

Review and Assessment of Policy Frameworks Applicable to the Hygienic Production of Fish Products in Africa's Great Lakes

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Executive summary

Access to adequate WASH and food safety services is critical for good health and wellbeing, and has been prioritised by the global community and national governments as a key public health intervention. The Sustainable Development Goals (#SDG 6.2) seeks to “achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations” by 2030. Despite the prioritisation and general improvement in access to WASH services, many people in low-and middle-income still lack access to adequate services. Most of the countries that disproportionately lack access to WASH services are in sub-Saharan Africa, where the number of people practising open defecation actually increased from 204 million in 2000 to 220 million in 2015. Even within sub-Saharan African countries, rural and other special populations such as refugees and fishing communities are particularly marginalised. Inadequate access to WASH services presents a greater health risk in fishing communities because it increases the risk of contaminated fish sold and consumed both locally and internationally. This risk is particularly greater in the Great Lakes of Africa region which is serves as an important source of fish in Africa and the global market.

The objective of this review was therefore to assess the policy and regulatory frameworks for the hygienic production of fish in five countries of the Great African Lakes region—Kenya, Malawi, Tanzania, Uganda and Zambia. In addition to reviewing policies and laws in the five countries, the study also conducted interviews with key stakeholders in Malawi and Kenya as case studies to understand the barriers to policy implementation and for recommendations on the necessary steps to address these challenges.

The policy analyses found key similarities in the policies and legal framework for sanitation, hygiene and food safety in the five countries. All the countries had laws and policies that sought to regulate different aspects and players in the food chain, from manufacturing through distribution to consumption. However, with the exception of Zambia which recently passed a Food Safety Act, none of the countries has an overarching policy that coordinated the implementation of food safety in the different sectors by government institutions and the private sector. The lack of an overarching food safety law or policy resulted in the duplication of functions and conflicting roles among government agencies. A major barrier to implementation is the absence of an elaborate implementation plan and criteria for monitoring and evaluating food safety and quality standards and guidelines implemented by the multitude of institutions overseeing different aspects of the sector. Another major barrier is the lack of adequate funding for the WASH sector especially as it relates to food safety. The budget for the WASH sector in almost all the countries is less than 1% of GDP, with most funding coming from donors and development partners. In addition, many of the agencies particularly at the sub-national level do not have the capacity to undertake critical services such as laboratory testing and analysis, daily inspection and surveillance to guarantee food safety.

In spite of the existing barriers to implementation, there are opportunities for policy reform and prioritisation of WASH and food safety in the five countries. A key opportunity at the regional level is the recent African Union policy and reform strategy for food safety in fisheries. The AU reform calls on member states to invest in appropriate technology, infrastructure and capacity development programmes to enhance fish safety and quality. All the five countries are member states of AU and can advantage of this regional reform strategy to reform their own policies and strengthen existing programmes and institutions of food safety in the fisheries sector. At the country level, important policy changes have occurred in Malawi and Zambia that can spur progress in those countries and also learning in Kenya, Tanzania and Uganda. In Malawi, the government has introduced a budget line for sanitation and hygiene, an important step to bridge the funding gap in the WASH and food safety sector. In Zambia, a comprehensive Food Safety Act has been passed to ensure coordination and clarity in the implementation of food safety standards and guidelines by various actors.

Given the barriers to the implementation of WASH and food safety standards and guidelines, a number of policy actions and strategies have been recommended in this study to address those barriers and improve food safety in the five countries:

Prioritise the enforcement and implementation of existing WASH policies and food safety standards and guidelines particularly targeting fishing communities and small-scale fishers and vendors.

Accelerate efforts and encourage Malawi, Kenya, Tanzania and Uganda to develop an overarching food safety policy or law to address the uncoordinated food safety activities of different institutions and stakeholders.

Increase domestic resource mobilisation and develop a comprehensive costed plan for the implementation of policies and guidelines on WASH and food safety.

Review policies and regulations on fisheries safety that are out of date to conform to recent policy changes at the African Union.

Strengthen the capacity of WASH and food safety agencies and personnel to enforce standards and guidelines. This includes strengthening the capacity of institutions to conduct laboratory analysis, inspection and surveillance.

1.0 Water, Sanitation and Hygiene in Fisheries in the Great Africa Lakes Region

1.1. Introduction

Access to safe water and adequate sanitation and hygiene is the most effective public health intervention the global community has at its disposal to promote good health and wellbeing, improve nutritional outcomes, conserve marine resources and ultimately end poverty (Mara et al. 2010; Mara and Evans 2017; United Nations 2015). In recognition of the critical role of WASH in promoting good health and wellbeing and achieving sustainable socio-economic development, the global community has over the years initiated programmes and set goals aimed at accelerating access to WASH services. The latest global goal on water and sanitation is #SDG 6 which seeks to “ensure availability and sustainable management of water and sanitation for all” (United Nations 2015). The SDG on water and sanitation and its associated targets represent a significant improvement in ambition and coverage for WASH services (Mara and Evans 2017). In addition, the SDGs prioritise the needs of vulnerable populations and people in vulnerable situation. Specifically, #SDG 6.2 seeks to “achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations” by 2030.

In spite of the general improvement in access to WASH services, many people in low-and middle-income countries still lack access to adequate WASH services and are therefore exposed to adverse health outcome due to this (Prüss-Ustün et al. 2019). For instance, only 79% and 44% of people in low-and middle-income countries affected by cholera have access to basic water and sanitation services, compared to 94% and 79% in low-and middle-income countries without cholera (Montgomery et al. 2018). Even among low-and middle-income countries, those in sub-Saharan Africa disproportionately lack access to WASH services. The latest JMP report shows that only 15% of people in sub-Saharan Africa have hand-washing-with-soap facilities at home compared to 76% in Western Asia and North Africa (WHO and UNICEF 2017). Between 2000 and 2015, the number of people practising open defecation in sub-Saharan Africa increased from 204 to 220 million while almost every part of the world experienced a decline (WHO and UNICEF 2017).

There are significant disparities in access to WASH services within sub-Saharan African countries, with rural populations and the poor particularly marginalised (Roche, Bain, and Cumming 2017). In addition, there are other special populations living in vulnerable situations which compromise their access to adequate WASH services. These include refugees, detention centres and fishing communities (Bwire et al. 2018; Mara and Evans 2017). Inadequate access to WASH services in fishing communities presents a greater health risk because it increases the risk of contaminated fish sold and consumed widely. Nowhere is this risk greater than in the Great Lakes Region of Africa which is renowned for fish products of vital importance to the local and international market (Lowe-McConnell 1993; Njiru et al. 2008). Lakes Victoria, Malawi and Tanganyika are estimated to have over 450,000 individual fishermen, most of who lack access to adequate sanitation and resort to open defecation (Sauvageot and Akilimali 2016). This limited access to WASH services has resulted in high WASH related morbidities and mortality in fishing communities along the Great Lakes of Africa (Bwire et al. 2018; Kaponda et al. 2019).

One of the major barriers to the provision of adequate WASH services to fishing communities in the Great Lakes region and much of sub-Saharan Africa is the lack of enabling an enabling policy environment and weak implementation of policies and laws where they exist. The objective of this review is to assess the policy and regulatory environment regarding the hygienic production of fish in five Great African Lakes countries—Kenya, Malawi, Tanzania, Uganda and Zambia. Specifically, the review will; ; (a) highlight the barriers to the operationalisation/implementation of policies and

frameworks (b) provide recommendations for addressing the barriers where appropriate (c) compare existing policies and frameworks across trans-boundary countries (d) provide recommendations for policy harmonisation and (e) map opportunities from existing policies and frameworks for sanitation and hygiene promotion in fishing communities. This review is part of a project to address the barriers to sanitation and hygiene in fishing communities of Africa's Great Lakes region.

1.2. *Regional Policies and Regulatory Frameworks for Hygienic Production of Fish*

Fishery is an important sector of the African economy, contributing about 1.25% of the continent's GDP (African Union Commission 2014). Even though this figure is a gross under-estimation of the sector's contribution, recent estimates show that 12.3 million people comprising of 6.1 million fishers, 5.3 million processors and 0.9 million fish farmers are employed by the sector in Africa (African Union Commission 2014). Fish is also by far the most important animal protein source in the continent. Recognising the potential of the fisheries sector to boost economic growth, improve nutrition and food security and create employment, the African Union adopted a policy framework and reform strategy to enable African governments transform fisheries and aquaculture for food, livelihoods and wealth (African Union Commission 2014). One of the specific purposes of this policy framework and reform strategy is to assist AU member states to develop realistic policies by suggesting standards and best practices.

The AU policy framework and reform strategy identifies improvement in the quality and safety of fish products as a strategic action for boosting trade and accessing regional and international fish markets. In this regard, the policy framework seeks to undertake three specific strategic actions; (a) strengthen safety and quality policies to comply with overall international sanitary and safety of fish requirements such as FAO Codex, (b) create regional reference laboratories that meet the norms and standards for main markets, and (c) put in place surveillance systems for seafood and aquaculture. The AU policy framework recognises the well-being of small-scale fishing communities as critical for enhancing quality and safety of fish products. The policy therefore calls for investment in appropriate technology, infrastructure and capacity development programmes that enable the small-scale post-harvest sector to produce quality fish products for local markets and exports.

In line with the AU policy framework and reform agenda as well food safety regulations imposed by United States and World Trade Organisation (WTO), the Common Market for Eastern and Southern Africa (COMESA) which includes almost all the countries in the Great African Lakes region has endorsed a number of key policy decisions to promote safety and hygiene in fish products. In 2015, the COMESA authority comprising heads of state and government directed the secretariat to develop COMESA guidelines for aquaculture, fish and fishery products based on the East African Community (EAC) Sanitary and Phytosanitary (SPS) guidelines by 2016 (COMESA 2015). While it is not clear whether these guidelines have been finalised, the decision marked an important policy direction on fish safety and hygiene at the highest level in the region. Within the southern Africa region, SADC introduced general guidelines for food safety law in 2011. These guidelines cover a wide range of food products and sectors, but safety and hygiene in fisheries seemed not to be prioritised (SADC Secretariat 2011).

1.3. *Methodology*

This review assessed national water, sanitation and hygiene policies and frameworks in five countries of the Great African Lakes region using *the Guidelines for the Assessment of National Sanitation Policies* (Elledge et al. 2002) (Table 1). The review particularly focused on the policies as they relate to safety and hygiene in the fisheries sector and in fishing communities. The policy

documents and guidelines that were included in the review for each country have been listed in Appendix 1.

Table 1 Assessment of policies and frameworks reviewed

Assessment Criteria	Sample Review Question(s)
1. Legal Framework	Are the policies supported by an existing legal framework? Are the policies compatible with other national and international policies and regulations?
2. Population Targeting	Are the policies appropriate for the target population i.e. fishing communities?
3. Institutional Roles and Responsibilities	Are roles and responsibilities clear in the policies, and appropriately assigned to relevant institutions?
4. Level of Services	Are minimum adequate service levels defined for the target population? Are the services in the policies appropriate for fish safety and hygiene?
5. Health Considerations	Are the health related-problems associated with poor fish safety and hygiene clearly understood? Do the policies address the main health problems?
6. Environmental Considerations	Is there a clear understanding of the magnitude of fisheries related environmental problems? Do the policies address the main environmental problems?
7. Financial Considerations	Do the policies indicate the cost of addressing all sanitation needs, and the needs of fishing communities in particular? What are the sources of funding for implementing the policies, and are they adequate?

In addition to the policy review, we conducted qualitative interviews with key informants in water, sanitation and hygiene in the fish and food safety sectors in Malawi and Kenya as case studies. The main purpose of the stakeholder interviews was to validate and identify gaps in the policy assessment. The interviews also sought to shed light on the implementation processes and challenges in the two countries. In Malawi, five individual interviews and three focus group discussions were conducted. The individual interviews were conducted with officials in the Ministry of Health and Population, Department of Fisheries, World Fish Centre, University of Malawi and Lilongwe University of Agriculture and Natural Resources. The focus group discussions were conducted with fishers and members of a fishing community—Chisi, an island community on Lake Chilwa.

In Kenya, six in-depth interviews were conducted with key officials in various institutions including the directorate of fisheries, county health departments and fisheries officers. All six in-depth interviews were conducted with stakeholders in Kisumu—4 males and 2 females. The respondents included an officer at the Fisheries Directorate, an officer responsible for Food Quality Control and Safety, Department of Health, a member of the beach management unit, a public health officer and a sub-county fisheries officer and a private stakeholder in fisheries.

The stakeholder interviews were conducted using semi-structured interview guides (Appendix 2). The guides were designed based on gaps and ideas emerging from the policy review. The interviews were audio-recorded with oral permission from the stakeholders. Before analysing the data, the audio-recorded transcripts were transcribed and coded according to the themes of the interview guide. The coding of transcripts and the analysis of data was done using Atlas.ti, and thematic analysis technique was used.

2.0 Water, sanitation and hygiene situation in Malawi

Malawi has an estimated population of 17.5 million people in 2018 (National Statistical Office 2019). The main water bodies include Lake Malawi (28,750 km²) which is Africa's third largest freshwater lake, Lake Malombe (303 km²) which is part of the Great East African Rift Valley and Lake Chilwa, an inland basin lake with a dense network of perennial rivers (Government of Malawi 2007). Fish account for over 60% of animal protein supply and the fisheries sector provides direct income to 60,000 people as well as indirectly engages over 450,000 people in fish processing, trading and distribution (Donda and Njaya 2007; FISH 2015).

