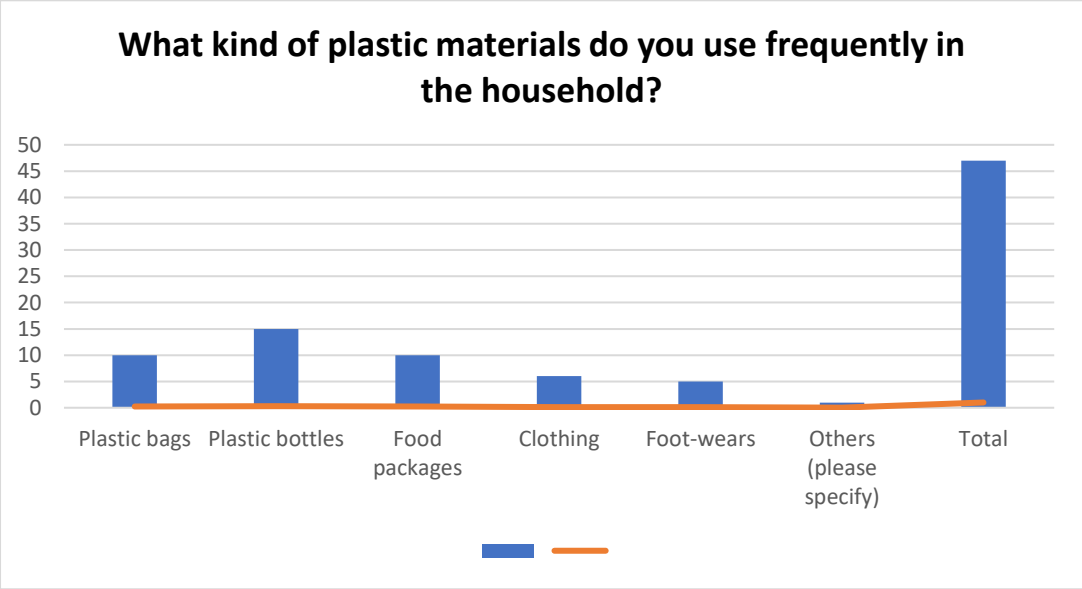
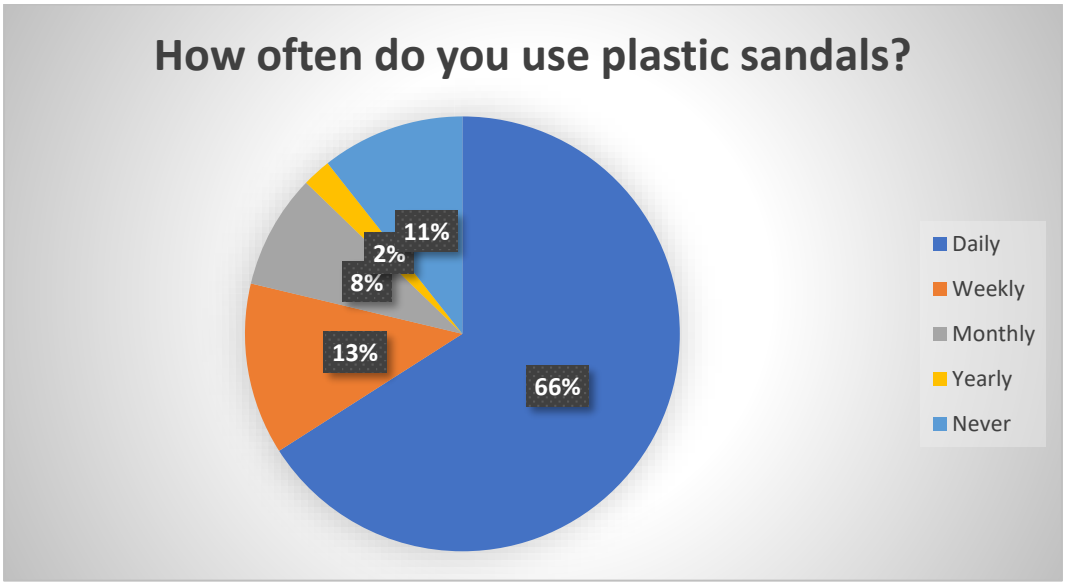


Table 4.3: How often do you use plastic sandals?

Daily	31	66%
Weekly	6	13%
Monthly	4	9%
Yearly	1	2%
Never	5	11%
Total	**47**	**100.00%**

Figure 4.3: How often do you use plastic sandals?



Based on the Type and Frequency of Plastics in Kenya according to table 4.3 and figure 4.3, the respondence response gave a varied feedback with majority of respondents stating on the use of plastic bottles, plastic bags, food packages, footwear and clothing at 31.91%, 21.27%, 21.27%, 10.63% and 12.76% respectively with daily disposals being done frequently at 65% followed by weekly at 13 and monthly and yearly covering 9% and 2%. However, a response of 10% on the remaining response gave a contrary response of not having used any plastic material whole year round.

