



BARRIERS TO COMPLIANCE WITH INTERNATIONAL HACCP REGULATIONS:

A Whole Chain Approach to the National Fisheries Food Safety Management System of Sierra Leone

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**Submitted to Postgraduate Office, University of Salford, Salford,
Greater Manchester, United Kingdom, in Partial Fulfilment of the
Requirement of the Doctor of Philosophy Degree in Hazard
Analysis Critical Control Point**

September 2013



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ABSTRACT

Sierra Leone has considerable fishery resources and needs the foreign exchange that trading these products internationally would achieve. Yet the nation is unable to export its fishery products through an inability to achieve HACCP (Hazard Analysis and Critical Control Point) standards and certification. A lack of HACCP has meant that overseas markets have been closed to Sierra Leone for over a decade. Previous attempts at resolving these problems of HACCP certification have been made, but none has produced any significant advancement towards achieving compliance with HACCP. This study attempts to uncover the barriers to compliance with HACCP by the Sierra Leone food safety management system, as perceived by the regulators, enforcement officials and businesses. This thesis also focuses on benefits determined and prioritized by regulators, enforcement officials, businesses, and consumers that will motivate successful implementation of HACCP. It is a qualitative case study utilizing triangulation involving a three-stage research design methodology comprising a set of convergent interviews of 22 people, followed by 77 individual case interviews and 3 focus group interviews. Ranked lists of 18 scored barriers and 22 benefits of HACCP for Sierra Leone national food safety management system were produced. The results of this study may provide suggestions for stakeholders to strengthen fishery safety infrastructure in order to protect public health, prevent fraud and deception, avoid food adulteration and facilitate trade. The results have shown that there are many and specific barriers in the SMEs in Sierra Leone that need to be removed, and their appropriate identification lies in the perceptions of national regulators, enforcement, and businesses who are familiar with their culture; attitudes; strength, weaknesses, opportunities and threats (SWOT). These barriers delineate the overarching principles of fishery safety infrastructure, and provide policy makers; enforcement officials; fishery businesses; academic and other relevant research institutions with valuable data on the benefits of successful implementation of HACCP-based systems.



ACKNOWLEDGEMENTS

This thesis arose in part out of years when food safety management system in Sierra Leone does not comply with international food safety standards, and led to a continued ban on the export of fisheries products to affluent markets. By that time, I have worked with a great number of people who contributed in various ways to the research and the making of the thesis deserved special attention and cite. It is a delight to convey my thankfulness to them all in this my meek acknowledgment.

Firstly, it is my moral obligation to record my gratitude to late Dr Jeanne Berry Harding. Jeanne was a mother, friend, who, sadly, is not around to receive my thanks in person, but to whom I owe most of my understanding of food safety discipline in my early days of academic pursuit, and her supervision, advice, and guidance from the very early stage of this research-‘may her soul rests in perfect peace’. I would also like to record my gratitude to Professor Eunice Taylor, who searched, identified and assigned me the most needed supervisor throughout my HACCP studies in United Kingdom. She provided me resolute encouragement and support in various ways and made her delight throughout my academic and professional pursuits in food safety. Her truly food safety intuition has made her as an invariable oasis of ideas and passions in HACCP, which not exceptionally inspire and enrich my growth as a HACCP student, but a researcher and a HACCP expert I want to be. Professor Eunice Taylor, I am indebted to you more than you know.

This study represents a milestone in more than nine years of work with Dr Kevin James Kane, my supervisor and personal advisor at the University of Salford. Since my first day with Kevin in 2003, I have felt at home at the University of Salford. His supervision, guidance and advice have provided me noble and unique opportunities for over nine years, starting as a Master of Science (MSc) student and Doctor of Philosophy (PhD) student. I remember he used to say something like "you're always optimistic about achievement!" to encourage me to stay focus and on top of work. Ever since, Kevin has provided me support not only by giving a research techniques almost ten years, but also parentally, academically, professionally and emotionally through the rough road to



complete my studies in United Kingdom. Thanks to Kevin for extending me the opportunity to start and finish this thesis. He did not only help me come up with the thesis topic but continuously guided and motivated me in all these years of research. During the most difficult and challenging times when writing this thesis, he relentlessly gave me the moral support, freedom, enthusiasm or zeal I needed to move on. I gratefully acknowledge Dr Kevin James Kane for his advice, supervision, motivation, and crucial contribution, which made him building blocks that formed concrete walls of this research and so to this thesis. His involvement in my academia with his unique and original ideas has triggered and nourished my intellectual capacity and maturity that I will benefit throughout my lifetime. Kevin, I am grateful to you in every possible way and hope to keep up our collaboration forever and ever.

Many thanks go in particular to Professor Ernest Tom Ndomahina, Director and Marine Consultant, Institute of Marine Biology and Oceanography, with whom I worked with as local supervisor in Sierra Leone for almost four years during my data collection for this thesis. I am much indebted to Professor Ndomahina for his valuable advice in fishery science and technology discussion, supervision in Freetown, leaving his busy schedules to read this thesis and gave his critical comments about national fishery control management system. He always kindly grants me his precious times even for answering some of my unintelligent questions about national fishery policy, regulation, enforcement and businesses. I am thankful that in the midst of all his busy activities and tight schedules, he immediately accepted to become my local supervisor when Dr Jeanne Berry Harding died in 2008.

Where would I be in HACCP without the HACCP team at Salford University? I would like to thank the HACCP team, namely Joanne Taylor, Katherine Clark, Ben Jones, Allison Ash, Christopher Jones and others who taught me HACCP from scratch and contributed to the development of international centre for HACCP innovation, which gave me the opportunity to study HACCP.



I would like to thank the stakeholders in food control system in Sierra Leone across the regulatory, enforcement, businesses and consumers, who kindly consented to be interviewed; and to all those researchers who assisted me to conduct the interviews in a spirit of openness or frankness, their perceptions, knowledge, understandings and experiences with HACCP. It was a memorable experience with these groups that left me with a sense of admiration and deep respect for people who have their country at heart and work tirelessly during the long period of data collection with sense of nationality and pride as the only reward, but of course, they are in no way responsible for any material, criticism, query and comments in this thesis. For maximum concentration, focus, and editing, I have counted on James's total support. Brother James, I am also grateful for your patience and understanding, because you have had to sacrifice "quality time with your tight schedules and late hours" without complaints to check the grammatical errors.

I would, in addition, like to thank Jude Boateng, brother and friend for always being cheerful and giving me spiritual encouragement. His Godly motivation presents me with the dream of completion and the vision of perpetual reward ahead of me when I was always over stretched by academic work and daily activities as a food safety and quality control officer of the United Nations. My parents and family deserve special mention for their inseparable support and prayers. My late Father, Mualimu Ismaila Sheriff, though no longer here to receive my thanks, is the person who gave me the fundament of my learning character, showed me the joy of intellectual pursuit ever since I was a boy- 'may his soul rests in perfect peace'. My Mother, Haja Fatmata Sheriff, commonly called Fatu is the one who earnestly raised me with her caring and gently love.

Words fail me to express my appreciation to my wife Omneya Khamis Mahmoud Badr, whose dedication, honesty, sincerity, love and persistent confidence in me, has taken the load off my head. Omneya is an Egyptian but I remember she always says "I don't care where you're from but I love you once you always love me", I owe her for being the first person to persuade me to enrol for PhD, unselfishly let her intelligence, passions, and ambitions collide with mine. I would also thank my children namely Mualimu Ismaila



Sheriff, Fatima Mohamed Sheriff and Jowaeraya Mohamed Sheriff, without whom the whole world for me would be nothing.

Finally, there are many brothers, sisters, friends and relatives at home and abroad, and I would like to thank everybody, as you were all important to the successful realization of this study. However, please accept my apology for not mentioning you personally one by one, but remember that you are all at the bottom of my heart.



DEDICATION

This thesis is dedicated to various people, institutions and departments of food control system in Sierra Leone from regulatory, enforcement, businesses and consumers who support innovations to improve food safety management system in the country. It is also dedicated to my children including Mualimu Ismaila Sheriff, Fatima Mohamed Sheriff, and Jowaeraya Mohamed Sheriff for missing their fatherly love and care, and my wife Omneya Khamis Mahmoud Badr who sacrificed to stay and support our children whilst away for this study.



DECLARATION

I declare that this work does not contain materials that have been previously submitted and/or published in support of another degree qualification or publication, except those cited in the literature review that were adequately referenced to their specific sources. The research design for this study makes provisions to use assistant interviewers to facilitate triangulation techniques in data collection, but they are in no way responsible for any material and comments in this thesis; thus I using my own initiatives carried out all the data collection, analysis and discussions.



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ACRONYMS

ACP	African-Caribbean-Pacific
ASQ	American Society for Quality
BRC	British Retail Consortium
BSI	British Standards Institution
CAC	Codex Alimentarius Commission
CI	Convergent Interview
CSPI	Centre for Science in the Public Interest
DAFF	Department of Agriculture, Food and Fisheries
EC	European Community
EFSA	European Food Safety Authority
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FBI	Food Borne Illness
FDA	Food and Drug Administration (United States)
FSA	Food Standards Agency
FSAI	Food Safety Authority of Ireland
FSMS	Food Safety Management System
GHP	Good Manufacturing Practice
GMP	Good Hygienic Practice
HACCP	Hazard Analysis and Critical Control Point
ICMSF	International Commission on Microbial Specifications for Foods
ISO	International Organisation for Standardisation
JETRO	Japan External Trade Organization
LDC	Least Developing Country
PRP	Pre-requisite Programme
QA	Quality Assurance



MFMR	Ministry of Fisheries and Marine Resources
NACMCF	National Advisory Committee on Microbiological Criteria for Foods
NAE	National Academy of Engineering
NASA	National Aeronautics and Space Administration
NGO	Non-Governmental Organization
NPRC	National Provisional Ruling Council
RASFF	Rapid Alert System for Food and Feed
SBHP	System Based on HACCP Principles
SFBB	Safer Food Better Business
SPS	Sanitary and Phytosanitary
SSOP	Sanitation Standard Operating Procedure
TBT	Technical Barriers to Trade
UK	United Kingdom
US	United States
USA	United States of America
WHO	World Health Organization
WTO	World Trade Organization



DEFINITIONS OF TERMS

Adherence: The action of continuing to believe and obey rule, law, agreement, advice, or recommendation and actively participate by collaboration and input to comply with them (Bajramovic, Emmerton et al., 2004)

Barrier: Refers to trade restrictions imposed on the free international trade of fishery products, which is generally classified as import and export policies reflected in fishery safety and quality assurance standards, and various types of certification (*developed by the author*).

Benefit: Refers to positive HACCP rewards expressed in monetary and/or non-monetary terms such as lift export ban, compliant, profit maximization, market competitive advantage, consumer confidence, and the like attained by public and private sectors following successful implementation of HACCP (*developed by the author*).

Business: Refers to system and service in which fishery products are produced, processed, handled, distributed and sold-also called fishery industry in Sierra Leone (*developed by the author*).

Codex Alimentarius: Food Standards (CAC, 2011)

Compliance: Refers to all actions including but not limited legal, management, administrative, technical, governmental or non-governmental conducted to conform to principles, laws, norms, product, process and other relevant requirements to effectively implement standards or regulations (Fairman and Yapp, 2004)

Convergent Interviewing: Is a technique for qualitative data collection where themes (barriers) emerge as the interview goes on with national stakeholders in food safety management (regulatory, enforcement and businesses) and thus enables the researcher to



modify questions by the end of each interview in order to converge on the themes, until the point called saturation is reached where no more themes emerge (Creswell, 2007-*modified by the author*).

End product testing: Is a term used in quality control concerning with the testing of a finished product at the end of the production process. This is the opposite of the continuous testing where the product is tested at various stages in the process (Tobin, Thomson et al., 2012; Grant & Leavenworth, 1996).

Enforcement: Refers to the application of an executive order by Government Agencies to compel businesses to implement a set of rules or regulations which are subject to inspection, verification and certification (Fairman and Yapp, 2004).

Focus Group Interview: This is a qualitative technique where an interview is conducted in a group and which generates data from the interaction on the focus group activity and the topics in the focus group protocol, usually this is facilitated by a moderator in order to solicit information on the phenomenon under investigation (Creswell, 2007; Perry, 1998).

Food: Any substance, whether processed, semi-processed or raw, which is intended for human consumption, and includes drink, chewing gum and any substance which has been used in the manufacture, preparation or treatment of “food” but does not include cosmetics or tobacco or substances used only as drugs (CAC, 2011, p22).

Hazard Analysis Critical Control Point (HACCP): Internationally accepted food safety management system, that identifies, evaluates and preventively controls potential hazards that are significant for food safety (Codex, 1993)

Individual Case Interview: A technique for qualitative data collection where interviewees are given question or situation or challenge to resolve. In this thesis the specific themes are derived from convergent interviews so they can be scored or ranked (Boyd and Chinyio, 2006- *modified by the author*).



Regulatory Authority: Refers to the Government statutory body formed and mandated under the terms of a legislative act or statute with the aim to ensure compliance with the provisions an act or statute, and in carrying out its purpose required by national law (Fairman and Yapp, 2004).

Standard: A specification that is usually issued by public or private sector including but not limited to a regulatory body, standards agency, international agency, for example Codex Alimentarius, International Organisation for Standardization (ISO), British Retail Consortium (BRC), and the like (Yang, Qian et al., 2012; ISO, 1992).



Chapter 1: Introduction

1.1 Introduction

Food is one of the most traded goods in the world and fishery products, in particular, are high value products that are in considerable demand in affluent western nations (Prieler, Fischer, et al. 2013; Norse, Brooke et al., 2012; Pauly and Froese, 2012; Cheung, Lam et al., 2011; Kinver, 2011; Srinivasan, Cheung et al., 2010; Bourne and Collins (ed), 2009; Tacon and Metian, 2009; Tacon and Metian, 2008). Sierra Leone possesses considerable fishery products resources and need foreign exchange and international trade, yet it is unable to export fishery products through the lack of acceptable international standards for food safety – the key standard being Hazard Analysis Critical Control Point (HACCP) (The Fish Inspector, 2010; Thorpe, Whitmarsh et al., 2008; Megapesca, 2000; Ndomahina and Chaytor, 1991). A lack of HACCP certification has meant that overseas markets have been closed to Sierra Leone for over a decade. Many attempts at resolving the problems of HACCP certification have been made, but without success.

This thesis is an attempt to uncover the barriers to compliance for the Sierra Leone national food safety management system, which has been unable to achieve HACCP certification and standards despite the need to do so, the willingness of foreign donors to fund development in this area, and the desire of affluent nations to have access to high quality fishery products from the country.

In order to examine the barriers to compliance, some of the key actors in the national food safety system are interviewed and their perceptions of the reasons why HACCP has not been achieved are identified. Using a case study methodology, individuals from the regulatory, enforcement and business areas are interviewed using convergent interviews and individual case interviews methods, whilst high-ranking members of the regulatory and enforcement authorities, as well as representatives of business and consumers are interviewed using the focus group method. This will uncover the reasons they perceive as to why HACCP compliance in the fisheries businesses has not happened by identifying the barriers that exist. It is also hoped to uncover the



participants' understanding of HACCP and what the focus groups see as the benefits to them and the nation of achieving HACCP compliance.

1.2 The Background of the Study

In Sierra Leone, the Ministry of Fisheries and Marine Resources (MFMR) and the Department of Fisheries (DOF) are legally responsible for fishery products (MFMR, 2008), but many other government ministries, departments and agencies are also involved in fishery products safety activities. Sierra Leone presently has no comprehensive food regulations or regulatory authority and therefore general foodstuff safety and quality assurance activities, including those for fishery products, are unfocused (Thorpe, Whitmarsh et al., 2008). Consequently, the national capacity for achieving positive food safety outcomes in Sierra Leone remains below international standards. As a result of this situation, the lack of safety standards acts as a significant barrier to Sierra Leone's officially accessing European Union (EU), United States (US), Japanese and other international markets.

In an attempt to overcome the barriers to these markets caused by the lack of internationally acceptable standards of food safety, western donors have provided assistance (World Bank, 2010). Technical assistance projects in the form of grants, aid, funds, donations, and consultancy have been provided to strengthen the capacity of the fishery safety control system, but have not achieved a positive outcome (Thorpe, Whitmarsh et al., 2008). The result has been the continuing exclusion of Sierra Leonean fishery products from profitable markets with the consequential loss of export revenue (EJF, 2012; Fisheries News Update, 2011). In 2009, the EU reiterated its ban on fish products even though attempts at improving food safety had been made for over ten years (The Fish Inspector, 2010).

A recent project aimed at improving this situation was an EU-funded project on fish sanitary and health controls, but this has so far been unable to offer guarantees of fishery safety equivalent to the HACCP standard (The Fish Inspector, 2010). It is noted that the activities of the EU to improve the health and hygiene control of Sierra Leone's fish products commenced in the year 2000, but the export ban has continued (News Update Fishery, 2011). For example, the United



Kingdom was a traditionally important trading partner which imports locally available fishery products like the Spiny lobster (*Panulirus* spp.), but it banned imports of fishery products from Sierra Leone in 2001, and this ban has continued in place even though the UK has financed developmental projects to allow access to its own markets (MFMR, 2008).

One of the key problems has been conflict among regulatory authorities, and the responsibilities of various government ministries, departments and agencies involved in fishery products safety environment are not clearly defined and overlap due to the present confused regulatory framework. There are also poor facilities and infrastructure including equipment, communications, transportation, and a lack of suitably trained and qualified enforcement personnel. These are among the major barriers that hinder the development and implementation of HACCP and its pre-requisite programmes (PRPs) in the fishery businesses in Sierra Leone. The author argues that, the structure and *modus operandi* of production, processing, handling, and distribution of fishery products in the country are incompatible with fishery products safety requirements in international markets or they may pose greatest cost of compliance. Therefore, it was not surprising to discover that government responses to the export ban on fishery products have been, in general, inadequate, slow and bureaucratic.

Coherent national food safety policies based on HACCP principles form the foundation for effective fishery products safety management systems in any country (Wang, Zhang et al., 2009; Chassot, Melin *et al.*, 2007). Whilst many countries in the world are increasing the capacity of their food safety control systems, food safety concerns are not adequately addressed in national governmental policies in Sierra Leone. There appears to be little awareness of food safety issues on the part of the government, no coordinated and sustainable approach to the adoption and implementation of holistic food safety system, and no effective programme on consumer food safety awareness. The local food businesses including fishery businesses lack comprehensive national standards, specifications, codes of practice, and guidelines to follow.

The production, processing and marketing of food, including fishery products, in Sierra Leone is also highly fragmented among a large number of small and medium sized enterprises (SMEs) who lack appropriate knowledge and expertise in the application of modern food safety



management tools and food hygiene. The challenges and possibilities for these SME producers to produce safe and high quality food are further hindered by the lack of coherent and comprehensive food safety policies and standards. Furthermore, there are no well-established systems by either government or private consultancies to assist these industries to develop their capacity to provide safe food. Fishery businesses that actively exported fishery products to high-income countries before the current export ban do not have sustainable training and support from government or private consultants (Fisheries of Sierra Leone, 2008). Unlike developed countries, Sierra Leone has no private consultancy firms specializing in food safety and quality assurance matters to support food businesses, while government regulators do not have the capacity to support business. The local fishery business does not appear to have accepted its primary responsibility for fishery quality and safety (Sheriff, Kane et al., 2010; Fisheries of Sierra Leone, 2008).

In addition to the problems that Sierra Leone faces with regard to the export of fishery products, the achievement of safety standards for food produced for domestic consumption through retail markets, supermarkets, schools, hospitals, restaurants, street food vending and other channels is poor. Sustainable efforts to improve the safety and quality of fishery products for these markets are seriously lacking. Significant quantities of Fresh, frozen, smoked and dried fishery products are usually street vended, sold in an open air with no infrastructure to ensure specific product temperature or safety and consequently, increase the emerging of new foodborne diseases and re-emerging of old ones (Sheriff, Kane et al., 2010).

The consequences of foodborne illness in Sierra Leone include adverse effects on tourism and international trade in lucrative food products such as fishery products, loss of earnings and productivity, to list but a few. Fishery product is both a high risk and an easily perishable product. Food spoilage is wasteful, costly and can lead to food insecurity and adversely affect the national economy and erode consumer confidence (Williams and Eldridge, 2010; Frewer, 1992).

1.3 Statement of the Problem

Food safety and compliance with HACCP standards in Sierra Leone is a complex problem with many aspects. Problems abound at all levels of the national food safety management system.



These problems include issues with overlapping and confused government regulatory authorities; incomplete and inappropriate regulation; lack of enforcement; lack of training and consultancy organizations; and poor attitudes and understanding of food safety in businesses and at street vending level. In the particular case of the fishery business, these problems have led to a continued ban on the export of fisheries products to affluent markets in developed countries.

On the other hand, fishery businesses in the country have no self-regulatory mechanisms in place to ensure the safety of their fishery products. Consequently, coordinated, comprehensive, state-of-the-art, and sustainable approaches to the holistic management of fishery safety cannot currently be adopted, implemented, and enforced in spite of the technical assistance in the form of grants, aid, funds and donations received from the international community to strengthen the national fishery safety management system.

For example, the EU-funded project in Sierra Leone on the health and hygiene control of fishery products begun in the year 2000 with the aim of lifting the export ban on fishery products, has so far proved unsuccessful and the export ban has become tougher and tighter over the years (The Fish Inspector, 2010). The report of an EU Food and Veterinary Office (FVO) mission in Sierra Leone on health and hygiene control conducted between 19 and 23 October 2009 states that:

“the system of public health controls in Sierra Leone cannot offer guarantees equivalent to those foreseen in the EU for the production of fishery products. The system of official controls has deficiencies in implementation and no monitoring plans for tests of Fishery Products and water or ice. Vessels, cold stores, ice factories and processing establishments visited during the mission did not meet all required Community standards” (The Fish Inspector, 2010).

Another typical attempt in the past to resolve the problem is the technical assistance project for Capacity-Building for improving the quality of Fish Trade Performance of five countries in West Africa including Benin, Gambia, Mauritania, Senegal and Sierra Leone. However, only three countries including Benin, Mauritania and Senegal were successful in obtaining EU approval for the export of fishery products, whilst Sierra Leone was not included in the list of countries eligible to export fishery products to the EU markets, and indicated insufficient guarantees in terms of quality and safety of fishery products in Sierra Leone (FAO, 2011).



Similarly, the Diagnostic Trade Integration Study (DTIS) reports on Sierra Leone also noted that there was a lack of human expertise in HACCP across the regulatory framework for fishery inspection to comply with even national standards and that this rigorously constrained the market for fishery products (FAO, 2011).

These examples further support the view that the technical assistance projects aimed at strengthening Sierra Leone's fishery safety management system have so far failed. What, however, is behind this failure? The author argues that the barriers within the regulatory framework, self-regulation in fishery businesses, and consumer awareness have not been identified and properly understood. This study suggests that the technical advice, method and approach employed in the past were wrong, unsustainable and not compatible with the actual food safety problem within the fishery safety control system; thus, without a change in perception in the investigation and analysis of the problem in fishery product safety management and development system in Sierra Leone, it is unlikely that it will be possible to identify and understand relevant barriers for targeted intervention.

The lack of access to safe food products has caused decreased worker productivity, disability, illness, and even early death among children and other vulnerable groups, thus lowering incomes and access to food. It contributes significantly to human suffering in the country. At the present time, there are high incidences of diarrhoeal diseases, cholera, and typhoid fever across all age-groups of the Sierra Leone population. This increasingly underlines the importance of food safety, which needs to be appropriately investigated and analyzed.

1.4 Rationale for this research

Given the problems faced by the national food safety management in Sierra Leone in achieving an acceptable level of food safety standards so that fishery products exports can be resumed, the question of what barriers are preventing the adoption and implementation of HACCP standards must be asked. Studies have been carried out by the European Union and others into improving the system of food safety, but these have not resulted in any significant advancement towards achieving compliance with HACCP and internationally accepted food safety management



standards. No investigation has been made into the perceptions of those involved in the national food safety management system. Moreover, no investigation has been made into the perceptions of those involved including regulators, enforcement officials and businesses by someone who is deeply familiar with the local culture, language, and attitudes. This study attempts to uncover the perceived barriers to compliance with HACCP that exist in those involved in food safety management in Sierra Leone.

The identification of barriers to compliance with international HACCP regulations in Sierra Leone is compatible with the objectives or requirements of the final act of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT), especially the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) and the Agreement on Technical Barriers to Trade (TBT) (Malkawi, 2011; Prévost, 2010; Sierra, 1999). The WTO TBT Agreement on Technical Regulations and Standards clarifies that one of the ways to resolve a deviation between a member state's standard and recommendations issued by international standardizing bodies, is through the member state's identifying the parts which in substance deviate from relevant recommendations issued by international standardizing bodies (Hornsby, 2010; Prévost, 2010; Donna, 2009; Greenhalgh, 2004).

The author argues that the outcome of this research suggests a way forward not only for Sierra Leone fishery safety control and regulatory mechanisms, but also for the activities of the World Trade Organisation (WTO) and the Codex Alimentarius Commission (CAC) concerning food safety, quality assurance, and trade for developing countries. The findings of this study may serve as a model for other developing countries to fine-tune their fishery safety control and regulatory system to match EU Legislation, Codex Alimentarius, WTO Agreements on SPS and TBT and other reputable international standards.

