

# **Moving Ghana Beyond Plastics: A Policy Blueprint for a Thriving Plastic Substitutes** and Alternatives Industry

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### DISCLAIMER

This is a project output funded by the Sustainable Manufacturing and Environmental Pollution (SMEP) Programme.

The Fresh Produce Impact Hub (FRESHPPACT), implemented by the University of Northampton, Aston University, the University of Hertfordshire and Blue Skies Holdings Ltd, has been awarded a UK International Development grant in order to develop solutions which help mitigate plastic pollution in Ghana The grant has been made via the SMEP Programme and has been awarded until March 2026.

The SMEP Programme is funded by UK International Development and is implemented in partnership with the UN Trade and Development (UNCTAD) who provide technical support. UK International Development have appointed a Project Management Agent (PMA) to manage programme delivery. The PMA comprises a consortium partnership between Pegasys and SouthSouthNorth.

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#### **About FRESHPPACT**

The Fresh Produce Impact Hub (FRESHPPACT) is a Research and Development Hub funded by the Sustainable Manufacturing and Environmental Pollution (SMEP) Programme. The SMEP Programme is funded by UK International Development and implemented in partnership with UN Trade and Development (UNCTAD). FRESHPPACT's main aim is to research transformative solutions to the biggest social and environmental challenges that exist within fresh produce supply chains rooted in developing or emerging economies.

The authors would like to thank the Sustainable Manufacturing and Environmental Pollution (SMEP) Programme, SouthSouthNorth (SSN), United Nations Trade and Development (UNCTAD), Blue Skies Holdings Ltd and all members of the FRESHPPACT consortium for their continued support.



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## Acknowledgments

This report is the result of the collaborative efforts of researchers and policymakers dedicated to advancing Ghana's transition towards sustainable plastic alternatives.

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The authors would like to acknowledge and thank the following stakeholders for their contributions to this report through the FRESHPPACT Plastics Alternatives Policy Workshop held in Accra in October of 2024:

- Blue Skies Ghana Ltd
- Ministry of Environment, Science and Technology
- Ministry of Finance
- Ministry of Sanitation and Water Resources
- Ghana Standards Authority
- Golden Exotics
- Environmental Protection Agency of Ghana
- RiverRecycle
- Sesa Recycling Ltd
- Accra School of Hygiene
- DercolBags Packaging Ltd
- Volta River Authority
- Ghana National Plastic Action Partnership
- Arocha Ghana
- Coca-Cola Ghana
- Africa Skills Hub
- Golden Exotics Ltd
- Faivich Enterprise
- Circular Economy GH
- Food and Beverages Association of Ghana
- Green Africa Youth Organisation (GAYO)

*Report Design:* The authors acknowledge Prince Peter Yalley (Clarkson University, US) and Charles Mensah (University of Essex, UK) for their contributions to the report design.

- The Coca-Cola Company
- HPW Ghana
- GIZ Ghana
- Plastic Punch
- Sesa Recycling Ltd
- Jospong Group
- HPW Ghana
- Coco360 Ghana Ltd
- Arocha Ghana
- Zoomlion Ghana
- Africa Skills Hub
- Chaint Africa
- BESNET Ghana
- Recycle Up! Ghana

### **OPEN ACCESS STATEMENT**

Title:

"Moving Ghana Beyond Plastics: A Policy Blueprint for a Thriving Plastic Substitutes and Alternatives Industry."

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Funding Acknowledgement:

This report is funded by the Sustainable Manufacturing and Environmental Pollution Programme (SMEP). The SMEP Programme is funded by UK International Development and implemented in partnership with UN Trade and Development (UNCTAD).

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Recommended Citation:

Laryea, E., Hosseinian-Far, A., Omoloso, O., Uba, C., Sarwar, D., Ameyaw, E, (2025). *Moving Ghana Beyond Plastics: A Policy Blueprint for a Thriving Plastic Substitutes and Alternatives Industry*. Fresh Produce Impact Hub.

### **1. INTRODUCTION**

The growing global awareness of the urgent need to address plastic pollution has driven countries across the world to reassess their reliance on single-use plastic products and seek sustainable alternatives. As a rapidly developing nation with ambitions to strengthen its economy while preserving its environment, Ghana is well-positioned to play a leading role in the transition towards plastic alternatives within the West African region<sup>1</sup>.