Malawi has made some progress in increasing access to safe water and improved sanitation and hygiene facilities (WHO/UNICEF 2019). For example, the proportion of the population engaged in open defecation declined from 15% in 2000 to 6% in 2017 (WHO/UNICEF 2019). While differentiated data on sanitation in fishing communities is lacking, the situation is thought to be poorer than the national level. One study in Malawi estimated that fishers spend up to 8 hours on boats without access to toilet facilities, leading to open defecation in the lake (Samikwa et al. 2019). Because fish is highly perishable, this lack of sanitation and hygiene facilities in fishing communities leads to poor fish quality and compromises the health of consumers. The study of Samikwa et al. found high concentration of *Escherichia coli* in fish, an indication of faecal contamination possibly from open defecation. The study found that the highest risk of faecal contamination of fish occurred during transportation from landing sites to the open market by vendors. In markets, fish is sold on wooden benches covered with sacks or plastic sheets which are difficult to clean effectively (Samikwa et al. 2019).

2.1 Assessment of policies and frameworks for hygienic production of fish in Malawi

2.1.1 Institutional Arrangement and Policy and Legal Framework

Malawi has a number of government Ministries, Departments and Agencies mandated to promote sanitation, hygiene and food safety including in the fisheries sector. These agencies include the Ministry of Health and Population, Ministry of Agriculture, Irrigation and Water Development, Ministry of Trade and Industry and the Ministry of Local Government. Within the Ministry of Health and Population, a number of departments are involved in enforcing policies, strategies and guidelines on food safety. These include the Department of Environmental Health, Health Education Unit, Epidemiology and Community Health Sciences Unit. The Department of Environmental Health is the main unit responsible for food safety and is mandated to enforce regulations for the control of hygiene in food premises. While the department is expected to inspect all food premises including landing sites and fish markets, the findings of the stakeholder interviews show that fish inspection is not prioritised by the department. This is because the Department of Environmental Health considers the fisheries sector as the preserve of the Department of Fisheries. This is illustrated by the following quote from one of the stakeholders interviewed;

“So, on our part, as the health sector, what we've done is to ensure that the district councils are able to conduct inspections. But our inspectors expect fisheries to have a role when it comes to fishing communities. So, it means they are not really so much into fishing communities. Much as they will inspect food and food premises, but thinking of the fishing communities, I think there are gaps. Health officials have limits here because our colleagues in fisheries are doing the same...”
[Stakeholder, Department of Environmental Health].

In the Ministry of Agriculture, Irrigation and Water Development, the Department of Fisheries is the main unit responsible for fisheries food safety measures including inspection of fishing vessels and issuance of permits. While the Ministry of Trade and Industry does not have a direct role in food and fisheries safety, it hosts the Malawi Bureau of Standards (MBS) which is responsible for enforcing compliance for food safety and quality standards. MBS has developed food safety standards which

conform to the Codex Alimentarius Commission (CAC) standards (Morse 2018), but these standards are not being enforced as expected especially regarding fisheries food safety. Finally, the Ministry of Local Government is responsible for enforcing national and local sanitation and hygiene regulations on commercial food premises through the district assembly.

The government institutions described above operate with a policy and legal framework, with policies that seek to promote sanitation, hygiene and food safety including in fisheries and aquaculture. These include the National Sanitation Policy, the Fisheries and Aquaculture policy, the National Nutrition Policy, the National Water Policy, and the National Community Health Strategy. For example, one of the priority areas of the National Nutrition Policy is the promotion of food safety and quality. In this regard, the policy's specific objective is "to protect Malawians from health and nutrition hazards that result from consumption of poor quality and contaminated processed foods" (Government of Malawi 2013). The policy calls for capacity strengthening of relevant food regulatory institutions such as MBS and district assemblies to monitor and control safety and standards. To promote food safety, MBS has developed food safety standards which conform to the Codex Alimentarius Commission (CAC) standards (Morse 2018). In the fisheries sector, the National Fisheries and Aquaculture Policy identifies fish quality and value addition as a key priority area (Malawi Government 2016). To achieve this, the policy seeks to ensure the adoption of practices including sanitary and phytosanitary practices to enhance quality, hygiene and sanitation for fish and fish products.

The policies on sanitation, hygiene and food safety are supported by an existing legal framework which consists of laws, Acts of Parliament and bye-laws that prohibit pollution, poor hygiene and sanitary practices and empower various actors to implement such policies and regulations necessary to promote adequate sanitation and hygiene. For example, the Public Health Act empowers health inspectors to inspect food and food premises including premises where fish is sold to ensure that food is wholesome and safe for human consumption (Lazaro, Kapute, and Holm 2019; Parliament of Malawi 1968). Similarly, the Fisheries Conservation and Management Act requires the director of fisheries to undertake appropriate steps for the protection of fish stock from the effect of pollution and siltation (Government of Malawi 1997).

Even though the goals, strategies and regulations articulated in the various policies, laws and regulations are critical for ensuring food safety, they are not being adequately implemented to achieve the desired outcomes (Lazaro et al. 2019; Morse 2018). One study conducted in Mzuzu, Malawi found that the regional office of the department of fisheries did not have laboratory equipment to conduct laboratory analysis before sanitary certificates are issued (Lazaro et al. 2019). Thus, the department relied only on visual inspection of fish which is inadequate to detect all spoilage bacteria. There is also evidence that fish inspectors are not present daily to monitor fish in the markets, while a joint team of inspection at the Mzuzu city council is done every three months (Lazaro et al. 2019). In addition, some of the policies and laws on food safety in Malawi are outdated and do not conform to recent policy changes at the regional and global level. For example, the Fisheries Conservation and Management Act which was enacted about 23 years ago does not include sanitary and phytosanitary aspects as outlined in recent AU reform and strategy (African Union Commission 2014). The Public Health Act which was enacted soon after Independence is also generally out of date and does not have specific guidance on how to monitor and evaluate fishing premises and markets. Furthermore, the institutional framework for implementing the various policies and laws on sanitation, hygiene and food safety is fragmented, with duplication of roles and responsibilities among ministries, departments and agencies. For instance, coordination of the implementation of the national sanitation policy which encompasses all aspects of sanitation and hygiene including in fishing camps is the responsibility of the Ministry of Agriculture, Irrigation, and Water Development (Government of Malawi 2008). However, the responsibility of promoting food safety and enforcing appropriate food standards is vested in the Ministry of Health and Population

and the Ministry of Trade and Industry through MBS. Part of the reason for this confusion and duplication of functions is the lack of a comprehensive food safety law or policy to harmonise the various policies and coordinate the functions of the institutions implementing them (Morse 2018). This challenge summarised by one of the key stakeholders we interviewed as follows; “...food safety collaboration has been a challenge. I think the main reason could be that there isn’t an overarching policy on food safety. You will find bits and pieces of legislation. You will find Acts on meat inspection, public health...but then you don’t have a comprehensive Food Safety Policy or Act like in other countries, so coordination becomes a problem. Recently we did a situation analysis of the food control systems and one of the key findings is that collaboration is really a problem...We have plans to develop a Food Safety Policy” [Stakeholder, Department of Environmental Health].

2.1.2 Target Population

In general, the policies, laws and regulations on sanitation, hygiene and food safety in Malawi target the entire food supply and distribution chain. Regarding food safety in fisheries and aquaculture, the policies and regulations target some aspects but there are gaps in other areas necessary to promote adequate safety and quality. The National Fisheries and Aquaculture Policy focuses mainly on fish quality and value addition, but does not provide for how to monitor and evaluate safety in fresh fish (Lazaro et al. 2019; Malawi Government 2016). The National Environmental Policy recommends the participation of fishing communities in the management of fisheries resources but there is no reference to sanitation, hygiene and fish safety practices in this policy (Government of Malawi 2004). One of the areas of focus of the National Sanitation Policy is the provision of latrines and hand washing facilities in markets and places where food including fish is handled or sold (Government of Malawi 2008). The Local Government Act mandates district assemblies and city authorities to manage, maintain and control places where food is sold including markets, market buildings and surrounding premises (Malawi Government 1998). This broadly includes fish markets and landing sites though not explicitly mentioned in the policy. The Public Health Act also focus on controlling the sanitary conditions of premises where food including is sold for human consumption (Parliament of Malawi 1968).

Even though fishing communities, landing sites, fish markets and other fish premises are generally considered priority areas of food safety in the various policies and regulations, actual provision of sanitation, hygiene and food safety services in the fisheries sector is inadequate and does not address the unique needs of fishing communities and fishing premises. One study in the Salima District showed that potable piped water from the municipal water supply system to Nguo landing site of Lake Malawi had been disconnected due to unpaid bills (Samikwa et al. 2019). Another study in Mzuzu market found that only three out of the 25 vendor studied maintained the temperature of fresh fish close to 0°C as recommended by national standards (Lazaro et al. 2019).

The findings of the stakeholder interviews in the current study show that the Ministry of Health and Population and the Department of Environmental Health do not prioritise food safety inspection and sanitation issues in the fisheries sector as they do in other sectors. This is because the Ministry of Health and Population and the Environmental Health Department consider the fisheries sector as the preserve of the Ministry of Agriculture, Irrigation and Water Development and the Department of Fisheries. This is illustrated by the following quotes from two the stakeholders interviewed; “You know...sanitation and health issues to me are more on the health side from the Ministry of Health. But their prioritisation is not on these beaches. You know beaches are left to the fisheries sector. They only come into fisheries when there is cholera...” [Stakeholder, World Fish Centre].

2.1.3 Level of Services Delivered

A number of the policies, Acts of Parliament and regulations on sanitation, hygiene and food safety in Malawi define the minimum services required to promote food safety and quality. The National

Sanitation Policy defines basic sanitation services as access to a latrine which is functional and allows for safe disposal of faeces; offers privacy and guarantees user safety; and is at least 30 meters from a ground/surface water source (Government of Malawi 2008). The policy also emphasises hand washing with soap to prevent food contamination during handling and processing. While these minimum sanitation requirements are critical for promoting food safety including in fish safety and quality, there is evidence that these services are not being provided in places where food including fish is sold and in fishing communities. The findings of our interviews with members of a fishing community in Lake Chilwa show that sanitation facilities and services have not been provided to the level expected in the sanitation policy. One of the members of the community indicated that; "...the only toilet in this community was constructed by ADC (area development committee) but it collapsed. It was constructed to be used by drivers. The government constructed a toilet in the surrounding village of Namakuima but not in our village". [Member, Chisi Village].

A study in four markets selling fish in Mzuzu found that only two markets had working sanitation facilities for vendors and customers, but none of these two markets had soap in their hand washing stations (Lazaro et al. 2019).

Another important service articulated in the policies and regulations for promoting food safety is inspection of food and food premises. The Public Health Act mandates health inspectors to inspect food including fish and fish premises to make sure that fish sold is wholesome and safe for consumption (Parliament of Malawi 1968). In line with the Public Health Act, the Local Government Act empowers district assemblies to "inspect premises where articles of food or drink are manufactured or prepared for use or are sold" (Malawi Government 1998, page 37). This includes fish markets and other premises where fish is processed for consumption. Despite the explicit articulation of inspection as a critical service in several of the policies and regulations, there is evidence that the level of inspection is generally inadequate and that inspections services particularly by district assemblies and the department of fisheries do not occur daily as expected (Lazaro et al. 2019).

2.1.4 Health and Environmental Considerations

The health problems associated with poor sanitation and hygiene and inadequate food safety are clearly understood and articulated in the policies and regulations in Malawi. The main objective for promoting food safety and quality in the National Nutrition Policy is to "protect Malawians from health and nutrition hazards that result from consumption of poor quality and contaminated processed food" (Government of Malawi 2013, page 70). The National Sanitation Policy views the adoption of good sanitation and hygiene practices as fundamental for reducing the burden of diseases such as cholera and diarrhoea. The Public Health Act explicitly prohibits the manufacture, preparation, storage, keeping, sale, import or export from Malawi any food which is or contains an ingredient which is diseased or unsound or unfit for human consumption (Parliament of Malawi 1968). This includes the preparation, storage, sale, import or export of fish. One of the sanctions in the Public Health Act for dealing in unwholesome or diseased food is seizure and disposal by destruction. The essence of these regulations is to protect consumers from ill-health associated with unwholesome food.

Despite the articulation health concerns associated with poor food safety and quality in the various policies, the policies do not adequately address the unique health issues in fisheries food safety and quality. For instance, none of the policies explicitly cited *salmonella* diseases associated with consumption of unwholesome as a major health consideration in the efforts to promote fish safety and quality. Yet, there is evidence that of high presence of *salmonella* spp. in most fish sold in the markets in Malawi (Lazaro et al. 2019). This lack of attention to the unique health issues in fisheries food safety is particularly glaring in the National Fisheries and Aquaculture Policy which completely fails to mention any disease associated with the consumption poor fish quality (Malawi Government

2016). In fact, the main health consideration in the fisheries policy is the mainstreaming of HIV in the fisheries sector.