This study suggests that the understanding of the barriers to compliance with HACCP will make the adoption, implementation and enforcement of HACCP in fishery businesses become a priority in Sierra Leone; thus equivalence in trade of fishery products could be achieved by the country. The improved level of food product safety and trade is proportional to the implementation of HACCP, and the food businesses should play a leading role in self-regulation



(Swartz, Sumaila et al., 2010; FAO, 2008; Cervone, Shadel et al., 2006). The roles of the regulator, enforcement, and businesses in this study may provide a buy-in and support by the national food control authority for the potential implementation of HACCP across the entire food chain.

The significance of food safety for any nation cannot be overemphasized (Vladimirov, 2011; Senauer, 1992). Food security for any nation could be viewed as when everyone in that country have full access to sufficient, **safe, wholesome, and nutritious** food (Srinivasan, Cheung et al., 2010). Ensuring sustainable food safety would eliminate or reduce foodborne illnesses that contribute to decreased worker productivity, disability, early death, lowered incomes, and denial of full access to food. The proper prevention of foodborne illnesses in Sierra Leone could reduce human suffering in a country that is currently going through a difficult post-war era. It would prevent the high incidence of diarrhoea and other foodborne-related diseases in school children, pregnant women, the aged, and other immunodeficient populations in the country. In a country where the food safety management system has almost collapsed, food insecurity spreads more rapidly (Unnevehr, 2007).

It can be argued that people infected with diseases such as human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS), tuberculosis, malaria, and other ailments affecting the Sierra Leone population, are at greater risk of being debilitated by unsafe food, such as unsafe fishery products, because their immune systems are already compromised. Fishery product is the main source of protein in Sierra Leone, and therefore, this study suggests that the assurance of safe fishery products through HACCP is essential to improving the quality of life for those already affected by diseases. Similarly, people suffering from foodborne illness are more vulnerable to other communicable diseases (Myers, Thurston, et al., 2009). Foodborne diseases are some of the underlying factors for malnutrition, mortality, and morbidity in Sierra Leone. Elimination or reduction of episodes of foodborne diseases can raise the nutritional profile with positive impact on the growth and the immune systems of infants, children, the aged, pregnant women, and other immunodeficient populations in the country (Konecka-Matyjek, Turlejska, et al., 2005).



The author argues that the outcome of this study may create awareness to review, repeal, replace, and upgrade the fishery safety management infrastructure in Sierra Leone, in order to strengthen, amalgamate, and coordinate the development, implementation, and enforcement of an effective national fishery safety policy; to adequately protect the health of consumers; and to enhance the competitiveness of national fishery products.

1.5 Research Aim and Research Objectives

The general aim of this study is to uncover the perceptions of HACCP among those involved in the Sierra Leone national food safety system in order to understand why HACCP standards have not been achieved, whether particular barriers exist in Sierra Leone, and whether the benefits of HACCP as understood overseas apply in that country.

The specific research objectives derive from the aim above:

1. To critically review, examine and analyse existing literature relevant to the study topic.
2. To determine the level of understanding of HACCP among those involved in the national fishery safety infrastructure – from policy and regulation officials to enforcement officers and compliance in businesses.
3. To identify the perceived barriers which exist within the national food safety infrastructure which prevent the implementation of HACCP.
4. To determine how the benefits of HACCP as suggested by other national HACCP regulators differ from those benefits perceived by local regulatory, enforcement and commercial representatives in Sierra Leone.

1.6 Methodology

This is a qualitative study and such an approach was selected for a number of reasons: firstly, it is necessary to access the perceptions of those involved in the Sierra Leone national food safety



system in order to understand the barriers to HACCP achievement and such understandings can be more easily accessed and understood using qualitative methods. It is only by interviewing people that their feelings and opinions on why a system is not working can be discovered – especially given the sensitive nature of the insights being sought. Secondly, only a relative few of those involved in the Sierra Leone national food safety system can reasonably be interviewed in the time available and given this number it was felt that generalizing using a statistical approach was not appropriate. However, a case study approach does allow for useful data and insights to be collected and non-statistical claims to be made.

The methodological position of this research is that valid and reliable research can be undertaken outside of statistical and scientific approaches since aspects of reality are both subjective and objective; that is to say, our perceptions are subjective and affect objective reality. It is therefore a realist perspective rather than a positivist one that is being adopted.

In order to achieve reliable and valid results in this study a triangulation approach is used. This consists of three separate methods:

1. Stage One (SI): Convergent one-to-one interviews with up to 22 stakeholders in the Sierra Leone national food safety system in order to gain an initial understanding of the issues involved and to determine the barriers to HACCP implementation that are felt to exist.
2. Stage Two (SII): Further interviews with other different 77 stakeholders involved in regulation, enforcement and business, using the barriers derived from stage 1 in order to confirm the validity of the barriers throughout the Sierra Leone national food safety system.
3. Stage Three (SIIC): Three focus groups (SIIC A, SIIC B and SIIC C) in 4 days of workshop meetings with the membership derived from 28 senior officers of the regulatory authorities, businesses, and consumers in order to confirm in a group interview setting the results of the earlier interviews. The focus groups were also asked about whether these barriers can be overcome and whether they feel the benefits of achieving HACCP certification are meaningful for Sierra Leone.



1.7 Arrangement of the Study

This section provides an overview of the different issues covered in logical sequence during the study. Six main different chapters were covered in this research: chapters 1, 2, 3, 4, 5 and 6. Chapter 1 is the introduction, which provides a systematic background of the research followed by the statement of problem, rationale, aims and specific objectives, outline of research methodology, arrangement of the study, contribution to knowledge, limitation, and conclusion. Chapter 2 provides an extensive critical review of the literature, followed by chapter 3, the methodology of how data were collected through a qualitative case study approach based on modern theory or principle of the “Reality Paradigm”. The presentation of data collected is analysed in chapter 4, followed by chapter 5, which discusses the data, and chapter 6, which explains how and to what extent the results of the data collected and analysed justified, and addressed the research aim, objectives and statement of problems. Chapter 6 further explained how the conclusions and implications fit into to theory, practice, limitations, originality of the research technique, and identification of potential areas for further research.

1.8 Contribution to Knowledge

This study is original and makes a distinct and novel contribution to the body of knowledge that encompasses the discipline of the modern food safety management system known as HACCP. This is the first time an in-depth investigation using a case study methodology has been carried out into the barriers to compliance with international HACCP Regulations in Sierra Leone; a country where unsafe food, political instability, foodborne diseases, war, and other major concerns dominate agendas and the news media, but the importance of food safety is often not well understood.

This study identified 7 new HACCP barriers important to Sierra Leone fishery products that have not been previously uncovered by other HACCP studies. This study further identified 22 HACCP benefits as compared to 12 HACCP benefits by other HACCP regulators. This is the first time the technical barriers that exist within the fishery businesses in Sierra Leone have been



ranked and prioritized for targeted interventions, to help a smoother and more effective compliance of national fishery safety system with international HACCP regulations.

The uncovering of more new barriers by this study, and less number of benefits listed by other HACCP regulators suggests that there may be a corresponding lack of understanding by the international community of what are the real HACCP barriers and benefits for Sierra Leone, and perhaps lies behind the reasons why fishery products from Sierra Leone is still banned for export to developed markets despite several international technical assistance projects. The actual technical barriers influencing the implementation of HACCP in fishery businesses in Sierra Leone were found to be complex and multifaceted. Barriers were far more complicated than imagined and cannot be solely explained in terms of lack of financial support but rather by the presence of several technical barriers that may impede the safety of the fishery product, process and infrastructure.

This research provides some indication of how to achieve HACCP standards through overcoming the barriers to HACCP in Sierra Leone for the first time and thus should help improve health and wealth in the nation. New approaches and knowledge such as those originated by this study, allow the regulatory and enforcement authorities, businesses, and consumers in the fishery safety infrastructure in Sierra Leone to cope with and to understand this methodology of food safety management system.

The bringing together of regulatory, enforcement, businesses, and consumers who represent the whole of the food safety management system is an innovative holistic approach in the country's food safety investigation. The success of HACCP system is the responsibility of all involved in the food control and depends largely on the acceptance of the new system by all actors.

Lastly, the lack of literature on HACCP for Sierra Leone suggests that this study is a significant contribution to the academic literature and contributes new knowledge to the concepts of HACCP.



1.9 Limitations of the study

This research seeks to uncover the perceptions of key stakeholders in Sierra Leone's national food safety system with regard to HACCP and the barriers that exist to its implementation. Thus, it is the ideas, thoughts, views, understandings, insights, and opinions of government regulatory authorities, fishery businesses, and consumers on the barriers to compliance with international HACCP regulations that are being sought. The benefits for successful implementation of HACCP in fishery businesses were also perceived by the focus groups. However, the study does not seek to evidence these views and opinions through data collection outside of the understandings of those stakeholders interviewed since it is their perceptions being uncovered. The objective reality of these understandings does not invalidate the perceptions that exist. Thus, the study did not seek any evidence from the interviewees to substantiate their answers and claims made during the data collection. Identities such as names and addresses of the interviewees are not revealed so that their official roles and responsibilities are not compromised and so that they may speak in confidence about sensitive issues.

1.10 Conclusions

Chapter 1 delineated the background of the study, statement of the problem, aims and objectives, and methodology for data collection in order to achieve those aims and objectives. The justification for undertaking this research and the contribution to knowledge resulting from the findings including theoretical and practical implications of the findings were also enumerated in this chapter. This chapter further outlined the arrangement of whole structure of the research and the limitation of the research.

Immediately following this, is the literature review in chapter 2 which will critically review previous studies on fishery production, safety, trade, HACCP including HACCP barriers and benefits to establish the historical background of this study. Chapter 2 will further compare fishery products safety regulatory arrangements in Sierra Leone against regulatory requirements of important developed countries trading partners, and subsequently, examine the roles of other HACCP regulators, actors and other private food standards in order to prepare the pace for the development of research aims and specific objectives.



Chapter 2: Literature Review

2.1 Introduction

This section covers a critical review of literature in various areas of food safety relevant to this study including origin of HACCP, barriers and benefits of HACCP, pre-requisite programmes (PRPs), standards, and their impacts on the fishery businesses, regulation, enforcement and consumption. This chapter further attempted to examine and review several previous studies from the academic literatures and other literatures from credible international organisations in areas that are relevant to the statement of the problem and subsequently, the development of the research aims and objectives. In this regard, a series of arguments will emerge to show how fishery businesses, regulation, enforcement, consumption, PRPs, HACCP, barriers and benefits of HACCP, and standards are linked together. This chapter will also highlight how the activities of other international stakeholders lead to the identification, ranking and location of HACCP barriers and benefits, which are the main focus of this study. There is also a literature review summary entitled “overview and summary of existing literature reviewed and theoretical framework”, in the form of a visual overview and summary of key texts and content relevant to fishery food safety as investigated in this research.

For export to EU, member states or third countries are required to meet the block harmonized requirements governing health, safety and hygiene in the capture, handling, processing, transportation, and storage of fishery products. EU also has detailed specific requirements for landing sites, layout of premises, equipment and facilities including floors, ceilings, walls, ventilation, toilet, hand washing, and ice making. There are also lay down principles on transportation, handling, processing, packaging, own-checks, organoleptic inspection, microbiological and chemical investigations, water quality and personnel health (Henson and Heasman, 1996).

It is mandatory for member state or third country supplier to undertake a system of “own-checks” base on the following steps that are compatible with Codex HACCP protocol (Delgado, C.L., N. Wada, et al., 2003): identification of critical control points (CCPs) in the production,



processing and distribution facilities that are specific to the manufacturer processing techniques; monitoring and controlling CCPs; sampling and analysis in EU approved laboratory to verify and certify cleaning, disinfections, and all requirements in the EU Directives; record keeping and documentation of all activities for minimum of two years. These own-checks must demonstrate full compliance with all requirements in the Regulation (EC) No 852/2004 in accordance with HACCP (Mortimore and Wallace, 2000). The argument will come to an end with a conclusion and an outline of the issues to be addressed in the next chapter.

2.2 Historical Background of HACCP

The HACCP concept got its origin in the USA and stands for "Hazard Analysis Critical Control Point". The concept was first developed by National Aeronautics and Space (NASA) in 1958, and in 1959, the concept was further developed to assure 100% safety of food used in space (Semos, and Kontogeorgos, 2007; Airey, 2004; Arvanitoyannis and Efstratiadis, 1999; ICMSF, 1986). In 1971 HACCP system was published and documented in the USA. The National Academy of Science (NAS) recommended the use of the HACCP system in 1985, and finally became a global food safety management tool and cited in the FAO/WHO Codex Alimentarius system.

In 1940's and 1950's, HACCP was first considered by the US Military to remove potential hazards in the production of military drugs, and was referred to as the Failure Mode Effect Analysis (FMEA) (Kane and Taylor, 2003). National Aeronautic and Space Agency (NASA) in collaboration with Pillsbury Company in US who adopted HACCP in 1959, to achieve 'zero-defects', for ensuring safety and quality assurance of food eaten by astronauts, when they were developing the first manned space programme (Kane and Taylor, 2003). The concept was presented in USA for documentation and publication in 1971, when Pillsbury presented HACCP concept at the National Conference on Food Protection that was jointly organized and sponsored by the Food and Drug Administration (FDA) and the American Public Health Association (Sperber, et al., 1998; Bernard, 1998). One can see that several changes have been made to HACCP in order to simplify the concept further, and make it easier to implement and maintain an effective Food safety Management System (FSMS). However, it is important to note that the initial concept of HACCP world-wide has still not changed.



In 1974, the FDA incorporated the HACCP concepts into its low acid and acidified food safety regulations, as a response to outbreaks of *Clostridium botulinum* poisoning in commercially canned food products. This regulation helped to effectively prevent occurrences of such outbreak since its implementation. The next outbreaks reported after that was found in commercial canned food businesses that fail to correctly follow the regulation.

During 1980, WHO / ICMSF report on HACCP as an international system of choice in food safety management, and, a number of publications were instrumental in making HACCP the predominant FSMS. By 1983, WHO Europe recommends HACCP and endorsed by joint WHO/FAO as an effective way of controlling foodborne disease when the Joint FAO/WHO Expert Committee on food safety advised that HACCP should replace the traditional end product testing approach to food safety assurance (CAC, 2008; Upmann and Jakob, 2004).

Subsequently, the National Research Council (NRC) in USA recommended HACCP in 1985, and published “An Evaluation of the Role of Microbiological Criteria for Foods and Food Ingredients”, and this publication also called the green book recommended that the food processing industry and governmental agencies implement HACCP system (CSPI, 2001; NRC, 1985). The publication further described the HACCP system as the most effective food safety system of choice throughout the food chain in the United States of America (USA). Most expert committees in the USA at that time stated that HACCP should be part of the entire food safety regulation in USA (CSPI, 2001). Interestingly, it was amazing to note that the adoption and implementation of HACCP in the United States (US) was driven by the consumers and marketplace rather than by the national food safety regulations. For example, a major and one of the most popular retail food producers, McDonald, in US made it as internal policy for all of their suppliers and retailers to implement HACCP to ensure that food sold in their restaurants is safe for human consumption (NACMCF, 1997, Available at: www.cfsan.fda.gov/~comm/nacmcfp.html. Accessed November 30, 2010). This encourages or motivates many other food retailers in US to follow suit.

In 1988, ICMSF published a Book on HACCP which included the concepts of CCP1 and CCP2 (Semos and Kontogeorgos, 2007; Airey, 2004; ICMSF, 1986). CCP1 represents a point where control can be applied to prevent or eliminate or reduce to an acceptable level any food safety



hazard. CCP1 today is known as CCP which means specific practice, procedure, process, stage, location or area where hazards would occur and of which preventive control measure should be established to prevent, control, eliminate or minimise the hazards to an acceptable level. CCP2 refers to a point at where hazard can be minimized but not controlled or eliminated. Over the years and currently the concept of CCP2 have changed to GHP, GMP, SSOP or PRP and most CCP2s were eliminated through the prerequisite programs (PRPs), and any other remaining CCP2s were designated to be control points (CP).

Moreover, CAC includes HACCP in its codes of practice for hygiene in 1991, and issued its first HACCP guidelines, standards and codes of practice which produced the first international definition for HACCP in 1993 (CAC, 2008). Within the same year, NACMCF reviewed its guidance and standard, and codes of practice for the five initial steps and seven principles of HACCP system (CAC, 2008). Steps 1 to 5 represent the significant and critical addition to the HACCP. The aim of the first step required that HACCP be developed by a cross-functional, multidisciplinary, inter-hierarchical, and broad based team approach. Steps two through five strengthened the team to produce a detailed knowledge and understanding of the type and nature of customer, product, and process used to produce the product in question. Such knowledge, understanding and information serve as springboard for the design and development of critical input into the hazard analysis of the product and process. Prior to this, several HACCP auditors have found and reported several weaknesses and insufficient details about practice, procedure, process, stage, location or area where hazards would occur in the product and production line. It was recommended that the following information such as flow of materials, byproducts, rework, waste, and personnel should be included in the flow diagrams (CAC, 2008).

From 1991 to 1998, WHO and FAO consultations on the above issues and recommendations were carried out systematically in various CAC sessions, and as result CAC and NACMCF issued revised document on standards, guidelines and codes of practice for HACCP in 1997 (NACMCF, 1997, Available at: www.cfsan.fda.gov/~comm/nacmcfp.html. Accessed November 30, 2010). During the revision process, NACMCF harmonized the US definition of HACCP with that of the Codex definition. PRPs were identified as the foundation and building block for the successful development, implementation and maintenance of the HACCP system, and acceptance of HACCP changed third party audit systems internationally to certify or accredit



product and process HACCP systems (Taylor and Taylor, 2008, 2004a, b, c & 2003; Taylor and Forte, 2008; Airey, 2004).

US also decided that the “sanitation audit” should be expanded by including PRPs and HACCP (Baylis, Nogueira, et al., 2010; Baylis, Martens et al., 2009; Buzby, Laurian et al., 2008). Within the EU system, private food safety audit schemes were also designed and developed (Nguyen, Norbert et al., 2009; Wilson and Otsuki, 2003; Otsuki, Wilson et al., 2001). The new EU schemes included the all the 5 initial steps and 7 principles of HACCP, PRPs and various elements of the 1994 version of International Organization for Standardization (ISO) 9001, a standard that specifies the FSMS (Nguyen, Norbert et al., 2009; Airey, 2004). Subsequently, FAO/WHO provided guidance and Codes practice for regulatory assessment of HACCP system (CAC, 2008).

Between 2000 to 2005, it was discovered that several private and national food safety standards were existing separately and with significant differences among them even though they were all for food safety (ISO, 2007; CAC, 1997). These differences created lot of difficulties for food safety third-party certifications. Therefore, the Danish Standards petitioned ISO to design and develop a standard that would define the requirements for a comprehensive FSMS (ISO, 2007; ISO, 2005).

Since HACCP is an evolving system, ISO 22000 was developed to describe the state-of-the-art practices of HACCP and FSMS and provided major millstone in the HACCP FSMS FSMS (ISO, 2005; ISO, 2000). The described HACCP in ISO 22000 was designed for any organization including large, small and medium size enterprises (SME) in the food chain, covering producers, processors, vendors, distributors, retailers, and food service institutions(ISO, 2007). The nature and structure of ISO 22000 is based on the 2000 version of ISO 9001, which is largely different from the 1994 version of ISO. The design and development of ISO 9001:2000 were purely based on a systems approach, by giving significant consideration to all the various elements of FSMS. Just like the ISO 9001:2000, ISO 22000:2005 reduced to an acceptable level the amount of required documentation system (CAC 2008; ISO, 2005; Tall, 2001; ISO, 2000).



Moreover, there was a Development of ISO/TS 22003 by ISO Technical Committee for 34 food products in 2007, and this laid down the guidelines and codes of practice for auditing, certifying and accrediting organizations to ISO 22000 (ISO, 2007). This technical standard requires auditors to have knowledge in both the food-processing sector they are auditing and the overall management of system audits. ISO 22003:2007 further described specific technical requirements for both the certification and accreditation bodies. The purpose of such technical requirements for certification and accreditation is to build customer confidence and transparency through providing adequate information to them about the methods and procedures suppliers obtain certification and accreditation. What is new in this particular standard is the separation of validation and verification which further redefined the HACCP principles (Taylor, 2008; ISO, 2007). HACCP principles and steps originally classified validation under verification, the 11th step and 6th principle of HACCP (CAC, 2008). After this ratification HACCP now considers Validation as a separate function or process of obtaining concrete evidence that the control measures managed by the HACCP plan and the operational PRPs are effective to achieve food safety objectives (FSO) and it should be carried before beginning the implementation of HACCP programme (Taylor, and Taylor, 2008). Verification is considered as the technical process of confirming through the provision of objective evidence that the specified requirements to achieve FSO have been fulfilled, and it should be carried out during and after implementation of HACCP programme, whilst monitoring is argued to be the technical process of conducting a planned sequence of observations and/or measurements to assess whether control measures put in place in the HACCP system are operating as intended, and it should be carried out during implementation of HACCP programme (Taylor, and Taylor, 2008).

Following 2007 to Present, the knowledge, understanding and approach in FSMS are still evolving. Quite recently the American Society for Quality (ASQ) has developed HACCP Auditor Certification (ASQ, 2008), education and training system designed to ensure that professionals have adequate knowledge and understanding in the HACCP standards and the principles of auditing a HACCP-based FSMS properly (ASQ, 2008, available at: www.asq.org/certification/haccp-auditor/. Accessed 30 November 2010).

Similarly the British Standards Institution (BSI) issued a publicly available specification (PAS) titled PAS 220:2008 (BSI, 2008). ISO 22000 certification bodies, Non-Governmental



Organizations (NGO), food producers in collaboration with suppliers, retailers and consumer groups have developed this specification to provide more detailed requirements for HACCP PRPs enshrined in clause 7.2 of ISO 22000 (BSI, 2008). One of the main objectives of this standard or specification is to ensure that the ISO22000 scheme is accepted and implemented worldwide for FSMS. The technical committee working group on the revision of ISO standards is now trying to upgrade the various elements of PAS 220:2008 into ISO standard. The future plan is that further improvements, studies, research and technology to simplify HACCP and PRPs are relentlessly on-going to enable voluntary implementation of HACCP system by food businesses anywhere in the world to ensure food safety.

2.3 The Concepts and Principles of HACCP in Food Safety Management

HACCP is a food safety management tool internationally recognised to address food safety problems through critical analysis and control of biological, chemical and physical hazards from the points of receiving raw materials, production, processing, distribution, storage, and to the final consumption (Codex, 2008; Taylor, 2008; NACMCF, 1997). Example, *“An outbreak of stromboid poisoning in fish led to HACCP becoming mandatory in the US fishing industries ...has spread to become part of the law of many countries, and is underpinning principle for international trade in foodstuffs”*, (Kane and Taylor, 2003).

The implementation of HACCP is the most secure and cost-effective method for controlling hazards during food production (Semos and Kontogeorgos, 2007; Arvanitoyannis and Efstratiadis, 1999). This in turn enhances food safety, business success and excellence and promotes trade by increasing food safety and overall quality assurance (Codex, 2008). The major cost of implementing HACCP is staff time but costs of capital investment and technical expertise are less important compared to important benefits it provides in protecting public health and sustaining consumer confidence nationally and internationally (Semos and Kontogeorgos, 2007; Henson, Holt, et al., 1999; Hansen and Knochel, 1999).

In the UK a formal guidance is now available as a tool to encourage and assess the application of HACCP in Food Industries (BSI, 2008; Barnes and Mitchell, 2000). EU Regulation (EC) No 853/2004, health conditions for the placing on the market of fish and fishery products requires



member states and third country suppliers to introduce systems of inspection and control based on HACCP. HACCP system has twelve (12) steps and seven (7) principles (Semos and Kontogeorgos, 2007; EC 1994, FDA 2001).

The adoption and implementation of HACCP system require other programmes including Good Manufacturing Practices (GMP), Good hygienic Practices (GHP) and Standard Sanitation Operating Procedures (SSOP) (ISO, 2005). These programmes are the building blocks that are required for HACCP system and thus referred to as Prerequisite Programmes (PRP). These PRPs provide the enabling environment and optimum operating conditions and codes of practices designed to meet requirements of international trade in food such as fishery products. Businesses are also required to adopt and implement other operational procedures that are specific to their products and process. PRP also include products, equipment, facilities, specification of materials, suppliers controls, ingredients, packaging materials, personal hygiene, clean-as-you-go, sanitation, training, traceability, pest control, prevention of cross contamination, temperature control and monitoring, recall procedures, and so on.

HACCP including a well-structured quality management system should be adopted and implemented in all countries processing fishery products, in businesses, vessels where processing is done and at fishery products markets to fulfil full requirements regarding safety and quality. National fishery products legislation and inspection authorities should recommend or make it mandatory for all fishery products businesses to adopt and implement HACCP system and include it as part of their quality assurance system.

HACCP system is now the basis of regulations requires for fishery products inspection adopted by the European Economic Community (EEC), USA, Canada and several other developed and developing countries (Huss, 1995 and 1994). In US the FDA regulations made it mandatory for all fishery products businesses to implement HACCP system (FDA, 1995). Similar recommendation is made by EU to enforce the implementation of HACCP in fishery products businesses in member states and third country supplier under the Regulation (EC) No 853/2004.

