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DOI: 10.1016/j.marpol.2020.103928

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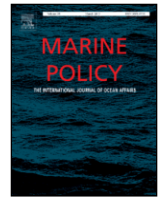
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Policies to reduce single-use plastic marine pollution in West Africa

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ARTICLE INFO

Keywords

Marine plastic pollution
Single-use plastics (SUPs)
Plastic bags
Plastic bag bans
Plastic litter

ABSTRACT

Countries in Africa are increasingly adopting policies to reduce single-use plastic (SUP) pollution, yet there has been limited analysis of policies adopted by African countries. This paper reviews SUP reduction policies, specifically in West Africa. The main policy instruments used by countries in West Africa is legislative SUP bans mostly on plastic grocery bags. Of the 16 countries, 11 have instituted bans, one has a market-based instrument and rest (4) with no strategy. Bans carry hefty punishments (i.e., fines and prison sentences). However, there is limited consultation when drafting bans, no national campaigns, and limited notification (less than one year) between ban announcement and subsequent implementation. There are no provisions for re-useable alternatives. We recommend current and future policies to reduce SUPs should engage stakeholders, allow sufficient time between announcement and implementation where the policy should be widely publicised. Governments are encouraged to offer inexpensive re-useable alternatives.

1. Introduction

Plastic pollution, including single-use plastics (SUPs), has become ubiquitous in all societies around the world [1]. Most plastics are SUPs and are designed to be used once before being discarded, and include plastic bags, microbeads, cutlery, straws, polystyrene such as cups and food containers, and sachet water wrappers [2]. While impacts of SUPs are highly visible on land, the marine environment serves as a major sink [3–5]. About 80% of plastic stranded on coastlines or at the sea bottom are SUPs and threaten marine life [1,6–8]. An estimated 4.8 to 12.7 million metric tonnes of plastic enter the oceans annually, equivalent to a truckload of plastic entering the oceans every minute [3].

Most marine plastic pollution is land-based, especially in jurisdictions lacking adequate waste management infrastructure [7]. Mis-managed land-based waste management systems account for about 80% of plastic waste leaking into oceans [5,9]. SUPs negatively impact the environment aesthetically and poses serious health challenges [10,11]. SUPs choke stormwater drains resulting in flooding, destruction of properties and even fatalities [12,13]. SUP plastic marine pollution negatively impacts livelihoods including coastal tourism and fishing [12–14].

Governments around the world have adopted different policy initiatives to reduce SUP pollution [4,15]. While momentum for such policy initiatives began in the global north, African countries have begun

to implement policies to curb SUP pollution in an unprecedented manner [16,17]. African countries are credited as having the harshest and most punitive anti-plastic bans in the world [18–21] and perceived as being committed to addressing problems posed by SUPs [17,22]. At the sub-regional level, West Africa has been heralded as a leader in efforts to curb SUP marine pollution [17]. Despite this, evidence suggests that plastic pollution, especially SUP persists in the sub-region and therefore raises questions about whether such policies are merely symbolic actions or signs of genuine interest to reduce plastic consumption [17,19,23,24]. Therefore, there is a need to comprehensively examine anti-plastic policies in West Africa to help guide both current and future anti-plastic policies. This paper undertakes a systematic review of policies aimed at reducing SUPs in West Africa. The scope of analysis includes 16 member countries of the Economic Community of West African States (ECOWAS).

1.1. West Africa in perspective

West Africa is a sub-region within the African continent. Geopolitically, it consists of 16 countries: Benin, Burkina Faso, Cape Verde, Ghana, Guinea, Guinea Bissau, Ivory Coast, Liberia, Nigeria, Niger, Mali, Mauritania, Senegal, Sierra Leone, The Gambia, and Togo (Fig. 1). These 16 countries constitute the politico-economic sub-regional body of the Economic Community of West African States (ECOWAS).

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Fig. 1. Map of Africa indicating the 16 member countries of Economic Community of West African States (ECOWAS).

The region covers an estimated 5,112,903 km² with a population of about 382.2 million, making it the second-most populous sub-region in Africa [25]. Almost half of West Africa's population (47.3%) lives in urban areas with high rates of population growth, urbanisation and a growing middle class [25]. These characteristics underscore the region's high patronage of plastic products. Increasingly, the traditional forms of packaging have been replaced with plastic packaging products [13].