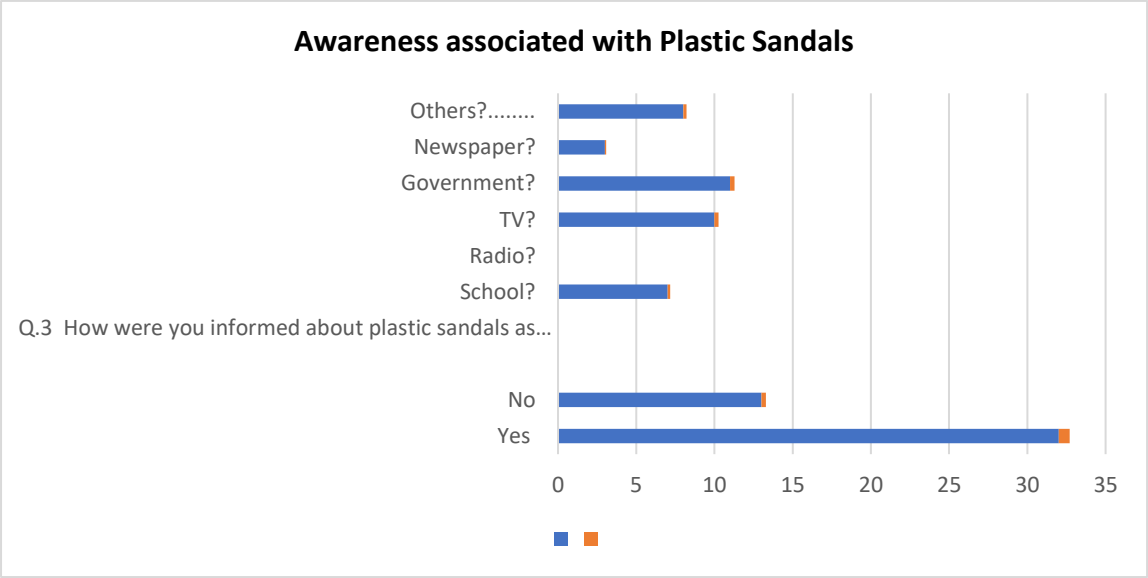
The finding according to respondents indeed gives a clear indication on use of plastic materials which find its way into ocean shores hence leading to marine pollution.

Table 4.4: Perception about Plastic Pollution in the Study Area

Q.2 Are you informed about the problem associated with plastic sandals pollution in Kenya?		
Yes	33	71%
No	14	29%
Total	**47**	**100%**

Q.3 How were you informed about plastic sandals as part of plastic pollution in Kenya?		
School?	8	18%
Radio?	1	2%
TV?	12	26%
Government?	13	28%
Newspaper?	4	8%
Others?.....	9	21%
Total	**47**	100%

Figure 4.4: Perception about Plastic Pollution in the Study Area



From the data findings as shown in table 4.4 and figure 4.4, the questionnaire sought to establish the level of awareness or perception about plastic pollution in the study area that these residents have, by asking whether they had heard advertisements, messages and campaigns on plastic sandals as part of plastic pollution in Kenya. 71% of them reportedly had experienced the awareness campaigns and none of them had not. This large number is undoubtedly proof that residents are aware of campaigns on plastic sandals as part of plastic pollution in Kenya. From the findings, majority of the respondents at 28% were informed about plastic sandals as part of plastic pollution in Kenya through government advertisements while 25% got the information through television. The least majority at 2% found the awareness information through the radio.

This large number of residents is undoubtedly proof that residents are aware of the plastic sandals as part of plastic pollution in Kenya

4.2: Descriptive statistics

4.2.1 Impacts of plastic sandals on Marine animals

Table 4.5: Impacts of plastic sandals

	Strongly Disagree	Disagree	Don't know	Agree	Strongly agree	Overall
	1	4	5	22	15	47
Plastic Sandals waste is considered as pollution for me and my family.	2%	7%	12%	45%	33%	100%
	1	0	0	15	31	47
The ingestion of plastic sandals by marine animals poses a serious threat to their health and survival.	2%	0.00%	0.00%	28%	70%	100%
	1	1	0	17	28	47
Plastic sandals waste damages the Kenyans Maritime Environment/ coastal environment and land	2%	2%	0.00%	35%	60%	100%
	1	1	10	28	7	47
The plastic sandals waste disposal initiatives supported by donor funding in Kenya have improved the overall environmental health of upland and coastal communities.	2%	2%	21%	61%	14%	100%