Established HACCP system requires continuous maintenance, in fact its maintenance is as important as its implementation. The requirements for implementation and maintenance of



HACCP system are verifications, record keeping and documentation (ISO, 2007; Codex, 1997). In food businesses, the product, process, environment, potential hazards and personnel change over time. In fishery products businesses, recording and documenting all scores of parameters including catching, handling, processing, and quality are essential tools to verify that the system is working according to plan. Record keeping and documentation also offers traceability in the product chain. Traceability is the ability to trace the history, application and location of products or process including origin of raw materials, part, processing history, distribution chains or ability to trace all stages of production and distribution of products (ISO, 2007; ISO, 2000; Tall, 2001).

2.4 Fishery Production, Safety, and Trade

Fishery products are relatively “high-risk” food products and are therefore subject to myriads of food safety and overall quality assurance requirements including general food hygiene, microbiological, chemical and physical contaminants (Hong, Luo, et al., 2013; Ginsberg and Toal, 2009). Fishery products from Sierra Leone are currently unable to officially compete in the global market due to a ban from entry into the European Union (EU) and other international markets because of failing to meet the Hazard Analysis and Critical Control Point (HACCP) requirements and Regulation (EC) No 852/2004 on the hygiene of foodstuffs (Megapesca and Oceanic Development, 2009; Sheriff, 2004; Megapesca, 2000).

Globally, the production of fishery products is on the increase and the catch level has been around 90 million tons from the year 2001 (Li and Saghaian, 2012 & 2011). The average annual growth rate of aquaculture production alone reached 6.2% or approximately \$98.4 billion USD by 2008, causing worldwide aquaculture production to hit 142 million tons in 2008, and consequently, the global export and import values reached \$102 billion USD and \$107 billion USD respectively in 2008 (Li and Saghaian, 2012 & 2011; FAO, 2009). China ranks first and the US sixth among all fishery products export countries (FAO, 2010). The global import statistics also estimate that over 80% of the world import of fishery products is still dominated by the EU, Japan, and the USA, and at the same time the number of reported cases of foodborne disease



associated with fishery products has increased dramatically in these countries and region (Ferri, 2005).

For example, it has been estimated that from 1993 to 1997 in the US there were about 76 million reported cases of foodborne illnesses, 325,000 hospitalizations and 5,000 deaths annually, of which 10-19% of all three were caused by fishery products; approximately 7% were associated with the consumption of fishery products (Li and Saghaian, 2012 & 2011). The foodborne disease outbreak alert reported from 1990 to 1998 estimated that 78% of outbreaks in US were associated with the consumption of fishery products (CSPI 2001). The author argues that these examples following the increased consumptions of fishery products demonstrate that food safety is a major concern facing the fishery products sector today. Similarly, several other studies have shown a dramatic increase in consumer awareness of food safety worldwide.

The sharp increase in the requirement for sustainable fishery product safety management also owes a lot to rapid growing of new or re-emerging fishery contaminating pathogens; vulnerability of population with lower immunity and resistance to pathogens and infections from foodborne diseases; concern of the developed world over the health of aging population; and World wide concern over the increase of HIV/AIDS pandemic which has the potential to increase in risks of infection, from contaminated imports (Birk, Gronlund et al., 2010).

2.5 HACCP as a Fishery Standard and Impact on Fishery Trade

Joint FAO/WHO CAC also facilitates fair trading practices in food trade by promulgating standards, guidelines, codes of practice, and recommendation in all food standards (CAC, 2008; Humphrey, 2006). Food standards from CAC are allowed to be used in all national and international trade in fishery products (Bratt and Williams, 2010; Semos and Kontogeorgos, 2007). Though the CAC standards, guidelines, codes of practice, and recommendation have no backing of any international law, it's endorsement by WTO through SPS and TBT agreements has made CAC standards *de facto* mandatory (CAC, 2008; CAC, 2003). An Important CAC standard, Guideline, codes of practice, and recommendation for food production, processing, and distribution businesses is to follow a Food Safety Management System called Hazard Analysis



and Critical Control Points (HACCP) (Board on Global Health Institute of Medicine, 2005). Hathaway (1999), stressed that it is important that any future planning, development and determination of SPS equivalence agreement for international trade should include HACCP as a practical guidelines. HACCP is accepted globally and is now a requirement in international trade and as an effective means of ensuring fishery products safety and overall quality assurance system.

Some businesses are urged by their customers to apply the HACCP, others it is a legal requirement to continue fishery products trading nationally and internationally (Kane and Taylor, 2003). Another driving force is the 'due diligence'. Actors need to show proven compliance or evidence to verify and certify compliance to food safety regulation. 'Due diligence' defence has been provided under UK legislation and have been defended by the UK court (FSA, 2007; EU 2007; Fiddler, 1990). HACCP is a major component of fishery products quality assurance and is the responsibility of the fishery business to implement HACCP in order to ensure compliance with the standards and legislation (Aggelogiannopoulos, Drosinos et al., 2007; Ananda, 2010).

Their interactive information exchange strategy is also pushing fishery businesses towards compliance to safety and quality and to make wise decisions about their very survival in fishery trading (Hui, Chandan et al., 2007). The WTO, FAO, WHO, CAC, EU, US FDA, and other similar professional organizations have been, and presently, promoting the concept that access of fishery products to markets is an important factor for the adoption and implementation of HACCP in fishery businesses (Aggelogiannopoulos, Drosinos et al., 2007; Ananda, 2010).

HACCP is an internationally recognized and widely implemented new food safety management system that seeks to identify the different potential hazards from the point of production to the final consumer (Kane and Taylor, 2003). It has several advantages over the traditional end-product testing method due to its preventive control functions in the inspection and elimination or reduction to an acceptable level of potential food safety hazards (Kane and Taylor, 2003). Many countries, especially developed countries, have enforced new standards or regulations by making HACCP mandatory for fishery products (FDA, 2011, 2010 & 1995; EC, 2004; Huss,



1997).). In the UK, a formal guidance is now available as a tool to encourage and assess the application of HACCP in Food Industries (BSI, 2008; Barnes and Mitchell, 2000).

Prior to HACCP, developed countries implemented food safety regulatory in a stricter form than the developing countries, leading to non-tariff barriers and trade disputes (Prévost, 2010). The author argues that the concept of HACCP as an internationally recognised new food safety standard on international trade of fishery products should be implemented across the globe as a way forward to eliminate non-tariff barriers to trade. Moreover, considering the wide variety of fishery products, this study believes that fishery products generally are particularly vulnerable to a wide variety of hazards, and therefore require a mandatory HACCP system.

For example, the general adoption and implementation of HACCP by fishery businesses in the US began after 1997, when the Food and Drug Administration published codes of practice (COPs) and HACCP plans to assist processors in the identification of potential hazards specific to different varieties of fishery products and in the control of overall food safety (FDA, 2011). Since then, the export of fishery products to US has been influenced by HACCP compliance by all trading partners (FDA, 2011). It can also be argued that the export of fishery products to the US and other developed country markets is influenced by successful implementation of HACCP, and that this will continue to affect global export and import of fishery products. Therefore, the author argues that this influence calls for the adjustment of food safety policies and regulations in developing countries towards HACCP, so that their fishery products can access developed markets in order to increase the benefits they obtain from world fishery products markets.

2.6 Codex Protocol: Steps and Principles of HACCP

HACCP is a food safety management tool internationally recognised to address food safety problems through critical analysis and control of biological, chemical and physical hazards from the points of receiving raw materials, production, processing, distribution, storage, and to the final consumption (CAC, 2008; Taylor, 2008; NACMCF, 1997). The implementation of HACCP is the most secure and cost-effective method for controlling hazards during food production (Semos and Kontogeorgos, 2007; Arvanitoyannis and Efstratiadis, 1999). This in turn enhances



food safety, business success and excellence and promotes trade by increasing food safety and overall quality assurance (CAC, 2008).

The major cost of implementing HACCP is staff time but costs of capital investment and technical expertise are less important compared to important benefits it provides in protecting public health and sustaining consumer confidence nationally and internationally (Semos and Kontogeorgos, 2007; Hansen and Knochel, 1999; Henson, Holt et al., 1999). Codex Alimentarius Commission (CAC) protocol for HACCP system consists of twelve (12) steps and seven (7) principles (Semos and Kontogeorgos, 2007; Kane and Taylor, 2003; EC, 2004, 1994, &1991; Huss 1997; FDA, 2011, 2010 & 1995) The first five (5) steps in the application of HACCP include:

- Assemble HACCP Team through multidisciplinary and inter-hierarchical approach involving experts from production, quality assurance, engineering, product development and even representative from other disciplines.
- Describe Product by given specific principal raw materials, process technologies used to manufacture, storage conditions and shelf life.
- Identify and describe intended use and users, especially where the users are among vulnerable groups such as aged, infant, pregnant, allergenic, and ill population.
- Construct a Flow Diagram covering all the steps in the process from the point of receiving raw materials up to distribution of finished products. This flow diagram forms the basis of hazard analysis.
- On-site Confirmation of the Flow Diagram by HACCP Team through physically checking the flow diagram against the entire operation in the process chains in hours, minutes and seconds and subsequently make modification, if any, of the flow diagram



The last seven (7) steps are called the seven (7) Principles of HACCP (Semos and Kontogeorgos, 2007; Kane and Taylor, 2003; EC, 2004, 1994, &1991; Huss 1997; FDA, 2011, 2010 & 1995) which include:

- Conduct Hazard Analysis by identifying significant potential hazards associated with the food and establish preventive control measures to control the hazards.
- Identify Critical Control Points (CCP) by identifying and describing specific practice, procedure, process, stage, location or area where hazards would occur and of which preventive control measure should be established to prevent, control, eliminate or minimise the hazards to an acceptable level.
- Establish Critical Limits (CL) for each preventive control measure established at CCP.
- Establish Monitoring Procedures for each CCP including what, when, how to be checked and by whom.
- Establish Corrective Actions to rectify or correct when things go wrong.
- Establish Verification procedures to confirm that the HACCP system is working well as planned, designed and developed.
- Establish effective record keeping and documentation systems for the whole HACCP operations. These records and documentations are evidence to show that the HACCP system is working correctly and can also serve as a 'Due Diligence' to protect the company in case of any food safety problem outbreak.

The adoption and implementation of HACCP system require other programmes including Good Manufacturing Practices (GMP), Good hygienic Practices (GHP) and Standard Sanitation Operating Procedures (SSOP) (ISO, 2005). These programmes are the building blocks that are



required for HACCP system and thus referred to as Prerequisite Programmes (PRP) (Kane and Taylor, 2003).

2.7 Rationale behind the Implementation of HACCP in Food Business

HACCP system is an orderly and logical sequence of approach to the identification, prevention and control of hazards associated with food production. It is widely recognized by reputable and internationally recognized scientific bodies, some of which had also developed and implemented national and international modern food safety and quality assurance system, example, United States (US) Food and Drug Administration (FDA), Government Accounting Office (GAO), the National Academy of Sciences (NAS), the National Advisory Committee on Microbiological Criteria for Foods (NACMCF), United Kingdom Food Standards Agency (UK FSA), Codex Alimentarius Commission (CAC) (Bratt and Williams, 2010; CAC, 2008; CAC, 2004; Board on Global Health, Institute of Medicine; 2005). HACCP provides food safety and quality assurances, documentation, and '*due diligence*' that businesses used to assure that production, processing and distribution of food products are under control and are producing safe, wholesome, and unadulterated products (Taylor, 2008).

The underpinning principle of adoption and implementation of HACCP is to stimulate improvement in food safety practices by setting public health-oriented targets, standards, specifications, policies, regulations, guidelines, codes of practice, innovation and changes that all food businesses must meet (Ramnauth, Driver et al., 2008). A key feature of the adoption and implementation of HACCP in fishery businesses is that food safety hazards would be eliminated or reduced to an acceptable level, and concurrently provide tools and framework for holding food businesses accountable for achieving food safety objectives (Ababouch, 2000).

HACCP system in fishery businesses raises new scientific, regulatory and policy framework upon which to set the targets or standards such as microbiological, chemical, physical and other performance limits. The approach of setting up quantitative and qualitative limits ultimately targets hazard elimination or reduction to an acceptable level. As HACCP techniques increases, additional hazards could be identified, targeted, and eliminated making the HACCP system more stringent (Taylor and Forte, 2008; Taylor, 2008). This research emphasized that the HACCP



approach is a way to achieve effective control and determine the effectiveness of food safety hazards control in the production, processing and distribution of fishery products over time. Certification or accreditation of the HACCP system can be used to evaluate and approve the safety of individual batch of fishery product.

2.8 Pressure on the Fishery Business

The author argues that the modern fishery businesses world wide are under increasing pressure and demand to fine tune their safety and quality assurance and assessment systems . The hardest hits are those from developing countries especially least developing countries. Many developing countries within the sub Saharan Africa are banned from exporting their fishery products to developed countries international markets because of health and safety reasons, following non-compliance of fishery products from developing countries with GHP, GMP, SSOP, HACCP and overall quality assurance (QA).

Fishery safety legislation are becoming tightening more and more following sophisticated training of inspectors in fishery safety hazards. Consumer awareness is also increasing with higher expectations and the media are more prepared now than ever to capture and publish event on fishery safety hazards. This has urged the fishery business to adopt and implement HACCP systems and moved away from the traditional end product testing. The least developing countries' fishery businesses should now adopt and implement standardized systems and frameworks to facilitate the development of fishery safety and QA system that demonstrate to consumers and regulatory authorities' world wide that their fishery products are safe for human consumption. Food safety and QA are continuously evolving and developing countries and SMEs need to keep abreast of these changes to remain competitive and meet international market requirements for export (Griffith, 2006; Griffith, 2005; Gilling, 2001; Taylor, 2001).

2.9 Constraints for Developing Countries in International Trade of Fishery Products

It is still evident that even after the ratification of the Sanitary and Phytosanitary Agreement (SPS) under the World Trade Organization (WTO), differences still continue to exist between various trading partners' national standards, inspection and certification systems; and further strengthening and/or creating new non-tariff trade barriers or TBT (Greenhalgh, 2004). In 2001,



EU banned the export of shrimp from China and Indonesia because of residual chloramphenicol and as such shrimp exports from these countries into EU has decreased by 64 percent (Cato and Lima dos Santos, 1998).

2.10 Agreements under WTO in Trade of Fishery Products

The SPS Measures under the WTO are considered the most relevant for liberalisation of international trade in fishery products both for exporting and importing countries and can serve as barriers if not complied with by trading partners (Greenhalgh, 2004). The fact is that SPS is very prominent and stands clearly in HACCP. The principles and steps of CAC HACCP protocol are the same and provide equal levels of health and safety protections in all countries. The WTO SPS agreement on international trade of fishery products favours CAC HACCP because, it establishes rules reflecting CAC standards for fishery products; allows the use of equivalence principles that will achieve equal levels of health and safety protections irrespective of different measures used by exporting and importing countries (Greenhalgh, 2004).

2.11 Safety and Quality of Fishery Products

There are different of opinions regarding quality of food, but with regard to fishery product we mean safety, nutritional value, integrity and freshness (Bremner 2002). The most significant quality of fishery products is the safety aspect. Safety of fishery products is mostly influenced by freshness or degree of spoilage (Snow, Davies, et al., 2010; Özogul, Polat, et al., 2004;). The method of catching, handling, processing and storage can also affect the safety and quality as they can lead to incidence of defects such as bruises, bloodstains, trimming imperfections, burst belly, strong off odour, sunken eye, soft loin and matt skin (Vladimirov, 2011). These can serve as technical barriers to trade of fishery products.

2.12 Barriers Suggested By International HACCP Regulators

In certain least developing countries (LDCs) some fishery businesses and regulatory authorities don't actually know what the HACCP system is all about whilst others feel that the system is too scientific, technological and complex all together (Ollinger and Moore, 2007; Wang, Weng et al.,



2007). Some HACCP studies have reported that despite the widespread dissemination and scientific support of HACCP principles, successful adoption and implementation of HACCP are yet to be experienced, especially in the LDCs (Taylor and Taylor, 2003; Gilling, Taylor et al., 2001). In the case of Sierra Leone, the major problem is that no study has been undertaken to uncover the perceptions of those responsible for national food safety infrastructure on barriers that impede the adoption and implementation of HACCP; thus no literature currently exist on the perceptions of stakeholders on HACCP barriers for the country.

Critical reviews of literatures show that barriers that impede the adoption and implementation of HACCP have only been identified generically and most of the studies were undertaken in developed countries that have started practicing HACCP. An insight of HACCP barriers analysed by Jevsnik, Hlebec, et al., (2006) in twelve articles found that 21 different barriers have been uncovered including human, training, knowledge, documentation, resources, planning, management, operations, credibility, organisational, customer, transportation, hazard analysis, personal, food handling, food safety, communication, responsibility, legislation, infrastructure and maintenance.

This study suggests that since these studies were undertaken outside the perceptions and feelings of those involved in food safety infrastructure in LDCs, most of the barriers may not have resonance for the food safety problems in Sierra Leone. Apparently, barriers of HACCP discovered in other countries are published in some academic journals (Kane, 2011; Azanza and Zamora-Luna, 2005; Taylor and Taylor, 2004b; Taylor and Taylor, 2004c), but the need to carry out new studies on barriers for Sierra Leone need not to be over emphasised

Lack of understanding of technical barriers of HACCP in LDCs is mainly responsible for non-adoption and implementation of HACCP in LDCs, and various terminologies are used to refer to barriers such as ‘burdens’, ‘bureaucratic nightmares’ or ‘hassles’; and sometimes there are various types of names and interpretations given to one notion of barrier or a sub-division of one notion (Maldonado, Henson et al., 2005; Strohbehn, Gilmore et al., 2004; Von Holy, 2004; Deodhar, 2003; Roberts and Sneed, 2003; Hooker, Nayga Jr., et al., 2002).



These different categorisation or sub-division of a single barrier not only create more different interpretations of barrier but also make the adoption and implementation of HACCP in LDCs more difficult, and this is one of the areas that is currently under researched in HACCP. Literature on a study entitled: ‘Successful Hazard Analysis Critical Control Point Implementation in the United Kingdom: understanding the Barriers through the use of a Behavioural Adherence Model’, undertaken in United Kingdom attempted to provide a model that serves as a tool to properly specify and locate barriers of HACCP in order to facilitate tailored and constructive intervention (Gilling, Taylor et al., 2001).

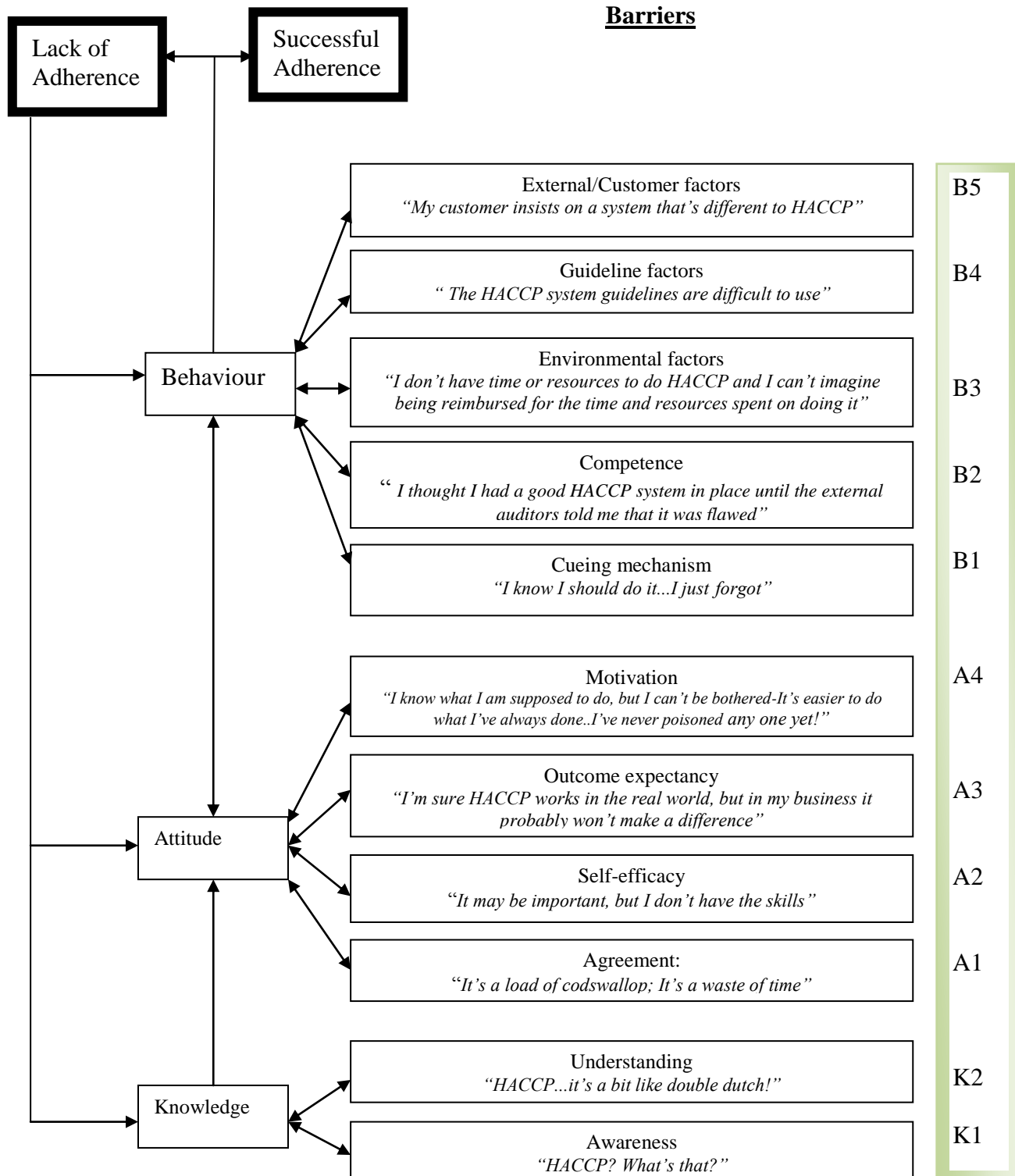
This model was proposed to demonstrate solution to the complexity of the barrier terminologies and the wide range of notions for single barrier through grouping the potential barriers into knowledge, attitude, and behaviour (Gilling, Taylor et al., 2001). This study adopts and modifies this model for the conceptual framework to identify, assess and locate barriers perceived by the local regulatory, enforcement and businesses for a tailor-made targeted intervention in Sierra Leone.

The suggested HACCP awareness to adherence model illustrates 11 key barriers that impede successful implementation of HACCP system in United Kingdom (Figure 1, [page 33](#)). These barriers include: a lack of awareness, understanding, agreement, self-efficacy, outcome expectancy, motivation, presence of a cueing mechanism, and competence; and negative environmental factors, guideline factors, and external factors. From the literature review it seems that the 11 barriers are not exhaustive and mostly applicable to developed countries where the adoption and implementation HACCP has started, but the definition and grouping of the barriers into knowledge, attitude and behaviour may attempt to narrow the different notions and wide range of meanings given to single barriers, and consequently, make the identification, definition, assessment, grouping and location of perceived barriers from LDCs more likely.

The model also suggests that the difficulties with the adoption and implementation of HACCP may be caused by one or more barriers across the groups of knowledge, attitude and behaviour; thus the model illustrates a framework for proper identification, assessment, and location of

barriers to enhance targeted intervention to remove the barriers that impede successful adoption and implementation of HACCP.

Figure 1: HACCP Awareness to Adherence model, Gilling, Taylor et al., 2001





2.12.1 Composite of Administrative, Managerial, Organisational Barriers

Several years' practical experience and a review of fishery HACCP literature indicate that failure in compliance with HACCP requirements in fishery business in LDCs is caused by administrative, managerial and organizational barriers. The barriers imposed by these various sets of interrelating difficulties, caused even the largest fishery businesses, equipped with state-of-the-art premises, equipment, facilities, materials, and money still not able to implement HACCP system. This lack of model or leading role by largest fishery businesses has served as another non-technical barrier (NTB) for the small and medium sized enterprises (SMEs) who believed that problems of implementation of HACCP are highly insurmountable (Taylor, 2008). For example, in Sierra Leone the largest fishery business that is also SME is not implementing PRPs and HACCP, and therefore, all other SMEs fishery businesses are not yet ready to do so.

These composite of administrative, managerial, and organizational barriers vary from fishery business to fishery business locally. In certain businesses internal factors including lack of management commitment and internal policy, non awareness of food safety management programme such as HACCP, lack of suitable and adequate knowledge and understanding of HACCP and PRPs, cultural beliefs and complaisance of the traditional method of doing things, and lack of required resources are the main hurdles in Sierra Leone. Generally in LDCs, there is lack of up to date fishery safety regulations, weak enforcement of basic hygiene policy, insufficient national scientific research data, none availability of government support and the like also form major technical and none technical barriers (NTBs) (WHO, 2008).

2.12.2 Lack of knowledge and understanding of HACCP Barriers

Despite the development of Codex Alimentarius Commission (CAC) HACCP protocols including 12 steps and 7 principles, many LDCs are still facing significant barriers to the development and implementation of the HACCP system within their fishery production, processing and distribution chain (Von Holy, 2004). The major barrier reported is lack of knowledge and understanding in HACCP in fishery businesses where there are high turnover of fishery products, several types of fishery products, high demands of fishery products, heavy



workloads and large numbers of casual workers and individual contractors (Panisello and Quantick, 2001).