Socio-culturally, lives of West Africans are intertwined with plastic products. The economy of West Africa is informal with a concentration in the primary and service sectors dominated by small, individually owned businesses [10]. In towns and cities, food vendors and hawkers employ SUPs as the primary packaging and carrying material [26]. Hawkers are people who move about on foot selling goods and usually draw attention to themselves by shouting out the name(s) of products on offer. It is common practice for food vendors and hawkers to dish food into plastic bags for their clients. Plastic bags are everyday carry-on bags that are offered for free to all clients who buy products from food and drink vendors, hawkers, and retail shops [27,28]. Drinking water is also packaged in 500 mL plastic sachets due to lack of available potable water [10]. As a consequence of these socio-cultural factors, plastic waste is ever-present in both landlock and coastal countries across the sub-region. Plastic waste is a source of environmental pollution, often polluting water bodies, choking stormwater drains and causing death of livestock [29]. Plastic waste is also a significant risk to marine ecosystems in the region and impacts livelihoods such as fishing and tourism [28]. Extremely high per capita consumption rates of

SUP in West Africa, coupled with lack of adequate infrastructure to manage plastic waste have exacerbated negative environmental impacts of plastic marine and terrestrial pollution [10,28].

Much of the plastic waste in West Africa, like elsewhere on the African continent, is mis-managed with poor and unavailable waste and plastic waste management systems [28]. Land-based sources of plastic waste mainly domestic waste from the use of plastic bags, grocery bags, sachet water bags, straws, and plastic beverage and water bottles are poorly handled as waste and ultimately end up in drains, landfills and inland water bodies (rivers and streams) and subsequently washed into the marine environment [28,30,31]. Also, poor waste management practices suggest that plastic waste end up in the marine environment as a result of direct human movement and behaviour (littering or dropping items), vehicular transport, wind and water (rivers, creeks, streams and stormwater outfalls [31–33]. Indeed, 13 of the 16 countries are boarded by the ocean, further aiding the transportation of land-based generated plastic waste into the ocean.

Additionally, the existence of indiscriminate and sometimes illegal waste dumping operations along the West African coast is a significant contributor to plastic marine pollution. Most SUP products in West Africa have limited or no waste collection and waste management infrastructure. It is estimated that over 90% of SUP waste is not properly collected or managed in West Africa, including electronic waste [31]. Also, there are no SUP waste recycling opportunities in West Africa, further resulting in the leakage of SUP waste into water bodies including the sea [31]. For instance, only 2% of plastic waste is recycled in Ghana with the remaining 98% leaking into landfills and the sea [10].

1.2. International policies for reducing SUPs

Due to significant impact of SUPs on marine and terrestrial ecosystems, coupled with varied sources, pathways, and persistence of plastics, countries have adopted a myriad of policies to deal with them. Based on transboundary nature of marine plastic debris including SUPs, strategies adopted to deal with them is multi-layered, including efforts at municipal, regional/state, national and international levels. Commensurate with this, policies range from generic global instruments on marine and environmental protection and pollution to regional marine debris action plans, and specific product bans at the national, state and municipal levels [15,34,35].

On the international stage, some of the early conventions and laws to target plastic debris include the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (commonly called the London Convention) 1972 and the International Convention for the Prevention of Pollution From Ships (MARPOL 73/78) signed in 1973. However, though the MARPOL (73/78) was first signed in 1973, it did not initially include a ban on the disposal of plastics at sea as part of its framework [2]. Similarly, the United Nations Convention on the Law of the Sea (UNCLOS) signed in 1982 did not identify plastic debris as a source of marine pollution even though it identified six different sources of marine pollution including land-based sources [36,34].

Despite recent recognition of plastic debris as an a global 'crises', evidence shows that production and consumption of plastics are increasing, further compounding the marine debris problem [5,37]. Besides high SUP use, there is also the problem of waste mis-management practices. As a response, international non-governmental organisations (NGOs) are engaged in monitoring research on marine debris to increase awareness [38]. Others, such as the Ocean Conservancy, undertake International Coastal Cleanups (ICCs) by engaging NGOs and volunteer groups to clean up coastal areas around the globe [2]. In addition, the Honolulu Strategy, which has been adopted by many countries around the world provides a framework for both market-based strategies (levies/taxes on plastic products) and legislations, policies, and regulations to reduce the production and consumption of plastic products [4,38,39].

The literature suggests both market-based strategies and legislations, policies and regulations are accepted globally but implemented selectively by countries, states, or municipalities. However, many countries are still lagging in terms of instituting an action to mitigate the ongoing environmental impacts of plastics [2]. Behuria [17] notes that structural and instrumental powers of the plastic industry have led to unwillingness of some governments to take action against uncontrolled proliferation of SUPs. Implementation of plastic-reduction initiatives has either been limited to municipal or state levels with limited policy coordination from central or federal governments [2].