Reference: Adobe Firefly

Like many nations in the Global South, Ghana faces significant challenges in reducing its dependency on conventional plastics, which have long been embedded in various sectors of the economy. These challenges include limited infrastructure for plastic recycling, insufficient regulatory frameworks, and a lack of incentives for local manufacturers to invest in sustainable plastic alternatives. The environmental impact of plastic waste in Ghana can be observed with ubiquity across the nation.

The rapid urbanisation of cities such as Accra, Kumasi, and Takoradi has resulted in a surge in plastic pollution, causing blocked drainage systems, soil degradation, and marine contamination (Adam et al., 2020). These environmental challenges pose significant threats to Ghana's public health, agricultural productivity, and biodiversity.

Recognising the urgency of the issue, Ghana's Ministry of Environment, Science and Technology (MEST) has prioritised addressing plastic pollution by implementing a number of policies to curb plastic pollution and help promote sustainable plastic alternatives. Ghana's early approach to plastic waste management policy focused mainly on plastic waste collection and disposal through municipal waste collection services and the informal waste collection sector. However, the corresponding surge in the volumes of plastic waste generated in recent years has necessitated a change to Ghana's policy approach to plastic waste management – one which goes beyond simply focusing on plastic waste collection and disposal.

This change in approach has resulted in the introduction of more comprehensive plastic waste management policies and programmes such as Environmental Sanitation Policy (2004), the Plastic Waste Management Programme (2013), and the Revised National Plastics Waste Management Policy (2020)<sup>2</sup>.

However, the global conversation on how we effectively address the issue of plastic pollution is shifting. Whilst the need to increase recycling capacity and recycling rates remains a significant point of focus, the subject of plastic alternative products has emerged as a new frontier in the collective effort to address plastic pollution. This is a virgin area for policymaking as far as Ghana is concerned, seeing as most of the existing policy work has been focused more on plastic waste

management, with very little emphasis placed on plastic alternatives. Resultingly, researchers, policymakers, and corporations are increasingly exploring the viability of biodegradable materials, reusable packaging solutions, and circular economy models as substitutes for traditional plastics. If adopted in a significant and meaningful way, these alternatives will reduce plastic pollution and present opportunities for the establishment of local industries,

This global shift toward plastic alternatives holds particular significance for Ghana and other nations in the Global South where plastic pollution is more pressing. Specifically, the adoption of biodegradable materials, reusable packaging, and circular economy models could offer transformative solutions to reduce the burden of plastic waste on Ghana's drainage systems, soil, and marine environments. Furthermore, the potential for a boost to Ghana's economic growth through the local production of plastic alternatives is significant seeing as a local plastic alternatives industry in Ghana will create jobs, attract investment, and strengthen its manufacturing sector.

As countries around the world shift away from plastics and toward alternatives, Ghana stands to gain a competitive advantage by positioning itself as an early producer and adopter of sustainable plastic alternative in Africa, thereby securing the green jobs of the future within its borders. This move would pave the way for Ghana to meet its own sustainability goals and export plastic alternative products to other countries in its sub-region.

This report has been compiled for the government and people of Ghana, and is the first of its kind for any country in the West African sub-region. It sets out the details of robust policy blueprint for the establishment of a thriving plastic alternatives industry in Ghana. Using a co-creation methodological approach, the blueprint is structured around six key pillars, each containing specific policy goals and actions - serving as a detailed policy guide for Ghana's transition from conventional plastics to the adoption of locally produced plastic.

This report is structured into four key sections including the introduction *(Section 1). Section 2* provides an in-depth assessment of plastic usage in Ghana, waste management gaps and the socio-economic impacts of plastic pollution in the country. This section also includes a discussion of the trends and innovations in plastic alternatives along with a case study highlighting the production of potential for plastic alternatives in Ghana.

*Section 3* provides the policy blueprint for the local production of plastic alternative products in Ghana, detailing six policy pillars that outline policy goals. The policy pillars and goals in turn inform economic incentive actions, regulatory framework actions, stakeholder engagement actions, research actions, and public awareness strategies to support the local production and adoption of plastic alternative products in Ghana.