Beyond health considerations, the various policies and regulations reviewed in this study also consider the environmental impact of good sanitation, hygiene and food safety practices. The National Sanitation Policy recommends the recycling of liquid and solid waste to protect the environment (Government of Malawi 2008). The policy also recommends regular environmental audits and impact assessment for industrial operations including large industrial fishing operations in line with the Environmental Management Act. The Fisheries Conservation and Management Act prohibits the pollution of rivers, streams, lakes and fishing waters in order to preserve fish for food or other aquatic resources (Government of Malawi 1997). The National Fisheries and Aquaculture Policy also seeks to reduce habitat degradation by addressing poor fishing practices such as over-fishing and fish preservation through smoking which have a negative impact on the environment.

In conclusion, while health and environmental factors are duly considered in the various policies and regulations, the strategies outlined in these policies have not been adequately implemented to achieve the desired health and environmental outcomes.

2.1.5 Financial Considerations

The WASH sector in Malawi is seriously underfunded, with the total budget estimated at 0.4% of GDP (UNICEF Malawi 2019). This is significantly below Malawi's commitment to allocate 1.5% of GDP to the sector in the eThekweni declaration (African Union 2008). While the government needs to be commended for introducing a budget line on sanitation, allocation to that budget line is 95% below the estimated financial requirements of the sector (UNICEF Malawi 2019). The WASH sector is heavily dependent on donors for financial resources, with as much as 93% of the budget for the 2018/2019 financial year expected from donors (UNICEF Malawi 2019). This represents a significant threat to sustainability of funding for the sector if donors fail to meet their financial commitment or pull out of the sector. Even with the current budget, a significantly higher percentage of the allocation is for personal emoluments and internal travel while less than a quarter is dedicated to food and rations (UNICEF Malawi 2019). Sanitation, hygiene and food safety measures in the fisheries sector is especially likely to be the most underfunded as only 3% of allocation to the Ministry of Agriculture, Irrigation and Water Development is to the fisheries and livestock sub-sector (UNICEF Malawi 2019).

In addition to being underfunded, resources for the WASH sector are centrally allocated to huge infrastructural water development projects, with less than 5% allocated to district councils for sanitation and hygiene services (UNICEF Malawi 2018). This inadequate allocation of resources to the district councils particularly compromises the ability of district environmental health offices and district fisheries offices to inspect fish premises and enforce other regulations required to promote food safety in fisheries. The allocation of these limited financial resources is also often characterised by significant delays due to protracted procurement processes and cash flow challenges (UNICEF Malawi 2018).

Despite the limited funds allocated to sanitation and hygiene particularly in fisheries, the National Fisheries and Aquaculture Policy which among other things seeks to promote fish quality has no resource mobilisation strategy to address the shortfalls in funding (Malawi Government 2016). The policy does not also include analysis of the resources required to promote safety and quality in fish products. Similarly, even though one of the priority areas of the National Nutrition Policy is to increase budgetary allocation to nutrition services including food safety, the policy has no resource mobilisation strategy as part of its implementation framework (Government of Malawi 2013). The Fisheries Conservation and Management Act is probably the most advanced in terms of the mobilisation of financial resources for the fisheries sector. The Act establishes the Fisheries Fund and

describes the sources of financial resources to the fund including parliamentary appropriation and voluntary contribution. However, financial resources in the fund are primarily meant for conservation and management of fisheries habitats and not necessarily the promotion of sanitation, hygiene and food safety in fisheries.

2.1.6 Summary of Findings, Barriers and Opportunities for Fisheries Food Safety in Malawi

The assessment of the various policies and regulations on sanitation, hygiene and food safety in Malawi shows that while some of the policies including the Fisheries and Aquaculture Policy and the National Nutrition Policy explicitly mention and prioritise fish safety and quality, there is no elaborate implementation plan to ensure the adoption of sanitary and phytosanitary practices to enhance quality, hygiene and sanitation for fish and fish products. The sanitation and hygiene needs of small scale fisheries and fishing communities have not been mentioned in any of the policies as a priority area. Even in the implementation of the general food safety regulations by district assemblies, environmental health offices and MBS, small scale fishing premises, fish markets and vendors are not prioritised.

The review also identified a number of barriers to the implementation of the various policies and regulations especially regarding food safety in fisheries. One of the major challenges has to do with the fragmented roles and functions of institutions responsible for food safety in general and fisheries in particular. The Department of Fisheries, Department of Environmental Health, Malawi Bureau of Standards and District Assemblies all have roles in promoting fisheries safety but these have not effectively coordinated to prevent duplication of functions. Part of the reason for this lack of effective coordination is the absence of food safety policy or law. Another major challenge to the implementation of sanitation, hygiene and food safety policies and regulations in fisheries is the lack of adequate funding in the sector. The review found that fisheries together with livestock receive the lowest allocation to the Ministry of Agriculture, Irrigation and Water Development. In addition, there are delays in the disbursement of allocated funds to the local level which probably explains the inability of district assemblies and the fisheries department to inspect fishing premises and markets regularly.

Notwithstanding the above challenges, there are opportunities for policy reform and for the prioritisation of safety in fisheries and the sanitation and hygiene needs of fishing communities. There are on-going discussions among policymakers on the need to develop an overarching food safety policy in Malawi. Accelerating these discussions and developing a food safety policy is an opportunity to address some of the gaps in fisheries food safety and also to update fisheries food safety standards to meet international requirements. Furthermore, the introduction of a budget line on sanitation in the national budget is an opportunity to increase funding to sanitation, hygiene and food safety in fisheries sector. While the current allocation to that budget line is low, there could be advocacy by various stakeholders to increase the allocation to the commitment made in the eThekweni declaration.

3.0 Water, Sanitation and Hygiene situation in Kenya

Kenya's population was estimated at 47.6 million in the 2019 Kenya population and housing census (Kenya National Bureau of Statistics 2019). Fisheries production in Kenya is provided by inland lakes, aquaculture and the country's vast coastline (Aloo et al. 2014). About 85% of fish landed in Kenya is from inland lakes including lake Turkana and Lake Victoria, with the bulk coming from Lake Victoria which contributes about 80% landings (KMFRI 2018). Even though the fisheries sector contributes to less than 1% of national GDP in Kenya, it plays a significant role in food security and job creation (Aloo et al. 2014; FAO 2015; Wakwabi, Abila, and Mbithi 2003). The sector is estimated to support about 150,000 people directly and another 800,000 people indirectly (MoALF 2015).

Despite the significant contribution of the fisheries sector to job creation and food security, many fishing communities in Kenya lack adequate access to safe drinking water and sanitation facilities (Aquaya 2019; Ministry of Health 2016). For example, it is estimated that as high as 82% of the population of Turkana County, which is home to Lake Turkana and has a sizable population of fishers, is engaged in open defecation (Ministry of Health 2016). Similarly, only about 20% of residents in Kisumu, the port city on Lake Victoria, are connected to a sewer (Aquaya 2019). These poor sanitation statistics in major fishing counties are in spite of the general improvement in the open defecation situation in the country, which decreased from 17% in 2000 to 10% in 2017 (WHO/UNICEF 2019).

While the general situation of water, sanitation and hygiene has improved in the last two decades, Kenya is still performing poorly on most indicators, according to the latest JMP report (WHO/UNICEF 2019). For example, only 25% of the population in Kenya have a basic hand washing facility at home. The proportion of the rural population using unimproved water sources only declined slightly, from 19% in 2000 to 15% in 2017, in 17 years. Open defecation among the poorest households is still as high as 43% compared to less than 1% among the richest households (WHO/UNICEF 2019). Similarly, only 37% of the poorest households have access to at least basic drinking water compared to 92% among the richest households. The lack of access to adequate water, sanitation and hygiene facilities has major negative implications for the health, economic and social circumstances of many Kenyans. For example, unsafe water and sanitation is the second leading contributor to mortality and morbidity in Kenya (Ministry of Health 2016).

3.1 Assessment of policies and frameworks for hygienic production of fish in Kenya

3.1.1 Institutional Arrangement and Policy and Legal Framework

Kenya has several government agencies and institutions responsible for sanitation, hygiene and food safety control which operate under various Ministries. These agencies include the Department of Public Health, Kenya Bureau of Standards (KEBS), State Department for Fisheries, Aquaculture and the Blue Economy, Fish Inspection and Assurance Unit, County governments and municipal authorities. The overall goal of the various agencies with regards to food safety is to protect consumers against health and promote economic development. The Department of Public Health under the Ministry of Health is the main institution responsible for coordinating the multiple agencies involved in food safety management and sanitation (Oloo and Jeo 2010). The department focuses on food safety and quality control, surveillance, prevention and control of food-borne diseases.

KEBS is a statutory institution under the Ministry of Industrialisation, Trade and Enterprise Development is responsible for coordinating all activities regarding the development and implementation of both local and international food standards relevant to Kenya. KEBS collects information on food safety and quality concerns through field visits and also through private complaint samples for analysis in its laboratories (Oloo and Jeo 2010). In the fisheries sector, the Fish Inspection and Assurance Unit focus on the attainment of appropriate standards of fish for the export market. County governments and municipal authorities are required to undertake several activities for the promotion of food safety. These include registration of food premises and

specification of standards to be observed; ensuring availability of hygienic market facilities for the handling, display and storage of fish, meat and other perishable food products; and ensuring regular inspection of all food outlets (Ministry of Health 2016).

Beyond the state institutional arrangement for promoting and enforcing food safety standards, there are number of non-state actors including voluntary private associations which enforce private food safety standards (Oloo and Jeo 2010). These actors include the Association of Fish Processors and Exporters of Kenya (AFIPEK) and the Kenya Association of Manufacturers (KAM). AFIPEK helps to enforce stipulated standards, regulations and code of conduct, and seeks to harmonise surveillance, monitoring and processing standards. Consumer organisations such as the Kenya Consumer Organisation also play a key role in protecting consumers from unsafe and substandard food products through informing consumers of their rights.

Even though Kenya does not have a single overarching policy or regulation on food safety, there laws and policies designed to protect consumers (Oloo and Jeo 2010). Key among the laws and policies on food safety are the Public Health Act, Fisheries Act, the Environmental Sanitation and Hygiene Strategic Framework and the National Food and Nutrition Security Policy. In addition to these policies and laws, Kenya also has food standards developed from international standards such as those by Codex and the World Trade Organisation (WTO) Sanitary and Phytosanitary Standards. The responsibilities of the institutions described in the previous sections are defined in these existing laws, policies and standards.

The Public Health Act explicitly prohibits the sale, import or possession of any food for human consumption that is tainted, adulterated, diseased or unwholesome (Republic of Kenya 2012b). The Act also mandates persons who prepare, manufacture, keep, transmit and sell food to take adequate measures to safeguard such food from infection or contamination. Kenya's overarching policy on food and nutrition, the National Food and Nutrition Security Policy, also identifies food safety as a priority issue of public health (Government of Kenya 2011). The policy's objective regarding food safety is to "ensure safe, high quality food by creating public awareness on relevant issues and by setting, promoting and enforcing appropriate guidelines, standards and a regulatory framework" (Government of Kenya 2011). To operationalise the food and nutrition policy, the Ministry of Health developed a five year strategic framework (2016-2020) for environmental sanitation and hygiene which requires county governments to establish and run programmes to control the sale of prepared foods and to register food premises and specify standards to be observed by operators and vendors (Ministry of Health 2016).

To promote food safety in fisheries, the Fisheries Act prohibits the use of poisonous and noxious substance for purposes of fishing (Republic of Kenya 2012a). The Fisheries Management and Development Act mandate the Cabinet Secretary to establish a technical committee on Fish Quality and Safety which is required to monitor the production of fish products and to regulate fish handling, landing, transportation, processing and marketing with the view to assessing risks to humans (Republic of Kenya 2016). Kenya also has a fisheries policy which among other objectives seeks to promote responsible fish handling and preservation measures as well as promote the active involvement of fishing communities in fisheries management (Ministry of Livestock and Fisheries Development 2005).

In addition to developing national policies and laws, Kenya has ratified several international conventions and treaties committing to guarantee sanitation, hygiene and safe food for all Kenya's including fishing communities. Key among these are the Ngor Declaration on Sanitation and Hygiene, the Sustainable Development Goals (SDGs) and commitment to Codex Alimentarius Commission Standards on food safety. In fact, Kenya is currently hosting the FAO/WHO Codex Coordinating

Committee for Africa with the responsibility to come up with regional Codex Food Standards for African Countries. In the fisheries sector, Kenya recognises that it shares some of its water resources with neighbouring countries especially great lakes countries. Therefore, the country's legal framework and institutional framework allows for shared management of fish stock and water resources through regional organisations such as the Lake Victoria Fisheries Organization. Similarly, the Beach Management Units (BMUs) Guidelines focus on harmonization of efforts between Kenya, Uganda and Tanzania, with clearly articulated roles and a structure of linkages for co-management. The roles are broken down according to different stakeholders including: fisheries department, research, local authorities and district technical staff, NGOs and development partners. In conclusion, despite the over 20 different national policies and laws and the numerous international treaties Kenya has ratified, the lack of an overarching food safety policy or law has created a fragmented legal and institutional framework, with consequences such as limited cross-sector collaboration and coordination and ineffective management and control of the food sector.

3.1.2 Population Targeting

In general, sanitation, hygiene and food safety policies and laws in Kenya targets all sectors of the economy including the food and fisheries sectors. The Environmental Sanitation and Hygiene Policy (2016-2030) prioritises sanitation and hygiene in schools, health facilities, public spaces such as fishing camps and fish markets as well as in field/outdoor areas such as plantations. With regard to food safety, while the policy targets food establishments and premises as well markets, fishing communities, fish camps and landing sites are not specifically mentioned in the policy as priority areas for food safety. For instance, the policy specifically mentions slaughterhouses as places where regular inspections will be undertaken but does not make similar reference to fishing landing sites. Such an omission could result in less attention on fish inspection as part of the efforts to promote food safety.