In Africa, the most common plastic-reduction instruments are legislative bans, and to a lesser extent, taxes [4,20,35]. Bans are mostly targeted at specific types of SUPs especially plastic bags [17,35]. Bans are targeted at importation, production, and consumption of SUPs [17,35]. Meanwhile, bans are noted to be harsher, often carrying hefty fines and longer prison terms. For instance, Kenya's punitive outright ban on plastic bags, described as the world's toughest, stipulates fines up to US\$40,000 and prison terms up to four years for importation, production, and consumption of SUP bags [17,20]. Following the punitive bans on plastic products in Africa, Jambeck et al. [35] and Behuria [17] have questioned motives for such legislation, especially in the face of an apparent lack of interest in development of re-useable alternatives and opposition from the plastic industry. In some instances, a number of African countries, including Kenya, and Ivory Coast have had to revoke plastic bag bans due to lobbying from the plastic industry, which used both structural and instrumental powers to pressure govern-

ments [13,17]. Also, Behuria [17] contends that most bans have been poorly implemented and enforced. Unlike bans, taxes have been less preferred as a policy instrument to reduce SUPs in Africa. Taxes have only been adopted in a few countries including South Africa and Cameroon [20,40,41].

Regarding implementation of global regulatory frameworks, all coastal countries in Africa (except Eritrea and Libya) including those in West Africa are signatories to the United Nations Convention of the Law of the Sea (UNCLOS) initiated in 1973. Also, a number of African and West African countries are parties to other multilateral environmental agreements, such as the London Convention and Protocol addressing dumping of waste at sea, the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), the Basel, Rotterdam, and Stockholm Conventions dealing with hazardous and other wastes and Conventions on Migratory Species and on Biological Diversity, which include provisions for the prevention of the harmful impact of marine plastic debris and microplastics. Other international regulatory frameworks with tangential impact on marine plastic debris to, which Africa and West African countries are parties, are the four African Regional Seas Conventions and Action Plans (RSCAPs), including the Barcelona Convention (Mediterranean) the Abidjan Convention (West Africa), the Nairobi Convention (East Africa and the Island States) and PERSGA (Red Sea and Gulf of Aden). PERSGA and the Abidjan and Nairobi Conventions, through the Regional Seas Programme of the UNEP, have undertaken activities to evaluate the level of risk posed by litter and the effectiveness of future mitigation programmes and strategies [35]. The Global Program of Action for the Protection of the Marine Environment from Land-Based Sources (GPA) agreed in 1995 and the 2011 Honolulu Strategy also targets both land-based and marine sources of plastic pollution. There are also other bilateral agreements including the Commonwealth Clean Oceans Alliance which represents an agreement among some Commonwealth countries to jointly tackle marine plastic to which Ghana is a party, as well as the Commonwealth Blue Charter, is an agreement among commonwealth countries to protect and preserve the ocean from all forms of contaminants including SUPs. Several African countries are signatories to this charter. The United Nations Environment Programme [20] also provides a 10-step roadmap for governments to follow to reduce SUP consumption and litter.

Despite growing momentum among African governments to reduce SUPs, few studies have comprehensively examined these policies. However, an examination is warranted to explore motives, scope, and pitfalls to inform similar future endeavours in Africa and elsewhere around the world. The scope of analysis in this paper includes a systematic review of SUPs reduction policies in the 16 member countries of ECOWAS.

2. Methodology and approach

The systematic review covered peer-reviewed and grey literature (government reports and websites), conference proceedings, and NGO websites and reports. Platforms for the search included the google search engine, ProQuest, Science Direct, Web of Science, Scopus, wikiplastic, and Google Scholar. The search terms included "plastics in Africa" "plastics in West Africa" "single-use plastic in West Africa" "single-use plastic in Africa" "plastic bags in Africa" "plastic bags in West Africa" "policies on plastics in West Africa" "policies on plastics in Africa" "plastic ban in West Africa" "plastic ban in Africa" "laws on plastics in West Africa" "laws on plastics in Africa" "legislation on plastic in Africa" and "legislation on plastic in West Africa".