Today HACCP is progressively mentioned, introduced, claimed, and praised by fishery businesses and some of them hosted the CAC HACCP protocol on their websites, but it is not developed and implemented in their fishery safety management system (Maldonado, Henson et al. 2005). From experience, the system can be considered as an effective tool that is simple to develop and implement by both fishery business and regulatory authorities to prevent foodborne diseases if it is fully understood by the fishery businesses. To say but the least, the success of any HACCP plan does not depend on the HACCP plan itself, but on the degree of knowledge and understanding by those who implement the plan. This study suggests that several variations in fishery products patterns, demand and supply, are expected and therefore those implementing the HACCP system should be adequately knowledgeable and understand the HACCP system well in order to adapt to these variations.

It can be argued that the deficit of relevant knowledge and practical skills among staff of fishery businesses in LDCs caused lack of clarity regarding the concepts of HACCP, and created uncertainty regarding their continuous employment, and consequently hindered the formation of full HACCP team. The fishery businesses in turn, perhaps, because of their sizes are unable to pay for overtime for staff to attend HACCP meetings. Lack of scientific publications, historical knowledge, regulatory documents, experimental trials, and other approaches hindered the fishery businesses in many LDCs to adopt HACCP system. Lack of knowledge and understanding also cause a big confusion between good hygienic practice (GHP), good manufacturing practice (GMP), standard sanitation operating procedure (SSOP), HACCP, international organisation for standardisation (ISO), total quality management (TQM) and overall quality assurance (QA) (Khatri and Collins, 2007).

2.12.3 GHP, GMP, SSOP or PRP Barriers

Lack of familiarity with GMP, GHP, SSOP or PRP and HACCP rules in the fishery businesses in many LDCs is related to poor business infrastructure and lagging skills which hindered their ability to make informed decisions relative to potential benefits (Khatri and Collins, 2007; Bas,



Ersun, et al., 2006; Panisello and Quantick, 2001; Wallace and Williams, 2001). In most developing countries the majority of GMP, GHP, and HACCP limiting factors are related to a weak economy, lagging skills and poor infrastructure (Jackson, 2006). These leave the responsibility of fishery safety to consumers. Lack of familiarity with GMP, GHP, HACCP principles created a lot of confusion among the fishery businesses, which made them unable to distinguish between quality and safety and considered HACCP as over regulation, which have the potential to rigid the overall fishery legislative system (Jackson, 2006).

2.12.4 Training Barriers

Development of curriculum and delivery of training programmes in HACCP and its PRPs are not usually conducted for fishery businesses in certain developing countries, though it will help the personnel (workers and managers) with a better understanding in fishery safety and handling to result in safer fishery products. Only someone trained in HACCP and its PRPs can effectively, plan, design, implement, enforce, and maintain the HACCP plan (Airey, 2004). For most of the developing countries, for example Sierra Leone, HACCP is not part of the national curriculum in Schools, Colleges and Universities and businesses and even the regulatory authorities have not received appropriate training in HACCP and PRPs. There appears to be a major obstacle for applying HACCP and Pre-requisite Programs (PRP) (Wallace and Williams, 2001). There are no indications that this type of assistance is currently available to the fishing businesses in the Sierra Leone, but the influence of market access requirements determine the government's commitment in meeting similar or equivalent HACCP requirement of the importing countries. Lack of trained and experienced personnel are few examples of the constraints and problems in the development and application of HACCP that still exist in several developing countries (CAC, 2003).

2.12.5 Socio-economical and Cultural Barriers

Different socio-economic situation, the environment, cultural values, movement of people, trades of goods and services has hindered successful implementation of HACCP in fishery businesses (Sweet, 2010). From experience, producing, processing and distribution of fishery products to meet consumers and society expectations based on HACCP is a very complex undertaking. On



one hand the product has multiple intended use, the Japanese preferred to eat the salmon raw that has been considered to be cooked properly before eating as described in the HACCP plan as preventive control measures for biological hazards (Sweet, 2010). Fishery businesses export products to different parts of the world, where the socio-economical situation, the environment, cultural values, and regulatory requirements, are different from the existing local condition.

2.12.6 Information Barrier

Experience in Sierra Leone shows that there is no proper communication between the fishery businesses and the fishing vessels whilst fishing and handling fishery products on board vessels, neither a network system such as an interactive website that links the fishery businesses and the companies of the fishing vessels to jointly develop and implement PRPs and HACCP programmes. No traceability system to track fishery products lot-by-lot from the points of catching through transit or on board vessels up to the ports of entry or fishery businesses. Perhaps lack of effective information network may be one of the reasons why the receiving point at the fishery businesses should be considered as the CCP for most of the potential hazards identified. It can therefore be argued that lack of proper communication network further hampered effective collaboration between fishery businesses and their vessels in terms of verification of documentation, dialogue and partnership that served as building blocks for Critical Limit (CL) in the HACCP Plan. This often caused delays in the verification of CL for product in the vulnerable business environment, and consequently serves as unnecessary Technical Barriers to Trade (TBT).

To the worst, customers are not informed about the safety nature of fishery products, as there are no labelling, traceability tags, lack of storage and handling instruction including health and safety signs, thus making effective implementation of HACCP/SSOPs a daunting task (Tall, 2001). The author argues that many products from fishery businesses in Sierra Leone have feeling of distrust towards the safety and quality assurance and they wrongly classified as “glaze or ice” fish even though they are not glazed.



2.12.7 Cost as a Barrier

The cost of implementing HACCP and its PRPs has been identified as a major barrier in the food businesses by other HACCP studies. The Managing Directors (MDs) wanted the HACCP but they cannot afford to pay the staff for extra hours to attend HACCP meetings (Taylor and Kane 2005). Structures and materials such as the hand washing basins, sinks, gowns, safety boots, cutting boards, chemicals, equipments, and other personal protective equipment (PPE) which are needed to buy or change are yet visualized (Taylor and Kane 2005). Certain SMEs considered these costs big relative to the small size of their various plants. The initial cost may be considered as a huge amount from the revolving business capital with consequence on their normal stock rotation.

2.13 Suggested Benefits by International HACCP Regulators

HACCP can establish visible and sustainable quality assurance (QA) system that can provide the genuine consumer confidence, market share, and subsequently strengthen the business to produce and sell more products (Maldonado, Henson et al. 2005; Strohhahn, Gilmore et al., 2004; Von Holy, 2004). In the literature review, the main reason for SMEs not undertaking HACCP is specified as existence of 'barriers' within the food safety infrastructure (Ollinger and Moore, 2007; Wang, Zhang et al., 2009; McSwane and Linton, 2000). The benefits of implementing HACCP could be determined more easily if more data on benefits are available especially for Sierra Leone that is still not sure about the outcome expectancy of HACCP. The most common benefit of HACCP proposed by some international regulators is the regulatory compliance for SMEs (Kane, 2011). However, the SMEs in Sierra Leone may not have appropriate food safety regulation to comply with in the first place.

Some literatures also suggest that certain SMEs in meat processing in USA achieve reduction of wastage of materials from rework due to compliance with HACCP (Nganje and Mazzocco, 2000). In terms of business management HACCP has also proved essential for management and administration of SMEs (Nganje and Mazzocco, 2000), but again the author argues that these SMEs could be from developed economies that are effectively practicing HACCP.



Experiences in HACCP show that benefits identified by some regulatory authorities that accrue from the adoption and implementation of HACCP are most likely, to encourage food businesses to adopt the system; but the problems are that the sources and provenance of such data and the methodology of collecting the data are difficult to verify such benefits for SMEs in Sierra Leone and perhaps other LDCs. Therefore, it can be argued that benefits of HACCP in the work of international regulatory authorities are likely for developed economies and have very little or no relevance to SMEs in Sierra Leone, because there are not practicing HACCP and not adequately familiar with the system. In other words, more benefits of HACCP are expected for Sierra Leone than those suggested by international regulatory authorities, mainly because of myriads of their chronic food safety problems. It can be argued that after long years of suffering of LDCs from international barriers, HACCP is their only hope to benefit from trade liberalisation, thus expect more benefits than those suggested by international HACCP regulators.

However, it is essential to carryout comparative studies and analysis of the potential benefits proposed by international regulators that can be accrued from the effective implementation of HACCP against the results of this study. The expected outcome of such comparison may uncover the differences and similarities in terms of agreement or disagreement between the views of the international HACCP regulators on the food businesses who have successful HACCP system in place against those perceptions of regulatory authorities in Sierra Leone who have the challenges to enforce and encourage adoption and implementation of the HACCP system.

Table 1, below attempts to synoptically illustrate various benefits of HACCP suggested by some of the international HACCP regulators (Kane, 2011). Those benefits suggested by the international HACCP regulators are indicated in Table 1, by shaded areas in light blue colour for ease of identification and differentiation. There is also a problem with the determination of succinct definitions of these benefits in order to provide full meanings as determined by the international regulatory authorities, but from the critical review of the literature for this study, the following definitions were attempted (Bratt and Williams, 2010; Taylor, 2008; FSAI, 2007; FSA, 2004; SFAC, 2004; WHO, 1999; FDA, 2011, 2010 & 1996):



Table 1: Benefits of HACCP suggested by International HACCP Regulators And other interested parties (FSAI, 2007; FSA, 2004; SFAC, 2004; WHO, 1999; FDA, 2011, 2010 & 1996) (Kane, 2011)

Ranked HACCP benefit by other HACCP regulators						
Ranked	Other Specific Regulators					Benefit
	FSA	FSAI	FDA	WHO	SFAC	
1 st						Prevention of FBI
1 st						Reduction in Costs
1 st						Legal Protection
1 st						Better Risk Management
2 nd						Customer Confidence
2 nd						Improved Market Access
2 nd						Product Improvement
2 nd						Team Ownership
3 rd						Improved Relationships
3 rd						Improved Management
3 rd						Improved Trading
3 rd						Process Based

2.13.1 Prevention of FBI: as a benefit of HACCP is that the state supports the businesses, through the provision of strict rules on GHP, standard sanitation operating procedure (SSOP), and other health services through the implementation of HACCP to preventively control foodborne illness (FBI).

2.13.2 Reduction in Cost: means the implementation of HACCP is cost effective and can meet the financial requirements of all food businesses.



2.13.3 Legal Protection: refers to the ‘due diligence’ provided by the effective implementation of HACCP to protect against customer complaint of illness resulted from consuming food from a business.

2.13.4 Better Risk Management: is the concept for an enhancement in the food business to preventively control and manage food safety risks.

2.13.5 Customer Confidence: is a measure of the level of optimism customers have about the performance of the business in the assurance of food safety and quality.

2.13.6 Improved Market Access: is the benefit that HACCP may help a business to lift export ban and access global markets fairly and without compromise to food safety and quality.

2.13.7 Product Improvement: benefit of HACCP is a systematic approach to be acquired from HACCP implementation to help businesses optimize its underlying processes to achieve more efficient results in the improvement in food safety, quality, consistency and reliability.

2.13.8 Team Ownership: is a HACCP benefit that facilitates teams to work collaboratively to achieve food safety objectives within the business.

2.13.9 Improved Relationships: is a benefit of HACCP that facilitates better relationships with all facets of the business.

2.13.10 Improved Management: benefit is derived from implementation of HACCP that ensures a holistic management approach that aligns all aspects of food businesses, promotes business effectiveness, efficiency, innovation, flexibility and integration in order to meet and exceed customer expectations.

2.13.11 Improved Trading: as a benefit means that successful implementation of HACCP guarantees the safety of the product and consequently increase sales and turnover of the product; whilst.



2.13.12 Process Based: as a benefit of HACCP means that any problem affecting the food products would be detected during the processing stage since it is unlikely to do 100% sampling and analysis of finished products to achieve food safety objectives.

Where developing countries and/or SMEs understand that the benefit of implementing HACCP outweighs the costs of removing the HACCP barriers on the businesses, they will voluntarily decide to remove those barriers to start the implementation of HACCP (Wallace, Sperber et al., 2011; Unnevehr, 2000). The cost of implementing HACCP is usually staff time and energy because most of the financial costs come at the initial stage and is one time, thus a rational investment for SMEs and LDCs (Kane, 2011; Worsfold, 2005; Kane and Taylor, 2003).

It can be argued that the time, energy and money for removing HACCP barrier are investments that yield maximum returns as benefits for implementing HACCP by businesses, and therefore cost effective. Similarly, if the barriers are seem to be insuperable, that means they are not relevant to produce the desired benefits. It can also be argued that understanding and awareness of barriers by the businesses are paramount for their removal; otherwise, the barriers become impassable, even where the benefits for removing those barriers are greater (Bas, Yo'Ksel, et al., 2007).

It can also be argued that even if the benefits outweigh the barriers, the decision to remove the HACCP barriers is mostly the decision of the businesses concerned since they are responsible for the safety and overall quality assurance of their food products, despite that regulatory authorities and enforcement officers may have the mandate to sanction the effective implementation of HACCP. Therefore, in HACCP intervention it is paramount to weigh the barriers and benefits and determine if the benefits outweigh the barriers or if those benefits are relevant to the food safety requirements of that business.

Perhaps, one of the major challenges for the SMEs especially in LDCs is that, the barriers of HACCP are unclear, taking into consideration the various negative environmental factors, lack of knowledge, skills, expertise, awareness and motivation, but the benefits are many and easily discernable. In developed countries, the larger food businesses have several merits for

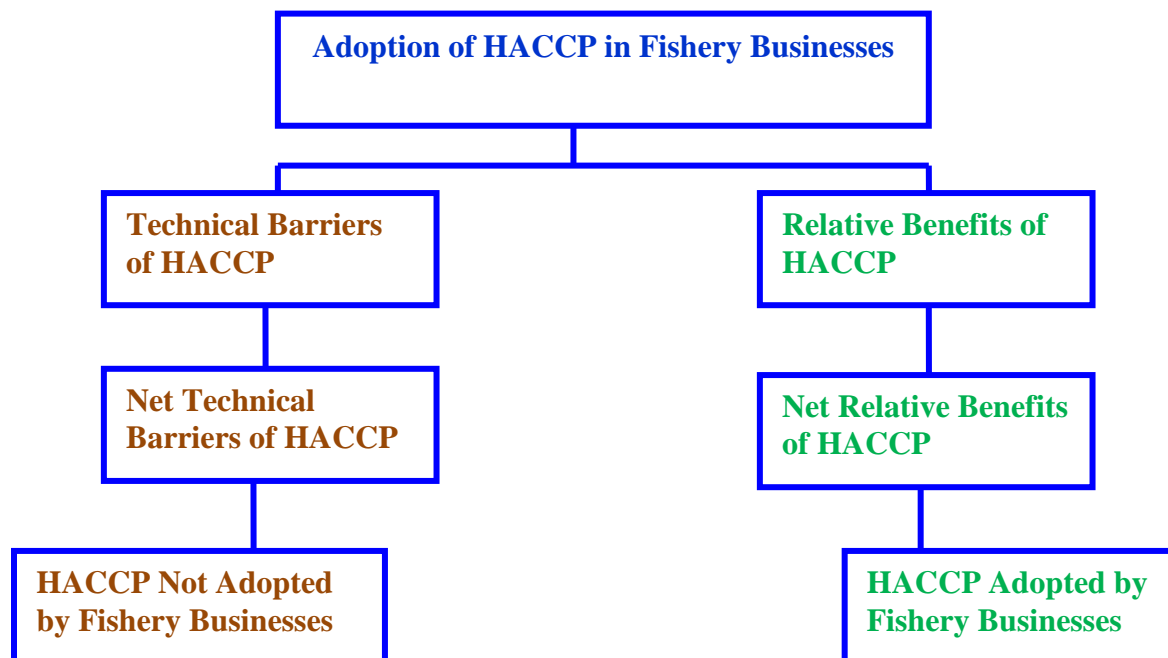


implementing HACCP such as customer demands due to pressure from existing consumer advocacy groups, mandatory compliance to public food safety standards, and the requirements for private standards, but are not as many of the benefits for LDCs that currently have many areas to exploit following successful implementation of HACCP. The author argues that several merits of HACCP in LDCs are not extant in developed countries because their larger businesses don't have clear barriers such as lack of consumer advocacy groups, lack of public food safety standards, private standards, to list but a few.

This study looks at the fishery businesses in a LDC that have not adopted and implemented a HACCP system. However, they are not clearly familiar with barrier versus the benefit equation; but they should be able to perceive the barriers that have impeded their compliance with HACCP and types of HACCP benefits and their relative importance if given the right opportunities such as the methodology of this study. By doing so, one could equate these barriers versus the relative benefits and compare them with those benefits suggested by international HACCP regulators.

Resultantly, the regulatory, enforcement and businesses would be in a vantage position to reflect on whether the benefits outweigh the barriers. This will figure out the decision of the local fishery businesses to voluntarily adopt HACCP or the adoption and implementation follow the sanction by the national regulatory and enforcement officers. By applying the cost and benefits analysis model proposed by Henson, (2004) the fishery businesses in Sierra Leone will attempt to make a decision on the removal of HACCP barriers to adopt HACCP through the model given below in Figure 2, (Griffith, 2006).

Figure 2: Barriers and Benefits Decision Model to adopt HACCP in fishery businesses in Sierra Leone (Adapted from Henson, 2004, for this Study)



The fishery businesses now face the choice of removing the barriers to adopt HACCP to achieve the HACCP benefits or not. Nevertheless, such decision by the fishery businesses depends largely on their awareness and acknowledgement of the barriers and the relative benefits of adopting the HACCP system. Certainly, the awareness and acknowledgement of barriers and their relative benefits seem to be unclear for most of the SMEs in LDCs. Moreover, it seems unlikely for the SMEs in LDCs to assess the significance of benefits of HACCP if they are not aware of the HACCP barriers. This study suggests that the awareness and acknowledgement of HACCP barriers by regulators and businesses are more likely enhanced if the regulators and businesses are given opportunities to give their perceptions and feelings about the HACCP barriers.

The third objective of this study is to compare the benefits of HACCP as suggested by international regulators against those benefits perceived in Sierra Leone, but the first priority is the identification of the barriers. The reason is that it is more difficult to identify the benefits of HACCP other than regulatory compliance, if the barriers are not known and acknowledged by those adopting or planning to adopt the HACCP system (Kane, 2011). Perhaps this is why SMEs



especially those in the LDCs are unable to adopt HACCP, because they still lack the knowledge about the barriers and benefit calculation and consequently, are unwilling to go ahead with the adoption.

Nevertheless, the author argues that the involvement of those involve in food safety infrastructure in the identification of HACCP barriers provides a realistic solution of the difficulty of calculating the merits and demerits of making decisions about adopting HACCP where the barriers and benefits of HACCP are unknown. With this notion one can suggest that the decision by the SMEs in LDCs not to adopt HACCP system cannot be squarely based on lack of willingness, but perhaps it could be rational to say that it is due to lack of knowledge and understanding of the barriers and benefits of HACCP.

Lack of knowledge and understanding of barriers especially among the LDCs have been used as protectionist tools that put developed countries into vantage position to justify ban on export of food products from LDCs, and this can be considered as a trade discrimination (Anders and Caswell, 2009). For example, fishery products from Sierra Leone are currently banned to enter developed markets because lack of HACCP certification is making HACCP to serve as barrier instead of benefit to the country. However, it can be argued that the word discrimination holds where enforcement is more rigorous for products from third countries than the domestic counterpart (Anders and Caswell, 2009). This can be considered as measure contrary to the Agreement on the application of SPS Agreement under the WTO. Nonetheless, if countries take less pessimistic view of the role of food safety standards as an opportunity to access developed markets and increase their trade opportunities, they could be motivated to develop and implement appropriate standards to remove the barrier. This means that benefits for implementing appropriate standards now outweigh the idea of trade discrimination from imposing stricter standard. As a result one can assume that benefit of standard as a trade catalyst outweighs the notion of standard as a barrier (Anders and Caswell, 2009). This means that in figure 2, above, the weight of benefit will outweigh the weight of barrier, thus benefit becomes a catalyst to provide various incentives for LDCs to develop state-of-the-art food safety infrastructure to be become export- oriented and improve public health domestically.



Barriers may act to impede the adoption and implementation of HACCP and subsequently, affect trade flows by imposing export bans and heavy cost of compliance, especially in developing countries (Jaffee and Henson, 2004; World Bank, 2005). In this case, the weight of barriers outweighs the weight of benefits in figure 2, above. There are also potential benefits arising from the implementation of HACCP. Certain countries may be able to use HACCP standards to their competitive advantage and increase market access (Jaffee and Henson, 2004; World Bank, 2005). The chances for the adoption and implementation of HACCP are higher by closing the gaps between barriers and benefits causing more benefits of implementing HACCP than the barriers. According to Jaffee and Henson, 2004, the comparison between the impact of barrier and benefit is more complex in reality. Therefore, this requires in-depth analysis of the growing markets to understand how more benefits of HACCP encourages implementation of HACCP and more barriers discourages the implementation of HACCP in developing countries.

2.14 Synopsis of Fishery Food Safety Regulations in EU, USA, Japan and Sierra Leone

2.14.1 Introduction

Fishery products are relatively “high-risk” food products and are therefore subject to myriads of food safety requirements including general food hygiene, microbiological, chemical and physical contaminants (Cunningham, Neiland et al., 2010; Burger, Jeitner et al., 2009; Dey, Rab et al., 2005; Özogul, Polat et al., 2004; Ruiz-Capillas and Moral, 2004; Özoğul and Özogul, 2002; Huss, 1997; Pitchforth, 1967). It has been estimated that 15% of 76 million yearly foodborne illnesses in United States are related to the consumption of fishery products (Mead, Slutsker, et al., 1999). This subsequently contributed to the mandatory introduction of HACCP in fishery businesses in United States in 1997 (Anders and Caswell, 2009). Regulation on the hygiene of foodstuffs, (EC) No 853/2004 requires member states and third country suppliers to introduce systems of inspection and control based on HACCP in fishery businesses (EC, 2004).

But challenges in tackling food safety are one of the serious global problems and has contributed to most of the morbidity and mortality (Chen, 2009; Kane and Taylor, 2003; FDA, 2001). As the spread of new and emerging Foodborne diseases increases so countries fine-tune their food



safety assessment system to counter those challenges (Tesfamichael and Pauly, 2011; FSA, 2002; FSA, 2001). In response to the increasing number of foodborne illnesses, most countries are intensifying their efforts to improve food safety by reviewing their policies and regulations, implementing tools for the early identification of potential hazards to food safety, with the aim of preventing and controlling these hazards from developing into health risks (Wang, Zhang et al., 2009; FAO/WHO, 2006; FAO/WHO, 2005; FSA, 2005).

However, there are major differences between developed and developing countries when it comes to food policies and regulations to protect consumers from fraud and unfair trading practices (Wang, Zhang et al., 2009). Several developing countries have no food law and therefore general food safety and quality assurance activities are seriously fragmented (Dey, Rab et al., 2005). Their food safety and quality assurance activities remained far below international standard and therefore are unable to export to EU, US, Japan and other developed countries international markets (MEMO/01/248 REVISED Brussels, 18 December 2001). In most of these countries especially LDCs, the responsibilities of various government ministries, parastatal, departments, and agencies involved in fishery products safety activities are often not properly coordinated, clearly defined or they often overlapped. They often have poor facilities or infrastructure including, equipment, communications, transportation, infrastructure, suitably trained and qualified personnel, which are among major barriers that hindering the development and implementation of HACCP and its PRPs (Peter, Zollers et al., 2004).

As a result government response to export ban on food products, for example ban on export of fishery products from Sierra Leone, due to safety and overall quality assurance requirements in international export markets have been very slow and bureaucratic. Most developing countries especially those in the African-Caribbean-Pacific (ACP) are still unable to technically contribute in the international institutions that have evolved to establish global food safety standards, including fishery safety standards (CAC-Agenda Item 14b, 2010).

These overwhelming differences in food safety and quality assurance policies, regulations, communication, understanding, mutual recognition and confidence between inspection services of trading partners in developed and developing countries have seriously affected the food



products including fishery products from LDCs to compete in the global market (Victor, 2000). The concerns of developed countries are valid as they would like to prevent any harm to their citizens, plant and animal life and health due to pest and diseases carried-in through export of food and agricultural products such as fishery products (FSA, 2007; FSA, 2005; FSA, 1998).

Therefore, developing countries must develop and implement a strategy for reviewing, validating, negotiating and arriving at just and fair food standards for their strategically important food products including fishery products (Manning, 2007; Manning and Baines, 2004; Shears, Zollers et al., 2001). Hence, policies, regulations, standards, codes of practice, and guidelines prescriptions for developing Countries are two-fold including domestic reforms in a direction of implementing effective HACCP system compatible with the requirements of Joint FAO/WHO Codex standards, EU Food Legislation; Rapid Alert System for Food and Feed (RASFF) of the EU including early warning (ER) system; and the International Food Safety Authorities Network (INFOSAN) (Mai, Bogason et al., 2010; Alfaro and Rabade, 2009; Suwanrangsi, 2000). The second strategy could be re-negotiation of SPS and TBT clauses.

The following sub-sections covered brief analysis of the EU, USA, Japan and Sierra Leone fishery safety policies or regulations. These countries were selected because they all influence the policy, regulatory and market position of developing countries such as Sierra Leone in fishery products safety management and market access. Following these is the comparison between food safety management system of Sierra Leone and developed countries.