The National Food and Nutrition Security Policy (2011) targets all levels of food production, processing, marketing and handling by all stakeholders from the private and public sectors, and by all consumers (Government of Kenya 2011). Although the policy recognises food safety concerns at both national and county levels, it prioritises food safety in urban and peri-urban areas and does not specifically address safety issues in fishing camps and fishing communities. Among the policies reviewed, the Fisheries Policy is the main policy that directly seeks to address fish quality and safety issues. To achieve its objective, the policy mandates the Competent Authority (CA) in fish matters to develop standards and manuals for fish quality control. The CA is also expected to expand and upgrade laboratories in major towns such as Nairobi, Kisumu and Mombasa as well as enter into agreements with the Kenya Bureau of Standards and other accredited laboratories in order to establish sections dedicated to fisheries. The main gap in the fisheries policy is that it does not mention the provision of sanitation facilities in its implementation strategy as key for enhancing fish quality and safety. Yet, without such facilities fishing communities and fishers will continue to defecate in water bodies, thereby compromising the safety and quality of fish.

Overall, evidence from the key informant interviews in Kenya confirm that fisheries policy and the department of fisheries priorities the provision of sanitation and hygiene facilities in fishing communities and landing sites while the overall sanitation policy and public health department does not. For instance, in Kisumu county, one of the stakeholders interviewed indicated that; *"we are working hand in hand with the fisheries department..., to say the truth we have been taught a lot about cleanliness and they [the fisheries department] have also brought us litter bins"*. One public health official interviewed, however, had this to say about the sanitation policy; *"The sanitation policy focuses on issues of defecation outside the lake but does not necessarily mean fisheries"*.

3.1.3 Level of Services Delivered

The Fisheries Act has made some provisions for the kind of services provided namely, the development of landing sites and *bandas*¹, as well as capacity building of the fishing community and staff, among others. Other services as revealed by this review, include litter bins, provision of wheelbarrows to avoid dragging the fish as well as containers with ice block for transportation, after which the fish is weighed. These services are provided by different partners; some are dependent on ongoing projects within the fishing communities. From the interviews, it was revealed that the minimum sanitation, hygiene and safety requirement is clearly stipulated in the Fisheries Act in that, fish needs to be iced in the ratio of 1:1, that is ratio of fish to ice, in Kilograms. Where storage is concerned, the cold temperature must be -18C with labelling and record keeping for fish storage and follow up.

Similarly, when it comes to processing, there are standards for calibration, such as refrigeration. To ensure compliance, the public health department conducts medical examinations for the fisheries and issues a medical certificate of fitness, once standards are deemed appropriate. The minimum sanitation requirements are best summarized in the following words: *“There are things for food handlers and for the premises, if it’s at the Beach there are things required for the premises, in the transportation of the fish and the storage of the fish. At the source the place may be very clean, there is need to have a weighing scale, refrigeration is a must to ensure cold chain is maintained. Under transportation, fish must be transported in a clean environment with clean containers...Handwashing skills is very key in issues of food safety. Point for display for sale the fish must be kept under clean and cold state. Even during preparation, it [fish] must be clean even at the household. Sanitation is key from the source, to the kitchen”* [Food Quality Control and Safety, Department of Health-Kisumu County].

The level of standards differs from one community to the other, for instance the interviews found that fishermen in Mombasa county are more compliant with use of cooling facilities unlike those in Kisumu county. There is also an aspect of poor funding by the government to afford fisherfolk in one particular county, refrigerators or coolers, hence the need to strengthen efforts on fish storage. It was noted however, that overall, Kenya meets the minimum requirements appropriate for international standards, having adopted the European Union (EU) standards of operation, and hence why the country is able to export to EU countries.

3.1.4 Health and Environmental Considerations

In general, the sanitation, hygiene and food safety policies and laws in Kenya recognise the health and environmental impact of poor sanitation and hygiene as well as poor quality and unsafe food. The environmental and sanitation hygiene policy identifies unsafe water and poor sanitation and hygiene as the second leading cause of morbidity and mortality in the country (Ministry of Health 2016). More than half of the population is at risk of diseases and death due to inadequate sanitation practices, unsafe drinking water and poor hygiene. The national food and nutrition security policy recognises that consumption of poor quality and unsafe food poses serious health risk such as cholera, diarrhoea and aflatoxicosis to consumers. The consequences of diseases associated with poor sanitation and hygiene is especially dire for fishing communities as diseases such as cholera increase fish spoilage and post-harvest losses in addition to the risk of death.

Promotion of good sanitation and hygiene to control food and water-borne diseases is an essential component of the strategy to eliminate communicable diseases in Kenya’s National Health Policy Framework. The health policy framework therefore mandates responsible departments and institutions in counties to license and control undertakings that sell food to the public including fish. In the fisheries sector, the fisheries directorate charged with ensuring that fish available in the

¹ *Bandas* are structures where fish is placed once it is brought from the lake

market is free of contamination and wholesome for consumption. To protect the health of consumers, the Kenya Bureau of Standards ensures that there is high quality fish in the market by assisting the Department of Fisheries in issuing health certificates, as a means of quality assurance. One of the stakeholders interviewed in Kenya summarised the health consideration in the sector as follows; “the Fisheries Act tells us that we have to prevent the problem coming from eating contaminated fish, so we have to prevent unsafe fish eating in the market, the unsafe fish it’s supposed to be retained it must NOT reach the market ,it has to be recalled and that’s why we have issues when we are packaging it has to be labelled and all the records have to be kept and that is why we should be able to trace where the fish comes from, so if we follow the chain well we will be able to follow it up to the landing site where the fish came from. Issues of the fish diseases management are addressed by the Act”. [Fisheries Directorate]. In addition, fishing communities are encouraged to undertake measures to ensure that fish that reach the market are safe for consumption. These have been summarised by one of the stakeholders interviewed as follows; “**Refrigeration:** if the fish is at the lake its safe, the only issue arises when the fish has been caught, contamination starts and when it talk about safety and hygiene people have been trained that when they catch the fish it’s supposed to be iced so thy are supposed to have containers with ice into the lake as they go fishing, when they reach the landing sites they are supposed to ensure that the fish is iced until it reaches the market. **Cleaning:** When it comes to cleaning, they have to clean the surfaces especially when it comes to ‘Bandas’ and tables, fish is not supposed to be thrown in the ground so the tables they are using should not contaminate the fish, the tables have to be stainless steel or galvanised and have to be cleaned. **Fish handling:** When it comes to handling fish, the landing sites is supposed to be fenced so that only the people handling the fish access the place, anybody who does not have anything to do with the fish is not supposed to enter those areas and the area is supposed to be protected from all animals”.

Beyond communicable diseases such as cholera and diarrheal which directly linked to poor sanitation and hygiene, the fisheries policy in Kenya also recognise that diseases such as HIV and Malaria are prevalent in fishing communities and also affect output in the sector. The fisheries policy explicitly recommends the mainstreaming of HIV and Malaria interventions into the sector. There is evidence that infection is high among fishing communities, and fishing communities also tend to be socially marginalised with limited access to health and other social services (Kwena ZA, Bukusi E, Omondi E, Ng’ayo M 2012). For instance, fishers often go fishing overnight or in early morning and return late in the evening when most public health facilities are closed (ZA n.d.). Therefore, most fishers are usually not available to access health services. There is therefore the need to ensure that the provision of health services is synchronized with fisherfolks availability.

With regards to the environment, Kenya’s various policies recognise the environmental impact fishing activities and poor sanitation and hygiene in the fisheries sector. The environmental and sanitation hygiene policy mandates the national and county governments to institute measures to safeguard groundwater, wetlands and water courses from contamination from poor environmental sanitation practices. These measures should include provision of sanitation facilities and adequate treatment of sewage in fishing communities and landing sites. In Kisumu, poor treatment of sewage is identified as a key contributory factor to the pollution in the lake which affect the safety and quality of fish (Odada et al. 2004). The Fisheries Act empowers the Department of Fisheries to measures that promote environmental conservation. To highlight the importance of environmental conservation in the fisheries, the National Environment Management Authority (NEMA) has been included into the Inter-Agency Monitoring, Control and Surveillance Unit established under the Fisheries Management and Development Act (Republic of Kenya 2016). An important aspect of integrated environmental management is the involvement of fishing communities in environmental planning as well as environmental impact assessment and audit.

In conclusion, it is evident that the various sanitation, hygiene and food safety policies and laws pay considerable attention to health and the environmental issues. However, these laws and policies have not been adequately implemented to promote health and the environment in the fisheries sector and fishing communities.

3.1.5 Financial Considerations

It is difficult to estimate the volumes of public and private investments in the industry as recent breakdowns of the national fleet and infrastructural base are not readily available. Overall, the WASH sector is funded by the national government, county governments, development partners and civil society organizations. Ideally, government agencies are expected to raise funds from the services they offer, but due to limited resources, this is supplemented by government transfers and disbursement from development partners. Notably, this is not sustainable, stressing the need to enhance self-financing mechanisms. It is the responsibility of the Fisheries Directorate to budget for sanitation and hygiene within their work plans, however there is low funding and sometimes more support is allocated towards capacity building. The current set up is such that funding is managed by the office of Agriculture, Livestock, Fisheries and Irrigation, without whose approval, institutional work plans cannot be implemented. The sector's financing deficit has grown over time, reaching Ksh 19 billion in 2016 up from Ksh 6 billion in 2012, reflecting 36 per cent deficit in 2016 up from 16 per cent in 2012 (KIPPRA 2018). For the marine fishing sub-sector, a major challenge has been the capability of the Fisheries Department to collaborate with the private sector to maximize on the opportunities that exist in fish production, processing, marketing and other operations (KIPPRA 2018).

Other forms of funding, as established from the key informant interviews, include the Lake Victoria Environmental Management Project (LVEMP) -funded by World Bank - which has supported in capacity building as well as infrastructure like landing sites and the *bandas*. The EU has also supported especially in the development of some landing sites, in Kisumu and facilitated export to EU countries. Africa Medical and Research Foundation (AMREF), United States Agency for International Development (USAID), FAO and programmes like Lake Victoria Fisheries Organisation (LVFO) and Smart Fish have been cited as sources of funding for sanitation and hygiene in the fisheries and food safety sector. There is also mention of funding coming from Ex-cheque—which are resources from taxes. The main challenge with funding in the WASH sector is that in most cases, the budget is not split for the specific areas of water, sanitation and hygiene, but rather lumped as one. This makes it difficult to assess individual allocations to each unit. The recommended strategies for the funding gap are suggested as more allocation of resources specific to sanitation and food safety, public participation, proposal development, capacity building for technical staff and the fish handlers, create more markets for exporting fish.

4.0 Water, sanitation and hygiene situation in Zambia

Zambia is one of the countries in the Great Africa Lakes Region, located within two large river basins; the Zambezi River and Congo River basins. Zambia has a rich endowment of water resources with the total water area including lakes, rivers and swamps estimated at 19% of the country's territorial area. In spite of having abundant water resources, access to safe water for individual and household use is limited. Data from the 2013/14 Demographic and Health Survey shows that only 65% of households have access to improved water sources. There is also a huge disparity in access to improved water sources with approximately 90% of urban households having access to improved water sources compared to just 47% among rural households (CSO, MOH, and ICF International 2014). With regards to access to sanitation facilities, Zambia has achieved remarkable progress following the failure to meet the Millennium Development Goal (MDG) 7c for water and sanitation. The proportion of households using an improved toilet facility increased from 64% in 2013 to 80% in 2016 (Yeboah-Antwi et al. 2017). This remarkable achievement has been attributed to the Zambia Sanitation and Hygiene Programme which is currently being implemented (Yeboah-Antwi et al. 2017).

The fisheries sector plays a significant role in Zambia's economy contributing to income generation, job creation and improved nutritional status of households. The fisheries sector's contribution to Zambia national Gross Domestic Product is estimated at 3.2% (Ng'onga, Kalaba, and Mwitwa 2019). Current production of fish in Zambia does not meet domestic demand, resulting in significant import of fish (Tran et al. 2019). A major factor limiting the fish production in Zambia is poor sanitation and hygiene which not only affects the quality and safety of fish but also compromises the health of fishers and reduces productivity. Fishing communities are especially vulnerable to water-borne diseases such as cholera due to inadequate access to safe water and sanitation facilities. For instance, between 2002 and 2007 a total of 1,155 cases of cholera were recorded in Nchelenge, a community with densely populated fishing camps on the shores of Lake Mweru (Gama et al. 2017).

4.1 Assessment of policies and frameworks for hygienic production of fish in Zambia

4.1.2 Institutional Arrangement and Policy and Legal Framework

Zambia has recently passed a Food Safety Act (Government of Zambia 2019), becoming one of the few countries in Africa to have such a law. The Act provides for "the protection of the public against health hazards and fraud in the manufacture, sale and use of food". Before the passage of the Food Safety Act, there were pieces of legislation and policies that sought to ensure safe and quality food to protect the health of consumers. These included the National Health Policy (2012), the National Health Strategic Plan (2017-2021), the Public Health Act CAP 295 and the Food and Drugs Act CAP 303. The National Health Policy mandates the government to develop food safety policies and strengthen the monitoring of food establishments at production, wholesale and retail levels (Ministry of Health 2011). The main gap in the Health Policy regarding food safety is the lack of specific direction, guidelines and timelines for developing food safety policies and strengthening the monitoring of food establishments.