#### 2. THE CURRENT LANDSCAPE OF PLASTIC WASTE MANAGEMENT IN GHANA



Plastics have become integral to modern life, owing to their durability, versatility, and cost-effectiveness. Their flexibility and adaptability across a wide range of temperatures have made them indispensable across numerous sectors for decades, offering countless benefits (Andrady, 2009; North & Halden, 2013). They are widely applied in industries such as engineering, medicine, robotics and have, therefore, driven a substantial rise in their global production (Idumah & Nwuzor, 2019).

The benefits of plastics, including ease of use has contributed to more reliance on, and production of, plastics products. Correspondingly, global production of plastics has continued to increase since 1950's (Chen et al., 2021). From a base figure of 1.7 million metric tonnes, global plastic production grew by an average of 9% per year. The figures equated to 360 million metric tonnes in 2018 (Chen et al., 2021) and is projected to more than double in the next decade (Ritchie, Samborska, and Roser, 2023). However, the increasing use of plastic products has led to a corresponding increase in plastic waste, with waste management systems struggling to keep pace (Lebreton & Andrady, 2019).

Projections indicate that without sustained action, plastic production and usage could increase by 70% by 2040 (OECD, 2024). Furthermore, Earth Action estimates that 69.5 million tonnes of plastics will be mismanaged this year alone. Alarmingly, if the problem remains unaddressed, plastic waste is expected to outweigh fish in the world's water bodies by 2050 (Pothiraj et al., 2023; De Smet, 2016).

The persistence of plastic waste in the environment causes degradation, exacerbating the plastic crisis. Due to their durability and lightweight nature, plastics can travel vast distances and resist degradation, persisting for hundreds to thousands of years in terrestrial, freshwater, and marine ecosystems (Hopewell et al., 2009). As plastic waste breaks down, it produces microplastics and nano plastics—particles smaller than 5mm—that accumulate in the atmosphere, soil, and aquatic environments (Andrady, 2017). These microplastics infiltrate ecosystems, contaminating soils and water. Mistaken for food by aquatic organisms, they enter the food chain and ultimately human diets through contaminated seafood (Hale et al., 2020). Increasing number of studies (see Verlis et al., 2018; Cartraud et al., 2019; Piccardo et al., 2020) have found that the ingestion of plastics cause injuries and, sometimes, death to land and sea animals. In addition to contaminating environmental media and wildlife, there is evidence to suggest that hazardous chemicals released from plastic waste have adverse impacts on humans. Chemicals often found in plastics are known to cause health problems such as cancers, attention deficit/hyperactivity disorder, and fertility issues (Paladino et al., 2020).

Specifically, recent medical studies highlight that there may be associations between microplastics and poor health outcomes, including cardiovascular disease (Marfella et al., 2024) and low male fertility (Hu et al., 2024).

In response, countries around the world are exploring innovative alternatives and implementing policies to curb the pollution, ranging from single-use plastic bans to promoting biodegradable materials. Despite these efforts, the impact of plastic pollution is particularly severe in regions with inadequate waste management systems, such as sub-Saharan Africa (Hosseinian-Far et. al., 2024).



In Ghana, the growing reliance on plastics combined with insufficient waste management infrastructure has created significant social and environmental challenges (Quartey et al., 2015). Poor waste management affects both urban and rural areas, leading to unsanitary conditions and health risks (Omang et. al., 2021). These challenges are exacerbated by increasing waste volumes driven by economic growth, population expansion, and industrialization (Baabereyir, 2009). For instance, a densely populated city like Accra generates approximately 900,000 metric tonnes of waste annually, while smaller cities like Wa contribute an estimated 40.18 tonnes daily (Ababio, 2024).

Cultural attitudes toward waste handling and minimal public participation further complicate the situation (Addaney & Oppong, 2015). Although recycling, recovery, and composting are often promoted as sustainable solutions, their adoption remains limited even in major cities like Accra, Kumasi, and Tamale (Samwine et al., 2017).

Among the various waste streams, plastic waste presents unique challenges due to its ubiquity and resistance to degradation. The heavy reliance on plastics, particularly single-use plastics, has led to a surge in production and importation (Debrah et al., 2021). The World Bank Group (2020) reports that, 27,000 metric tons of flexible packaging are produced annually, catering to both multinational corporations and informal microenterprises. PET bottle production stands at 68,000 metric tons per year, with 87% of industries sourcing their plastic packaging from local manufacturers. Small-scale sachet water companies alone produce between 15,000 and 45,000 sachets daily, underscoring the widespread use of plastics (Quartey et al., 2015).