Other search terms were "levies on plastics in West Africa", "plastic levy in West Africa", "fees on plastics in West Africa", "plastic taxes in West Africa", "taxes on plastic products in West Africa", "levies on polythene/plastic bags in West Africa", "fees on polythene/plastic bags in West Africa" and "taxes on polythene/plastic bags in West Africa"

. Further specific searches focused on each of the 16 countries making up the ECOWAS. For instance, a typical search at the country level included the following: “plastics in Ghana” “single-use plastics in Ghana”, “laws on plastics in Ghana”, “policies on plastics in Ghana”, “regulations on single-use plastics in Ghana”, “microbeads in Ghana”, “plastic bags in Ghana”, “levies on plastic products in Ghana”, “taxes on plastic products in Ghana” and “fees on plastic products in Ghana”. These searches were repeated for the other 15 countries.

Further, to ensure that other dimensions of the scope of this paper are captured, we also searched based on these dimensions. Specifically, we searched on whether there was a national campaign that accompanied a specific policy or not. Here, a national campaign was conceptualised as a campaign or awareness creation instrument (outreach or educational programmes) designed as part of the policy on plastics and implemented by the agency or actors directly responsible for formulation and implementation of the policy. Conception of this study was limited to campaigns on only plastic products since the focus of the analysis is plastics and not sanitation. Therefore, while we found evidence of some campaigns on general sanitation issues, these were not specific to plastic litter and hence did not meet the inclusion criteria set in this study. However, preliminary survey results in Ghana conducted by the authors suggest a high awareness rate on consequences of SUP pollution. Results of the parallel study will complement this paper. For those countries with policies on plastics, we expanded our search to ascertain extent of enforcement of policies. This included a review of local news items on whether the policy is effectively enforced or poorly enforced for each country. Effective enforcement suggests that enforcement of the policy is conducted across the country and provisions are equally applied to all, as stated in the policy document. Poor enforcement is conceived as a situation where the policy is selectively applied in certain parts of a country as well as certain selected stakeholders and businesses contrary to provisions of the policy or the policy is not applied in its entirety.

To ensure reliability and validity of information retrieved, two conditions needed to be fulfilled regarding information gathered for each country. First, at least half of the information gathered on a country must be consistent in terms of dates of policy announcement and implementation, the scope of the policy, penal measures (if any), and drivers of the policy. Second, attempts were made to retrieve original policy/legislative documents, and for those which could be retrieved, at least three sources must have taken the information directly from original government sources. The search languages included English, French, and Portuguese since these are the three official languages in the region. Of the 16 countries, five have English as their official language; two are Portuguese speaking and nine French-speaking. Three of the authors are native English speakers and therefore handled all searches in Portuguese and translation of search results from Portuguese into English. We hired services of French language experts to handle all searches and translation of search results from French into English.

3. Results and discussion on policies

3.1. Scope and design of SUP policies in West Africa

Twelve out of 16 countries in West Africa have instituted SUP reduction policies. However, interventions in 11 countries are bans with only one country (Ghana) having a market-based strategy, specifically, an excise tax on imported semi-finished and raw plastic materials but does not have a ban on plastics (Fig. 2). This suggests that the main policy instrument used in West Africa is legislative bans. The choice of legislation over other market-based approaches is widespread on the African continent [35]. The popularity of plastic bans in West Africa could be explained by the unwillingness of governments to bear the political cost of market-based approaches such as taxes and levies

since these would directly be felt by the populace [17,42]. Market-based instruments such as levies or taxes on SUP bags as implemented in South Africa, Ireland and other countries are equally options in dealing with the SUP problem. As proven in other contexts, such as South Africa and Ireland, levies imposed on SUP bags aimed at consumers can help reduce SUP leakage [35,40]. Another market-based approach that can be used in West Africa is taxes that will be targeted at manufacturers and retailers of SUP bags as exemplified by Denmark in 1994. Denmark implemented a tax on SUP bags in 1994 but limited its payment to retailers which in turn motivated the retailers to discourage the use of SUP bags and rather promoted re-useable alternatives to shoppers [40]. Meanwhile, all bans in West Africa are partial as they target specific plastic products, such as non-biodegradable or lightweight plastic bags (mostly less than 30 μm [micrometer]). Partial bans, though not comprehensive, are welcome as effective enforcement can still lead to SUP reduction and also signal commitment by governments to reduce SUPs.

Although data on plastic waste movement is unavailable for the region, anecdotes suggest that the scope of the bans captured as in this paper reflects concerns of governments of the contribution of land-based sources to marine and coastal environments of their respective countries. The scope of bans attempts to target land-based sources of plastic waste to minimise the amount of plastic that enters the ocean by targeting the production, importation, and use of the SUPs. This is directly aimed at reducing land-based sources of plastic waste in the region. This is important since the majority of the West African population resides in coastal cities, with high per capita consumption of plastic than its inland population [30,35,42].