Compared to the National Health Policy, the Health Strategic Plan has specific food safety targets. The Health Strategic Plan seeks to ensure high standards in the production, collection, preparation, processing, storage, sale and consumption of food (Ministry of Health 2017). To achieve this objective, the health strategic plan has a target of increasing the number of food establishments implementing hazard analysis and critical control from 0% to 30% between 2016 and 2021 (Ministry of Health 2017). The Public Health Act explicitly prohibits the sale of unwholesome food including fish and mandates the seizure of such unwholesome food by the appropriate authority (Republic of Zambia 1972). The Food and Drugs Act mandates the inspection of food intended for consumption and places where food is manufactured or prepared or kept.

The institutional mandate for the implementation of the various policies and laws on sanitation, hygiene and food safety in Malawi resides in different ministries and departments. Recognising that there was little progress in attaining the MDG target on water and sanitation, Zambia has created a new ministry for water development, sanitation and environmental protection (MWDSEP). The ministry is expected to streamline the coordination of mechanisms for the WASH sector in order to increase synergies and effectiveness in planning and financing in the sector. While MWDSEP is in charge of overall sanitation and hygiene issues, it is the Ministry of Health that is responsible for developing and implementing food safety standards. The Food Safety Act recently passed by parliament provides for the establishment of a Food Safety Coordinating Committee under the Ministry of Health which will be responsible for implementing the provisions of the Act. The Committee is expected to be composed of representatives from other ministries including agriculture, local government and water and sanitation. The committee is expected to foster collaboration and coordination between the various ministries critical food safety and address the current bottlenecks of duplication of roles and responsibilities. What is conspicuously missing in the proposed committee is a representative from the fisheries sub-sector.

In conclusion, even though Zambia passed the Food Safety Act in order to harmonise the efforts of stakeholders in different sectors to protect the public against the hazards and fraud in the manufacture, sale and use of food. The current institutional framework for sanitation, hygiene and food safety is still disjointed and uncoordinated with different line ministries and departments focusing on specific aspects. Implementation of the Food Safety Act is expected to address this challenge by coordinating the responsibilities of various agencies and ministries.

4.1.2 Population Targeting

In general, the existing policies and laws on sanitation, hygiene and food safety in Zambia target all aspects of society. The Public Health Act, for instance, targets sanitation in dwellings, food premises, storage facilities, water-courses. With regard to food safety in fisheries sector, the Fisheries Act focuses on regulating the methods of curing, preserving, or storing fish in commercial areas (Republic of Zambia 1994). The mandate officials of the Department of Fisheries to inspect fishing boats and sites to ensure best practices are adhered. The Act, however, does not have specific provisions on open defecation and sanitation in fishing communities. Even though the National Health Policy prioritises the provision of adequate and safe water and appropriate sanitary facilities in rural and urban areas as part of the overall strategy to reduce the burden of diseases and mortality, the policy does not recognise the unique sanitation needs of fishing communities. There is therefore no prioritisation of fishing communities in this policy.

The Food Safety Act is comprehensive in addressing all aspects food safety including production, manufacture, handling, preparation and storage of food in a manner that prevents food related diseases. While the Act targets all food sub-sectors including fisheries, it does not have a strong focus on fisheries. For instance, the Department of Fish Inspectors are not explicitly mentioned in the Act as part of the “authorized officers” mandate to inspect food and food premises. This implicit omission of the Fisheries Department could starve the department of the necessary funding required to enforce the Act in the fisheries sector.

In sum, in spite of the fact that the various policies and laws on sanitation, hygiene and food safety in Zambia target all sectors of society and various food sub-sectors, the unique sanitation needs of fishing communities and food safety concerns in the fisheries sector are not highlighted. There is an opportunity for stakeholders in the fisheries sector to advocate for the prioritisation of fisheries food safety in the enforcement of the Food Safety Act.

4.1.3 Level of Services Delivered

As mentioned in previous sections, Zambia has recently passed a food safety law. The Food Safety Act makes provision for a number of critical services to be delivered in order to ensure food safety. These include laboratory services, inspection and certification. The Act specifically makes provision for the establishment of a National Food Laboratory to be responsible for examining, analysing and conducting research to determine the quality and safety of food products including fish. The Food Safety Act also requires health clearance for food premises after inspection and a certificate of compliance which has food safety and quality standards and guidelines.

In addition to the Safety Act, other policies and regulations define the standards and services that expected to be delivered to the public including fishing communities. The National Sanitation Policy defines minimum level of sanitation services as provision of the disposal facilities whether on-site or off-site of human excreta, the collection of wastewaters from residential, commercial or industrial sources and the treatment and disposal of waste water to reduce environmental degradation. The policy aims to ensure proper management of sanitation facilities so as to reduce the incidence of water-borne diseases which touches on the needs of fishing communities. The policy also emphasises on the promotion of good hygiene practices like hand washing with soap and provision of waste treatment infrastructure, school sanitation facilities and household toilets. These measures help to reduce food contamination during handling and processing of fish in the fishing communities. Even though the policy emphasises on capacity building; minimal efforts have been registered in the development of the capacity of fishing communities.

In the fisheries sector, the Fisheries Act mandates the registration of fishermen and boats used for commercial fishing as well as the inspection of fish and boats for poisonous and harmful substances that constitute a threat to the health of consumers.

In conclusion, even though the policy and legal framework for sanitation, hygiene and food safety define the services and standards required to promote food safety, much of these services are not being delivered in fishing communities and the fisheries sector as expected. The fact that some of the services such registration of boats and certification of premises require the payment of fees means that small scale fishermen and food premises are unlikely to be registered or comply with the appropriate standards for food safety.

4.1.4 Health and Environmental Considerations

Health and the environment are essential components of policies and laws aimed at promoting sanitation, hygiene and food safety in Zambia. The main health risks associated with poor sanitation, hygiene and unsafe food in the policies are cholera, diarrhoea, malaria, and water-borne diseases such as schistosomiasis. The National Health policy acknowledges that Zambia is prone to cholera, dysentery and other diarrheal diseases which are mainly caused by water, sanitation and hygiene practices. Consistent with this acknowledgement, the policy measures for addressing these diseases are focused on prevention, treatment, care and support. As part of prevention, the health policy recommends the provision of adequate and safe water and appropriate sanitary to rural and urban areas including fishing communities. The Food Safety Act also recognises the health consequences of consuming contaminated and unsafe food. In general, while health issues associated with sanitation, hygiene and food safety are prioritised in policy and legal framework, there is limited delivery of these services in fishing communities which remain marginalised.

Similarly, environmental concerns feature prominently in the sanitation, hygiene and food safety policy and legal framework of Zambia. The Fisheries Act prohibits fishing methods that are destructive to the environment and fish stock. One of the objectives of the draft national fisheries policy (2010-2020) is to protect fisheries biodiversity and the environment that supports fisheries. The food safety bill mandates holders of applicants for food safety certificates to provide an

environmental assessment report and adhere to the environmental management plan approved under the Environmental Management Act of 2011. It is evident from the various policies and laws cited above that environmental issues are prioritised in sanitation, hygiene and food safety policies. However, the challenge that remains is the implementation of these policies for sound environmental management.

4.1.5 Financial Considerations

The major challenge confronting the implementation of policies in sanitation, hygiene and food safety especially in the fisheries sector is inadequate funding. Historically, the WASH sector is one of the least funded by the government of Zambia. For instance, the 2016 budget for the sector saw a 48% reduction in allocation compared to the 2015 budget. In addition, consistently releases less than the budget 50% of the financial resources required by agencies in the WASH sector. Even within the sector, most of the financial resources are allocated for water development with sanitation and hygiene very little resources. Overall it is estimated that the WASH sector in Zambia requires US\$ 6 billion by 2030.

Recognising the funding challenges in both the WASH and fisheries sector, some of the policies developed recently or are being developed prioritise the mobilisation of resources from various stakeholders and partners to implement interventions. For instance, the national sanitation strategy has an elaborate mechanism for funding and resources mobilisation. These include individual and community contribution to cover the cost of latrine construction and emptying and seeking donor support. To ensure financial sustainability, the national water policy seeks to achieve full cost recovery through user fees. The policy also commits the government of Zambia to increase the budget and allocation of financial resources to the sector. In the fisheries sub-sector, the Fisheries Act prescribes fees for some of the services delivered including registration of boats. The Act also provides for the establishment of a Fisheries and Aquaculture Development Fund in order to provide funding for fisheries activities (Republic of Zambia 2011). The food safety bill also imposes a number of fees for services such as inspection and laboratory services.

While these fees are essential for implementation of WASH and food safety interventions, they could also further marginalize fishing communities from accessing the required sanitary and food safety services. What is required is for government and development partners to prioritise fishing communities with appropriate subsidized sanitary and food safety services to ensure access to adequate services. The government needs to honour its commitment in the various policies to increase budgetary allocation to both the WASH and fisheries sectors.

5.0 Water, sanitation and hygiene situation in Tanzania

Tanzania is one of the most populous countries in the great African lakes region, with an estimated population of 57 million people in 2017(Thomas 2013). The country is endowed with fisheries resources from marine, freshwater, riverine and wetlands species. The fisheries sector contributes significantly to the economy providing about 183,800 direct jobs in 2014(MALF 2016). Overall, the fisheries sector employs more than 4 million Tanzanians(MALF 2016). Despite its significant role in job creation, the fisheries sector has not reached its full potential in terms of meeting local demand and export to the international market. One of the major barriers to accessing the international market especially among small-scale fishers and fish traders in Tanzania is the inadequate compliance with international sanitary and phytosanitary standards. The lack of adequate sanitary facilities in fishing communities coupled with poor fish processing and preservation techniques increase the concentration of fish spoilage bacteria and harmful chemicals that compromise the safety and quality of fish products.

In general, access to improved sanitation and hygiene is a challenge to many Tanzanians. Estimates from the 2017 multiple indicator survey shows that only 60% of the population have access to an improved water source. With regards to sanitation, only 24% of the population live in households with improved non-shared toilet facilities. There is huge disparity between rural and urban areas in terms of access to improved toilet facilities with approximately 36% of urban households having access to an improved non-shared toilet facility compared to just 17% of rural households. Households in fishing communities are particularly marginalized when it comes to access to toilet facilities. One study by Berling et al., (2013) in three fishing communities along Lake Victoria found that less than 5% of households had permanent pit latrines.

The lack of adequate sanitation in Tanzania in general and fishing communities in particular has resulted in widespread water and food-borne diseases. The 2015-16 Tanzania Demographic and Health Survey reported that 12% of children under five years had diarrhea in the preceding two weeks. Diarrheal diseases are estimated to account for 7% of deaths in children under-five years of age in Tanzania. Apart from diarrheal diseases, poor sanitary conditions in fisheries increases the risk of aflatoxins which cause stunting among children(37). Tanzania recognises the health risk posed by inadequate access to WASH services, and has therefore introduced a number of policies and interventions to the current challenges. Tanzania has ambitious WASH targets which include achieving 100% coverage of minimum basic drinking water services, 100% access to basic sanitation and 75% of the population practicing basic hygiene by 2030. Achieving these targets will be crucial for food safety and overall health of the population.

5.1 Assessment of policies and frameworks for hygienic production of fish in Tanzania

5.1.1 Institutional Arrangement and Policy and Legal Framework

Tanzania has a number of policies and laws aimed at promoting access to safe water, adequate sanitation and hygiene services and food safety. Tanzania's overall Development Vision 2025 seeks among other things to increase access to improved sanitation to 95% by 2025. The Water Supply and Sanitation Act (2009) seeks to promote and ensure that every Tanzanian has access to efficient, effective and sustainable water supply and sanitation services(The United Republic of Tanzania 2009). The National Health Policy (2017) also prioritises the promotion of water safety, sanitation, hygiene and food safety. The Food (Control of Quality) Act of 1978 and its subsequent amendments aim to ensure the safety and quality of all food products produced or consumed in Tanzania. The Act is essential in addressing all elements of safety management including sanitation and hygiene as well as coordinating the activities of the stakeholders in a proper manner. However, it needs to be updated in order to be able to deal with the contemporary issues in food safety and to comply with the codex standards. In the fisheries sector, the National Fisheries Policy (2015) recognises that poor

hygienic handling of fish affects the utilization and marketing of fish products. The government through the fisheries policy has therefore committed to promoting the use of improved and appropriate technologies in fish handling, preservation and processing.

Notwithstanding the foregoing policies and laws on water safety, sanitation, hygiene and food safety, Tanzania has no overarching food safety policy. The absence of such a policy means that the regulation of the entire food system is not well coordinated as the roles and functions of various institutions in the food safety environment are sometimes duplicated or conflicting. For instance, the Food and Drugs Authority is the main institution responsible for registering and licensing food premises and food businesses. The Authority is required to ensure that food premises have adequate and easily accessible sanitary conveniences to cater for employees and customers. The Authority is further mandated to ensure that storage facilities in food premises and businesses protect food products from deterioration. In the Fisheries Act (2003), however, the responsibility of prescribing specifications for fish storage facilities including cold rooms and ice plants as well as issuance of certification before fish is placed in the market is vested in the Ministry of Livestock and Fisheries. It is not clear how the functions of the Food and Drugs Authority and the Ministry of Livestock and Fisheries are coordinated to prevent conflict.