Figure 4.5: Impacts of plastic sandals on Marine animals

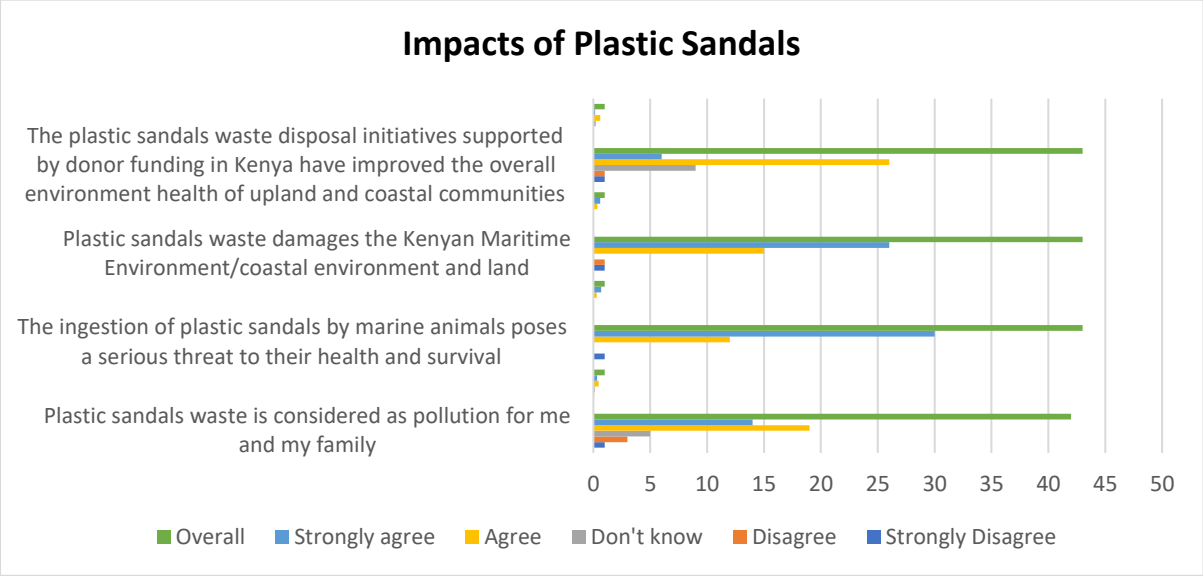


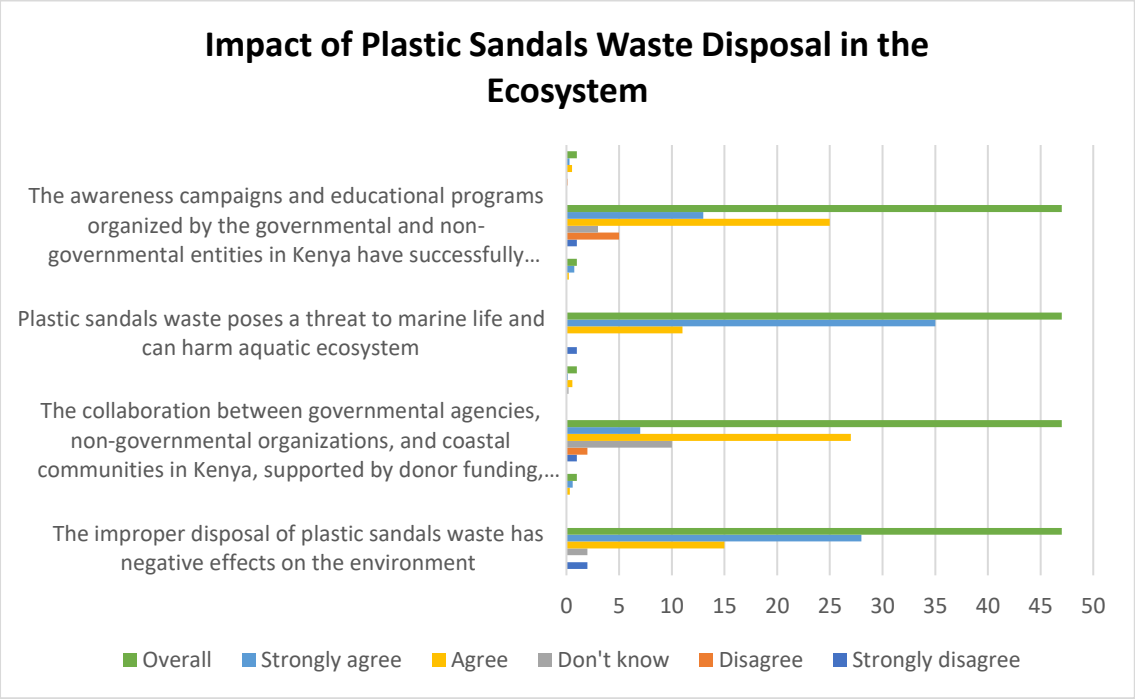
Table 4.5 and Figure 4.5 show the analysis as to whether plastic sandals waste damages the Kenyan Maritime. Based on the analysis 33% of the respondents who participated in the study strongly agree that Plastic Sandals waste indeed is considered as pollution to the family while 2% strongly disagree on the contrary. The data finding also indicate that 69% of the respondents strongly agree that ingestion of plastic sandals by marine animals poses a serious threat to their health and survival. Another 60% of the responds gave an indication that Plastic Sandals waste damages the Kenyans Marine Environment/Coastal Environment and Land while the majority of the respondents at 60% agree on the plastic sandals waste disposal initiatives supported by donor funding in Kenya having improved the overall environmental health of upland and coastal communities.

4.2.2 Impacts of Plastic Sandals Waste Disposal in the Ecosystem

Table 4:6: Impacts of Plastic Sandals Waste Disposal in the Ecosystem

Statement	Strongly disagree	Disagree	Don't know	Agree	Strongly agree	Overall
The improper disposal of plastic sandals waste has negative effects on the environment	2	0	2	15	28	47
	4%	0.00%	4%	32%	59%	100%
The collaboration between governmental agencies, non-governmental organizations, and coastal communities in Kenya, supported by donor funding, has been instrumental in controlling plastic sandals pollution in the marine ecosystem	1	2	10	27	7	47
	2%	4%	21%	58%	15%	100%
Plastic sandals waste poses a threat to marine life and can harm aquatic ecosystem	1	0	0	11	35	47
	2%	0.00%	0.00%	23%	75%	100%
The awareness campaigns and educational programs organized by the governmental and non-governmental entities in Kenya have successfully raised public awareness about the impact of plastic sandals on the marine ecosystem.	1	5	3	25	13	47
	2%	11%	6%	53%	28%	100%

Figure 4.6: Impacts of Plastic Sandals Waste Disposal in the Ecosystem



The first statement addressed the improper disposal of plastic sandals waste and its environmental effects. The majority of respondents, amounting to 59.57%, strongly agreed that improper disposal had negative consequences on the environment. This high agreement percentage highlighted a widely recognized concern about the adverse ecological impact stemming from the improper handling of plastic sandals waste. The second statement delved into collaborative initiatives involving governmental agencies, non-governmental organizations, and coastal communities, supported by donor funding. The responses revealed that a significant 57.45% of participants agreed that these collaborative efforts had been instrumental in controlling plastic sandal pollution in the marine ecosystem. This underscored the acknowledgment of the positive role that coordinated endeavours played in mitigating the impact of plastic waste on coastal ecosystems.

The third statement addressed the threat posed by plastic sandals waste to marine life and aquatic ecosystems. The responses revealed that a substantial 74.47% of participants strongly agreed with the notion that plastic sandals waste presented a threat to marine life and could harm aquatic ecosystems. This overwhelming agreement underscored a heightened awareness of the potential ecological harm arising from plastic sandals waste and its implications for

marine environments. The final statement pertained to awareness campaigns and educational programs in Kenya. A notable 53.19% of respondents agreed that these initiatives had successfully raised public awareness about the impact of plastic sandals on the marine ecosystem. This positive perception demonstrated the perceived effectiveness of educational efforts in increasing understanding and sensitivity toward the environmental consequences of plastic sandals waste.