In terms of coverage, bans are national in scope and therefore have support of central or federal governments. This contrasts with current patterns in international policy initiatives where SUP reduction policies are fragmented across different levels of government even within the same country [2,4]. Such fragmentation in policies dealing with SUPs results in ineffective coordination and enforcement and is therefore associated with reduced desired impacts [2,6]. In this regard, national coverage of bans on SUPs in West Africa is desirable because it is likely to lead to uniform implementation and enforcement.

Although coverage of bans in West Africa is encouraging, relative inaction by some influential countries in the region, particularly Ghana and Nigeria, presents some challenges in expanding the scope of regional reduction policies. Nigeria is the most populous in West Africa (and Africa) with a population of 195.9 million, followed by Ghana, with a population of 29.5 million [25]. Also, Nigeria has the largest economy in West Africa (and Africa) while Ghana has the second-largest economy in West Africa. Almost half the population in both countries resides in urban areas, with growing middle-income classes [25] who have high demand for SUPs, including plastic bottles, plastic bags, straws, plastic disposable cups and takeaway containers [40,41]. Even though Ghana introduced an excise tax in 2014 (*Environmental Excise Tax Act 863*), this tax only targets imported semi-finished and raw plastic materials [43]. The tax appears to be motivated by the desire to raise revenue for the government rather than reducing SUP consumption and leakage since most of the commonly patronised SUP products in Ghana (polythene/plastic bags, plastic beverage bottles, sachet water packs) are locally produced and not imported. However, the government has not imposed similar tax on locally produced SUPs. Therefore, the focus of the *Environmental Excise Tax Act 863* on only imported semi-finished and raw plastic materials cannot significantly reduce SUP consumption and litter in Ghana.

3.2. Scope of SUP bans

Most plastic policies have usually targeted certain specific types of SUPs. Similarly, the bans across the West African region focused on certain particular types of SUPs. In some countries, the bans targeted plas-

Table 1
Interventions on SUPS in West Africa.

Country	Type of intervention	Year announced	Year implemented	Jurisdiction	Driver	Decision making process	Scope of policy	National campaign	Enforcement	Status of intervention
Togo	Partial ban	2011	2011	National	Protection of environment, and sanitation	Top-down	A ban on the production, importation, possession and commercial use of non-biodegradable plastics. Violators risk to pay fines ranging from 5 million to 10 million FCAF (US\$8517–17,035) or go to jail for terms ranging from two months to two years.	No	Poorly enforced	In place
Mali	Partial ban	2012	2012	National	Protection of livestock (sheep and cattle), sanitation.	Top down	A ban on the production, importation, possession, sale and use of non-biodegradable plastic bags. Violator risk jail term of 3 months to 1 year or a fine of 100,000–500,000 CFA (US\$170–850).	No	Poorly enforced	In place
Mauritania	Partial ban	2013	2013	National	Protection of livestock (sheep and cattle), and sanitation	Top down	A ban on manufacturing, using, and importing plastic bags. Anyone using, manufacturing or importing plastic bags could be fined ranging from 4630 to 1,653,799 FCAF (US\$8 - US\$2817) or sentenced to a year in prison.	No	Poorly enforced	In place
Cote D'ivoire	Partial ban	2013	2013	National	Protection of environment, and sanitation	Top down	A ban the production, importation, commercialisation, possession and the use of any non-biodegradable plastic bags made of lightweight polyethylene, or similar plastic derivatives with a thickness of less than 50 µm. Violators risk jail term of between 15 days and 6 months or a fine of between 100,000–1,000,000 CFA francs (US\$170–17,000).	No	Poorly enforced	Revoked 2013 ban due to threats to 7600 jobs and

Table 1 (Continued)