There is also duplication and conflict in the roles and functions of various institutions responsible for promoting water safety, sanitation and hygiene. The Water Supply and Sanitation Act (2009) mandates water and sanitation authorities to protect and maintain water sources. This could include lakes and rivers that are also used for fishing purpose. The National Fisheries Policy (2015) also obligates the ministry responsible for natural resources and tourism to perform a similar function of ensuring the conservation of wetlands and water catchment areas. This duplication of roles and functions among various line ministries results in inefficient use of resources to ensure the water conservation and prevention of pollution in water courses.

In conclusion, while Tanzania has policies and laws on water safety, sanitation, hygiene and food safety, the country is yet to develop a comprehensive food safety policy. The absence of such a policy is a major limitation for effective management of the food system to protect consumers. In addition, the current institutional arrangement for enforcing food safety standards and guidelines is fragmented, with institutions duplicating roles and functions and no clear coordination among various stakeholders.

5.1.2 Population Targeting

The policy and legal framework for enforcing the sanitation, hygiene and food safety regulations and standards in Tanzania target all segments of the society and the whole food supply and distribution chain. The Food, Drugs and Cosmetics Act (2003) target all components of the food supply and distribution chain including manufacturing facilities, storage facilities, food outlets, equipment and utensils and persons handling food. The Food and Drugs Authority has standards and guidelines for regulating each of these of component the food supply/distribution chain. This is to ensure that safety is not compromised at any stage of food of food manufacturing, processing, distribution, handling and consumption. The Food, Drugs and Cosmetics Act also target all food premises regardless of size or location. Thus, restaurants, canteens and kiosk, wholesale shops and retails are all targeted for inspection and food safety registration and licensing. The fisheries policy targets fisher-folks, aqua farmers and other stakeholders including vendors with extension services and other activities for processing, storing and marketing fish products to ensure that quality and safety is not compromised.

With regards to water safety, sanitation and hygiene, the policies also target the provision of services to all communities including fishing communities and the conservation of water bodies. While fishing communities are not explicitly mentioned in the Water Supply and Sanitation Act (2009), the Act requires local government authorities in fishing communities to make bye-laws in relation to the provision of water and sanitation services. The water policy is also sensitive to gender issues and the needs of women and girls in provision of water. Despite the policies targeting rural

areas and other marginalized settings, the expenditure framework in Tanzania shows that water and sanitation resources are disproportionately allocated to urban areas. This means that rural and fishing communities are usually neglected in the provision of adequate sanitation and hygiene services.

In conclusion, even though the policies and laws on sanitation, hygiene and food safety in Tanzania adequately target the entire food systems and all communities including fishing communities, the implementation of these policies is not adequate for all communities and food sectors.

5.1.3 Level of Services Delivered

Even though Tanzania is yet to develop an overarching food safety policy, the existing policies and laws that seek to promote food safety define the level of services required to ensure that food produced or imported into Tanzania is safe for consumption. With regard to sanitation and hygiene in food premises, the guidelines for registering and licensing food premises by the Food and Drugs Authority requires that food premises provide adequate and easily accessible sanitary facilities to cater separately for male and female employees and customers. In addition, food premises are required to have proper systems of waste disposal. The Food and Drugs Authority is required to provide inspection services to all food premises and manufacturers to ensure that the appropriate standards and guidelines are adhered to. The Fisheries Policy requires local government authorities to execute fisheries extension services and issue license to fishing vessels as part of measures to promote safety and quality in fish products. The Tanzania Bureau of Standards is also required to set standards and codes of hygiene for various products including food and agriculture products. The Bureau also provides laboratory services for testing food and agricultural commodities to ensure safety and quality.

With regards to water, sanitation and hygiene, the policies and guidelines define the level of services to be provided by the appropriate authorities, communities and households. Improved sanitation includes availability of various types of toilet facilities; pit latrine with a slab, ventilated pit latrine, pour flush, flush toilet with a cistern and composting toilet/ecosan latrine. Improved water sources include piped sources, tube wells, boreholes, protected dug well and carts with tanks. Hygiene services include availability of hand-washing facilities, soap and running water. While these services have been defined and are expected to be made available in all communities, public spaces and food premises including in landing sites. In practice, very few of these services are available. For instance, it is reported in the health policy that only 44% of health facilities have a functioning toilet while 96% of schools lack improved sanitary facilities.

In conclusion, even though the policy framework defines the level services that need to be delivered to guarantee food safety and adequate sanitation and hygiene, in practice few of these services are being delivered.

5.1.4 Health and Environmental Considerations

Health and the environment factors are major components of the sanitation, hygiene and food safety policy framework in Tanzania. National Environmental Health Policy (1997) identifies improper waste disposal as a threat to the health of Tanzanians including residents of fishing communities. The National Water Policy (2002) recognizes that lack of safe water; poor hygiene and sanitation are major causes of illness and death. The overall aim of the Food, Drugs and Cosmetics Regulations (2006) is to protect consumers from ill health and diseases associated with contaminated food products or premises. The Public Health Act (2009) prioritises the control of epidemics associated with poor sanitation, hygiene and food safety such as cholera, dysentery and typhoid. It is reported in the National Health Policy (2017) that more than 60% of outpatient diagnosis is associated with poor sanitation and hygiene practices as well as unsafe food.

To address the health consequence of poor sanitation and hygiene practices and unsafe food, the essential health care package emphasizes the prevention of diarrheal diseases through adequate sanitation management and the extension of treatment to all levels of healthcare. However, fishing communities are known to have limited access to health services and health facilities despite having some of the highest incidence of diarrhea. In addition to diarrheal diseases, the fisheries policy acknowledges that fisher-folk and fishing communities are disproportionately affected by HIV/AIDS due to the nature of fisheries activities which involves movement domestically and across trade borders. Provision of sanitation, hygiene and food safety services and facilities will help to prevent diarrheal diseases and reduce the health consequences of such diseases. Provision of health services and facilities in fishing communities is also critical for the treatment and management of epidemics arising from poor sanitation and hygiene as well as HIV/AIDS.

Beyond health considerations, environmental factors are also considered and prioritised in the sanitation, hygiene and food and water safety policies of Tanzania. In fact, one of the main reasons for revising the water policy of 1991 was the lack of attention to environmental protection. The water policy of 2002 therefore requires the development of regulatory instruments aimed at controlling the discharge of waste products into water sources. Such regulatory instruments are expected to provide guidance in terms of the quantity, quality, timing and location of discharges. The Public Health Act (2009) also requires the ministry responsible for environmental management and local government authorities to make regulations that prohibit establishments and factories that are likely to pollute streams and water courses from unsuitable locations. Environmental conservation and sustainability are central tenants of the fisheries policy. The policy recognises the environment as a cross-cutting issue that need to be mainstreamed into the fisheries sector. In general, while the sanitation, hygiene and food safety policy and regulatory framework recognise the health and environmental consequences of poor sanitation, hygiene and unsafe food, coordination among institutions and stakeholders in health, environment, sanitation and food safety is weak. This has resulted in ineffective implementation of policies across these closely related sectors.

5.1.5 Financial Considerations

Tanzania is one of the countries which signed the 2008 eThekweni declaration, committing the government to spend at least 0.5% of GDP in the water sector. Despite this commitment, approved funding for the water sector in the 2017/2018 financial year reduced by 27% from the previous year. Spending in the water sector in the 2016/2017 financial year was just 0.3% of GDP, well below the eThekweni commitment of 0.5% of GDP. Spending in the WASH sector is especially inadequate when compared with the investment requirements of the sector. The National Water Sector Development Programme alone was estimated to require 3.3 billion between 2016 and 2021. The current funding gap in the WASH sector is estimated at USD 882 million.

Despite the huge funding gap and investment requirement in the sector, most of the policies reviewed did not have an elaborate funding mechanism or resource mobilisation strategy to close this gap. For instance, the fisheries policy (2015) does not include costings for the implementation of the policy and the provision of fisheries safety services and facilities as stipulated in the policy. Similarly, the health policy which has a component on water safety, sanitation, hygiene and food safety does not also have a costed plan for implementation. Overall, the absence of an overarching food safety policy in Tanzania makes it difficult to estimate the financial resources required to provide adequate food safety services and facilities. The lack of costed implementation plans and resource mobilisation strategies in the various policies means that the WASH and food safety sector will continue to be deprived of the necessary budgetary allocations and financial resources needed. The main financial consideration in the existing policies and regulations relates to fees and levies for utilizing WASH and food safety services. The Water Supply and Sanitation Act requires consumers to

pay fees and levies for using water and sanitation services provided by water and sanitation authorities. The Public Health Act requires owners or occupier's food premises to pay fees for food safety inspection services. The payment such services could discourage poor and disadvantage individuals and communities from seeking or availing themselves for such services. The lack of subsidies targeted at fisher-folk and fishing communities means that they are less likely to access these services and more likely to continue to use water courses for defecation and dumping of refuse.

In conclusion, the lack of costed plans and resource mobilisation strategies in most of the WASH and food safety policies in Tanzania is a major gap that will affect the effective implementation of these policies. Also, the payment of user fees and levies for WASH and food safety services including inspection could discourage small food premises in poor communities from accessing such services.

6.0 Water, sanitation and hygiene situation in Uganda

Uganda has four of East Africa's Great Lakes—Lake Victoria, Lake Kyoga, Lake Albert and Lake Edward within the country or on its borders. These Lakes serve as important sources of fish and marine products with lakes Victoria, Kyoga and Albert contributing to about 95% of the total fish catch per annum. The fisheries sector is a critical component of Uganda's economy providing employment and foreign exchange revenue. Fish exports increased from about US\$ 1 million in 1990 to US\$ 126 million in 2013 (FAO, 2017). It is estimated that nearly 1.2 million Ugandans depend on fisheries related activities for survival. Between 2005 and 2011, Uganda experienced a dramatic fall in fish catch from Lake Victoria, falling from 238,533 tons in 2005 to 183,824 in 2011 (Uganda National Fisheries Resources Research Institute, 2012). Water pollution and the lack of adequate sanitary facilities in fishing communities along water bodies couple with poor fish safety practices contribute to declining fish stock and compromise the quality of fish.

Uganda has made progress in increasing access to WASH services, with the percentage of households using improved water sources increasing from 49% in 1995 to 78% in 2016 (Uganda Demographic and Health Surveys, 1995 & 2016). Similarly, the percentage of households with improved non-shared toilet facilities increased from approximately 2% in 1995 to 19% in 2016. Despite the progress, Uganda was one of the countries that failed to meet the MDG targets for water and sanitation. There are significant disparities between rural and urban areas and between rich and poor households in access to WASH services. For instance, 27% of households in urban areas have improved non-shared toilet facilities compared to just 16% of households in rural areas. Fishing communities are particularly marginalized in terms of access to WASH services, with many lacking functional toilet facilities. The lack of toilet facilities in fishing communities coupled with unhygienic fish handling practices compromise the quality and safety of fish in Uganda. Between 1996 and 2000, the European Union imposed three export bans on fish from Uganda due to safety and quality concerns.

The government of Uganda recognises the challenges in the WASH and fisheries sectors and has taken steps to address these challenges including developing policies and integrating WASH targets into key policies.

6.1 Assessment of policies and frameworks for hygienic production of fish in Uganda

6.1.1 Policy and Legal Framework and Institutional Responsibility

Recognised the challenges in the WASH and food safety sectors and consequences of inadequate sanitation and hygiene and poor food safety, the government of Uganda has over the years developed a comprehensive policy and legal framework to regulate the sector and promote sanitation, hygiene and food safety. The main policies in the sector include the Public Health Act (2000), National Sanitation Policy (1997), the National Sanitation Guidelines, the Food and Nutrition Policy (2003), the Food and Drugs Regulations (2005) and the National Fisheries and Aquaculture Policy (2017). The national sanitation policy (1997) seeks among other things to promote the safe disposal of human excreta, proper management of solid and liquid waste and safe maintenance of water bodies. The Food and Nutrition Policy (2003) prioritises the provision of adequate sanitation in the entire food chain to ensure food safety. The Food and Drugs Act makes it an offence to sell unsafe food to consumers. In the fisheries sector, a key objective of the fisheries and aquaculture policy (2017) is to promote the quality and safety of fish and fisheries products. The major gap in the policy landscape of Uganda is the lack of a comprehensive food safety policy that will harmonise the efforts of the different sectors and actors in the food system. In addition, some of the policies and regulations in Uganda such as the sanitation policy (1997) and the Fish Act (1964) are out-dated and do not address contemporary sanitation and fish safety issues.

The institutional framework for the implementation of the various sanitation, hygiene and food safety policies, laws and regulations is characterised by a multiplicity of institutions that lack coordination. The Rural Water Supply and Sanitation Department, Local Government Authorities, the Department of Fisheries Resources and the National Bureau of Standards all have key responsibilities in the implementation of sanitation, hygiene and food safety policies and regulation. However, there is no collaboration and coordination among these institutions. The lack of coordination sometimes results in duplication of functions and consequently inefficient use of resources. While the national fisheries and aquaculture policy proposes the development of a mechanism for coordinating the activities of the Ministry with other ministries, departments, agencies and non-state actors, the level of coordination in actual enforcement of laws and regulations is not defined in the policy. The food and nutrition policy propose the establishment of a multi-sectoral body (Uganda Food and Nutrition Council) composing of relevant ministries, agencies and non-state actors to ensure coordination in the implementation of the policy at the national level. Multi-sectoral committees are also expected to be formed at the local level to enforce regulations and bye-laws. It is not clear whether these multi-sectoral committees have been set up and how effective they are in facilitating coordination in implementation.