2.14.2 European Union (EU) Regulatory Framework

In the EU and many other developed countries or regions it is mandatory for member state or third country supplier to undertake a system of “own-checks” based on the following steps that are compatible with Codex HACCP protocol (EC, 2004;1994; 1993; 1992;1991): identification of critical control points (CCPs) in the production, processing and distribution facilities that are specific to the manufacturer processing techniques; monitoring and controlling CCPs; sampling and analysis in approved public health laboratory to verify and certify cleaning, disinfections,



and other relevant requirements; record keeping and documentation of all activities for minimum of two years.

Government and statutory fishery regulatory authorities are concerned with codifying standards, codes of practices and to protect consumers from fraud and dishonest trading practices in the sale of fishery products. For example, EU laid down Regulation (EC) 852/2004 of the Council on the hygiene of foodstuffs (e) as amended by Regulation 219/2009; Regulation (EC) 853/2004 of the Council laying down specific hygiene rules for food of animal origin(f) as amended by Regulation 2074/2005; and Regulation (EC) 854/2004 of the Council laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption(g) as amended by Regulation 882/2004, to protect their consumers from fraudulent, dishonest and unfair food trading practices (EC, 2004).

All “own-checks” for EU member states and third country supplier must demonstrate full compliance with all requirements in the Regulations (EC) 852/2004, 853/2004, and 854/2004, and HACCP (EU, 2010; Statutory Instruments No. 534, 2010; EC, 2009a; 2009b; 2009c; 2009d; and 2009e; BRC, 2005; Swoffer, 2005; EC, 2005; EC, 2004). This study considered fishery safety management as the assurance that the fishery product with consumer is safe for human consumption when produced, processed, distributed, and prepared for eaten according to its description and intended use.

Each day millions of people become ill and thousands die from a preventable Foodborne disease, and economic devastation in terms of medical costs, lost of employment and productivity caused by foodborne diseases is overwhelming (Mai, Bogason et al., 2010). The purpose of fishery safety regulations in any countries is to prevent the production, processing, distribution and sale of fraudulent fishery products and mostly concerned with freshness, composition, weight, defects, and traceability (Johnson and Peppas, 2003; Baines, 2002; EC, 2002; Early, 2002; European Parliament & Council of the European Union, 2002; Ababouch, 2000; EC, 2000).

EU legislation is divided into three including Directives, Regulations and Decisions (MacMaolain, 2007; Europe Information Service, 2003). A regulation usually requires general



application and is binding and directly applicable by all Member States; whilst directive shall be binding based on achievable results but the choice of form and methods is purely the option of specific Member states; and the decision too shall be binding in its entirety but binding only on those Member states to whom it is addressed (MacMaolain, 2007; Europe Information Service, 2003).

The main aim of the EU food safety legislation is to guarantee a high standard of public health protection, by ensuring food safety and overall quality assurance and that the consumers are sensitized, guided and adequately informed of the nature, type and intended use of food products and, where appropriate, the source of origin of the food product (MacMaolain, 2007; Europe Information Service, 2003). EU legislation is mostly obtained from the EU Official Journal as the primary source (Europe Information Service, 2003). The procedure for the implementation of new EU legislation by member states is specific to the type of legislation. There are different procedures for implementation of EU Directive and EU Regulation. As briefly stated above, EU has developed several legislation and have covered many products such as fishery products; fresh red meat; poultry and poultry products; eggs; milk; general food hygiene; and so on (MacMaolain, 2007; Goldsmith, Turan et al., 2003).

Interestingly, EU has circulated many directives through the Official Journal for each category of food products, and the good thing is that most of the legislation are reviewed regularly and amended in order to be compatible with the challenges of new and emerging food safety hazards, based on evidence of modern science and technology.

The most popular legislation in this study is the regulation on the hygiene of foodstuffs, (EC) No 853/2004 and laying down the health conditions for the production and the placing on the market of fishery products. The adoption and implementation of this regulation have served as springboards in the development of EU food law and served as benchmarks for general food hygiene control, and specifically, fishery products safety and quality assurance across the entire spectrum of the EU. This regulation is closely related or in other words compatible with the requirements of Codex Alimentarius and the US NACMCF on food hygiene, safety and overall quality assurance, though the regulation did not use wordings of Codex and NACMCF verbatim.



For export of fishery products to the EU, member states or third countries are required to meet the block-harmonized regulations governing health, safety and hygiene in the capture, handling, processing, transportation, and storage of fishery products (EC, 2004; Henson and Heasman, 1996). The EU also has detailed specific requirements for landing sites, layout of premises, equipment and facilities including floors, ceilings, walls, ventilation, toilet, hand washing, and ice making (EC, 2004). They also lay down principles on transportation, handling, processing, packaging, own-checks, organoleptic inspection, microbiological and chemical investigations, water quality and personnel health (MacMaolain, 2007).

However, the author argues that several statutory requirements in the European Community's food safety legislation hinder the export of food products from developing countries. To some extents the hindrances or barriers on export of food products from developing countries to EU may arise due to a range of food safety requirements, but some may also appear to be rather minor legal amendments, such as an update of obsolete regulations and development and promulgation of standards (Peter, Zollers et al., 2004).

On the other hand, this study argues that there is no easy solution to the food safety problem in developing countries. Therefore, there are dire needs to improve harmonisation of food safety measures in the developed countries such as EU countries and subsequently, the EU should properly investigate and identify the likely consequences on developing countries of any new food safety regulation, and point out possible alternatives without compromise to food safety. The author also argues that the EU should strengthen its provision of technical assistance especially on capacity building of developing countries to enable their compliance with the food safety standards.

Most of the developing countries especially those from LDCs in Africa that are not highly industrialized greatly depend upon exports of agricultural and fishery products, and for most of them the European Community (EC) is the primary export market for attractive foreign exchange earnings. Initially, the entrance of agriculture and fishery products to EC's markets was protected by higher tariffs as trade barriers (Broberg, 2009). Following several criticisms from different



trading partners on the negative effects on these tariff barriers on developing countries, these barriers were dismantled (Broberg, 2009; Gibbon and Bolwig, 2007).

Furthermore, the WTO agreements on Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) established stringent food safety requirements, and food producers in developing countries are now encountering new embargo to export to EC (Gibbon and Bolwig, 2007). For decades now, non-compliance with international food safety requirements such as SPS, good agricultural practice (GAP) and HACCP rank among the first few requirements for export of agriculture and fishery products to the EU by developing countries (Broberg, 2009).

These are legal requirements under the EU food safety policy which impose bans on most exporters of fishery products from developing countries. HACCP requirements have been identified as one of the leading issues with shortcomings in compliance that are estimated to cost agricultural and fishery products exporters from developing countries approximately over \$1 billion United States Dollars lost per annum (Broberg, 2009).

Within the EU food safety system there are requirements of an integrated approach from ‘farm-to-fork ’, covering the entire sector of the food chain, including feed production, plant and animal health, animal welfare, primary production, food processing, handling, storage, transport, retail sale, importing and exporting (Broberg, 2009). One can argue that the EU food safety system is comprehensive and integrated, because the responsibilities of the food and feed operators and the competent authorities are clearly defined, which makes it more coherent, effective and dynamic food policy, but has little or no recognition of the food safety system in developing countries. In other words EU food legislations do not take into account the different institutional capacity of LDCs especially in terms of production, inspection and certification systems, and consequently, resulted to a situation that constitutes technical barriers to exports of fishery products from developing countries.

The EU food safety legislation is being continually monitored and adapted and is based on risk analysis (MacMaolain, 2007). The establishment of the European Food Safety Authority (EFSA) has proved to be a major way forward to support the statutory mandates of the EU institutions



especially in terms of consumer protection, scientific advice, rapid alert system for food and feed (RASFF) and early warning system of emerging, re-emerging and existing foodborne diseases (EFSA, 2010).

In fact there are three key strategies of the EU food safety system including comprehensive legislation; sound scientific and technological advice on which to base decisions; and enforcement control and monitoring (Broberg, 2009). On the basis of specific consumer protection requirements there are also other special measures such as the use of pesticides, food supplements, additives, antibiotics or hormones, packaging, labellings and so on (Ponte, 2005; Wilson and Abiola, 2003).

The Commission also has enforcements of EU feed and food law by verifying that that EU legislation has been properly incorporated into national law and implemented by all EU member states including on-site and on-the-spot inspections both inside and outside the EU (EFSA, 2010). Furthermore, the Commission's Food and Veterinary Office (FVO) inspects specific food production systems, and has a key mandate to check and verify that EU and third countries have the pre-requisite system in place to guarantee that their own food producers and handlers comply with the EU's high food safety legislations (Broberg, 2009; Gibbon and Bolwig, 2007). The mission of the FVO has integrated responsibilities through its audits, inspections and related activities, to check and verify compliance with the requirements of EU food safety and quality, animal health and welfare and plant health legislation within the European Union and third country suppliers exporting to the EU; contribute to the drafting and development of EU food safety legislation and subsequently, its implementation, control and monitoring (Broberg, 2009; Gibbon and Bolwig, 2007).

2.14.3 Legal Requirement for Export of Fishery Products to United States

US general requirements for acceptance of fishery products mandated the adoption, implementation and enforcement of Good Manufacturing Practice (GMP), Good Hygienic Practice (GHP), Sanitation Standard Operating Procedures (SSOP), including written sanitation records, and implementation of HACCP (FDA, 2011, 2010 & 2001; Public Law 111-353, 2011;



Anders and Caswell, 2009). Importers of fishery products to US must also comply with similar requirements. Third country supplier further needs to sign a Memorandum of Understanding (MOU) with the U.S. Food and Drug Administration (FDA) that is responsible to verify, certify and document that third country system is equivalent or compliant with the inspection system of fishery products in the US (FDA, 2001). Without the MOU and written verification from FDA on equivalence regulatory requirements, no enterprise will be allowed to import fishery products from any country to US (FDA, 2011, 2010 & 1995).

The US regulatory requirements on fishery products are divided into the following two main components, and any country exporting fishery products to US must fully comply with all (Smith, Tatum et al., 2005; Golan, Krissoff et al., 2004; FDA, 2011 & 2001):

product specifications designed to ensure that the fishery products are not adulterated, as defined by U.S. legislation; and

in addition “*affirmative steps*” to verify that the fishery products have been processed in accordance with U.S. regulatory requirements.

Importers are also required to take the following steps and some for example HACCP, are mandatory for fishery products in US (FDA, 2011 and 2001):

evidence of HACCP and SSOP monitoring records from the foreign processor to verify that U.S. regulatory requirements have been satisfied by the country of origin;

evidence of a continuing or lot-by-lot certificate from an appropriate foreign government inspection authority or competent authority certifying that the imported fishery products are or were processed in accordance with U.S. regulatory requirements;

evidence of undertaking regular inspections of the foreign processor’s facilities to ensure that the imported fishery products are processed in accordance with U.S. regulatory requirements;

evidence of authenticated or certified copy of the processor’s HACCP plan and a written assurance from the processor that the imported fishery products are being processed in accordance with U.S. regulatory requirements;

proof of ongoing periodical testing of the imported fishery products including valid written assurance from the processor that the imported fishery products are being processed in accordance with U.S. regulatory requirements; or



other records and documentation verifying and certifying that foreign fishery products fully comply with U.S regulatory requirements.

Like the EU, third country also needs to have a competent authority referred to by U.S “*Competent Third Party*” for U.S importers to use to assist with or perform these verification and certification procedures, including preparation of the importer’s verification procedures. In all cases, it is mandatory to record and document the performance of “competent third party” and U.S importers performances plus results of all affirmative steps undertaken (FDA, 2011 and 1995). Third country must provide concrete evidence that all fishery products have been processed under conditions that are equivalent to U.S. regulatory requirements. Without this concrete evidence, the FDA will assume that the fishery products are adulterated and will be denied entry at the port of entry or border.

The FDA always maintains a system of border inspections to ensure that imports of all fishery products meet the same requirements or specifications as domestic fishery products (FDA, 2011). There is also tough bureaucracy that requires importers to apply for an entry notice and an entry bond with the U.S. Customs Service pending a decision regarding the admissibility of the fishery products by FDA. The FDA in turn will be notified by Customs of the arrival of a consignment of fishery products in order to decide whether the fishery products will be granted entry according to article of admissibility (FDA, 2011). Prior to the decision on the article’s admissibility the FDA will verify documentation including physical checks on the fishery products.

Where there are suspicions of U.S regulatory violations or history of non-compliance, the fishery products will be automatically detained at the border without further physical examination. Based on level of violation, all or part of the fishery products will be refused entry, or in case of widespread violations, imports of fishery products from that particular country of origin will be banned until further notice. Because of September 2011 terrorist attacked, the US has also introduced an act on bio-security that will require importers to have a named agent in the US and to provide prior notification of any consignment prior to its arrival at the border (FDA, 2001).



2.14.4 Legal Requirement for Export of Fishery Products to Japan

All countries exporting fishery products to Japan must comply with Japan's provisions of both the Food Sanitation Law and the Quarantine Law (Japan External Trade Organization (JETRO), 2011 and 2003; Globefish 1998). The Japanese Food Sanitation and the Quarantine Laws are based on the following requirements that prohibit importation and sale of food and food products that are found to be among the following characteristics (JETRO, 2011 and 2003; Globefish 1998):

- rotten, decomposed, or immature in a way that is proved to be unfit for human consumption;
- contaminated or suspected to be contaminated with toxic or substances that can cause or have potential to cause injury to public health;
- proof of contamination with or suspected to be contaminated with pathogenic or any microbiological hazards;
- potential to cause health injury due to unhygienic conditions, chemical and physical hazards.

The requirements by Japan regarding export of fishery products are to larger extent limited, but exports requires authentic health certificate from the government fishery products regulatory authority specifying the country of origin, species and the areas of productions or collections (Globefish, 1998). Japan border fishery products inspection agent enforces stringent inspections on all fishery products originated from cholera-infected areas and there're maximum specified limitations acceptable to Japan.

For export to Japan, standard plate count (SPC) , also called aerobic plate count (APC) of 300,000/gram and zero coliforms, *salmonellae*, and *Staphylococcus aureus* are the maximum acceptable limitations for uncooked frozen fish and fishery products (JETRO, 2011 and 2003). Export of all food and food products including fishery products also requires prior notification to Japan Food Sanitation Inspectors at quarantine stations. Regular importers are however given waiver for certain period of time on the basis of submission of planned imports to Japan Sanitation Inspectors but document examinations and inspections can still be carried out (JETRO, 2011 and 2003). Like in all countries, previous history of compliance and non



compliance dictates the level of inspections in addition to Japan's specific imports and exports requirements for fishery products.

2.14.5 Sierra Leone Fishery Act 1994, Amended 2007

In Sierra Leone the Ministry of Marine Resources and the Departments of Fisheries are legally responsible for fishery products matters. However, a multitude of government ministries, parastatal, departments, and agencies are involved in fishery products safety activities. Sierra Leone presently has no food law and therefore general food including fishery products safety and quality assurance activities are seriously fragmented. Consequently, the National capacity of food safety in Sierra Leone remains far below international standards, and therefore fishery products safety requirements continue to act as a significant barrier to officially access EU, US, Japan and other international markets (The Fish Inspector, 2010; MFMR, 2008).

The legal framework for fisheries management in Sierra Leone is the Fisheries Management and Development Act of 1994, that repealed the Fisheries Management and Development Act of No. 7, of 1992, which repealed the Fishery Management Act of No. 9, of 1990, and which also repealed the Fishery Management Act No. 4, of 1988, supplement to the Sierra Leone Gazette Vol. CXXV. No. 58 Dated 8th December 1994, amended by the Fisheries Management and Development Act, 2007, Supplement to the Sierra Leone Gazette Vol. CXXXVIII. No. 45 Dated 6th September 2007 (SL Gazette Vol. CXXXVIII, No. 45, 2007).

The present fisheries management measures focused on fishery licensing, mesh size to prevent and control juvenile fishing, gear restrictions, area limitations, landing, import and export obligations, and the enforcement through fisheries surveillance patrols and penalties for violations, but there is no proper enforcement (Sheriff, Kane et al., 2010). These measures concern greatly on the collection and analysis of statistical data from artisanal and industrial fisheries sectors. From this, it can be analyzed that the first law governing the fishery products came into force on the 8th of December 1994. Currently the following fragmented Act of parliament are governing the management and development of few elements of food but there is no food law that covers specifically the safety and quality assurance for the protection of the



local populace and facilitate trade (SL Gazette Vol. CXXXVIII, No. 45, 2007; SL Gazette Vol CXXXV, No. 49, 2004):

- Public Health Act of 1960;
- Veterinary Act of 1962;
- Fishery Act of 1994 amended in 2007
- Standards Act of 1996
- The Public Health Act, 2004, amended the Public Health Act of 1960, *Supplement to the Sierra Leone Gazette Vol. CXXXV, No. 49 dated 26th August, 2004.*

Ironically, the purpose of the amendment was not to strengthen food safety and quality but to repeal and replace the fines, upgrade and denominate fines from pounds sterling into Leones. This act enforces general public health and safety by stressing on water sanitation, housing, and food safety declared as “health areas”. This act is not ecologically oriented and has no provision specifying the exact composition and the permitted ingredients of various articles of food, the percentage of each ingredient or additive that could be added, the Sale of Food, no microbiological specification, chemical contaminants including but not limited to maximum residue limits (MRLs) for pesticides and veterinary drugs, to list but a few.

The Veterinary Act of 1962 enforces veterinary work and animal husbandry in Sierra Leone. It's one of the most successful developmental activities since the colonial era in Sierra Leone and several other African countries (SL Gazette Vol CXXXV, No. 49, 2004). The fact is that the control of epizootic diseases during the colonial period-allowed herds and flocks to increase production, providing income for livestock owners and nutritionally vital protein for agriculture and urban populations. An animal health improvement was successful nationwide where rapidly growing numbers of cattle, sheep, and goats endangered ecological stability. However, for decades now after the end of colonial era, this area has been seriously neglected politically and academically amid the growing demands of animal products as luxurious national protein. There are little or no research data available on national status of veterinary science and the use of veterinary scientist has been redundant in many areas of public and private sectors. From 1962 to now is almost 48 years, no review or repeal has been made on the veterinary act to match the challenges of the twenty first century such as Bovine spongiform encephalopathy (BSE),



Bovine spongiform encephalopathy (BSE), commonly known as mad-cow disease is a fatal, neurodegenerative disease in cattle and can lead to spongy degeneration in the brain and spinal cord (Olsson, 2008). BSE is mostly transmitted to human beings by eating food contaminated with the brain or spinal cord of infected carcasses (Olsson, 2008). It is also believed that the infectious agent, although mostly concentrated in nervous tissue, but can also be found in all tissues throughout the body, including blood of the infected carcasses (Peter, Zollers et al., 2004). The human form of BSE is called *Creutzfeldt-Jakob* disease and affected certain people in Britain a year or two ago. The author argues that Sierra Leone is currently unable to detect BSE in animal product and the local population remained highly vulnerable.

In the Universities of Sierra Leone as well, subject like veterinary science has been unaccountably neglected by students of the twenty first century because of the uncertainty of job security after graduation. Policy review in this direction is long overdue to match the requirement of modern challenges in food safety management system such as HACCP.

The SLSB was established on the 15th of February 1999 to coordinate all standard activities including food safety or HACCP standards through performing the functions enshrined in Part 2, Section 4 Sub-Section 1 of the Standards Act No 2 of 1996 (FAO/WHO, 2005; NPRC Decree No. 2, 1996). However, the current capacity of SLSB is far below international standards to effectively carry out its functions. There is no planned and organized national food inspection services if any, it is only carried out in the capital city and few district headquarters with no benchmark and control exercised, of which the main motive is to collect revenue from the unregulated businesses. Other government statutory departments such Fisheries, Health and Environmental Sanitation also conduct non-food safety and quality assurance inspections of meat and/or fishery products to get their revenues or individual gains.

Fishery Act of 1994 amended in 2007 does not provide the Ministry of Marine Resources and the Departments of Fisheries with a clear mandate and authority to prevent fishery safety problems. Furthermore, the act is not in line with international requirements such as EU legislation, Codex Alimentarius and other reputable international standards on fishery safety and quality assurance management. Critical analysis of Fishery Act of 1994 amended in 2007 against EU legislation



and Codex Alimentarius showed several deviations from the requirements of international fishery safety management and quality assurance.

Part IX, Monitoring, Control, Surveillance and Enforcement, section 62, sub-section (2) Appointment of authorised officers, paragraph (d) states that:

“Where an authorised officer has reasonable ground to believe an offence against this Decree is being or has been committed, he may without a warrant – take samples of any fish found in any vessel or vehicle inspected or any premises searched under this Decree”.

The same section 62, sub-section (2) Appointment of authorised officers, paragraph (e) and sub-paragraph (iv) states that:

“Where an authorised officer has reasonable ground to believe an offence against this Decree is being or has been committed, he may without a warrant – seize – fish not meeting health standards prescribed under this Decree”.

Part IX, section 68, sub-section (2) Duties to inspectors and observers, paragraphs (a) and (c) respectively state that:

“The operator and each member of the crew of such vessel shall allow and assist any inspector or observer to - board such vessel for scientific, compliance, monitoring and other functions, at such time and place as the Director may require; take and remove from the vessel reasonable samples for the purposes of scientific investigation and other relevant information”.

This part of the act is based on traditional end product testing which is incapable to identify and control low incidence hazards in fishery products and is not compatible with the requirements of EU legislation and Codex Alimentarius.

___Part IX, section 68, sub-section (4) Duties to inspectors and observers, paragraphs (a), (b) and (c) respectively state that:

“ In addition to the requirements of subsection (3), the operator may be required to pay in full the following costs of the inspector or observer – travel costs to and from the vessel; such salary as may be notified by the Director, being the full amount of such Salary; and full insurance coverage”.

The author finds surprising and disappointing to see that an act to regulate fishery operators can at the same time oblige the operator to pay travel cost, salary and insurance for the inspector and observer for carrying out statutory mandates. The fair retrieved from these paragraphs is that the chances of corruption through compromise of integrity by the inspector and observer are extremely high. Consequently, there will be a deliberate ineffective or no enforcement of the act



for the fact that the operators pay incentives to the inspector and observer. This study believes that inspector and observer of fishery operators should be well paid by the government in order to be neutral and allow them carryout the statutory mandates effectively.

PART XIII, Miscellaneous, section 99, subsection (3), paragraphs (a) and (b) respectively state that:

Any license issued under this section shall be subject to the following conditions –

“the establishment shall be maintained and operated in a safe, clean and sanitary manner; accurate records shall be maintained relating to the operation of the establishment, including records of quantity of fish received and processed and such records shall be open for inspection by authorized officers”;

PART XIII, Section 100 on import and export of fishery products for commercial purposes, subsections 1, 2 and 3 respectively state that:

“Any person who imports or exports fish or fish products for commercial purposes shall furnish the Director returns in respect of the species, quantity and value of the fish within one month of such import or export, in such form and detail as the Director may require; No person shall export fish or fish products from Sierra Leone without obtaining a Fish Health Certificate from the Director”; The Fish Health Certificate shall be issued in such form and for such fee as may be prescribed”.

The deviation from international fishery safety and quality assurance requirements such as EU, Codex Alimentarius and other reputable international standards are that specific fishery products health and safety guidelines on microbiological, chemical and physical hazards are not given. There is no standard or benchmark that can be checked against to verify and certify the health and safety of fishery products destined for commercial purpose. Comparing to EU legislation, Chapter V health control and monitoring of production conditions, chemicals checks, paragraphs (3) (a) and (b) of Council Directive 91/493/EEC states that:

“samples must be taken and subjected to laboratory analysis for the control of the following parameters: TVB-N (Total Volatile Basic Nitrogen) and TMA-N (Trimethylamine-Nitrogen). The levels of these parameters must be specified for each category of species in accordance with the procedure laid down in Article 15 of this Directive; Histamine” (EC, 1991)

It is also a surprise to know that the fishery act is non-compliance to Codex Alimentarius irrespective of the fact that Sierra Leone is a member of United Nations FAO/WHO and receives all Codex Standards, Codes of Practice, and Guidelines free of charge. Sierra Leone also has



National Codex Committee (NCC) with various Technical Committees in various food products including fishery products, of which the Ministry of Marine Resources and Department of Fishery are fully represented. The absence of microbiological, chemical and physical criteria in this act is a serious gap and therefore made the act handicapped to implement and enforce any modern fishery safety and quality assurance management such as the HACCP system.

For example, Codex Standard 165-1989 (Reviewed 1 - 1995) for Quick Frozen Blocks of Fish Fillet, Minced Fish Flesh and Mixtures of Fillets and Minced Fish Flesh, section 5 Hygiene and Handling, subsection (5.2), paragraph (ii) state that:

“When tested by appropriate methods of sampling and examination prescribed by the Codex Alimentarius Commission, the product shall not contain histamine that exceeds 20 mg/100 g in any sample unit. This applies only to species of Clupeidae, Scombridae, Scombresocidae, Pomatomidae and Coryphaenidae families” (CAC, 1995).

Given specification for this type of fishery product hazard in the act it is essential for the fishery operators and regulators to enforce the control of histamine in fishery products. By just stating safe and healthy fishery products are not enough to ensure the safety of fishery product and the act seems to pay more attention to revenue collection. According to the act, the Director issues health certificate on the basis of declaration of species, quantity and value of the fish, and after the payment of fees.