4.3: Donor Funding/Programmes

Table 4:7: Donor Funding/Programmes

Statement	Strongly disagree	Disagree	Don't know	Agree	Strongly Agree	Overall
	2	2	9	28	6	47
Donor funding has a significant positive impact on the success of governmental and non-governmental programs aimed at controlling plastic sandals waste in Kenya.	2%	2%	17%	67%	12%	100%
	4	5	6	23	9	47
Donor-funded programs have helped enhance the effectiveness and reach of initiatives targeting plastic sandals waste management in both upland and coastal communities in Kenya.	7%	9%	14%	54%	16%	100%
	4	3	9	25	6	47
Donor funding has played a crucial role in enabling the implementation of comprehensive	9%	4%	18%	53%	13%	100%

educational campaigns and awareness programs about plastic sandals pollution in Kenya.						
	4	5	6	25	7	47
Donor-funded programs have fostered strong collaborations between various stakeholders, including government agencies, NGOs, and local communities, resulting in effective control measures for plastic sandals waste in Kenya	5%	10%	14%	55%	17%	100%
	6	6	11	15	9	47
Governmental and non-governmental organizations in Kenya, with donor support, have been able to develop and deploy innovative solutions to tackle plastic sandals waste due to the availability of funding	9%	9%	26%	35%	21%	100%

Figure 4.7: Donor Funding/Programmes

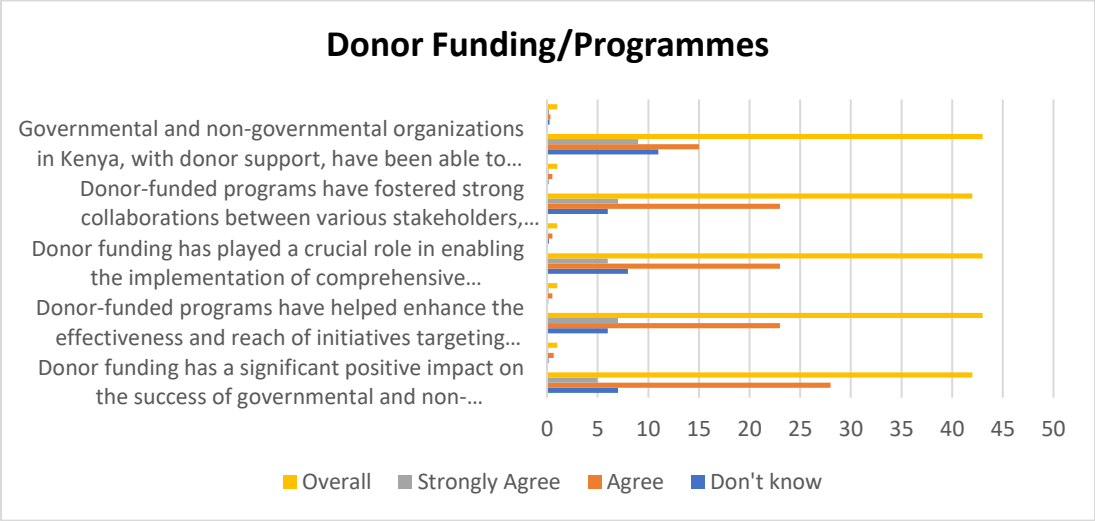


Table 4.7 and figure 4.7 above illustrates that majority of respondents at 66% believes on Donor funding having a significant positive impact on the success of governmental and non-governmental programs aimed at controlling plastic sandals waste in Kenya according to the response given. Majority of respondents at 53% also agree Donor-funded programs having helped enhance the effectiveness and reach of initiatives targeting plastic sandals waste management in both upland and coastal communities in Kenya. Notwithstanding, 55% of the questionnaire collected agree that Donor-funded programs have fostered strong collaborations between various stakeholders, including government agencies, NGOs, and local communities, resulting in effective control measures for plastic sandals waste in Kenya. Lastly, it was evident that Governmental and non-governmental organizations in Kenya, with donor support, have been able to develop and deploy innovative solutions to tackle plastic sandals waste due to the availability of funding as per 34% agreement by the respondents while a significant percentage at 24% not knowing about effective control measures for plastic sandals waste in Kenya.

4.4 Correlation Analysis

		Plastic Sandals	Marine animals	Ecosystem
Plastic Sandals	Pearson Correlation	1	-.559	-.749*
	Sig. (2-tailed)		.004	.029
	N	47	47	47
Marine animals	Pearson Correlation	-.559	1	.830
	Sig. (2-tailed)	-.004		.101
	N	47	47	47
Ecosystem	Pearson Correlation	-.749*	.830	1
	Sig. (2-tailed)	.029	.101	
	N	47	47	47

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The calculated correlation coefficient of -0.559 between "Plastic Sandals" and "Marine Animals" reveals a noteworthy relationship between these variables. This negative correlation signifies a moderate inverse connection between the impact of plastic sandals and the well-being of marine animals. As the detrimental effects of plastic sandals increase, there emerges a tendency for the health and prosperity of marine animals to diminish. Put simply, regions where plastic sandals exert a more harmful influence are prone to witness a decline in the overall health and survival of marine creatures. This correlation underscores the potential threat that plastic sandals pose to marine ecosystems and emphasizes the importance of addressing their impact to safeguard marine animal populations.

The correlation coefficient of -0.749 observed between "Plastic Sandals" and the "Ecosystem" unveils a robust and negative relationship between these variables. This strong negative correlation signifies a substantial inverse association between the impact of plastic sandals and the health of the broader ecosystem. As the detrimental effects of plastic sandals intensify, there arises a tendency for the overall health of the ecosystem to deteriorate. This suggests that areas grappling with a more pronounced impact from plastic sandals are more likely to experience a significant decline in the overall ecological well-being. This correlation accentuates the

potential cascading effects of plastic sandal pollution on the ecosystem's vitality and underlines the urgency of adopting measures to mitigate this impact.