Overall, Uganda has several policies, regulations and laws aimed at promoting sanitation, hygiene and food safety. However, the main gap is the lack of a comprehensive food safety policy. The policy and legal framework in the sanitation and food safety sector also seemed fairly out dated. Regarding the institutional arrangement for policy implementation, there is weak coordination among institutions, resulting in duplication of functions and inefficient utilization of resources.

6.1.2 Population targeting

Water, sanitation, hygiene and food safety policies and regulations in Uganda target the whole population, all levels of the food chain and all manner of food products. The Food and Nutrition policy targets both human and animal consumers to ensure that food consumed by humans and animals is safe and nutrition. Even though the policy targets the entire population of Uganda, the nutrition and food safety needs of children under five year, adolescents, women of reproductive age and persons living with HIV/AIDS are prioritised. In terms of the food chain, the policy targets production, handling, distribution and consumption in order to ensure safety and high-quality standards at each of these levels. Food standards and quality control target chemicals and drugs used in agriculture and fisheries and food additives used in food processing. Food standards and quality control measures also target street food vending and the transportation of food. In the fisheries sector, safety and quality standards are targeted at fish exported to the European and other developed world markets. Thus, fish safety and quality in the local market is poor exposing local consumers to health risks.

Similarly, policies and regulations in the water and sanitation sub-sector target all Ugandans. However, the policies recognise the need to promote equity in the provision of water and sanitation services. The National Sanitation Policy, for instance, commits to providing special support to low income households and communities where the cost of providing basic water and sanitation services is exceptionally high such as areas with collapsing soil or high water table. While fishing not explicitly mentioned, this equity principle in the policy can be invoked to provide services to fishing communities. The sanitation policy also targets women and children as special populations that need to be prioritised in the provision of water and sanitation services.

In conclusion, sanitation, hygiene and food safety policies and regulations in Uganda adequately target all population groups, with special attention to vulnerable groups and communities such as fishing communities, women, children and persons living with HIV/AIDS. The challenge, however, is

that these special groups are usually not prioritised in the actual implementation of these policies and regulations.

6.1.3 Level of Services Delivered

Despite the lack of a comprehensive policy on food safety, the existing pieces of policies and regulations define a number of services that need to be delivered to ensure safety and high-quality food products. Inspection is one of the major services included in all the policies, and is expected to be delivered in various setting including in households, food premises, and production sites to promote safety. A key strategy outlined in the fisheries and aquaculture policy for promoting safety and high-quality fish in Uganda is to strengthen systems of inspection and quality control. Following the ban of fisheries export to the EU and similar markets in the 1990s and 2000s, the government and stakeholders increased investment in fisheries inspection including provision of inspection manuals. Despite these investments, there is evidence that the level of services delivered by fisheries inspectors is not satisfactory, with some inspectors not adhering to instructions on hygienic fishing handling. The Food and Drugs Act also provides for the inspection of animals intended for slaughter and examination of meat products. However, such inspection services are often carried out in slaughter houses and not at the household level or in remote communities.

Another important service prescribed in the policies and regulations for promoting food safety is laboratory services. The fisheries and aquaculture policy seek to support the establishment and accreditation of fisheries laboratories for chemical inspection and analysis as a measure of ensuring safety and quality. There is evidence that the government together with donors have invested in a number of chemical inspection laboratories. However, the level of utilization of these laboratories especially among small scale fishers who sell to the local market is low. The Food and Drugs Act also makes provision for testing and analysis of food products by a public analyst to ensure they meet the right standards and quality. Testing services are provided at a fee, discouraging small-scale manufacturer and vendors from accessing such services.

In the water and sanitation sub-sector, the policies and regulations also define the minimum services and facilities required. The basic sanitation policy guidelines define safe and quality water as that containing less than 50 faecal coliforms per 100 mls of sample. Regarding hygiene, the sanitation policy mandates the provision of hand washing facilities near all latrines and at all food preparation areas. In terms of sanitation, the policy defines the types of approved toilet facilities in rural, urban and other hard to reach areas. In fishing communities specifically, the toilet facilities recommended include compost pit latrine and an aqua privy with disposal lagoons/cesspools. The sanitation regulations define adequate distance from homes to toilet facilities as 20 meters. Despite the detailed description of WASH standards and services required, actual delivery of these services is low especially in rural areas and fishing communities.

6.1.4 Health and Environmental Considerations

Health and the environment factors are adequately prioritised in the sanitation, hygiene and food safety policies of Uganda. The sanitation policy recognises that improvements in sanitary conditions will reduce the incidence of diseases such as cholera, diarrhoea and other sanitation related diseases as well deaths associated with such diseases. The overall goal of the sanitation policy is to preserve the health of individuals and communities through sanitation. To emphasise the links between sanitation and health, the ministry of health is the main line ministry responsible for coordinating the implementation of the policy. The Food and Nutrition Policy (2003) seeks to control major epidemic and endemic diseases such HIV/AIDS, intestinal worms and diarrhoeal diseases through promoting the consumption of nutritious and safe food as well as increasing coverage of water and sanitation services. In the National Health Policy (2000), the government commits to reducing the

burden of diseases particularly in rural and hard to reach areas such as fishing communities through promotion of personal, household, institutional, community and food hygiene.

In addition to health factors, the sanitation, hygiene and food safety policies of Uganda also prioritise environmental factors. The Food and Nutrition Policy identifies water and soil conservation and the prevention of environmental degradation as an essential strategy for increasing access to safe and nutritious food. The policy therefore calls for the enforcement of environmental regulations that apply to the food chain. Environmental conservation is also a critical component of the sanitation policy. The policy requires sanitation improvement programmes to be environmentally sustainable, mandating environmental impact assessment before large-scale sanitation projects are implemented. The policy recommends environmental education to be included as an integral part of sanitation projects.

Overall, the policies in Uganda pay significant attention to health and environmental factors that affect and are affected by sanitation, hygiene and food safety. The policies recognise that improvements in sanitation, hygiene and food safety will induce changes in the health and environment sectors and vice-versa. However, actual integration of these factors in sanitation, hygiene and policy implementation is limited. Institutions and stakeholders in these sectors continue to operate in silos, without multi-sectoral coordination in implementation.

6.1.5 Financial Considerations

Financial resources are critical for the effective implementation of sanitation, hygiene and food safety programmes and regulations. However, the WASH sector in Uganda is severely underfunded, with a budget that is consistently less than 1% of GDP. In the 2019/2020 national budget, the share of the water and environment sub-sector accounted for just 3%. This was actually a decline from 5% in the previous budget. Total allocation to the sector is projected to decline from UGX 1,266 billion in FY 2018/2019 to UGX 765 billion in 2019/2020. Given the consistent under-funding of the sector, the financing gap is estimated at US\$ 80 million for water supply and US\$ 26 million for sanitation and hygiene per year.

Recognising the funding gap, stakeholders in the water and environment sector have developed a strategic sector investment plan (SSIP) to guide investment in the sector up to 2030. The SSIP shows that amount of funding required to meet the SDG targets for the water and environment sector in Uganda. It is important to note that there is no government ownership of the SSIP. Yet, the lack of an investment or costed implementation plan is a major in the WASH and food safety policies of Uganda. In fact, none of the policies reviewed an investment/costed implementation plan. The main financial consideration in the policies reviewed is resource mobilisation. For example, the fisheries and aquaculture policy seek to mobilise internal resources to finance its implementation including enforcing safety standards through fish levies, registration and licensing fees, inspection fees, testing fees and fines. In the nutrition policy, the main sources of funding are government consolidated funds, grants and donations from the government and external sources. Besides listing the sources of funding, the policies do not have an elaborate plan on how much will be raised per year, from which specific sources and for what activities. Without an elaborate investment/costed implementation, the funding gap in the sector will continue to increase.

The other financial consideration in the policies relate to subsidies and financial support to vulnerable individuals, institutions and communities. Subsidies are especially emphasized in the sanitation policy. The policy requires government to provide subsidies to water and sanitation projects run by organized communities. Subsidies are also expected to be provided to individuals and communities unable to afford basic sanitation services. While financial considerations for the sanitation needs of vulnerable populations is laudable, there is no evidence that these policy requirements have been fully implemented.

In conclusion, even though the policies in Uganda have resources mobilisation strategies, the lack of an elaborate investment/costed implementation plan represents a major weakness that will affect sustainable funding of programmes.

7.0 Summary of findings from all the five countries

The assessment of the sanitation, hygiene and food safety policies in the five countries of the Great Lakes region of Africa particularly as they relate to food safety and hygiene in fisheries revealed major similarities between the countries and a few differences (see table 2 below). The most obvious similarity among the five countries is the absence of an overarching food safety policy or law, except in Zambia where the Food Safety Act has recently been passed. The general lack of an overarching food safety policy or law has resulted in the duplication of roles among various government institutions and poor coordination in the implementation of sanitation, hygiene and food safety programmes. In addition, some of the policies and laws especially with regards to food safety in a number of the countries are out dated and do not conform to recent policy reforms at the African Union (African Union Commission 2014). For example, the Fisheries Conservation and Management Act (1997) of Malawi; the Fisheries Act (1994) of Zambia; and the Fisheries Act (2003) of Tanzania are all out of date and do not include some of the Sanitary and Phytosanitary highlighted in the recent AU reform strategy and EAC guidelines.

Furthermore, the results of this assessment showed that while all the countries have policies and laws on sanitation and hygiene that also include goals on food safety, these laws and policies have not been adequately implemented due to several factors. One of the major barriers to implementation is the absence of an elaborate implementation plan and criteria for monitoring and evaluating sanitation, hygiene and food safety standards implemented by the multitude of institutions overseeing different aspects of the sector. Specifically, the review did not come across any monitoring and evaluation guidelines for inspecting fish premises and public places where fish is sold. Another major barrier to implementation is the lack of adequate funding for the WASH sector especially as it relates to fisheries. Most of the policies assessed in the five countries did not include a costed implementation plan or a strategy for mobilising resources to implement the various strategies and programmes articulated in those policies. Even though all the five countries share some of the major water and fisheries resources, there is little evidence of cross-country resource mobilisation and collaboration for implementation of sanitation, hygiene and fisheries food safety programmes.

Despite the foregoing barriers, there are emerging opportunities at the regional level and in some of the five countries for policy reform and prioritisation of sanitation, hygiene and food safety particularly in the fisheries sector. A major opportunity at the regional level is the AU reform strategy for food safety in fisheries which among other things seeks to establish regional reference laboratories, and also calls for appropriate investment in technology, infrastructure and capacity development programmes to enhance fish safety and quality for local and international markets. All the five countries in this review can advantage of these regional reforms to reform their own policies and strengthen existing programmes and institutions of food safety in the fisheries sector. At the country level, important policy changes have occurred in Malawi and Zambia that can spur progress in those countries and also learning in the other three countries. In the case of Malawi, the introduction of a budget line for environmental sanitation is significant step that can bridge the funding gap in the country. In Zambia, the passage of the Food Safety Act is a major milestone and an opportunity to improve on overall food safety standards including in fisheries. The other four countries which are yet to formulate a comprehensive food safety policy or law can learn from the experience of Zambia.

Table 2 Summary of policy Assessment in five countries of the Great Lakes Region—Malawi, Kenya, Zambia, Tanzania and Uganda

Country	Assessment Criteria	Sample Review Question(s)	Response
Malawi	Legal Framework and Institutional Responsibility	<ol style="list-style-type: none"> 1. Are the policies supported by an existing legal framework? 2. Are the policies compatible with other national and international policies and regulations? 3. Are roles and responsibilities clear in the policies, and appropriately assigned to relevant institutions? 	<ul style="list-style-type: none"> • Yes, the policies are supported various laws and Acts of Parliament but there is no overarching food safety law or policy. • The major policies are out-dated and do not conform to recent food safety guidelines recommended by COMESA, EAC and AU. • The policies assign roles to various institutions, but there is lack of clarity and duplication of roles in some cases.
	Population Targeting	<ol style="list-style-type: none"> 1. Are the policies appropriate for the target population i.e. fishing communities? 	<ul style="list-style-type: none"> • No, the policies are not adequately targeted at fishing communities and food safety in fisheries.
	Level of Services	<ol style="list-style-type: none"> 1. Are minimum adequate service levels defined for the target population? 2. Are the services in the policies appropriate for fish safety and hygiene? 	<ul style="list-style-type: none"> • Minimum adequate services are defined for all sectors of food, but the level of services actually delivered is inadequate especially in the fisheries sector.
	Health and Environmental Considerations	<ol style="list-style-type: none"> 1. Are the health related-problems associated with poor fish safety and hygiene clearly understood? 2. Is there a clear understanding of the magnitude of fisheries related environmental problems? 3. Do the policies address the main health and environmental problems? 	<ul style="list-style-type: none"> • Yes, the health consequences of poor sanitation and hygiene are understood and articulated in various policies. But the peculiar health concerns of poor food safety in fisheries such as <i>salmonella</i> diseases are not clearly articulated. • The environmental concerns are focused on pollution of waters bodies. However, there is little focus on environmental concerns around fisheries processing, handling and storage.