Country	Type of intervention	Year announced	Year implemented	Jurisdiction	Driver	Decision making process	Scope of policy	National campaign	Enforcement	Status of intervention
Niger	Partial ban	2013	2013	National	Protection of livestock (sheep and cattle) and environmental pollution	Top down	A ban on the production, importation, trade, usage and stocking of low-density smooth plastic and packaging bags. Fines range from 100–1,000,000 Francs (US\$0.17–17,000) or from 3 to 6 months.	No	Poorly enforced	In place
Senegal	Partial ban	2015	2016	National	Protection of livestock (sheep and cattle), protection of marine life, sanitation, and environmental pollution	Top down	Ban on production, importation, possession and distribution of plastic bags < 30 µm. Violations are subject to jail term of up to 2 years or a fine ranging from 10,000–20,000,000 CFA (US\$17 – US\$34,000) or both.	No	Poorly enforced	In place
The Gambia	Partial ban	2015	2015	National	To protect and enhance the tourism industry and environmental pollution	Top down	A ban on production, importation, sale and use of plastic bags. Violators could face a jail term of between 6 and 12 months or a fine of between 1000–500,000 Gambian dalasi (US\$20–10,000) or both.	No	Poorly enforced	In place
Burkina Faso	Partial ban	2015	2015	National	To protect livestock (sheep and cattle) and environmental pollution	Top down	A ban on the use of non-biodegradable plastic packages and plastic bags with effect, and anyone who contravenes the ban risks jail term between 3 months –5 years, in addition to a fine of between 100,000 and 10,000,000 CFAF (US\$170–17,000)	No	Poorly enforced	In place
Guinea-Bissau	Partial ban	2013	2013	National	Choked drains and sanitation	Top down	A ban on the manufacturing, importation, possession and sale of non-biodegradable plastics.	Yes	Poorly enforced	In place
Cape Verde	Partial ban	2015	2017	National	To protect the tourism industry and improve on sanitation	Top down	A ban on production, importation, marketing and use of plastic bags. Violators face fines ranging from 50,000 to 800,000 thousand Escudos (US\$510–8160) for businesses.	Yes	Poorly enforced	In place

Table 1 (Continued)

Country	Type of intervention	Year announced	Year implemented	Jurisdiction	Driver	Decision making process	Scope of policy	National campaign	Enforcement	Status of intervention
Benin	Partial ban	2018	2018	National	Protection of the environmental and sanitation	Top down	A ban on the production, importation, possession and use of non-biodegradable plastics. Violators are liable to a fine ranging from 5000–100,000 CFA francs (US\$9–170).	No	Poorly enforced	In palace
Ghana	No Ban Tax	– 2014	– 2014	– National	Generate revenue for plastic waste management	Top down	Attempted a non-legislative ban on plastics below 20 µm on 30th July 2015. This was a kneejerk reaction following the flooding and death of 150 people in Accra but failed to implement such directive. Since 2017 there is a national consultation process on a possible ban on plastic bags. 10% tax (Environmental Excise Tax Act 863) on the ex-factory price on imported semi-finished and raw plastic materials to be paid by the importers and manufacturers. The resulting revenue is meant to be used for recycling of plastic waste, and production of plastic waste bins and bags and production and use of biodegradable plastic. However, the revenue made is not used for the intended use.	– No	– Poorly enforced	– In Place
Nigeria	No ban	–	–	–	–	–	A bill to ban plastic bags is being considered in the house of representative (lower chamber of parliament) as at May 2019.	–	–	–
Guinea	No ban	–	–	–	–	–	No conscious and concerted effort to deal with plastics in the country.	–	–	–
Liberia	No ban	–	–	–	–	–	No conscious and concerted effort to deal with plastics in the country.	–	–	–
Sierra Leone	No ban	–	–	–	–	–	No conscious and concerted effort to deal with plastics in the country.	–	–	–

cies should also target plastic waste management to curb their inflow into river systems and subsequently into the marine environment.

Availability of re-useable alternatives to SUPs is fundamental to ensuring the success of anti-SUPs policies especially bans as in the case of most West African countries. Given the reliance on SUPs, the provision of re-useable alternatives to SUPs and at prices that are affordable to the populace will ensure an easy transition from SUPs to such re-useable alternatives. The provision of re-useable alternatives is fundamental to ensuring transition from SUPs as recognised by the Pacific Island Countries and Territories (PICTS) through the South Pacific Regional Environment Programme (SPREP) which required its members states to provide subsidies and assist firms to transit from SUPs to re-useable alternatives. Also, the state of California in 2014 introduced a plastic bag ban together with the creation of a US\$2 million revolving fund aimed at providing loans to companies involved in the manufacture and recycling of re-useable alternatives. Similarly, the European Union (EU) under its Directive 2019/904 recommends that where re-useable alternatives are available, member states should introduce bans on SUPs products.