The extensive use of plastics is deeply ingrained in Ghanaian economic and commercial activities culture. Single-use plastics are frequently employed as primary packaging for food, offered as free carrier bags in shops, and expected by customers (Adam et al., 2020). Beyond cultural reliance, the plastic industry generates substantial economic benefits. Monthly, it contributes approximately Ghana Cedi (GH¢) 14.4 million in income and GH¢5.4 million in tax revenue, supporting livelihoods and making the transition away from plastics economically challenging (Amankwaa et al., 2024).

Despite these economic contributions, the environmental costs are significant. Ghana imports over 2.58 million metric tons of raw plastics annually, with 73% ending up as waste (Earth Care Ghana, 2022). Of the nearly one million tonnes of plastic waste generated each year, only 9.5% is recycled, leaving a significant portion to leak into the environment (Akuoko et al., 2023; GAS, 2024). Urban centres are grappling with clogged drainage systems, polluted water bodies, and mounting landfill pressures (Adam et al., 2021). When compared to Nigeria, which produces about 2.31 million tonnes of plastic waste annually and recycles less than 12%, it becomes evident that low recycling rates are a regional challenge in sub-Saharan Africa (Yalwaji et al., 2022; Deme et al., 2022).

While Ghana has joined initiatives such as the Global Plastic Action Partnership and established the National Plastic Management Policy to address plastic pollution (Kwansa, 2021), progress has been constrained by poor implementation and the absence of clear guidelines for sorting, recycling, and disposal (Osei-Bonsu et al., 2023). According to the Ghana Audit Service (2024), the lack of effective collaboration between the Ministry of Environment, Science and Technology (MEST) and key stakeholders has further undermined efforts to manage plastic waste.



Stakeholders often work in isolation, missing critical opportunities to create synergies that could enhance the efficiency and impact of plastic waste management initiatives. Additionally, limited technological expertise and inadequate infrastructure for effective waste management pose significant barriers (Deme et al., 2022).

On a positive note, some innovative companies are taking proactive measures to address the challenges associated with plastic waste management in Ghana. For instance, Trashy Bags, a company that repurposes plastic waste into products such as school bags, pencil cases, and mats, demonstrates how plastic waste can be converted into valuable items (Debrah et al., 2021). A further example is Nelplast, which transforms shredded plastic waste into durable concrete blocks, providing a creative solution to both plastic pollution and construction needs (Hervie & Daróczi, 2021). These initiatives, on one hand, underscore the potential for local entrepreneurs to play a significant role in tackling Ghana's plastic pollution problem. On the other hand, the challenges also highlight the pressing need for sustainable alternatives to plastics, underpinned by robust policies, technological advancements, and behaviour change initiatives that are tailored to Ghana's unique context (Tulashie et al., 2022).

The next sections of this policy report explore the global landscape of plastic alternatives and policies, the plastic management approaches used by some countries in Africa, and an evaluation of Ghana's current efforts to address plastic waste.

#### 2. 1 Trends and Innovations in Plastic Packaging Alternatives

As the menace of plastic pollution continues to escalate, so are the risks associated with it. In response to this growing crisis, research and innovation have driven the development of sustainable production methods and improved material properties, paving the way for more sustainable materials. Promising innovations like biodegradable, compostable, and bio-based plastics, have emerged as viable substitutes for conventional plastics, offering solutions tailored to different needs (Shamsuddin et al., 2017). Biodegradable plastics, derived from renewable resources like cellulose and starch, decompose into natural, harmless substances through microbial activity, making them an environmentally friendly alternative (Filiciotto & Rothenberg, 2021).

Polylactic acid (PLA) is a prominent example of biodegradable plastic. Due to its sustainable nature, PLA is already being adopted by several countries and businesses in various sectors. For instance, in Ecuador, PLA fibre is used in 3D printing, while companies like Newman's Own Organics and Walmart in the United States of America utilise PLA containers for packaging (Nampoothiri et al., 2010; Morales et al., 2020). PLA's versatility extends to packaging, medical devices, carrier bags, waste bags and has also proven beneficial in the development of biodegradable and compostable tableware such as plates and cutlery, helping reduce reliance on conventional disposable products and enhancing recyclability (Razza & Innocenti, 2012).