Country	Assessment Criteria	Sample Review Question(s)	Response
	Financial Considerations	<ol style="list-style-type: none"> 1. Do the policies indicate the cost of addressing all sanitation needs, and the needs of fishing communities in particular? 2. What are the sources of funding for implementing the policies, and are they adequate? 	<ul style="list-style-type: none"> • None of the policies reviewed included a costed implementation plan. • The WASH sector is heavily donor dependent, estimated as high as 93%.
Kenya	Legal Framework and Institutional Responsibility	<ol style="list-style-type: none"> 1. Are the policies supported by an existing legal framework? 2. Are the policies compatible with other national and international policies and regulations? 3. Are roles and responsibilities clear in the policies, and appropriately assigned to relevant institutions? 	<ul style="list-style-type: none"> • Yes, the policies are supported various laws and Acts of Parliament but there is no overarching food safety law or policy. • Yes, the food safety policies and regulations are compatible with international standards such as Codex and EAC guidelines. • The policies assign roles to various institutions for the implementation of safety guidelines and KEBS is responsible for overall coordination implementation.
	Population Targeting	<ol style="list-style-type: none"> 1. Are the policies appropriate for the target population i.e. fishing communities? 	<ul style="list-style-type: none"> • No, the policies are not adequately targeted at fishing communities and food safety in fisheries.
	Level of Services	<ol style="list-style-type: none"> 1. Are minimum adequate service levels defined for the target population? 2. Are the services in the policies appropriate for fish safety and hygiene? 	<ul style="list-style-type: none"> • Minimum adequate services are defined for all sectors of food, but the level of services actually delivered is inadequate especially in the fisheries sector.
	Health and Environmental Considerations	<ol style="list-style-type: none"> 1. Are the health related-problems associated with poor fish safety and hygiene clearly understood? 2. Is there a clear understanding of the magnitude of fisheries related environmental problems? 3. Do the policies address the main health and environmental problems? 	<ul style="list-style-type: none"> • Yes, the policies understand and pay considerable attention to health and environmental issues. • However, they have not been adequately implemented to address health and environmental concerns

Country	Assessment Criteria	Sample Review Question(s)	Response
			particularly in fishing communities and food safety in fisheries.
	Financial Considerations	<ol style="list-style-type: none"> 1. Do the policies indicate the cost of addressing all sanitation needs, and the needs of fishing communities in particular? 2. What are the sources of funding for implementing the policies, and are they adequate? 	<ul style="list-style-type: none"> • None of the policies reviewed included a costed implementation plan. • The national government, county governments and donors fund the sector, but there is a huge funding deficit.
Zambia	Legal Framework and Institutional Responsibility	<ol style="list-style-type: none"> 1. Are the policies supported by an existing legal framework? 2. Are the policies compatible with other national and international policies and regulations? 3. Are roles and responsibilities clear in the policies, and appropriately assigned to relevant institutions? 	<ul style="list-style-type: none"> • Yes, the policies are supported by the existing legal framework and the country recently passed Food Safety Act. • Yes, the policies and regulations particularly the Food Safety Act are compatible with international standards such as Codex and ISO. • The recently passed Food Safety Act assigns clear roles and responsibilities to different institutions, with coordination vested in the
	Population Targeting	<ol style="list-style-type: none"> 1. Are the policies appropriate for the target population i.e. fishing communities? 	<ul style="list-style-type: none"> • The policies target all aspects of sanitation, hygiene and food safety, but there is no strong focus on food safety in fisheries even in the recently passed food safety Act.
	Level of Services	<ol style="list-style-type: none"> 1. Are minimum adequate service levels defined for the target population? 2. Are the services in the policies appropriate for fish safety and hygiene? 	<ul style="list-style-type: none"> • Yes, the minimum adequate services are defined for all sectors of food. But much of the services are not being delivered in the fishing communities and the fisheries sector.

Country	Assessment Criteria	Sample Review Question(s)	Response
	Health and Environmental Considerations	<ol style="list-style-type: none"> 1. Are the health related-problems associated with poor fish safety and hygiene clearly understood? 2. Is there a clear understanding of the magnitude of fisheries related environmental problems? 3. Do the policies address the main health and environmental problems? 	<ul style="list-style-type: none"> • Yes, the policies understand and pay considerable attention to health and environmental issues. • However, they have not been adequately implemented to address health and environmental concerns particularly in fishing communities and food safety in fisheries.
	Financial Considerations	<ol style="list-style-type: none"> 1. Do the policies indicate the cost of addressing all sanitation needs, and the needs of fishing communities in particular? 2. What are the sources of funding for implementing the policies, and are they adequate? 	<ul style="list-style-type: none"> • The national sanitation policy and the Fisheries Act include funding mechanisms. • The sources of funding are through national budget and donor support by there is a huge funding gap.
Tanzania	Legal Framework and Institutional Responsibility	<ol style="list-style-type: none"> 1. Are the policies supported by an existing legal framework? 2. Are the policies compatible with other national and international policies and regulations? 3. Are roles and responsibilities clear in the policies, and appropriately assigned to relevant institutions? 	<ul style="list-style-type: none"> • Yes, the policies are supported existing laws and Acts of Parliament but there is no specific food safety law like in Zambia. • The Food, Drugs and Cosmetics Act is compatible with Codex and EAC standards and guidelines. • The policies assign roles to different institutions which in some cases conflict or are duplications.
	Population Targeting	<ol style="list-style-type: none"> 1. Are the policies appropriate for the target population i.e. fishing communities? 	<ul style="list-style-type: none"> • No, the policies are not adequately targeted at fishing communities and food safety in fisheries.
	Level of Services	<ol style="list-style-type: none"> 1. Are minimum adequate service levels defined for the target population? 2. Are the services in the policies appropriate for fish safety and hygiene? 	<ul style="list-style-type: none"> • Yes, the minimum adequate services are defined for all sectors of food. But few of these services are delivered, especially in the fishing communities and the fisheries sector.

Country	Assessment Criteria	Sample Review Question(s)	Response
	Health and Environmental Considerations	<ol style="list-style-type: none"> 1. Are the health related-problems associated with poor fish safety and hygiene clearly understood? 2. Is there a clear understanding of the magnitude of fisheries related environmental problems? 3. Do the policies address the main health and environmental problems? 	<ul style="list-style-type: none"> • In general, the policies pay considerable attention to health and environmental issues. • However, the policies have not been adequately implemented to address the health and environmental concerns highlighted in them.
	Financial Considerations	<ol style="list-style-type: none"> 1. Do the policies indicate the cost of addressing all sanitation needs, and the needs of fishing communities in particular? 2. What are the sources of funding for implementing the policies, and are they adequate? 	<ul style="list-style-type: none"> • None of the policies reviewed included a costed implementation plan. • The main sources of funding for the WASH sector are government and development partners. But there is a huge funding deficit, estimated at USD 882 million.
Uganda	Legal Framework and Institutional Responsibility	<ol style="list-style-type: none"> 1. Are the policies supported by an existing legal framework? 2. Are the policies compatible with other national and international policies and regulations? 3. Are roles and responsibilities clear in the policies, and appropriately assigned to relevant institutions? 	<ul style="list-style-type: none"> • Yes, the policies are supported by existing laws and Acts of Parliament but there is no specific food safety law like in Zambia. • Yes, the policies and regulations are compatible with international standards such as Codex and EAC guidelines. But the guidelines and standards are not adequately implemented. • The policies assign roles and responsibilities to various institutions. However, the roles are characterised by multiplicity of functions and lack of coordination.
	Population Targeting	<ol style="list-style-type: none"> 1. Are the policies appropriate for the target population i.e. fishing communities? 	<ul style="list-style-type: none"> • The policies target all population groups, with special attention to vulnerable groups and communities including fishing communities. However, fishing

Country	Assessment Criteria	Sample Review Question(s)	Response
			communities and food safety in fisheries is adequately prioritised in actual implementation.
	Level of Services	<ol style="list-style-type: none"> 1. Are minimum adequate service levels defined for the target population? 2. Are the services in the policies appropriate for fish safety and hygiene? 	<ul style="list-style-type: none"> • Yes, the minimum adequate WASH services and standards for food safety are defined, but actually delivery of these services is low in the fisheries sector and in fishing communities.
	Health and Environmental Considerations	<ol style="list-style-type: none"> 1. Are the health related-problems associated with poor fish safety and hygiene clearly understood? 2. Is there a clear understanding of the magnitude of fisheries related environmental problems? 3. Do the policies address the main health and environmental problems? 	<ul style="list-style-type: none"> • Overall, the policies pay significant attention to health and environmental issues that affect and are affected by WASH and food safety. • However, the policies are not being adequately implemented to address critical health and environmental concerns.
	Financial Considerations	<ol style="list-style-type: none"> 1. Do the policies indicate the cost of addressing all sanitation needs, and the needs of fishing communities in particular? 2. What are the sources of funding for implementing the policies, and are they adequate? 	<ul style="list-style-type: none"> • None of the policies reviewed included an investment or a costed implementation plan. • The main source of funding is government and donor support. But the sector is severely underfunded, with a budget consistently less than 1% of GDP.

Table 2 Summary of policy Assessment in five countries of the Great Lakes Region—Malawi, Kenya, Zambia, Tanzania and Uganda

8. Conclusion and Recommendations

In all the five countries, there are policies and laws on WASH and food safety which seek to regulate various stakeholders. These policies and laws define the minimum standards and level of services required that need to be delivered in the entire food chain to ensure safety and quality as well as protect consumers. A number of government institutions and agencies in the WASH and food safety sector have been assigned roles and powers to enforce standards and regulate players in the sectors. However, in all the countries there are duplication of functions and conflicting responsibilities among the various institutions due to the lack of an overarching food safety law that empowers an appropriate institution to coordinate implementation. The recent passage of the Food Safety Act in Zambia is expected to improve coordination and streamline the actions of the various institutions in that country. In general, implementation of WASH and food safety standards seem not to be adequately targeted at small-scale fishers and fishing communities in all the countries. Finally, the WASH and food safety sectors are heavily underfunded in all the countries, and most of the policies reviewed did not include an investment or costed implementation plan.

Based on the findings of this study, we recommend a number of policy actions and strategies for addressing the gaps and challenges identified:

- a. Prioritise the enforcement and implementation of existing WASH policies and food safety standards and guidelines particularly targeting fishing communities and small-scale fishers and vendors.
- b. Accelerate efforts and encourage Malawi, Kenya, Tanzania and Uganda to develop an overarching food safety policy or law to address the uncoordinated food safety activities of different institutions and stakeholders.
- c. Increase domestic resource mobilisation and develop a comprehensive costed plan for the implementation of policies and guidelines on WASH and food safety.
- d. Review policies and regulations on fisheries safety that are out of date to conform to recent policy changes at the African Union.
- e. Strengthen the capacity of WASH and food safety agencies and personnel to enforce standards and guidelines. This includes strengthening the capacity of institutions to conduct laboratory analysis, inspection and surveillance.

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Appendix 1

List of reviewed policies and frameworks

Kenya
1. National Food and Nutrition Security Policy (2012)
2. Fisheries Act (2012)
3. Public Health Act (2012)
4. Fisheries Management and Development Act (2016)
5. Environmental Sanitation and Hygiene Strategic Framework (2016)
6. Health Policy (2014-2030)
7. Draft Kenya Fisheries Policy (2005)
Malawi
1. National Fisheries and Aquaculture Policy (2016)
2. National Water Policy (2005)
3. National Sanitation Policy (2006)
4. National Forest Policy (2016)
5. National Environment Policy (2004)
6. National Community Health Strategy (2017-2022)
7. National Environmental Health Policy (1996)
8. Malawi Health Strategic Plan II (2017-2022)
9. Environmental Management Act (2017)
10. Catalogue of Malawi Standards (2015)
11. Agriculture Sector-wide Approach II (2017-2020). Resettlement Policy Framework
12. Fisheries Conservation and Management Act (1997)
13. Implementation, Monitoring and Evaluation Strategy for the National Fisheries and Aquaculture Policy (2016-2021)
14. Malawi Decentralization Policy (1998)
15. National Multi-sector Nutrition Policy (2018 -2022)
16. National Agriculture Policy (2016)

17. Water Resources Act (2013)
Uganda
1. Health Sector Development Plan (2015-2019)
2. National Sanitation Policy (1997)
3. Food and Drugs Regulations Act (2005)
4. Public Health Act Chapter 281 (1935)
5. The Second National Health Policy (2010)
6. Fisheries and Aquaculture Policy (2017)
7. Food and Nutrition Policy (2003)
8. Fish Act (1964)
Zambia
1. Food Safety Act (2019)
2. National Health Policy (2012)
3. National Health Strategic Plan (2017-2021)
4. Public Health Act (1972)
5. Fisheries Act (1994)
6. Draft National Fisheries Policy (2010-2020)
7. Environmental Management Act (2011)
8. Fisheries Act (2011)
9. Local Government Act (2019)
Tanzania
1. Tanzania Fisheries Act (2003)
2. Tanzania Fisheries Regulation (2009)
3. Tanzania Fisheries Sector Policy (2015)
4. Tanzania Food Hygiene Regulations (2006)
5. National Health Policy (2017)
6. Tanzania Public Health Act (2009)

7. National Water Policy (2002)
8. Tanzania Water Supply and Sanitation Act (2009)
9. National Fisheries Policy (2015)
10. Food Act (1978)