The correlation coefficient of 0.830 established between "marine animals" and the "ecosystem" highlights a robust positive connection between these variables. This strong positive correlation signifies a notable direct relationship between the well-being of marine animals and the health of the ecosystem they inhabit. As the health and survival of marine animals improve, there is a corresponding tendency for the overall ecosystem health to ameliorate as well. Conversely, regions boasting healthier marine animal populations are more likely to showcase a more favourable state of the ecosystem. This correlation underscores the interdependence of marine animals and their ecological surroundings, emphasizing that the well-being of one is intricately linked to the well-being of the other.

4.5 Results from Interviews

Questions	**Themes according to Respondents A, B, C, D, E, & F**
Impact of governmental and non-governmental programmes on the situation awareness towards plastic waste management.	**According to Respondent (F)** on the impact of Governmental and Non-Governmental Programmes on the situation awareness and especially Kenya in partnership with the European Union under the Go Blue project "*engaged school teachers and tutors in hands-on demonstrations of how plastics can be recycled into useful objects"*. This has also led to the launch of the "*National Marine Litter Management Action Plan"* which calls for collaborative action to improve waste management practices and reduce marine pollution and litter. The government recently enacted the National Waste Management Act that requires mandatory waste segregation at source. In addition, the government is in the process of enacting the Solid Waste Management Bill of 2021 and Extended Producer Responsibility (EPR) regulations. These instruments propose a strategic approach to waste management by emphasizing waste prevention, education and awareness, economic instruments to promote waste prevention, formulation of enabling regulations that support and promote EPR schemes as well as strategic phase-out of single-use plastics. The government banned the manufacture, sale and use of plastic carrier bags and flat bags for domestic and commercial packaging in 2017. It further banned the use of single-use plastics including plastic bottles, straws and related products within protected areas including beaches and game parks and reserves in 2020.

	The National Marine Litter Management Action Plan (2021-20130) contains actions that deal with marine litter (ML) from land-based, sea-based, and trans-boundary sources. The plans also highlight actions like ML removal, education and awareness, involving stakeholders, conducting research and monitoring, and sharing information to support the plan's implementation The Kenya Plastic Action Plan advocates for a circular economy. It suggests policies and ways promote through setting up financial and organizational support like tax incentives and EPR schemes, creating a recycling system and adopting waste segregation and collection best practices. Mombasa County recently introduced new laws for solid waste management. The laws require everyone to take responsibility for managing SWM and separate solid waste into different categories, including plastic waste ii) outlines the county government's role in collecting and disposing of solid waste from streets and public areas **Respondent C and D**, illustrated the importance of governmental and non-governmental programmes through various agencies that have been involved in conducting education awareness programmes in schools as well as the community. Respondent D said *"These programmes have really built a strong collaboration with other stakeholders within the coastal region such as KEMFRI, Kenya Maritime Authority and Technical University of Mombasa"*. **Respondent C** also concluded that "*These programmes are evaluated in terms of metrics and scores to enable the organization analyze their achievement as per the objectives*

	and targets which contribute to the overall performance of the organization". **Responded E expressed that** "*After the ban of single use plastic in 2017, the private companies sought the intervention of the Ministry of Environment and a framework of cooperation between the ministry and the private sector was established to handle waste in general*". The responded also added that "*In 2022 the ministry came up with a legal act to segregate waste at source and collected waste at a fee".* A waste material recovery facility was established by the county government to segregate the *organic and inorganic waste*.
Ways in which the availability of donor funding affected the implementation and sustainability of governmental and non-governmental programmes aimed at controlling plastic sandals from upland and coastal communities in Mombasa County.	**Respondent F**, pointed out that there are a number of initiatives by Government & NGOs to prevent the leakage of plastic into the marine environment which are supported by donors. These include; 1) ***World Wildlife Fund-Kenya*** in collaboration with other partners *e.g. Coca Cola, PETCO, KMFRI*, among others to scale-up solutions to combat the increasing problem of plastic pollution in the region. Additionally, *"through the waste-to-value project, WWF has worked with Waste value chain stakeholders in Mombasa and Kilifi Counties to connect them (collectors, sorters and recyclers) to high-end and innovative plastic recycling expertise and technology including Taka-Connect Mobile app that links them together for a ready market".* 2) ***Ecoworld Recycling*** in partnership with ***Watamu Marine Association*** created a dynamic partnership with community groups and hotels from which they collect recyclable waste from

	different litter categories i.e., marine litter and fishing gears, plastics, metals, rubber and glass. Ecoworld also works with neighborhood organizations through a "Weigh and Pay" programme, which pays waste collectors per kilogram for plastic debris gathered from local beaches and other locations. Through their collaboration with the tourism sector, Ecoworld receives free recyclable garbage from hotels as well as sponsorship for beach cleaners and clean-up activities. 3) ***The Flip-flopi expedition*** uses education, sailing trips, inspirational storytelling, dance, clean-ups, artwork, music, and campaigns to fight single-use plastic and inspire a revolution in plastic reuse.
Challenges faced in implementing governmental and non-governmental programs aimed at controlling plastic sandals from upland and coastal communities on marine ecosystem pollution	**Respondent G pointed out that** some of the challenges faced are "*the publics themselves in understanding their role as the main pollutants".* This is brought about by their attitude and perception towards the marine ecosystem. Based on the above, the respondent recommended the implementation of more awareness & education programmes that will impact the schools and community with a vast knowledge on how to ensure a healthy sustainable ecosystem thus creating a positive attitude and improved perception. *"Lack of resources"* was also identified as a challenge to manage the programmes and the initiatives such as beach cleaning, the flip-flopi expedition etc which requires resources to sustain them. Weak Regulatory framework has greatly affected the implementation of governmental and non-governmental programmes and therefore the **respondent** blew the whistle in ensuring that a strong and active regulatory framework should

	be developed *"to ensure everyone is accountable and responsible of what they produce and consume"* and the Government should harmonize all laws to be applicable by all organizations. Failure to ratify International laws to local laws has also led to major challenges in implementing governmental and non-governmental programmes aimed at controlling plastic sandals. Poor Monitoring and Evaluation system to analyze the existence of plastic sandals initiatives which are aimed at motivating the local communities and people. This has led to many abandoned programmes due to lack of follow-up thus affecting other programmes to be executed successfully.