Polyhydroxyalkanoate (PHA), another biodegradable plastic produced from materials such as plant oils and sugars through fermentation (Venkatachalam & Palaniswamy, 2020), has found diverse applications, from packaging to agriculture. Countries like China and Brazil, with robust agricultural sectors, have capitalised on PHA for products such as mulch films, highlighting the material's adaptability to local industries (Othman et al., 2022). Its biodegradability and biocompatibility make PHA a highly sought-after biopolymer for biomedical applications worldwide (Behera et al., 2022). It is important to note that not all biodegradable plastics are bio-based, and not all bio-based plastics are biodegradable (Rujnić-Sokele & Pilipović, 2017). An example of a notable innovation in this regard is the emergence of partially bio-based and partially fossil-based plastics often referred to as drop-in plastics (Prieto, 2016). These plastics, like fossil-based plastics, can exhibit either biodegradable or non-biodegradable properties. For example, Polybutylene Adipate Terephthalate (PBAT), although fossil-derived with the potential to break down into microplastics is gaining traction for its flexibility and use in shopping bags, as seen in China's KINGFA-developed PBAT-starch blends. Other examples include biopolyethylene (bio-PE), bio-polyethylene terephthalate (bio-PET), bio-polypropylene (bio-PP). Made from fossils and renewable resources, they significantly lower the carbon footprint compared to conventional plastics (Naser et al., 2021). Their chemical similarity to fossil-based plastics ensures compatibility with existing recycling systems, supporting circular economy efforts by reducing the demand for virgin plastic (Fredi & Dorigato, 2021). This demonstrates how even partial shifts toward biodegradable solutions can lead to widespread adoption in consumer markets (Jian et al., 2020).

Beyond drop-in plastics, innovative biomaterials like mycelium-based composites are transforming material science. Mycelium, the vegetative structure of fungi, is combined with renewable agricultural byproducts like sawdust and coffee husks to create biodegradable, energy-efficient alternatives to traditional plastics (Alemu et al., 2022). These mycelium-based materials are versatile and are being used in diverse applications such as packaging, furniture, construction materials, synthetic leather, and even medical products (Verma et al., 2023). When added to the soil, they take about 30 days to decompose (WEF, 2020). Their production consumes less energy compared to conventional plastics, and their biodegradability ensures minimal environmental impact. Companies like Ecovative are at the forefront of utilizing mycelium for construction products, showcasing its commercial potential (Ellen MacArthur Foundation, 2024).

#### 2. 2 Case Study: The Story of Coco 360 Ltd & Coconut Coir Mulch Production in Ghana

Ghanaian farmers, particularly those who farm pineapples, have in the main adopted the use of polythene-based mulch (also known as plastic agricultural mulch)<sup>3</sup> to increase yields, retain moisture, and reduce weeds. Unfortunately, this is to the detriment of the environment, with non-biodegradable material suffocating the soil leaving in its midst a trail of pollution. Working with FRESHPPACT, Blue Skies Ghana Ltd, and with funding through the SMEP Programme, Coco 360 Ltd, a Ghanaian start-up company, began a journey to produce a sustainable substitute to plastic agricultural mulch.

Their aim was to produce biodegradable coconut coir mulch which is made from coconut husks – a waste product available in Ghana with ubiquity. This material is often disposed of without any consideration to its potential use. Coconut coir's natural properties of biodegradability, water retention. and durability place it at the forefront of any agricultural application. Coco360 designed а production process to leverage this opportunity to address plastic pollution as

address plastic pollution as well as provide a means by which a commonly available waste product in Ghana can be re-purposed into something useful for all farmers.

The livelihood impact of the production of coconut coir mulch in Ghana through the activities of Coco 360's operations is substantial. The start-up's coconut coir mulch production operation is located on the outskirts of Takoradi, a sea-side city in the Western Region of Ghana. Takoradi is known



CEO of Coco 360 Ltd, Sue Yemidi with pineapple planted with coconut coir mulch

for its tourist attractions and the fishing communities that have lived on its beaches for centuries. In recent years, the livelihoods of locals residing in these fishing communities have been threatened, and in some cases, destroyed due to reduced fish stocks in Ghana's territorial waters from overfishing and marine plastic pollution. The loss of such livelihoods has meant that residents have had to look to other sources of employment to make ends meet.