Codex Standard 167 – 1989 for Salted Fish and Dried Salted Fish of the Gadidae Family of Fishes, section 3 Essential Composition and Quality Factors, subsection (3.2) state that “salt used to produce salted fish shall be clean, free from foreign matter and foreign crystals, show no visible signs of contamination with dirt, oil, bilge or other extraneous materials and comply with the requirements laid down in supplement 1 to the Code of Practice for Salted Fish (CAC/RCP 26-1979)(CAC, 1989)”.

Codex General Standard 190 – 1995 for Quick Frozen Fish Fillets section 4 Food Additives, State that the Maximum Level Limit of Monosodium orthophosphate, Monopotassium orthophosphate, Tetrasodium diphosphate, Tetrapotassium diphosphate, Pentasodium triphosphate, Pentapotassium triphosphate, Sodium polyphosphate, Calcium, polyphosphates in Quick Frozen Fish Fillets should be 10 g/kg expressed as P_2O_5 , singly or in combination



including natural phosphate (CAC, 1995). These kinds of specifications in any modern fishery safety and quality assurance policy and regulatory document provide fishery operators, regulators and consumers a clear mandate and authority to prevent and control fishery safety hazards. They are highly useful in HACCP's hazard analysis and determination of Critical Limit (CL) for the effective control at CCP. Their absence made the act non-compliance to international requirement for modern fishery safety and quality assurance management.

The fishery safety problem in Sierra Leone is greatly affected by the regulatory framework due to the absence of some basic principles and components of an effective fishery safety system in the Fishery Act of 1994 amended in 2007. However, it is important to note that this lengthier, wider and more comprehensive study and analysis of the fishery safety control systems in Sierra Leone suggest a building block for lifting the export ban on fishery products, but the study suggests that the long term solutions to overall food safety problem in Sierra Leone would go beyond the size limit of this research.

2.15 Comparing HACCP in Sierra Leone and Developed Countries

How does Sierra Leone compare with developed countries with respect to initiatives on food safety management system, and what are the implications of the barriers and benefits of HACCP? A view taken by some food safety experts in developed countries is that of the modification of developed countries food safety management system. For example, in the late 1990s and early twenty-first century European Union (EU) modified an EU food safety management system using HACCP principles to become more effective at ensuring food safety (Appelhof and van den Heuvel, 2011). This put EU food safety management system far ahead of developing countries. Least developed countries such as Sierra Leone that was a traditional exporter of fishery products to EU was banned to export fishery products to EU due to lack of HACCP certification (Megapesca, 2000). Moreover, the EU food safety management system encouraged the development of private standards, the effectiveness of controls over farms and food facilities, and consequently, placed the ownership of food safety system in the hands of the businesses (Humphrey, 2012). Consumer protection agencies in developed countries are



constituted, recognised and strengthened to the level of pressure group for businesses to comply with food safety requirements (Arnade, Calvin, et al., 2009).

Increased emergence of new foodborne illness or re-emerging of existing ones in Sierra Leone such as the case of Typhoid fever, Cholera, Diarrhoea, to list but a few, reinforced the impression that the businesses are not carrying out their responsibilities to ensure food safety. Poor hygiene practices and lack of implementation of HACCP found in the food operation at the heart of the increasing foodborne illnesses would not have been left undetected by third-party HACCP certification in Sierra Leone. The lesson learnt from this and other examples would be that Sierra Leone needs to catch up with developed countries food safety requirements and that the best option is through the successful implementation of HACCP system in food businesses through a whole-chain approach. Some critics of food safety management system of developed countries believed that effective food safety infrastructure cannot be achieved in the absence of the active participation of businesses and all other actors in the food chain (Williams, 2010, available at <http://mercatus.org/sites/default/files/publication/wp1069-a-new-role-for-the-fda.pdf>, accessed 30 July 2012.).

In Sierra Leone, this view is mistaken and lead to several problems in the national food safety management system. These problems include overlapping and conflicting government regulatory authorities; incomplete and confusing regulation; lack of adequate enforcement; lack of continuing HACCP support for government departments; lack of training and consultancy organisations to support business; to list but a few. In the particular case of the fishery businesses, these problems have led to a continued ban on the export of fisheries products to affluent markets; despite the need to do so; the willingness of international community to fund development in this area; and the desire by the affluent nations to access high quality fishery products from the country.

Several attempts have been made to resolve these problems, and generally, all the previous, on-going and pipeline projects by the Government of Sierra Leone are excellent attempts at resolving HACCP-related problems. However, these projects represent partial and individual rather than holistic and systemic ways of solving the problems of the whole of the supply chain



that links not only the provision of laboratory equipment, skills and knowledge development of the commercial fishermen and the institutional strengthening, but also the development of the regulatory, enforcement, businesses and educational resources that will encourage and support the agriculture and fishery sector and food manufacturing businesses to voluntarily comply with HACCP-related standards. Identification of constraints and rewards of food safety management system in a country through a whole chain approach across regulatory, enforcement, businesses and consumers represents a significant response to enhancement of food safety management system and procedures (Henson and Jaffee, 2008).

It will significantly change the way food safety is controlled both domestically and internationally– notwithstanding the possibility that the changes proposed for domestic food safety management system reform are so significant that there will, inevitably, be pressure to moderate new controls in the national food safety management system (Arnade, Calvin, et al., 2009; Aragrande, Segre, et al., 2005). This implies that by all means the type of controls currently in place in Sierra Leone are not the same as in developed countries. The government agencies in Sierra Leone continue to have fragmented and duplicated roles in food safety, particularly as a legitimiser or monopoliser of the system without significant roles of businesses and consumers.

However, this study argues that a whole chain approach is the best option where private companies and consumers will also have a role to play in the food safety system because of the likely need for extensive monitoring and enforcement required to achieve successful food safety management system. Lack of significant roles of private businesses and consumers in food safety management to a larger extent responsible for the complexity of barriers in achieving food safety (Arnade, Calvin, et al., 2009; Caduff and Bernauer, 2006). It was argued above that the modification of EU food safety management system through the inclusion of HACCP principles that based on multidisciplinary team based approach created such a strong requirement for verification that a third-country exporter complies with HACCP to assure consumers of food safety. Such possibility is foreshadowed in the holistic approach in the identification of barriers and benefits of HACCP in this study.



Another requirement with respect to the comparison between the Sierra Leone and developed countries food safety systems relates to the challenges facing Sierra Leone regulators. At all levels across farm, processing, manufacturing and distribution the focus is on the traditional end-product testing. This reflected the concerns of the developed countries food safety authorities on the assumption that there are no own guidance of good hygienic practices, thus hygiene controls did not appear to be overly concerned with health problems arising from production, processing and distribution of food products. For example, while a literal reading of EU legislation might suggest that member states and third-country exporters be subjected to verification of on-farm hygiene practices in the production, processing and distribution of food products (EC, 2006), there is no evidence that such requirements are enforced in Sierra Leone. Furthermore, microbial contamination of food products and the serious health impacts associated with them are rarely communicated due to lack of adequate and transparent publicity such as the one given in developed countries, for example, *E. coli* outbreak in Germany in 2011.

If Sierra Leone food safety authorities come to consider microbial contamination of food products as seriously as the authorities in the developed countries, then it may be Sierra Leone that needs to catch up by quantum leaps. To sum up these comparisons, the food safety management system in Sierra Leone requires a radical shift towards a whole-chain approach. This approach would likely to have a very substantial impact on both the domestic production and on production of food products meant for export to developed countries. Precisely, this has worked very well in developed countries. For instance, the US FDA succeeded by undertaking a very demanding set of challenges that compelled the designing and implementation of effective and enforceable science- based food safety controls through the application of heterogeneous food safety management system and not placing too onerous a burden on regulators or enforcement officers or farmers or businesses alone (US GAO, 2010; Knowles, Moody, et al. 2007).

2.16 Shifting From Traditional End-Product Testing To Preventive Regulatory Strategy

For decades now many countries especially developed countries are changing the way the regulate food safety. This can be seen as a change in perception or shift in the balance of food



safety strategies away from reliance on inspection, sampling and end-product testing towards prevention strategy that requires holistic approach. This is exactly the terminology used by this study in its title -----“ ***A Whole Chain Approach to the National Fisheries Food Safety Management System of Sierra Leone***”. This shift or change in perception towards a whole-chain approach is an increased emphasis on prevention than cure (Aragrande, Segre, et al., 2005; Fulponi, 2006). Similarly, EU Regulation 178/2002, usually referred to as the General Food Law, comprises of similar terminology such as ‘risk assessment, risk management, and risk communication’ including but not limited to the reduction to an acceptable level or elimination of hazards that are significant to food safety and health (Henson and Reardon, 2005). Such terminology are part of the broader changes or shift in whole-chain preventive food safety management system (Fulponi, 2006; Aragrande, Segre, et al., 2005; Henson and Reardon, 2005)

Whole-chain preventive approach reflect ideas about food safety-at-source and quality management including ISO 9000 standards relating to manufacturing production , such as ISO 9000 (Nadvi and Waltring, 2004). The author argues that there is growing adoption and implementation of prevention of hazards approach in the food businesses, but the success of such system depends on the level of management practices that encourage a whole-chain approach that focuses on prevention and control of food safety hazards from the source. Laboratory testing is an expensive process and as result many food businesses in LDCs such as Sierra Leone may not pay good attention to testing, there by allowing these to enter food chain across production harvesting, processing, transport, distribution and final consumption. Therefore, whole-chain approach designed to prevent or control hazards is becoming more acceptable to be the most cost-effective strategy than the traditional end-product testing (Plunkett and DeWaal, 2008). Though traditional end-product testing is essential for verification purposes to establish good process controls, it can never be practical as the only means of monitoring safety (Plunkett and DeWaal, 2008).

This change in perception can be characterised as a process of identification and controlling of the problem from the source, means a holistic or whole-chain approach that involves all the players in order to shift from product controls to process controls (Nadvi and Waltring, 2004). Product controls focused on traditional inspection, sampling and testing and since it is not



possible to do 100% sampling and testing, there is no guarantee that the section sampled is the one affected or infected (Kane and Taylor, 2003). In contrast, process controls describe the method of production, processing, handling, distribution and intended uses, and there requires the participation of all actors in the whole food chain across regulatory, enforcement, businesses and consumers. This study focuses on preventive control measures and specific responsibilities across the whole-chain to ensure that the product is produced correctly and safely.

In food safety management system this change in perception can be argued to be the difference between traditional end-product testing at only a certain point along the food chain whilst leaving behind more critical areas in the food chain unchecked. On the other using the whole-chain approach requires all actors to develop procedures at different points in the food safety management system designed to provide proper laws and monitoring mechanism in order to identify hazards to food safety and put in place appropriate procedures that prevent the hazards from occurring or reduce their occurrence to an acceptable level. HACCP in a whole-chain approach is designed to achieve this. The other advantage of this process-based approach is that traceability is put in place to identify product so that products can be traced as whether is coming from well-regulated food safety management system or not.

Nadvi and Waltring, 2004, made a wide comparison between product controls (traditional end-product testing) and process controls (preventive approach) and this led to a clear distinction between the two approaches in food safety management system. However, Nadvi and Waltring, 2004, fall short of providing a sufficiently strong analytical basis for understanding and interpreting the main options about the selection and designing of food safety regulations and standards. The author argues that preventive options to a larger extent can effectively influence the way in which the activities of regulators, enforcement officials, businesses and consumers affect food chain if it involves a whole-chain approach.

This study further attempted to use the analytical framework provided by Coglianese and Lazer (2003) for the discussion of the HACCP and a whole-chain regulatory strategy. Coglianese and Lazer, 2003, provided three approaches to regulatory strategies instead of focusing on two approaches. The focus of the three approaches developed by Coglianese and Lazer, 2003, is on a



preventive approach, but could be used to justify a whole-chain strategy. Firstly, a ‘Performance-based regulation’ is proposed which allows the regulatory authorities (law makers and law enforcers) specify expected outcomes. For instance, certain food can be specified not to contain maximum residue limits (MRLs) of pesticides or should be free of *Salmonella* or *E.coli* contamination. The key focus here is the achievement of particular food safety outcomes and therefore no limitation is given on specific methodology in this achievement because no method is recommended or disqualified. Moreover, ‘performance-based regulation’ is not product specific and for example, absence of *Salmonella* can be applied to beef and beef products, poultry and poultry products, fish and fishery products, plants and plant products. However, this study believes that the success of Coglianese and Lazer ‘performance-based regulation’ depends not only the participation of regulatory authorities but also the businesses that implement the regulation and the consumers that may serve as pressure group on regulators to enforce and businesses to comply.

The second part is the ‘Technology-based regulation’, which specifies the type of technology to be used or followed (Coglianese and Lazer 2003). This relates to the major distinctions between HACCP and good agricultural practices (GAPs) especially in the control of external environment. In the controlled environment where hazards are identified, critical control point identified and critical limit established HACCP is the most effective method to use, but in the environment where hazards are unpredictable such production of fresh fruits and vegetables in farms, it is recommended for farmers to use GAPs which is often considered as HACCP-based approach. The role of businesses, farmers or fishermen falls under here within the whole-chain approach. However, it can be argued that the compliance from businesses depend on the adequacy of law and the effectiveness of enforcement to achieve food safety objective. This also requires the pressure from the consumers on regulators and businesses to carry out their mandates. The role of businesses in ‘Technology-based regulation’ requires the use of specific technology such as HACCP or GAPs.

Thirdly, the ‘Management-based regulation’ is not specific output oriented (Coglianese and Lazer, 2003). What is required here is for the businesses to produce a plan in order to comply with generic criteria designed to promote targeted social goal required by law. For example, a



business can design a food safety management plan such as HACCP plan based on required regulation. In this case the specific outputs, processes and technological requirement depend on the HACCP procedures (Coglianese and Lazer, 2003). However, the author argues that the success of such a plan depends to a larger extent on the adequacy of elements or components to achieve food safety objective, and these need to be verified by auditing from regulatory authorities. The decision to implement HACCP and the choice of elements and tools to achieve is the management decision and therefore ‘management-based regulation’, but needs to be audited by regulators or third party that means a whole-chain strategy is required.

According to Coglianese and Lazer, 2003, legislation demanding business for management-based regulation might simply require same business to conduct a risk assessment and subsequently, develop a realistic food safety plan that can prevent, eliminate or reduce the risk to an acceptable level. Furthermore, the enforcement officials might specify detailed procedures to enforce the legislation. The enforcement officers might further request the HACCP plan to be documented for further in-depth verification and, subsequently, the regulatory authority might complement the risk assessment with stringent inspections system to specify, verify and monitor compliance with specific technical requirements. One can see that the achievement of all these requires the participation of all the actors in the whole-chain across regulatory, enforcement and businesses and implications on how compliance to the regulation is to be achieved.

The increase in enforcement activity by the regulatory authorities subsequently increases business compliance, and as a result the level of prescription increases. Consumers as pressure group may serve as referee in the whole-chain approach. Consequently, this narrows or diminishes the gap between management-based regulation and technology-based regulation. In Table 2 below, Coglianese and Lazer, 2003, discussed the situations in which particular type of regulation becomes more effective than the other.



Table 2: Regulatory Model by Coglianese and Lazer, 2003, Modified by the Author to Reflect a Whole-chain Approach in Sierra Leone

Type of regulation	Most Appropriate at a Particular Time	Trend of Sierra Leone Fishery Products
Performance-based	Outcomes clear, achievable and measurable when all actors are involved	It is unlikely that 100% sampling and testing of fishery products can take place. Hence there is no guarantee that the batch sampled is the one affected. Whole-chain approach addresses the problem from the source, thus fishery safety is guaranteed and fishery trade is maximised through access to developed markets. Potential hazards such as microbiological, chemical, and physical can be identified at a particular point in the whole-chain and preventive measures taken.
Technology-based	Private businesses operate in similar manner with own technology that stabilises after sometimes (Coglianese and Lazer, 2003). The validity of machinery used including compliance with technology need verification by regulatory authorities and pressure from consumers.	Improvement in Science and technology leads to the availability of a wide range of technology as you move from one business to another. Therefore, development of specifications of technology should involve a whole-chain approach so that multidisciplinary team provides detailed specifications that can be generalised. Specification provided by a whole-chain team has the chances to eliminate many potential hazards from different sources in complex environment in real time.
Management-based	Appropriate technology undefined and it is unlikely to measure output.	Increase fishery products trade requires definition of appropriate management-based practice across national boundaries. The author argues that the success of this depends on the involvement of a whole-chain. That is, regulatory authorities develop holistic regulation, while businesses implement appropriate food safety tool and consumers as pressure group for compliance.

The author argues that the success of food safety management system has a lot to do with the regulatory strategies and have direct impact on the national food safety system for both public and private sectors. This can be seen in the approaches taken in this study for the formulation of whole-chain strategy that requires the role of all stakeholders across regulatory, enforcement, business and consumers through the combination of all the three types of regulation described by Coglianese and Lazer, 2003.

2.17 Comparing Previous Works on Food Safety and this Study in Sierra Leone

The weakness of Sierra Leone's capabilities with regard to HACCP issues in fishery food safety is longstanding and has been previously identified by international donors as a barrier to



development (Thorpe and Whitmarsh, et al., 2008; Tall, 2007). In response to these identified needs, a number of internationally funded projects have been undertaken, and although these have been generally successful, they have tended to focus on individual parts of the overall supply and regulatory food chain rather than at a holistic approach that would address the issues of integration, education, regulation and consequent sustainability. Therefore, there is a need for further development and support before HACCP requirements represent an opportunity rather than a barrier to Sierra Leone. The Rural Private Sector Development project supported by the World Bank and jointly executed by the Ministries of Trade and Industry and Agriculture and Food Security, has been implemented in Sierra Leone to address HACCP issues in the areas of value chain improvements for fishery and various agricultural products in a bid to improve fishermen and famers' livelihoods and income to reduce poverty and other socio-economic problems (World Bank, 2011).

Sierra Leone has also benefited from several technical assistance programmes supported by World Bank, FAO, WHO and INFOPECHE especially in the areas of strengthening capacity to facilitate agriculture and fishery products trade (GOPA, 2009). Through the initiatives of Economic Community of West African State (ECOWAS), Sierra Leone has actively participated in projects funded by the US Agency for International Development (USAID) and coordinated by the West Africa Trade Hub (WATH) with the aim of harmonizing HACCP issues across the sub-region (USAID, 2009).

Under this project, an assessment of HACCP issues in Sierra Leone was undertaken by USAID in 2006 and a West Africa Quality Programme (WAQP) implemented by ECOWAS and executed by UNIDO in 2010, revealed that the current framework for food safety controls does not meet Sierra Leone's need to protect public health and to develop economically through international trade in agriculture and fishery products (Béné, Lawton, et al., 2010; DfID Sierra Leone, 2008; Unruh and Turray, 2006). This further details the weaknesses in Sierra Leone's food safety infrastructure and institutional framework, and subsequently, recommends the strengthening and improving the institutional and human resource capacity in this area.



A study carried out by the European Commission within the framework of the ECOWAS Quality Programme evaluated the existing infrastructure and assessed the needs for technical assistance in the area of food safety and quality including the implementation of the WTO Agreements on SPS and TBT including HACCP (EU, 2009). UNIDO also carried out needs assessment in the areas of accreditation, conformity assessment, inspection, standardization, quality, metrology, and compliance with the WTO Agreements on SPS and TBT including HACCP in Sierra Leone to identify priority areas for strengthening and capacity building in food safety and quality under the framework of the ECOWAS quality programme (UNIDO, 2008). Under this framework UNIDO started the provision of materials and equipment for Chemical Testing, Metrology, Pesticide and Residue testing laboratories for the Sierra Leone Standard Bureau (SLSB).

The Diagnostic Trade Integration Study (DTIS) conducted through the Integrated Framework of WTO for Sierra Leone identified the food sector as an area that requires technical assistance in order to progress trade at national, regional and international levels (GOSL and UNDP, 2007). It has been estimated that the national revenue accruing from the agricultural and fisheries sectors is far less than that the sector could actually provide due to the lack of appropriate infrastructure, human expertise in food safety and efficient management and administration (GOSL and UNDP, 2007). As a consequence of the lack of adequate HACCP infrastructure, most of the foreign exchange revenues which previously had accrued nationally from agriculture and fisheries have been lost. As a consequence, Sierra Leone has been obliged to accept the reduced returns that accrue from license fees instead of processing and exporting its own resources; farmers have been under-producing due to a lack of financial incentives; and little of what is exported has much in the way of local additional ‘value added’.

Previous international food safety interventions in Sierra Leone did improve local understanding of HACCP requirements. However, the capacity of enterprises in the agro-business chains, fishery sector and other food businesses, government regulatory and enforcement departments, standards and conformity assessment infrastructure are still unable to comply with the international HACCP. In one specific example, a Standard and Trade Development Facility (STDF) project titled “Capacity-building for improving the fish trade performance of selected African countries: Benin, Gambia, Mauritania, Senegal, Sierra Leone” (STDF/PG/134) improved



local understanding of SPS and HACCP requirements (FAO, 2011). Though the project STDF/PG/134 was successful to a significant degree, only three countries (Benin, Mauritania and Senegal) obtained EU approval for the export of fishery products (FAO, 2011). Sierra Leone was not included in the list of countries eligible to export fishery products to the EU markets. In addition to the above, the Food and Veterinary Office (FVO) of the European Union (EU) inspection mission (DG (SANCO) 2009-8351-MR FINAL), found ‘insufficient guarantees in terms of quality and safety of fishery products in Sierra Leone’ (The Fish Inspector, 2010). The final FAO report from June 2010 called for more assistance in building Sierra Leone’s capacity to implement regulatory food safety standards in order to facilitate access to EU and other developed markets.

The Strengthening of Fisheries Products (SFP) project that was funded by the EU ended in 2010 without lifting the export ban on fisheries products due to several food safety issues. The SFP project was to specifically address certification on HACCP measures for fishery exports from Sierra Leone, yet it is unable to export fishery products through the lack of acceptable international standards for food safety or HACCP.

In another development, the Enhanced Integrated Framework (EIF) Tier-II project is also in the pipeline for institutional capacity of the Sierra Leone Standards Bureau (SLSB) in order to be able to respond to Sierra Leone’s trade development needs so that the country can actively participate and benefit in the multilateral trading system (World Bank, 2011). Specifically, the EIF Tier-II project is to strengthen the SLSB on Standards Conformity assessment, Metrology and Certification to provide quality services for industrial and export sectors mainly the agricultural products. The only element of major HACCP issues in EIF Tier-II project is the Laboratory analysis of agricultural products to verify compliance with standards.

It can be observed that there have been attempts to address HACCP issue previously in Sierra Leone. However, after the completion of several projects, there are indications that previous projects have not left much in the way of a sustainable HACCP legacy in the agriculture and fishery sector in the country. Generally, all the previous, on-going and pipeline projects by the international donors and Government of Sierra Leone are excellent attempts at resolving HACCP



problems. However, these projects represent partial and individual rather than holistic whole-chain and systemic ways of solving the problems of the whole of the supply chain that links not only the provision of laboratory equipment, skills and knowledge development of the commercial fishermen and the institutional strengthening of the SLSB, but also the development of the regulatory, enforcement, businesses and educational resources that will encourage and support the agriculture and fishery sector, and food production businesses to voluntarily comply with HACCP standards.

That being said, there is a firm desire by the Government of Sierra Leone to achieve HACCP standards in a sustainable and effective manner, and the newly instituted Poverty Reduction Strategy Programme (PRSP) indicates the Government's commitment in prioritizing compliance with HACCP requirements (World Bank, 2010).

This study attempts to assess the present system of national food safety management in order to diagnose the issues that are preventing the achievement of international food safety standards (HACCP barriers); determine the level of understanding of HACCP amongst those involved in national food safety infrastructure; and whether HACCP benefits as suggested by other HACCP regulators apply to Sierra Leone. The ultimate result will be a framework for an integrated and coordinated Food Safety Management system that achieves standards and thus leads to market access. This study seeks to develop an integrated whole-chain approach to diagnose the national food control system, so that desired results could provide sustainable strategies for state-of-the-art approaches for the whole food chain. The target Unit of Analysis of this study include national stakeholders across regulatory, enforcement, businesses and consumers concerned with ensuring food safety.

This study does not conflict or contradict the past and present projects being carried out by international donors and line ministries; rather it complements and supports these by creating the framework that will allow the fishery sector, agricultural sector and food businesses of Sierra Leone to develop sustainably, effectively and efficiently. A sound HACCP management control system in Sierra Leone will instil confidence among trading partners, stimulate the country's economic growth and help in alleviating poverty among the population. Access of the country's



agricultural and fishery products to food export markets depends to a large extent on the capacity of the national food safety management system to meet the regulatory requirements of importing countries, especially developed nations (Béné, Lawton, et al., 2010). Similarly, establishing continuous and sustainable demand for agricultural and fishery products in international markets relies on guaranteeing the trust and confidence of consumers and importing countries as a whole in the integrity of the national food safety management system of the exporting country (Tsamenyi, Palma, et al., 2010 and 2009). Agriculture and fishery products being the heart of the national economy, food safety measures in compliance with HACCP requirements are indispensable (Béné and Friend, 2009).