CHAPTER FIVE

DISCUSSION AND IMPLICATION OF MAJOR FINDINGS

5.1 Introduction

The chapter majorly focuses on research questionnaires, which was derived from the study. It also covers summary of the findings, conclusion, recommendations and suggestion for further research.

5.2 Summary of the Findings

Seventy questionnaires were created and distributed to the respondents during the research investigation. 47 of the 70 questionnaires that were distributed to the respondents were returned, while 23 were neither addressed nor returned. There were 67% of surveys that were responded to and 33% that were neither addressed nor returned. The questionnaires that were answered revealed that 51% of the respondents were men and 49% were women, indicating that a large number of men dominated the test and provided more responses than women. Also, from the response, 2% of the respondents had acquired the secondary level of education or rather the certificate, majority of respondents at 72% respondents had acquired undergraduate certificate while the remaining 25% of the respondents had acquired a postgraduate level with no Master's Degree and PhD represented during the study. In conclusion on the Occupation of those who took part in the study, civil servants, artisans, traders and fisherfolk represented 50%, 2%, 13%, and 15% respectively on the total number of the respondents who participated in the study while farmers did not respond. On the counties surveyed, majority of respondents at 52% were from Mombasa County while Lamu and other counties representing 2% and 45% respectively. It was also noted that there was no respondent from Kwale County who took part in the study

5.2.1 Plastic sandals influence on marine life

Plastic sandals had influence on marine life along Mombasa's coast, according to 45% of survey participants, who made up the majority of responses, while 2% strongly disagreed. Based on the majority of survey respondents' replies, there is a clear trend about the consequences of plastic sandal pollution on marine life.

Numerous studies have illuminated the potential dangers of plastic waste, including discarded sandals, on marine environments (Smith et al., 2022; Johnson & Martinez, 2021). The prevalence of plastic debris, such as broken sandals, can lead to entanglement of marine animals, ingestion of micro plastics, and disruption of habitats (Johnson & Martinez, 2021). Such impacts can extend throughout the food chain, affecting marine organisms of various sizes (Smith et al., 2022). The consensus among survey respondents regarding the influence of plastic sandals on marine life further emphasizes the urgency of addressing plastic waste management strategies to mitigate the potential harm inflicted upon the delicate marine ecosystems along Mombasa's coast. Further research into specific pathways and effects of plastic sandal pollution on marine life could provide valuable insights for more targeted conservation efforts in the region.

5.2.2 Impacts of Plastic Sandals Waste Disposal in the Ecosystem

The majority of responders, 59%, appeared to agree on the significance of correct disposal of plastic sandal trash because it has a detrimental impact on the environment. The majority of the opinions expressed also concurred that donor financing and coordination between Kenyan government institutions, non-governmental groups, and coastal communities were crucial in reducing Mombasa's coastal pollution.

The issue of plastic waste has garnered significant attention as a pressing environmental challenge, as documented by numerous global studies focusing on the production and subsequent pollution caused by plastics (Adeniran & Shakantu, 2022). The adverse impact of plastic waste on both the environment and its inhabitants serves as a central cause for public concern, underscoring the urgency of preserving ecosystems. Majority of the respondents at 74% agreed that plastic sandals waste presented a threat to marine life and could harm aquatic ecosystems. This overwhelming agreement underscored a heightened awareness of the potential ecological harm arising from plastic sandals waste and its implications for marine environments. The implementation of measures aimed at minimizing human exposure to the harmful substances released from plastic waste holds the potential to foster a healthier society and a cleaner environment.

5.2.3 Impacts of Donor Funding/Programmes on control of plastic sandals waste in Kenya

The majority of respondents, 66%, unequivocally agreed that donor funding has a large positive impact on the success of governmental and non-governmental programs targeted at minimizing plastic sandal waste in Kenya while recognizing the impacts of donor funding. According to 53% of the respondents, donor-funded programs have improved the efficacy and scope of measures aimed at managing plastic sandal waste in both highland and coastal communities in Kenya. In the context of coastal communities, Thompson and Green (2016) conducted a case study in a Kenyan coastal town and demonstrated the substantial impact of donor-funded projects on plastic waste control. Their findings indicated that programs financed by international organizations facilitated the establishment of waste collection points, recycling facilities, and awareness campaigns. The integration of donor-funded initiatives into local waste management strategies led to a noticeable reduction in plastic sandal waste along the coast.

5.2.4 Interview Summary

The interview findings provided valuable insights into the efforts and strategies employed by different Government Ministries and National Environment Management Authority (NEMA) in combating plastic sandals pollution in coastal communities. It was evident that NEMA recognized the gravity of the issue, with a dedicated department focusing on marine litter and various comprehensive programs and reports to address this environmental concern. These efforts encompassed not only practical initiatives, such as beach clean-ups and awareness campaigns but also collaborative partnerships with government agencies and community-based organizations. The existence of a monitoring and reporting system demonstrated NEMA's commitment to tracking progress and ensuring accountability among stakeholders.

However, the interviews also highlighted challenges, including the need for increased public awareness and limited resources. The role of public perception and individual responsibility in addressing marine litter emerged as a significant hurdle. NEMA's future plans, such as partnering with international organizations and manufacturers and the gazettement of Extended Producer Responsibility (EPR), underscored their commitment to finding innovative solutions. Overall, these findings emphasized the complexity of addressing plastic sandals pollution, requiring a multifaceted approach involving education, collaboration, and regulatory measures.