Nonetheless, all countries with SUPs bans in West Africa have not made any plans to provide and promote the use of re-useable alternatives. In fact, analysis of various laws prohibiting production, importation, and use of SUPs revealed that none of the countries have made any conscious plan to develop and promote the use of re-useable alternatives. While laws acknowledge and often suggest the need to promote re-useable alternatives, they fell short of even identifying any type of re-useable alternatives or hint of a strategy to produce and supply re-useable alternatives. Though this points to a lack of planned and coordinated attempts to deal with SUPs, it appears to be a trend that transcends the West African sub-region to be a common feature of anti-SUPs policies across the African continent [17]. Even among African countries with relative success in curbing the use of SUPs, alternative industries producing re-useable products do not exist [17]. Another important dimension of the provision of re-useable alternatives is price. West Africa being one of the poorest regions in the world, there is a need for re-useable alternatives to be inexpensive to enable patronage and usage even when they are made available.

3.3. Drivers of SUPs bans in West Africa

There are four broad motives for the ban on SUPs in West Africa as contained in documents announcing the ban. Therefore, the four motives are limited to what is explicitly stated as being the reason underlying the ban as captured in the policy documents outlining bans. These include the desire for environmental protection, sanitation, protection of livestock and protection of the tourism industry (Table 1). Aside from environmental protection and sanitation, the other two reasons relate to 1) impact of SUPs on dominant economic activities and/or; 2) livelihoods of countries concerned. Rearing of livestock and tourism constituted motives for bans on plastics, especially in countries where these two sectors are vital to their economies. The three landlocked countries in the region (Niger, Mali, and Burkina Faso) and Mauritania viewed the ban on SUPs as a solution to protect livestock. Rearing of animals is an important livelihood activity in these countries which were alarmed by hazards caused by SUPs to livestock. Livestock such as cattle and sheep often die from ingestion of SUPs, causing loss of revenue to livestock farmers and governments. For instance, in Mauritania, the government estimates that SUPs cause about 70% of livestock death and hence the ban was to prevent further loss of livestock and its associated impact on livelihoods and the economy [28]. The ban in Cape Verde and the Gambia was motivated by the need to protect the tourism industry because of its significance to the economy of both countries. It is also important to note that Cape Verde is an Island

state and therefore motivated to protect its marine ecosystem, which is closely linked to their tourism industry.

SUPs also pose sanitation challenges. Environmental pollution and sanitation problems constituted reasons for banning SUPs in some West African countries (Table 1). SUPs, especially plastic bags, and other plastic packaging materials like those used in packaging drinking water, are a common sight in many West African countries [12,28]. Across West Africa, the unavailability of safe drinking water has created a market for the packaging of drinking water in sachet plastic bags of 500 mL [27,29,46]. Unfortunately, there often are no proper waste management systems to deal with the billions of SUP sachets generated through the sale of drinking water [29,46]. These sachets, in addition to plastic bags, are often disposed of indiscriminately, leading to environmental and sanitation problems [10,47,48].

3.4. Enforcement of SUP bans

While bans on SUPs are welcome and considered a sign of commitment to deal with SUP pollution, such bans are characterised by poor enforcement regimes and thus have resulted in reduced desired impact across the West African sub-region. As shown in Table 1, enforcement of bans on SUPs has been lacking. In some countries like Niger, Mali, Burkina Faso, and Guinea Bissau, the governments have not taken any action towards the enforcement of the bans beyond their announcement [42,48]. Further, lack of comprehensive engagement and sensitisation of the public on the legislation, a product of the top-down policy approaches in West Africa, often means that the public is ill-informed about the bans [19,49]. Besides, political and economic pressures associated with implementation of such bans have proven to be obstacles in their enforcement [17,35,42]. The plastic industry employs thousands of people, serves as a significant source of government revenue and provides sustenance for many families [19]. The industry, therefore, exercises both structural and instrumental power in either delaying the implementation of the bans or creates a lack of political and economic will on the part of governments to enforce them [6,17]. For instance, the government in Ivory Coast was forced to revoke the initial plastic ban it instituted in 2013 due to threats and demonstrations by the plastic manufacturers association and its employees and the fear of potential loss of revenue and over 7600 jobs [42], only to be re-introduced in 2017. The political and economic pressures of the plastic industry are aided by the already high unemployment rate and incidence of poverty in the sub-region [28,30]. In Benin, Guinea Bissau, Burkina Faso, Ivory Coast, Mali, Mauritania, Niger, Senegal and Togo, the public vehemently opposed bans due to their reliance on SUPs, selective enforcement of bans (Table 2), and lack of availability of reasonably priced re-useable alternatives [17,42].