Coco360 has employed residents in Takoradi to work in its production facilities and the wider coconut coir mulch production value chain. In total, the start-up has provided direct employment for at least 48 people with 79.2% of its work force made up of women. Applying conservative employment multipliers from the International Labour Organisation (Sossa, 2021), it is estimated that for every one job created by Coco360, 32 indirect jobs were created in the supply chain and related sectors - thus bringing the estimated number of indirect jobs created to a total of 1,536<sup>2</sup>.

This statistic highlights the job creation potential that local production of plastic alternatives holds for Ghana. Additionally, it also demonstrates the potential that exists for the promotion of gender equality in Ghana from a thriving plastic alternatives industry. By providing employment for women Coco360 is helping to enhance their financial independence and break the socio-economic barriers that they face. Furthermore, Coco 360's employment of women in such significant numbers has had a positive effect on the local communities in Takoradi where those employed have invested their increased incomes in improved education and health outcomes for their families.



Coco 360 Ltd Coconut Coir Mulch Rolls

The next section of this report provides the details of a policy blueprint for the establishment of a thriving plastics alternatives industry in Ghana. The blueprint is made up of a series of policy pillars, policy goals and policy actions that will constitute a strong and robust policy framework which supports the local production of plastic alternative products in Ghana.

#### 3. POLICY BLUEPRINT FOR PLASTIC ALTERNATIVE PRODUCTS IN GHANA

As part of its policy research activities, the FRESHPPACT project convened relevant Ghanaian stakeholders for a policy workshop at the China-Europe International Business School in Accra, on Thursday the 24th of October 2024. The primary aim of this workshop was to identify the key policies required to support the local production and commercialisation of plastic alternative products in Ghana. The policy recommendations highlighted by stakeholders at the policy workshop have been adapted in the creation of a comprehensive policy blueprint for Ghana – the first of its kind for any country in the West African sub-region. This has been achieved by way of an inclusive/co-creation methodology involving stakeholders across diverse sectors, including governmental agencies, private sector players, waste management companies, non-governmental organisations (NGO's), and academia. This inclusive and co-creation approach was selected to ensure that the policy blueprint recommended by the report reflects the collective perspectives, and priorities of stakeholders who are active in the plastics and plastic waste management sector.

As shown in Table 1, the policy blueprint is made up of six policy pillars with corresponding actions and policy goals, outlining a strategic policy approach to establishing a thriving industry for plastic alternatives products which will help transition Ghana away from conventional plastic products in the long term whilst establishing it as a key exporter in the West African subregion. This blueprint is designed to align with Ghana's broader sustainability goals, ensuring that the policy actions it provides not only protect the environment but also create economic opportunities, support local industries, and improve livelihoods. With effective implementation, the blueprint has the potential to transform Ghana into a regional hub for plastic alternatives, setting a global example for sustainable development.

Policy Pillar	Policy Goal(s)	Action Plan(s)
Pillar 1 - Strengthen Stakeholder Networks	<ol> <li>Establish open channels of communication to develop an inclusive approach to policy implementation.</li> </ol>	1. Form alliances between government agencies, private sector participants, waste management companies, educational institutions, and NGOs to promote the need for plastic alternative products in Ghana. Involve all stakeholders in the development, implementation, and monitoring phases to ensure policies are effectively adhered to and have broad support.

Table 1: Policy recommendations, indicating pillars, goals, and necessary actions.