Previous food safety interventions in Sierra Leone have, in effect, focused on the relative merits of traditional end-product testing that is only technology-based including provision of laboratory equipment, whilst this study focuses on all the types of Coglianese and Lazer, 2003 regulations, because it is a whole chain approach that is being sought. According to Heggum, 2010, technology-based type of regulation can be characterized as the old type of regulation. Technology-based type focuses on the removal of hazards by implementing specific ‘technologies’ or procedures such as laboratory analyses (Heggum, 2010). Technology approach can be either at the regulatory level or business level or consumer level. The whole-chain approach in this study is based on the ideas of preventive approach from the source that requires the involvement of all the stakeholders’ levels including regulatory, business level, and consumer in order to achieve acceptable levels of protection of food from substances injurious to the health. Table 3 below, summarises the differences between the previous food safety intervention in Sierra Leone and the strategy assumed by this study.

Table 3: Differences between the previous food safety intervention in Sierra Leone and the strategy assumed by this study, Heggum, 2010, Model Modified by the Author

Previous Food Safety Intervention	Whole-Chain Approach by this Study
Words such as ‘sampling’ to investigate hazards may fall short to provide sustainable solution because it is unlikely to do 100% sampling.	Words or phrases such as ‘prevent’, ‘reduce to an acceptable level’ of hazards from source across regulatory, enforcement and businesses applied, and may provide sustainable solution.
Unsafe food as a result of flaws in the intervention may enter food chain and fishery products banned to access developed market.	Safe food is likely due to reliance on validation and verification from the sources across whole-chain and assures international trading partners for export.
Focus is on product at specific point within the supply chain and point is selected randomly.	Focus is on process performance and outcomes involving multiple points and multiple actors across the whole-chain.
Inspection, sampling and testing base on pre-identified benchmark irrespective of different scenarios. There are no control points or critical control point.	Results reliance on verified and validated outcomes across multiple sources within the whole-chain. There are control points and critical control point.
Old generation of food safety determined by absolute answer, that is, yes or no.	New generation of food safety determined by continuous process and assessment.
Responsibility to determine food safety rests with government through laboratory analyses.	Division of labour across whole-chain. Government enacts legislation, businesses implement appropriate food safety tool, and consumers as pressure group.

This study takes into consideration, to the extent possible, the various fishery products and processing procedures as well as the differing characteristics of fishery products. It focuses on acceptable fishery safety outcomes that may be achieved through the application of multiple points of validation and verification across the whole-chain, rather than mandating random inspection, sampling and testing processes for individual fishery product. One may also draw a line between the types of control measures used for example microbiological, chemical, and physical hazards for fishery products. In the previous intervention they focus on final product testing to determine hazards which may be considered unsustainable because the origin of the hazards is unknown and it is unlikely that prevention or elimination measure can be effective. With this study potential hazards are identified within certain point across whole-chain and appropriate measures implemented to prevent, reduce to an acceptable level or eliminate them.



2.18 Private Standards versus HACCP in Fishery Businesses

Internal quality assurance (QA) systems requires businesses, producers, processors, distributors and retailers to effectively implement product and process specific food safety and QA system (Aggelogiannopoulos, Drosinos et al., 2007). Such QA systems are usually based on the requirements of ISO standards to ensure that their individual suppliers meet stringent product and process specifications (Aggelogiannopoulos, Drosinos et al., 2007).

In certain situations and under specific membership agreement, some trade unions can design and develop standards for their respective members through consensus. One specific example of such standard is the British Retail Consortium (BRC) standard on food hygiene and sanitation. The BRC is a Global Standard for Storage and Distribution and came into use in August 2006, and has so far proved to be a reliable pilot scheme for certification and Accreditation with United Kingdom Accreditation Service (UKAS) (BRC, 2008).

By January 2008, the Pilot scheme of BRC ended and helped to identify several parameters that could enhance more justification of certification and accreditation system. Due to the complexity of the fishery production chain ranging from primary producer to the dining table (farm-to-fork), BRC cannot certify the entire fishery chain, however, it endeavours to ensure inspections, auditing, verification and certification at several stages within the production chain (BSI, 2008).

Joint FAO/WHO CAC also facilitates fair trading practices in food trade by promulgating standards, guidelines, codes of practice, and recommendation in all food standards (CAC, 2008; 2003 & 1997). Food standards from CAC are allowed to be used in all national and international trade in fishery products. An important CAC standard, guideline, codes of practice, and recommendation for food production, processing, and distribution businesses is to follow a Food Safety Management System Called Hazard Analysis and Critical Control Points (HACCP) (CAC, 2008 and 2003). The Codex Alimentarius General Principles of Food Hygiene lay a strong foundation for the adoption and implementation of a fishery safety management system that complies with the HACCP system (Anders and Caswell, 2009; FAO, 2008).



Developing countries' businesses face continuously growing demands on safety, quality, regarding both product and process attributes especially when it comes to international trade (Amjadi, Reinke, et al., 1996). For fishery products some of the most important attributes include colour, size, flavour, freshness, homogeneity and other intrinsic characteristics which can be directly monitored through quality index method (QIM) at all different stages of the production chain, from the point of catch to dining table (farm-to-fork) (Bratt and Williams, 2010).

It is also important to note that these attributes can hardly be observed after the specific production process is completed because they are also dependent upon characteristics such as geographical origin, environment condition, GHP, GMP, SSOP, or PRP (Bratt and Williams, 2010; Omojowo and Raji, 2010; Pena-Pereira, Lavilla et al., 2010; Burger, Jeitner et al., 2009; Wang, Zhang et al., 2009; James, Tsai et al., 2007). Fishery businesses in developing countries need to progressively established coordination mechanisms for adequate internal QA in order to achieve better adaptation between consumers' demands and producers' capacities (Goldsmith, Turan et al., 2003). These could involve the adoption and implementation of specific, product and process oriented safety and QA approaches including but not limited to brands, product certifications, labels, International Standards, ISO 9000 and HACCP (ISO, 2007; ISO, 2000).

Considering the complexity of fishery production operation and limited short-life period of fresh fishery products, problems with demand and supply, and the difficulties in the enforcement of internal QA by regulators along the production chain, the traditional end product testing quality approaches have shown limited applicability and sucessibility in the food businesses (Bratt and Williams, 2010; Kane and Taylor, 2003). HACCP system has emerged as new alternatives to fishery businesses in both developed and developing countries.

The adoption and implementation of HACCP standard is a fundamental approach to guarantee the safety of the fishery supply, and therefore, serves as a systematic procedure for the identification, evaluation and control of hazards at all stages in fishery operations (Codron, Giraud-Heraud et al., 2005; Cato, 1998). Fishery businesses in developing countries exporting fishery product have to produce to the requirements of their international markets and



demonstrate acceptable conformity to fishery safety and QA regulations (FSA, 2007; Musonda and Mbowe, 2001). The only alternative to this is the ban on export of fishery products from developing countries to developed international markets such as EU, USA, Canada, Japan, and so on, because consumer awareness in those countries or region including influence of tourisms are very strong, active and recognised (Chen and Chen, 2010; NCLC, 2010).

2.19 Summary of Sources of Literature Review

A comprehensive literature review was performed in support of this study to determine the type, extent, and content of research and information that is readily available regarding barriers and benefits of HACCP for the development of the research aims and objectives. The findings of the literature review are also a resource for the author to highlight how the activities of other international stakeholders lead to the identification, ranking and location of HACCP barriers and benefits, which are the main focus of this study.

A variety of literature sources were researched and reviewed including academic and professional journals, textbooks, professional trade magazines, on-line publications, Government gazette and organizational websites. Total of 217 and 198 sources of literature were reviewed for barriers and benefits respectively. The specific sources of literature, author, title and the number of documents found related to the study are presented in Appendix 1 (page 320), a summary including specific sources of literature, author, date and number of documents found related to the study are presented in Table 4 below (pages 81-83):

Table 4: Summary and Number of Sources Reviewed, Developed for this study.

Number of Barriers	Number of Benefits	Source, Author and Year
17	13	British Food Journal - (Shears, P., F. Zollers, et al. 2001), (Manning, L. and R.N. Baines, 2004), (Peter, S., E.F. Zollers, et al. 2004), (Taylor, E. A. and J.Z. Taylor, 2004b), (Griffith, C.J. 2005), (Griffith, C. J. 2006), (Jackson, L. 2006), (Khatri, Y. and R. Collins 2007), (Knowles, T., R. Moody, et al. 2007), (Manning, L. 2007), (Semos, A. and A. Kontogeorgos. 2007), (Ramnauth, M., F. Driver, et al. 2008), (Mai, N., S.G. Bogason, et al. 2010), (Mai, N., S.G. Bogason, et al. 2010) (Sweet, T. 2010), (Vladimirov, Z. 2011).
1	2	HACCP Press, University of Salford – (Kane, K. and E. Taylor (2003).
17	14	Journal of Food Control – (Fidler, D.G. 1990) (Arvanitoyannis, I.S. and M.M Efstradiadis. 1999) (Bernard, D. 1998), (Hansen T.B. and S. Knochel. 1999), (Hathaway, S 1999), (Henson, S., G. Holt, et al. 1999), (Ababouch, L. 2000), (Barnes, J. and R.T. Mitchell (2000), (Panisello P.J. and P.C. Quantick. 2001), (Taylor, E. 2001), (Wallace, C. and C. Williams. 2001), (Azanza, P. and M. Zamora-Luna. 2005), (Maldonado, E.S., S.J. Henson, et al. 2005), (Taylor, E. and K. Kane. 2005), (Taylor, E. 2008), (Bas, M., A.S. Ersun, et al., 2006), (Aggelogiannopoulos, D., E. H. Drosinos, et al., (2007), Wang, F., J. Zhang, et al. 2009).
3	2	Journal of Food Protection – (Gilling, S.J., E.A. Taylor, et al. 2001), (Bas, M., M. Yo'ksel, et al., 2007), (Birk, T., A.C. Gronlund, et al., 2010).
2	2	Blackwell Scientific Publications – (ICMSF. 1986), (Bratt, L. and A. Williams (2010). “.
1	1	Diary, Food and Environmental Sanitation – (Sperber, W. H., K.E. Stevenson, et al 1998).
11	11	Codex Alimentarius Commission – (CAC 1989), (Codex 1993), (CAC 1995), (CAC 1997), (CAC 2003), (CAC 2003), (CAC 2004), (FAO/WHO 2005), (FAO/WHO 2006), (CAC 2008), (CAC (Agenda Item 14 b) 2010).
1	1	National Advisory Committee on Microbiological Criteria For Foods – (NACMCF 1997).
2	2	Food, Science and Technology – (Gilling, S. J. 2001), (Taylor, E. and J.Z. Taylor 2004a).
5	3	International Journal of Environmental Health Research – (McSwane, D. And R. Linton 2000), (Taylor, E.A. and J.Z. Taylor 2003), (Taylor, E.A. and J.Z. Taylor 2003), (Taylor, E. A. and J.Z. Taylor 2004c), (Worsfold, D. 2005).
2	2	International Journal of Contemporary Hospitality Management – (Taylor, E.A. and J.Z. Taylor 2008), (Taylor, J. F. and J. Forte 2008).
3	1	American Journal of Agricultural Economics – (Anders, S. and J. Caswell 2009), (Baylis, K., A. Martens, et al., 2009), (Baylis, K., L.Nogueira, et al., 2010).
2	2	Food Policy – (Otsuki, T., J. Wilson, et al. 2001), (Codron, J., H. Giraud-Heraud, et al. 2005).
5	5	International Organization for Standardization – (ISO, 1992). (ISO, 1994), (ISO, 2000), (ISO, 2005), (ISO, 2007).
1		Infofish International – (Tall, A. 2001).
1	1	British Standard Institute – (BSI, 2008).
3	6	Food and Drug Administration, United States – (FDA, 1995), (FDA, 1996). (FDA, 2001), (FDA, 2010), (FDA, 2011), (Public Law 111-353, 2011).
1		Marine Policy – (Thorpe, A., D. Whitmarsh, et al. 2008).
5	5	World Bank - (Amjadi, A., U. Reinke, et al. 1996), (Jaffee, S., and S. Henson. S. 2004), (World Bank, 2005), (World Bank, 2010), (World Bank, 2011).
2	2	USAID – (USAID, 2008), (USAID, 2009).
2	2	An International Journal – (Johnson,V. and S.C. Peppas. 2003), (Ollinger, M. And D.L. Moore. 2007).
1		Acta Alimentaria - (Jevsniak, M., V. Hlebec, et al. 2006).
1	1	Hospitality and Tourism Themes - (Kane, K. J. 2011).
1	1	Journal of the American Dietetic Association – (Strohbehn, C. H., S.A. Gilmore, et al. 2004).
1	1	Food Review – (Von Holy, A. 2004).
1		Indian Journal of Economics and Business – (Deodhar, S. Y. 2003)..
1		Food Protection Trends – (Roberts, K. F. R. And J. Sneed. 2003).
1		Journal of Agricultural and Applied Economics – (Hooker, N. H., R.M. Nayga Jr., et al. 2002).
2	2	World Health Organization (WHO) - (WHO. 1999), (WHO. 2008).
1		Policy Research - (Greenhalgh, P. 2004).
9	7	Food and Agricultural Organisation – (Huss H.H. 1994), (Huss H.H. 1995), (Cato, J.C. 1998), (Globefish. 1998), (Ferri, M. 2005), (Unruh, J. D. and H. Turray. 2006), (FAO. 2009), (FAO. 2010), (FAO (2011).
1		Cambridge, Woodhead, Publishing Ltd – (Bremner H.A. 2002).
4	2	Food Chemistry
1	1	Veterinary Records – (Snow, L.C., R.H. Davies, et al. 2010).
1	1	St. Paul, Minnesota: Eagan Press – (Nganje, W. E. and M. A. Mazzocco. 2000).
	1	Food Safety Authority of Ireland (FSAI) www.fsai.ie/industry/haccp/industry_haccp_benefits.asp (accessed



		01/08/08) - (FSAI, 2007).
6	7	Food Standard Agency (FSA) - (FSA. 1998), (FSA. 1998), (FSA. 2001), (FSA. 2001), (FSA. 2002), (FSA. 2002), (FSA. 2004), (FSA. 2005), (FSA. 2005), (FSA. 2007).
	1	Scottish Food Advisory Committee (SFAC). - (SFAC. 2004).
1	1	On-line publications – (Wallace, C.A., W.H. Sperber, et al. 2011).
	1	Guelph Food Safety – (Henson, S. 2004).
1		Ministry of Agriculture, Fisheries and Food, London – (Henson, S and M. Heasman. 1996).
1	1	WorldFish Center, Washington, DC, Penang – (Delgado, C.L., N. Wada, et al. 2003).
1	1	London, Chapman and Hall – (Moretimore, S. and C. Wallace. 2000).
1	1	Encyclopedia of Meat Sciences – (Upmann, P. and P. Jakob. 2004)..
1	1	Center for Science in the Public Interest (CSPI), Washington DC. - (CSPI. 2001).
1		Economic Information Bulletin. – (Buzby, J. C., J. Laurian, et al. 2008).
2	1	Southern Agricultural Economics Association (SAEA – (Nguyen, A.V. T., L. Norbert, et al. 2009), (Li, X. and S.H. Saghaian. 2012).
1	1	Journal of Economic Integration – (Wilson, J. S. And T. Otsuki. 2003).
1	1	American Society for Quality (ASQ) (Web site: www.asq.org) accessed 30/11/10. - (ASQ. 2008
26	26	European Commission/Union - (EC. 1991), (EC. 1992), (EC. 1993), (EC. 1994), (EC (2000), (EC (2000), (Megapesca. 2000), (EC. 2002), (European Parliament and Council of the European Union. 2002), (Europe Information Service. 2003), (EC. 2004), (EC. 2004), (EC. 2004), (EC. 2005), (Swoffer, K. 2005), (EC. 2006) (EU. 2007). (EC. 2009a), (EC. 2009b), (EC. 2009c), (EC. 2009d), (EC. 2009e), (EU. 2009). (Megapesca and Oceanic Development 2009), (EU. 2010). (The Fish Inspector. 2010). (Group of Policy Advisers (GOPA) (European Commission). 2009), (The Fish Inspector (2010), (EC. 2011).
1	1	Department for International Development(DfID) – (DfID Sierra Leone. 2008).
1	1	United Nations Industrial Development Organization (UNIDO) – (UNIDO. 2008).
1	1	Government of Sierra Leone and United Nations Development Programme – (GOSL and UNDP. 2007).
	1	Environmental Health Perspective – (Ginsberg, G.L. and B.F. Toal. 2009).
1		Personal Communication. – (Sheriff, M. (2004).
1	1	International Food and Agribusiness Management Association – (Li, X. and S.H. Saghaian. 2011).
1	1	European Journal of Development Research – (Humphrey, J. 2006).
1	1	The National Academies Press _ (Board on Global Health, Institute of Medicine. 2005).
1	1	Centre for Disease control – (Ananda, R. 2010).
1	1	Health, Meat, Milk, Poultry, Seafood and Vegetables – (Hui, Y.H., R. Chandan, et al. 2007).
1	1	Marine Resources Economics – (Cunningham, S., A. Neiland, et al. 2010).
1	1	Journal of Toxicology and Environmental Health – (Burger J., C. Jeitner, et al. 2009).
1	1	Aquaculture Economics and Management – (Dey, M. M., M. A. Rab, et al. 2005).
1	1	Turkish Journal of Zoology – (Özoğul Y. and F. Özogul. 2002).
1	1	Her Majesty's Stationery Office and Queen's Printer of Acts Of Parliament (384038). – (Pitchforth, H. 1967).
1	1	Asia Pacific Journal of Clinical Nutrition – (Chen, S.C. 2009).
1	1	Western Indian Ocean Journal Of Marine Science - (Tefamichael, D. and D. Pauly. 2011).
1	1	European Food Safety Authority. Available at: (www.efsa.eu.int) 12/12/2010. – (MEMO/01/248 REVISED Brussels, 18 December. 2001)..
1	1	New York University Journal of International Law and Politics – (Victor, D.G. 2000).
1	1	International Journal of Production Economics – (Alfaro, J.A. and L.A. Rabade. 2009).
1	1	Woodhead Publishing Limited, Abington. – (Suwanrangs, S. 2000 in T. Mayes & S. Mortimore S (eds.).
1	1	Food Hygiene (England) (Amendment) Regulations – (Statutory Instruments No. 534. 2010).
2	2	British Retail Consortium (BRC) – (BRC. 2005), (BRC. 2008).
1	1	Cirencester, Royal Agricultural College – (Baines, R.N. 2002).
1	1	International Journal of Food Science and Technology Early, R. (2002). "Food ethics: a decision making tool for the food industry?"
1	1	Oxford, Hart Publishing – (MacMaolain, C. 2007).
1	1	International Food and Agribusiness Management Review - (Goldsmith, P., N. Turan, et al. 2003).
3	3	Danish Institute for International Studies – (Ponte, S. 2005), (Gibbon, P. and S. Bolwig. 2007), (Broberg, M. 2009).
1	1	European Food Safety Authority Journal – (EFSA. 2010).
1	1	51st International Congress of Meat Science and Technology – (Smith, G.C., J.D. Tatum, et al. 2005).
1	1	Washington, DC, Agricultural Economic Report – (Golan, E., B. Krissoff, et al. 2004).
2	2	Japan External Trade Organization (JETRO) – (JETRO. 2003), (JETRO. 2011).
1	1	Ministry of Fisheries and Marine Resources, Sierra Leone – (MFMR. 2008).



2	2	Sierra Leone Gazette - (Sierra Leone (SL) Gazette Vol CXXXV, No. 49. 2004), (Sierra Leone (SL) Gazette Vol. CXXXVIII, No. 45. 2007).
1		African Journal of Environmental Science and Technology – (Sheriff, M., K. Kane, et al. 2010).
1	1	Open Food Science Journal – (Olsson, A. 2008).
1	1	National Provisional Ruling Council – (NPRC Decree No. 2. 1996).
	1	New York Science Journal – (Omojowo, F. S. And A. Raji. 2010).
1	1	Journal of Toxicology and Environmental Health – (Burger J., C. Jeitner, et al. 2009).
1	1	US estuaries – (James H., W.Y. Tsai, et al. 2007).
1	1	International Food and Agribusiness – (Goldsmith, P., N. Turan, et al. 2003). “
1	1	International Food and Agribusiness Management Review – (Goldsmith, P., N. Turan, et al. 2003).
1	1	Jaipur, Consumer Unity & Trust Society (CUTS). – (Musonda, F.M. and W. Mbowe. 2001
1	1	National Consumer Law Center (NCLC) (2010). - (NCLC. 2010).
1	1	Tourism management – (Chen, C. and F. Chen. 2010).
1	1	Wageningen Academic Publishers – (Appelhof, T. and R. van den Heuvel 2011).
1	1	Institute of Development Studies (IDS) – (Humphrey, J. 2012).
1	1	Review of Agricultural Economics - (Arnade, C., L. Calvin, et al., 2009).
1	1	George Washington University, Mercatus Centre – (Williams, R. 2010).
1	1	The World Economy - (Henson, S. and S. Jaffee 2008).
1	1	EU DG Joint Research Centre – (Aragrande, M., A. Segre, et al., 2005).
1	1	Review of Policy Research – (Caduff, L. and T. Bernauer. 2006)..
1	1	United States Government Accountability Office (US GAO) - (US GAO) 2010).
1	1	Presentation made at 3rd Australian Food Safety Conference, Melbourne, 8-9 September. – (Heggum, C. 2010).
1	1	34 Water International – (Béné, C. and R. Friend 2009). “Water, Poverty and Inland Fisheries: Lesson from Africa and Asia”
1	1	International Journal of Marine and Coastal Law – (Tsamenyi, M., M.A. Palma, et al. 2010).
1	1	Intergovernmental Organisation for Marketing Information and Co-operation Services for Fish and Fishery Products in Africa (INFOPECHE). – (Tall, A. 2007).
1	1	The Commonwealth Secretariat, London, Economic Paper Series 86 – (Tsamenyi, M., M.A. Palma, et al. 2009).
1	1	World Development (In press) – (Béné, C., R. Lawton, et al. 2010).
TOTAL	TOTAL	
217	198	

2.20 Conclusions

The argument above attempted to investigate the situations that lead to the design and development of HACCP as an internationally recognised food safety management system of choice, and subsequently, how other international stakeholders identify, rank and locate the barriers and benefits of HACCP. To a larger extent, these reflect the aims and the specific objectives of this study that particularly demand the national stakeholders including regulatory, enforcement, businesses and consumers to perceive the barriers, understanding and benefits of HACCP in Sierra Leone. One can also see from the above arguments that several factors influence other international stakeholders to implement HACCP. For example, there were regulatory, standards, trade, legal protection, consumer pressure, to list but a few that called for the actions of other international stakeholders.



The international stakeholders also calculated the weights of benefits and barriers to determine whether the benefits outweigh the barriers or not. By applying cost and benefits analysis model proposed in the literature review, the stakeholders in Sierra Leone will now attempt to make a real choice to remove HACCP barriers or not. This will also encourage voluntary action by businesses to adopt and implement HACCP or implementation follows by the sanction of the national regulatory and enforcement officers.

The main focus of this study is any factor that influences the perceptions of local regulatory, enforcement and businesses which to a larger extent, impact their decisions to adopt and implement HACCP in fishery businesses. The local regulatory, enforcement and businesses are the actors in the national food safety infrastructure. The author argues that these national stakeholders have better understanding of the problems that exist within the food safety infrastructure, and what benefits they will gain from solving those problems. These are the key objectives of this thesis and these focused on the process of uncovering what these barriers, understanding of HACCP and benefits might be from perspective of local regulatory, enforcement and businesses including consumers at a certain stage. Immediately after this chapter is Chapter 3, which mainly focuses on methodology as an attempt to describe and justify the techniques for data collection and analysis to address the research objectives as follows:

- To critically review, examine and analyse existing literature relevant to the study topic.
- To determine the level of understanding of HACCP among those involved in the national fishery safety infrastructure – from policy and regulation officials to enforcement officers and compliance in businesses.
- To identify the perceived barriers which exist within the national food safety infrastructure which prevent the implementation of HACCP.
- To determine how the benefits of HACCP as suggested by other national HACCP regulators differ from those benefits perceived by local regulatory, enforcement and commercial representatives in Sierra Leone.



Chapter 3: Methodology

3.1 Introduction

This chapter provides detailed explanation on the methodology applied for this study. The holistic methodology for identifying, ranking and locating HACCP barriers and benefits in Sierra Leone has not been undertaken before to guarantee targeted intervention; but as has been argued the solution is not to neglect the process, but rather to utilize methodology that carry out good surveys (Marshall, 2010). The author argues that this has served as a major factor in the apparent failure by regulatory, enforcement, businesses and donor communities to pragmatically redress the national food safety problems and export ban on fishery products.

The critical search of literature for this work involved reviewing all readily available materials on the subject. Qualitative case study methodology was utilized for this research. Several schools of thought have made strong support for qualitative approach in data collection (De Vaus, 2002). The qualitative method was used to survey regulators, enforcement, fishery businesses, and consumers. This chapter also attempted to explain and justify the use of qualitative case study for this research including the researcher's assumptions of paradigm, ontology, epistemology, and brief comparison between quantitative and qualitative case studies.

Four main paradigms of qualitative research including reality, positivism, constructivism, and critical theory paradigms have been identified (Guba and Lincoln, 2005). This chapter also provides details of research design and to which paradigmatic concerns can be linked to each other in ways that provide simultaneous application of them.