CHAPTER SIX

CONCLUSION & RECOMMENDATION

6.0 Conclusions

From the data collected, a conclusion was made on the influence of plastic sandals on marine life. The study findings laid bare the minimum equipment demanded to ease the collection of already disposed plastic sandals as well as ways to control coastal strips by all stakeholders.

Plastic Sandals Waste Disposal can also be concluded to carry along a severe impact on the Ecosystem. This is according to the response by majority respondents with reason being waste disposal in oceans and river basins affects the normal growth and lives of sea marine which contributes immensely to the oceanic ecosystem. Besides degradation, plastic sandals also release toxic chemicals into the ocean. This may further contaminate the water and threatens the health of marine life and therefore exacerbate the impact of pollution next to diversity and climate change impacts (Hellweg et al., 2023). In some coastal communities, plastic sandals can clog drains and cause flooding, which can have serious consequences for the environment and local residents.

The survey results indicated that regardless of sex, educational level, age group and occupation, majority of the city residents widely used plastic sandals and bags in their daily life activities. Some of the main reasons attributed to the widespread usage of plastic sandals were low, easy availability and light weight.

The reliance on donor-funded programs for environmental initiatives, such as plastic waste management, presents a complex dynamic. On one hand, donor funding can be instrumental in jumpstarting and sustaining critical projects that might otherwise struggle to secure necessary resources. It enables the implementation of essential programs, capacity-building efforts, and the promotion of sustainability practices. Donor support often brings expertise and technology transfers, helping communities leapfrog in terms of environmental conservation.

However, challenges exist within this dependence. Donor funding is typically finite and time-bound, potentially leaving projects vulnerable to discontinuation or a lack of sustainability once the funding ends. Moreover, donors may have specific agendas or priorities that could divert focus from local needs, eroding community ownership and autonomy. Therefore, striking a

balance is crucial. Local ownership and community-driven initiatives should be at the core of environmental programs, with donor funding viewed as complementary rather than primary support. Capacity-building efforts should extend to developing sustainable financing mechanisms, ensuring that communities can maintain and expand their environmental efforts independently. Transparent collaboration and communication among donors, organizations, and local stakeholders are essential to aligning donor-funded projects with local priorities and fostering lasting, community-driven environmental solutions.

6.1 Limitation of the Study

6.1.1 Generalization

The results of this study cannot be applied universally because they were obtained in a specific setting and the respondents had unique features and others did not return the questionnaire, and results may vary depending on the location. As a result, a cross-country study is necessary to investigate the same phenomenon in order to reduce the number of plastic sandals in the marine ecosystem.

6.2 Study Recommendations

Corrective actions and measures should be a priority geared towards ensuring that donor partners and agencies should emulate best practice while handling plastic sandal waste at the cost of Kenya. Trained management team should be put in action to check and prevent fund loses upon allocation.

Government should also put in place strict measures against waste disposal at the coast of the country. Regulations and policies are needed to spearhead the control of plastic sandal disposals to the ocean. The application of corrective taxes to remove the distortionary impacts of negative externalities. The purpose of such taxes would be to include the social costs of economic activity in the marginal private costs of that activity.

Funding preventative initiatives like enhanced recycling and trash management would be a better use of the estimated costs for coastal cleanups. Additionally, in order to provide a more long-term solution, there is a requirement for strong government leadership and action when it comes to plastic trash. To increase recycling rates, top organizations must fund innovation, create viable alternatives to petroleum-based plastics, increase consumer awareness, and

standardize plastics and their labeling. It would also be important to give industry the proper incentives to switch to recycled plastics from virgin ones.

The use of network theory is therefore crucial in this study for the development of policy network, strengthen service delivery and ensure implementation, and management networks in curbing the issue of plastic sandals pollution in the marine ecosystem.

In the case of plastic sandals pollution in Kenya, the implementation of programs to control the pollution can be viewed as an innovation. The success of the implementation of these programs is influenced by various factors, including the communication channels used in disseminating information about the programs, the characteristics of the programs, and the characteristics of the adopters.

6.3 Suggestions for Further Study

Similar study should be done on other polluting substances such as plastic bottles and containers. There should also be a broad study to cover all water bodies in the country to include lakes and rivers. Further research can also engage in specific plastic sandals and investigate their impact on marine life and the ecosystem.

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APPENDICES

Appendix 1: Survey Questionnaire

QUESTIONNAIRE ON THE IMPACT OF PLASTIC SANDALS FROM UPLAND AND COASTAL COMMUNITIES ON MARINE ECOSYSTEM POLLUTION. A CASE STUDY OF MOMBASA COUNTY.

Demographic Information

Please tick as appropriate

1. Gender: Female ( ) Male ( )
2. Age: (18- 28), (29- 38), (39- 48), (49- 59), (60 and above)
3. Education: Primary ( ), Secondary ( ), Undergraduate ( ), Postgraduate ( ), PhD ( )
4. Occupation: Civil servant ( ), Artisan ( ), Farmer ( ), Trader ( ) Any other Please specify
5. County: Mombasa ( ), Kwale ( ) Lamu ( )

SECTION 1: Information about plastic sandals

What kind of plastic materials do you use frequently in the household?

Plastic bags

Plastic bottles

Food packages

Clothing

foot wears

Others (please specify)

1. How often do you use plastic sandals?

   Daily ( ), Weekly ( ) Monthly ( ) Yearly ( ) Never ( )
2. Are you informed about the problem associated with plastic sandals pollution in Kenya? Yes ( )

   If yes are you aware of the impact of pollution in Kenya":

   Which do you consider as the biggest problem associated with plastic sandals in Kenya?
3. How were you informed about plastic sandals as part of plastic pollution in Kenya? School ( )

   Radio ( ), TV ( ), Government ( ), Newspaper ( ), Others……. ( ).