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Table 1 continuation

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Pillar 2 - Create Economic Incentives for Effective Plastic Waste Management & Local Production of Plastic Alternative Products	1.	Support local producers in establishing a sustainability supply chain for plastic alternatives, boosting employment and economic resilience. Attract investment into the plastic alternatives industry, helping it scale quickly to meet local and international demand.	2.	Establish price floors for recyclable materials to encourage waste collection and ensure fair earnings for informal sector collectors. Introduce tariffs on imported plastics to boost local production of plastic alternatives, making them more competitive in the Ghanaian market. Develop plastic alternative free zones with access to government-provided infrastructure and tax breaks. This could help plastic alternative producers establish operations at lower initial costs, thus providing a competitive edge.
Pillar 3 - Set Regulatory Standards and Guidelines to Implement Phased Bans and Restrictions on Single-Use Plastics	<ol> <li>1.</li> <li>2.</li> <li>3.</li> </ol>	Gradually transition Ghana's consumption and production patterns away from single-use plastics, thereby limiting the environmental impact of plastic waste and encouraging the adoption of plastic alternative products. Enhance the competitiveness of Ghana's plastic alternatives industry in the global market while ensuring positive environmental impacts and product quality. Simplify waste management systems and improve the efficiency of recycling systems thereby promoting a circular economy.	<ol> <li>1.</li> <li>2.</li> <li>3.</li> </ol>	Phase out single-use plastics, beginning with commonly discarded items like plastic bags, and place limits on production quantities and progressively reduce these limits over a 5- to 10-year period to phase them out. Align production standards for plastic alternative products with international guidelines such as the ISO, and standardise requirements for biodegradability, compostability, and safety. Implement a waste segregation policy at the source (households, businesses) to streamline recycling and ensure efficient processing of used plastic alternative products.



Table 1 continuation

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Pillar 4 - Boosting Public Awareness to Advance Local Adoption of Plastic Alternative Products.	<ol> <li>Build a national culture that values sustainable practices and supports the adoption of plastic alternative products.</li> <li>Instil sustainable habits from an early age, creating an informed generation of Ghanaians who are ready to champion environmentally friendly practices and understand the need to switch to sustainable alternative plastic products.</li> <li>Establish a national culture where consumers actively participate in recycling and waste reduction.</li> </ol>	<ol> <li>Launch nationwide campaigns to educate the public on the environmental and health benefits associated with the use of plastic alternative products. Leverage social media, radio, television, and community outreach programs.</li> <li>Work with the Ministry of Education to include modules on plastic waste, sustainable alternatives, and proper waste disposal in primary and secondary education curricula in Ghana.</li> <li>Encourage supermarkets, malls, and retail stores to incentivise recycling through discounts and loyalty rewards for customers who return used plastic packaging and opt for products packaged with alternative plastic products.</li> </ol>
Pillar 5 - Research & Development	<ol> <li>Encourage innovation in locally produced plastic alternatives to reduce reliance on imported materials and maintain key employment opportunities for Ghanaians.</li> <li>Establish Ghana as a leading exporter of plastic alternative products to the West African sub-region and the wider world.</li> </ol>	<ol> <li>Allocate funding for research into bio-based alternatives, such as seaweed and aquatic plants, that can be locally sourced and used to develop plastic alternative products in Ghana.</li> <li>Create active partnerships between Government of Ghana agencies, universities, and research institutes to drive the development of cost-effective, environmentally friendly plastic alternatives for different sectors of the Ghanaian economy.</li> </ol>



#### Table 1 continuation

Pillar 6 - Establish a Regulatory Framework for Monitoring and Compliance

- Ensure that regulations are effectively implemented, with a particular focus on environmental outcomes and recording reductions in plastic waste.
- 2. Track the impact that the adoption of plastic alternative products has had on Ghana's environment and socio-economic circumstances.
- Facilitate a smooth transition for the plastic industry in Ghana, helping traditional manufacturers to adapt and pivot towards the production of plastic alternative products.

- Establish regulatory bodies to oversee compliance with plastic reduction and alternative production standards. Regular audits, spot checks, and penalties for non-compliance will encourage adherence to policies.
- 2. Conduct baseline studies and regular impact studies to monitor plastic pollution and the effectiveness of plastic alternative products in limiting plastic pollution. The publication of annual reports on progress toward achieving national plastic reduction goals is recommended and advised.
- 3. Provide support to local plastic manufacturers to help them gradually pivot towards the production of plastic alternative products. Support measures in this regard may include tax breaks, training programs, and technical assistance

In addition to the table shown above, a systems mapping of the policy blueprint is shown below.



Figure 1: Causal map of variables under each pillar of policy recommendation, indicating interactions and cross-influence between pertinent actions.

The systems map of the blueprint demonstrates the comprehensive way the six pillars of the blueprint are interconnected and interdependent with each providing key reinforcing policy goals and actions related to economic, regulatory, social and technical factors. The positive (reinforcing) and negative (balancing) signs on the arrows demonstrate the positive or negative impact of each policy action's causality within and across the policy pillars.