Despite that most bans were conceived and passed without proper stakeholder engagement and public consultations, bans were also not accompanied by planned and coordinated national campaigns to raise awareness related to the negative environmental impacts of SUPs (Table 1). Past studies have noted that the majority of the populace in West Africa lack the necessary awareness of SUPs and their environmental hazards [10,28,50]. Evidence from environmental psychology suggests that the stimulation of internal motivation and, for that matter, awareness of the detrimental effects of behaviour on the environment is fundamental to achieving durable pro-environmental behaviour [43,45,51,52].

4. Conclusions

Eleven West African countries have already undertaken initiatives to reduce use of SUPs by imposing national bans on SUPs (mostly plastic grocery bags), with Ghana having tax on some imported plastic materials. This is encouraging since such efforts are likely to result in some level of impact in combating SUP pollution in the region. How-

Table 2
Scope of enforcement of SUP reduction interventions.

Country	Geographic application	Stakeholder application	Policy application
Togo	Full	Selective	Selective
Mali	Full	Selective	Selective
Mauritania	Full	Selective	Selective
Cote D'ivoire	Full	Selective	Selective
Niger	Full	Selective	Selective
Senegal	Full	Selective	Selective
The Gambia	Full	Selective	Selective
Burkina Faso	Full	Selective	Selective
Guinea-Bissau	Full	Selective	Selective
Cape Verde	Full	Selective	Selective
Benin	Full	Selective	Selective
Ghana	Full	Full	Full
Nigeria	None	None	None
Guinea	None	None	None
Liberia	None	None	None
Sierra Leone	None	None	None

ever, initiatives are skewed towards legislation (ban) with limited consideration for market-based approaches (only one of the 16 countries (Ghana) has imposed a tax on some imported plastic materials), and behavioural change strategies. There is a need for governments in West Africa to complement their legislative initiatives with market-based approaches and behavioural change strategies to help cultivate durable anti-SUPs behaviour. The behavioural strategy will inform and raise awareness on SUP pollution and thereby help stimulate innate desires to reduce the consumption of SUPs. By so doing, the public is likely to support bans on SUPs and therefore make enforcement easier. Similarly, awareness of future and current policies on SUPs could be enhanced through national campaigns. In most of the countries, communication of the bans to the public was poorly done and there are no national campaigns on them to adequately inform the public.

Bans on SUPs in the region are adopted without broad and adequate stakeholder engagement. In all the 11 countries with bans, the approaches followed in designing and implementing the bans have been top-down. There is often little support for the bans among the public. Consequently, future policies on SUPs should broadly engage all stakeholders, especially the public. Such broad engagement has the potential to inform and raise awareness on bans and also woo the public to support them. Time lags between announcement and implementation of bans have been too short. This gives little or no lead time for the plastic industry to clear their stock and go into production and distribution of re-useable alternatives.

Similarly, there is a short time for the public to adjust their behaviour regarding SUPs. It is imperative to allow for enough time in policies on SUPs to allow the players in the plastic value chain and the public to adjust appropriately. Without such adequate time, they may oppose such policies which could jeopardise their success. There is also the need for future policies on SUPs to make provisions for adequate supply of re-useable alternatives. As observed in this review, all countries lacked plans and provisions for re-useable alternatives, thereby making it challenging to avoid SUPs. Governments should provide incentives to plastic manufacturers to enable them to transit into the production of re-useable alternatives. Such government support could serve as an incentive for them not to oppose policies aimed at reducing SUPs.

There is also the need for a conscious and concerted effort at both the sub-regional level and within individual countries. A coordinated effort through ECOWAS will give member countries the momentum

as well as political will to implement such interventions, because all West African countries will be equally impacted, therefore giving no country an 'advantage' over the others.

CRediT authorship contribution statement

Issahaku Adam: Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft, Funding acquisition. **Tony Robert Walker:** Conceptualization, Validation, Writing - review & editing, Resources, Supervision, Project administration. **Joana Carlos Bezerra:** Data curation, Writing - review & editing, Funding acquisition. **Andrea Clayton:** Writing - review & editing, Visualization, Funding acquisition.

Declaration of competing interest

None.

Acknowledgements

This study was supported by the Association of Commonwealth Universities (ACU) Blue Charter Fellowships awarded to Issahaku Adam, Joana Bezerra and Adrea Clayton for three-month research residency at the School for Resource and Environmental Studies, Dalhousie University, Canada.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.marpol.2020.103928>.

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