SECTION B – IMPACTS OF PLASTIC SANDALS

Please read the statement below and circle the letter of your choice

A- Strongly disagree, B- Disagree, C- Don't know, D- Agree, E- Strongly agree

No.	Statement	Response				
1.	Plastic Sandals waste is considered as pollution for me and my family.	A	B	C	D	E
2.	The ingestion of plastic sandals by marine animals poses a serious threat to their health and survival.	A	B	C	D	E
3.	Plastic sandals waste damages the Kenyans Maritime Environment/ coastal environment and land	A	B	C	D	E
4.	The plastic sandals waste disposal initiatives supported by donor funding in Kenya have improved the overall environmental health of upland and coastal communities.	A	B	C	D	E

SECTION C – IMPACTS OF PLASTIC SANDALS WASTE DISPOSAL IN THE ECOSYSTEM

No.	Statement	Response				
1.	The improper disposal of plastic sandals waste has negative effects on the environment.	A	B	C	D	E
2.	The collaboration between governmental agencies, non-governmental organizations, and coastal communities in Kenya, supported by donor funding, has been instrumental in controlling plastic sandals pollution in the marine ecosystem.	A	B	C	D	E
3.	Plastic sandals waste poses a threat to marine life and can harm aquatic ecosystems	A	B	C	D	E
4.	Proper management and recycling of plastic sandals waste can help minimize its impact on the ecosystem.	A	B	C	D	E
5.	The awareness campaigns and educational programs organized by the governmental and non-governmental entities in Kenya have successfully raised public awareness about the impact of plastic sandals on the marine ecosystem.	A	B	C	D	E

SECTION D- DONOR FUNDING /PROGRAMMES

No.	Statement	Response				
1.	Donor funding has a significant positive impact on the success of governmental and non-governmental programs aimed at controlling plastic sandals waste in Kenya.	A	B	C	D	E
2.	Donor-funded programs have helped enhance the effectiveness and reach of initiatives targeting plastic sandals waste management in both upland and coastal communities in Kenya.	A	B	C	D	E
3.	Donor funding has played a crucial role in enabling the implementation of comprehensive educational campaigns and awareness programs about plastic sandals pollution in Kenya.	A	B	C	D	E
4.	Donor-funded programs have fostered strong collaborations between various stakeholders, including government agencies, NGOs, and local communities, resulting in effective control measures for plastic sandals waste in Kenya	A	B	C	D	E
5.	Governmental and non-governmental organizations in Kenya, with donor support, have been able to develop and deploy innovative solutions to tackle plastic sandals waste due to the availability of funding					

Appendix II: Interview Guide (NEMA)

INTERVIEW QUESTIONS FOR NATIONAL ENVIRONMENTAL MANAGEMENT AUTHORITY (NEMA) OFFICIALS.

Your organization is a major stakeholder in the protection of the Kenya marine environment, can you tell me;

Plastic sandals is a thorny problem to the coastal community. Yes or No?

a. What Programmes does NEMA have to mitigate or reduce plastic sandals from coastal communities?
b. How do you ensure that these programs are executed successfully?
c. Are there any monitoring or reporting system or mechanism in place?
d. What are the challenges encountered in efforts to mitigate or reduce plastic sandals waste?
e. What are the indicators used by your organization/agency in evaluating its performance encountered in plastic pollution?
f. Do you have a system for monitoring plastic waste in the (marine) environment?
g. What are the future plans in reducing plastic sandals in Kenya? What do you intend to do?
h. What solutions do you think you can have, come up with for the future?

Appendix III: Interview Guide (Government Officials)

INTERVIEW QUESTIONS FOR MINISTRY OF ENVIRONMENT/ FISHERIES OFFICIALS

The government of Kenya has been making some efforts to manage the disposal of waste of the local in the uplands and coastal communities;

a. What existing measures are presently taken by the Government of Kenya to mitigate or reduce marine litter (i.e plastic sandals) in the coastal communities?
b. In your opinion, how can the Government of Kenya create a behavioral change in those coastal communities?
c. Are there awareness programmes by the Government of Kenya aimed at sensitizing the locals on the impact of marine litter in our ocean?
d. Is there a system to monitor plastic waste disposal in places other than collection points?
e. What are the measures in place to tackle behavioral change towards plastic sandals in the coastal communities?
f. What other ways do you suggest that could be helpful in reducing plastic sandals in Kenya?

Appendix IV: Consent Form

CONSENT FORM

Dear Participant,

Thank you for agreeing to participate in this research survey, which is carried out in connection with a Dissertation which will be written by the interviewer, in partial fulfilment of the requirements for the degree of Master of Science in Maritime Affairs at the World Maritime University in Malmo, Sweden.

The topic of the Dissertation is **"Assessment of the impact of Governmental & Non-Governmental Programmes in Kenya through donor funding to control plastic sandals from Upland and coastal communities on Marine Ecosystem Pollution". A Case Study of Mombasa County.**

The information provided by you in this interview will be used for research purposes and the results will form part of a dissertation, which will later be published online in WMU's digital repository (maritime commons) subject to final approval of the University and made available to the public. Your personal information will not be published. You may withdraw from the research at any time, and your personal data will be immediately deleted.

Anonymised research data will be archived on a secure virtual drive linked to a World Maritime University email address. All the data will be deleted as soon as the degree is awarded.

Your participation in the interview is highly appreciated.

Student's name	**Grace Mumo Muli**
Specialization	**Ocean Sustainability Governance and Management**
Email address	**w1013042@wmu.se**

I consent to my personal data, as outlined above, being used for this study. I understand that all personal data relating to participants is held and processed in the strictest confidence, and will be deleted at the end of the researcher's enrolment.

Name: .....

Signature: .....

Date: .....

Rev August 2021