The first pillar, focusing on stakeholder networks, emphasises inclusive policy implementation and open communication channels to involve key players such as government, private sector, and civil society. This collaborative foundation is critical for building trust and ensuring widespread support for the transition to plastic alternatives. Importantly, these networks act as the bridge that connects all other pillars, facilitating communication, collaboration, and feedback loops across the blueprint. Economic incentives form the second pillar, highlighting measures such as tax breaks, tariffs on imported plastics, price floors for recyclables, and attraction of investment to promote local production of alternatives. These incentives will directly influence the regulatory environment in Ghana, enabling the adoption of strict standards while simultaneously supporting public awareness campaigns by making alternatives more accessible and affordable to the Ghanaian people.

The policy goals and actions listed in the third pillar on regulatory standards will ensure that Ghana's plastic alternatives industry operates within a structured, environmentally conscious framework. As seen in the blueprint mapping above, key policy actions such as bans on single-use plastic, the establishment of production standards for alternatives, and waste segregation at the source are all aligned with efforts related to the sixth pillar in the blueprint (compliance and enforcement), thus reinforcing responsible consumer behaviour. In addition, elements of the third pillar will also help shape policy actions in the fifth pillar (research and development) by defining the parameters for innovation within Ghana's alternative plastics industry.

The raising of public awareness (fourth pillar) is vital for driving behavioural change and establishing a national culture of sustainability. The policy goals and actions in the fourth pillar will interact with the policy actions on economic incentives highlighted in the other pillars to ensure that the Ghanaian public are motivated to engage with recycling programs and adopt alternatives. The comprehensive design and interconnectedness between the fourth pillars and other pillars within the blueprint will achieve significant buy-in from the Ghanaian public, thus strengthening compliance making regulatory enforcement more effective.

The raising of public awareness (fourth pillar) is vital for driving behavioural change and establishing a national culture of sustainability. The policy goals and actions in the fourth pillar will interact with the policy actions on economic incentives highlighted in the other pillars to ensure that the Ghanaian public are motivated to engage with recycling programs and adopt alternatives. The comprehensive design and interconnectedness between the fourth pillars and other pillars within the blueprint will achieve significant buy-in from the Ghanaian public, thus strengthening compliance making regulatory enforcement more effective.

Policy actions and goals in the fifth pillar (research and development) are linked to and reinforce other policy actions in the second and fourth pillars – namely, the optimisation of local production processes for plastic alternatives and the enhancement of public support for the increased adoption of plastic alternative products. In addition, the policy actions in the fifth pillar will inform consumer innovations in the production of plastic alternative products or practical needs, thereby increasing public acceptance.

The sixth and final pillar is about compliance and enforcement carries policy goals and actions that will ensure a smooth transition to plastic alternative products and the long-term success of Ghana's alternative plastics industry. The sixth pillar connects directly to the policy actions and goals on stakeholder networks in the first and other policy actions listed in the second pillar. The interconnectedness of these pillars will allow for enforcement feedback and public awareness to drive adherence, and regulatory standards to monitor the progress being made by the Ghanaian public in adopting locally produced plastic alternative products. Together, these interconnected pillars form a critical part of a dynamic and cohesive policy architecture which will ensure establishment of a plastic alternative products industry in Ghana to secure its transition away from conventional plastic products to a sustainable and globally competitive alternatives.



#### 4. CONCLUSIONS

The transition from conventional plastic products to sustainable alternatives is a necessary and urgent step in Ghana's environmental and economic agenda. By embracing plastic alternatives, Ghana has the opportunity to not only address plastic pollution but also to develop a new industrial sector that can generate employment, boost local entrepreneurship, and help achieve its overall sustainability goals.

This report has set out a clear policy blueprint for establishing a thriving plastics alternatives industry in Ghana. Develop through a co-creation methodological approach, the blueprint consists of six main pillars with each pillar having its own set of policy goals and policy actions – providing a comprehensive policy guide for Ghana in its efforts to transition away from conventional plastics by adopting locally made plastic alternative products.

By implementing the policy blueprint herein proposed, Ghana can position itself as a leader in the production and adoption of plastic alternatives within West Africa. As the global conversation gradually shifts away from plastic waste management towards the adoption of plastic alternative products, Ghana is well positioned, drawing on the benefits of the blueprint herein proposed, to address its plastic waste challenges and become a key player in the emerging area of plastic alternative products.



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