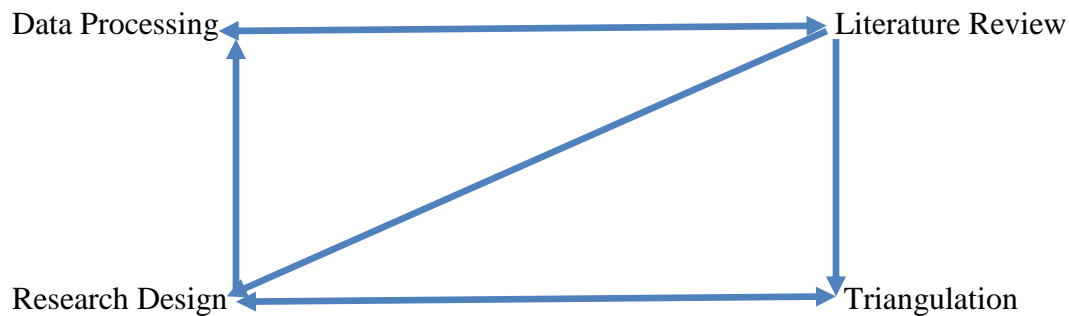
3.2 The Research Design

3.2.1 Introduction

According to Alreck and Settle, 2004, every research is a process that comprises of various stages and such a process is described in the figure 32, below. The planning stage is very crucial and researcher needs the appropriate framework for the data collection. Practicalities of data

collection technique to a larger extent will influence modifications of the research design and methods of data collection.

Figure 3: Diagrammatic Presentation of Research Planning, Alreck and Settle, 2004, Modified by the Author



The research design for this study involved two sources of data collection. Firstly, the writer utilised secondary data collection which includes collecting information from a diverse source of documents and electronically stored information, which is also referred to as critical review of literature. Secondly, the research design to collect primary or empirical data for this case research involved an iterative process via multiple methods known as triangulation. This study has relied mainly on *convergent interview*, the *case interview* and the **4 days focus group workshop** through triangulation technique, to investigate, identify and explain barriers and benefits to compliance with international HACCP regulations governing the trading of food across international borders, that exist within the food safety regulatory, enforcement and commercial operations of the fishery businesses in Sierra Leone. Figure 33, below provides the logical sequence of data collection from secondary to primary data.

Figure 4 Logical Sequence of Data collection from Secondary to Primary Data, Developed for this study





3.2.2 Secondary Data Collection

The critical review of literature for this study utilized several online databases and other sources including but not limited to Food Standard Agency, Food and Drink Safety, Management and organisation Studies: SAGE, Microbiology Network, EThOS, Europa, Applied Social Sciences Index and Abstract, British Standards Online, Business Information on the Internet, BioMed Central, Blackwell Reference Online, Codex Alimentarius Commission, University of Salford Library Catalogue, Emerald, Science Direct (Elsevier), World Health Organisation, Food and Agricultural Organisation, World Bank, Worldwide Standards Developing Organisations Index, Information Sources Guide for Leisure, Hospitality and Food Management, Index to Thesis, and so.

Published literature included articles in the scientific journals, books, thesis, dissertation, magazines, newsletters and reports extracted from the databases as electronic copies or libraries as hard copies. The author also collected some literatures from "grey areas" that can be argued but they are based on consensus of experts opinions from presentations of national, regional and international seminars; the manuals and other literature obtained from offices of multilateral and bilateral organisations such as British Council Sierra Leone, FAO, WHO, UNIDO, EU, DFID, World Bank, and so on; and other unpublished manuscripts. Summary of full list of literature used for this study is given in Appendix 1, page 351, and Chapter 2, Table 4, page 81. The literature review also revealed that there was no literature on the HACCP system for Sierra Leone.

The critical review of literature allowed written documents from various sources mentioned above to be systematically analysed in order to identify and determine specific inferences and linkages. It was a process of inductive and deductive strategies with the aim of identifying specific themes and to develop the framework and model for the accomplishment of the research aims and specific objectives. The overall literature review took place between the period of July 2008 to June 2010. Each piece of literature was critically reviewed against the aim and specific objectives of this study to see how theories and practices can be replicated and subsequently,



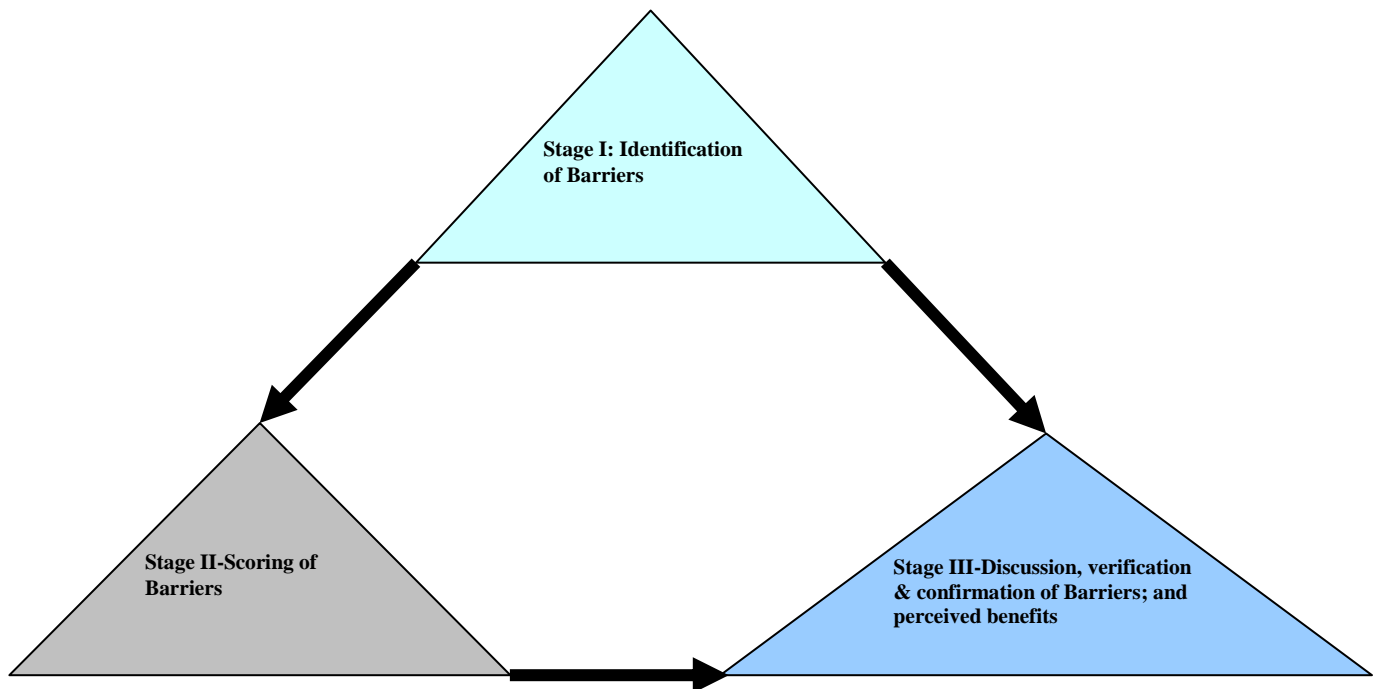
how the result of this study contributes to knowledge of HACCP in the academic discipline of food safety management.

3.2.3 Primary Data Collection

It was highly significant to investigate and analyse the perceptions of barriers and benefits of HACCP within the relevant variables relating to the study population at the government, business and consumer levels. In this regard, it was necessary to design an appropriate method of empirical data collection and analysis. Many researchers have made a very strong case for use of triangulation as it produces the same result despite the use of different methods (Denzin and Lincoln, 2008).

It has also been argued that, mixing two or more approaches in data collection adds flavour and explanatory power to result of a research study (Corbin and Strauss, 2008; Atkinson, Coffey et al., 2003). Convergent *interview*, the *case interview* and the *focus group workshop* data collection included extraction of relevant data on barriers and perceived benefits of HACCP from targeted government officials, and heads of relevant institutions of regulatory authorities, fishery businesses, and consumers. Therefore, the study design for empirical data collection has essentially three stages following one another in a sequence over time. That means stage I (Convergent *interview*) is followed by stage II (*case interview*), and next stage III. This logical sequence between stages I, II and III is more accurately represented by the ‘Triangle Presentation of Stages I, II & III’ in Figure 5.below and was designed to enable the data to be appropriately triangulated through the utilization of multiple methods of interviews and arrive at the same result.

Figure 5: Triangle Presentation of Stages I, II & III (Triangulation) (Adapted for this study from Kane, 2007)



The overall process of triangulation took place from July 2010 to December 2010. The author discussed each stages I, II and III separately below according to their respective requirements and application in this study. Stage I was the most critical because it forms the backbones for stages II and III in this whole research. The author used a new method for this study that has never been used in food safety intervention in Sierra Leone and therefore decided to explain with reference to paradigm before going to the detail explanations of stages I, II and III in triangulation technique.

3.3 Paradigm and a Change in Perception

For decades now, the word “paradigm” is being used in connection with many subjects and an unclear definition. But a question still remains to be unanswered: What is “Paradigm? The popularity of the use of “paradigm” has grown over decades in direct proportion to the watering down of its philosophical meaning (Proscio, 2001,



http://www.emcf.org/fileadmin/user/PDF/Other_Resources/jargon_badwordsforgood.pdf,

accessed on 29/09/2012). According to ‘The American Heritage Dictionary of the English Language, 2000’, a “paradigm” means a set of assumptions, concepts, values, and practices that comprises of a way of viewing reality for the community that shares them, especially when it comes to an intellectual discipline. This study attempted to define the word “paradigm” with reference to its philosophical roots through extracting its meaning from its usage. Plato and Aristotle seem to be the oldest sources elaborating on the idea, notion and thought of paradigm (Agamben, 2002).

In his lecture at European Graduate School (EGS), Agamben indicated that the use of the word paradigm in Plato’s book is peculiar because sometimes paradigm acts from things to ideas or ideas to things. Agamben also referred to Goldschmidt’s book that analysed Plato’s use of paradigm by saying that idea does not result from a logical induction but simply by comparison. Aristotle said that when two statements follow similar order but one is more knowable than the order, the previous one is an example of a paradigm (Agamben, 2002). Kuhn also generalized the meaning of the word paradigm as the basic way of perceiving, thinking, valuing, and doing thing associated with a particular way of viewing reality, establishes boundaries and how to behave within boundaries to achieve success (Kuhn, 1996; Barker, 1992; and Harman, 1970).

In this study the notion of paradigm as being an example and perception could be viewed by the examples of how the previous food safety management projects perceived in Sierra Leone might differ from the new perception in this research. From the point of this study, many technical assistance projects have been undertaken to improve Sierra Leone’s food safety management system, yet no significant improvement in resolving the problem. It’s only more astonishing to see that several examples of food safety system in the country including methodology of investigating food safety problems are offering no advantage to the nation, following evidence of continuous export ban on food products and increasing foodborne illnesses.

The methodology of this research is influenced by the study aim, specific objectives, change in perception and the author’s own ontological and epistemological positions. There are different types of research paradigm but the identification of the researcher’s own assumptions or



perceptions will help with the understanding of the validity and reliability of the research. The writer's approach towards identification and understanding of the terms barrier and benefit in this study represent a change in perception.

In paradigm, a change in basic assumptions within a theory of science may also occur and it is usually referred to as a paradigm-shift (Sankey, 1997; Kuhn, 1996). Though Kuhn restricted the term Paradigm-shift to hard sciences, the term has been used in numerous non-scientific contexts to describe a profound change in a significant model or perception or feeling of events (de Jong and von Hippel, 2009; von Hippel, 2005). A scientific revolution occurs, during the time scientists encounter anomalies which cannot be explained by the universally accepted assumptions or paradigms within which scientific progress has thereto been made (Sattler, 2003; Teece, 2000). In fact anomalies can be observed for all paradigms, but they are usually treated as acceptable levels of error, and they can be easily ignored and not dealt with (Hand, 2010).

According to Guba and Lincoln, 2005, a paradigm-shift could be justified by reference to the specific paradigm and guidelines of evidence. The word paradigm has been used to describe distinct concepts in the disciplines of linguistics and science (Encyclopedia Britannica, 2003). It can be argued that the term paradigm describes thought pattern in scientific disciplines or one's own ontological and epistemological philosophical positions on concepts.

This thought pattern is referred to as a philosophical and theoretical framework of a scientific discipline within which hypothesis, principles, theories, laws, and generalizations and the methodology carried out in support of them are formulated (Martin, 2003). Thus in physical sciences, paradigm is the set of exemplary experiments that are likely to be copied or emulated and represents a more specific way of viewing reality or limitations on acceptable standard methodology than the more general scientific approach (Martin, 2003).

Paradigms are incommensurable and therefore two paradigms cannot reconcile with each other for the fact that they cannot be subjected to the same common standard of comparison (Kuhn, 1996). The only way to compare two paradigms is to make fundamental modification of the concepts that form an intrinsic part of the two paradigms to be compared (Thomas, 2002). This leads to a paradox of sorts, because comparing two paradigms involves constant measurement



against each other (Thomas, 2002). It is also important to note that the competing paradigms may also go beyond their own conceptual frameworks.

For this reason, paradigm as a concept in the philosophy of science could more meaningfully be defined as a self-reliant explanatory model or conceptual framework (Martin, 2003). This definition makes it clear that the use of single qualitative methodology to investigate the real barrier to compliance with international HACCP regulations in LDCs is not necessarily the absence of common units of measurement, but an absence of mutually compatible or mutually intelligible concepts between previous studies and this study on the same or related concepts. Under such circumstances, the author argues that a change in perception is not necessarily better, or a new paradigm or assumption is not in all cases better than the old paradigm, due to the fact that the criteria of judgment are controlled by the paradigm itself, and by the conceptual framework which defines the paradigm and gives its explanatory value.

At any rate, there is a concurrence within a paradigm about the way of designing, developing and asking questions including how scientific methodology should be conducted (Christensen and Klyver, 2006). Such consensus is acceptable in academic research and academics who shared different views are either ignored or criticised by those who agreed with them. The consensus and recognition of the correct methodology of carrying out a research form the foundation and backbone of paradigm.

What causes contests in science are usually those of differing scientists who believed in different result of the universal methodology, but not the validity and reliability of the paradigm itself, especially when it comes to new and less familiar paradigm (Kuhn, 1996). One of the ethos of science is dynamism and in “real” world the paradigm itself are questionable, but this creates opportunities for arguments until paradigm moves from general to specific (Kuhn, 1996). In certain cases arguments moves from disagreement to agreement or agreement to disagreement but even when there is a disagreement within a discipline about the accepted methodology of study, the discipline will not die, but it may move to what is known as pre-paradigmatic stage (Mertens, 2005). In fact, any discipline of science passes through three stages in a cycle starting from pre-paradigmatic, through paradigm to revolution (Kuhn, 1996).



Despite increase in development of science and technology the outbreak of existing and new emerging foodborne diseases is on the increase and responsible for most of the morbidity and mortality rate worldwide (Snow, Davies, et al., 2010; Huneau-Salaün, Chemaly, et al., 2009). This increase has led to the emergence of the modern food safety management system called HACCP, but the system could still be in its a pre-paradigmatic stage with disagreements over methodologies from physical sciences of microbiology, chemistry and engineering through to the social sciences including business management, politics, economics, psychology, sociology, philosophy and many other relevant disciplines. The methodology applied in this study could not be an exception, but what is important to note is that any disagreement will not affect its validity and reliability. Secondly, though HACCP is new and fast evolving, its methodology has been internationally accepted to be specific to product, process and environment (Taylor and Taylor, 2008), thus the methodology applied in this study is specific and new to Sierra Leone food safety situation.

The author believes that in the study of HACCP, which is a fast evolving field, changes in perception tend to be most dramatic and dynamic as it appears in physical sciences. In physical science, a physicist called Lord Kelvin famously said that there is no more things to discover in physics and all remained to do is more and more precise measurements, but his statement was challenged thereafter (Handa, 1986). Five years later, Albert Einstein published his work on “Special Relativity” to challenge “Newtonian Mechanics” which has been used to describe force and motion for over two hundred years (Handa, 1986). This change in paradigm or assumption or perception reduced the old paradigm Newtonian mechanics to be only good as a model for approximation for speeds that are slow but not for the speed of light (Thomas and Stewart, 2000).

In another example, several philosophers and historians of science, including Kuhn himself, ultimately accepted a modified version of Kuhn's model, which synthesizes his original view when generally seen as too limited. In his book entitled “The Structure of Scientific Revolution”, Kuhn (1996), said that successive change from old paradigm to new paradigm through revolution is the usual developmental style of mature and strong science. Kuhn's idea was considered revolutionary in its time and entirety because it brought a major change in the way that academics discuss and analyse science. Therefore, it could be argued that even “caused and



effect” is part of a change in paradigm or assumption or perception in the history and sociology of science.

Like Kuhn, Handa (1986) also addressed the issue of changing from old paradigm to new paradigm; the process popularly known as paradigm-shift. In this scenario, Handa (1986) mostly focused on social circumstances surrounding such a change and the impacts the change may have on social institutions, including educational institutions. It can be argued that this general change of perception in the social and scientific circumstances changes individual perception about “realism”, “positivism”, “Constructivism” and “Critical theory”.

Change in perception has also found uses in various other contexts, representing the notion of a significant assumption in a certain thought-pattern (Hand, 2010; Ramnauth, Driver, et al. 2008). For instance, a radical change in personal beliefs, attitude, behaviour, complex systems or organizations, replacing the former or old way of thinking or doing things or organizing with a radically different way of thinking or doing things or organizing projects or activities (Hand, 2010). The US engineering association also perceived that damaging, negative stereotypes about engineering would not change unless the association presented more positive, appealing images of the engineering profession and the engineers. In an attempt to change the perception, the National Academy of Engineering (NAE) called for a coordinated national awareness sensitisation through sending messages to change public attitudes toward and understanding of engineering (NAE, 2008). The messaging perception developed to change engineering stereotypes and impact engineering profession in US, and what have yet to learn about inspiring student and keeping them going along the pathway to engineering careers (NAE, 2008).

Change in perception has also caused shifts in meaning of the concepts and terms, and suggested to define terms on the basis of form and processes of formation or function (Sazu, 2004). Change in perceptions may provide an opportunity for new knowledge, skills and technology especially in developing countries where policies such as agricultural policy inadequately focus on people, poverty alleviation, food security and livelihoods (FAO, 2012).

The author also argues that change in perception is needed to shift the way the national food control system is being managed in Sierra Leone. The weakness of Sierra Leone’s capabilities



with regard to food safety issues is longstanding and has been previously identified by international donors as a barrier to development. In response to these identified needs, a number of internationally funded projects have been undertaken in Sierra Leone, but these projects represent partial and individual rather than holistic and systemic ways of solving the problems of the whole of the supply chain that links not only the provision of laboratory equipments, skills and knowledge development and the institutional strengthening, but also the development of the regulatory, enforcement, businesses and educational resources that will encourage and support the food control system and food production industry to voluntarily comply with HACCP system.

It can also be argued that previous projects were introduced to complement or supplement the fragmented, overlapping and confused government regulatory authorities without seeking the perceptions of those involved in national food safety infrastructure. Due to the variations in the mandates in different Acts of different government, ministries or agencies there were implementation problems of these projects and the lack of importance given to the identification and elimination of the problems that exist within the national food safety infrastructure over a period. The local food businesses too are facing problems with compliance as different Acts, Ministries, Departments and Agencies govern the same product. As a consequence, actors in the system were unable to guide the regulatory, enforcement and business, on the causes, locations and sources of the food safety problems in order to direct any targeted intervention.

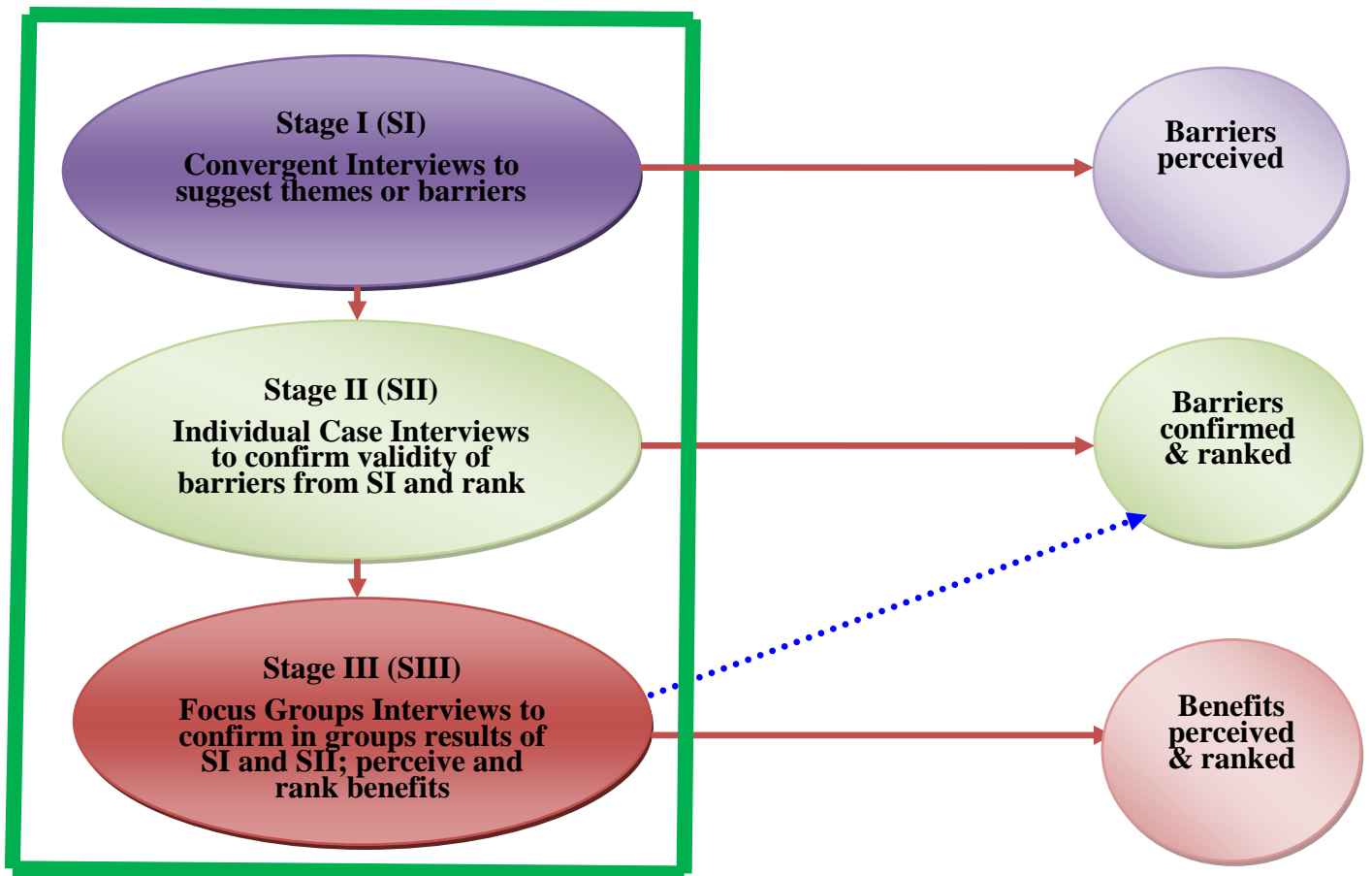
The triangulation techniques utilized in this study are attempts to overcome shortcomings and to give more importance to the perceptions, feelings and attitudes of stakeholders to identify the barriers that exist within the national food safety infrastructure. This approach consolidates the results of three stages of interviews of the regulatory, enforcement and businesses relating to fishery products and identifies the barriers to compliance with international HACCP regulations that exist in national fishery safety system.

This approach provides a different way of identifying HACCP barriers through accessing the perceptions of stakeholders that are familiar with the problems involved. The triangulation method provides a useful way for stakeholders to exchange views and achieve some form of understanding of the barriers and benefits that exist within the national food safety infrastructure.

Mapping the three stages of interviews using the diagram below (Figure 6) suggests a framework for stakeholders to share information and opinions in a structured way, and help to identify barriers and benefits.

The overall framework of the change in perception proposed in this study is for the development of a national holistic system across the regulatory, enforcement, businesses, and consumers to identify significant HACCP barriers and benefits in order to facilitate compliance with HACCP measures throughout Sierra Leone.

Figure 6: Steps for Obtaining Perceptions of Stakeholders on HACCP Barriers & Benefits In Sierra Leone (Developed by the Author)



Thus there is a need for a holistic approach to HACCP before it will represent an opportunity rather than a barrier to Sierra Leone.



3.4 Realism, Positivism, Constructivism and Critical Theory

Several researchers and analysts argue that, despite anomalies, the realist paradigm is dominant and more fertile, than its rivals are, thus taking the view that the world is real (Thomas and Stewart eds., 2000). This research takes the views of realism and the decision is influenced by the author's own ontology and epistemology. Realists attempt to create various views of the world in order to understand and interpret it in terms of its relativity at a particular period within a given environment and context (Charmaz, 2010; Cohen and Maldonado, 2007). Comparing to positivism, positivistic paradigms refers to a set of epistemological perspectives including philosophies of science which believed that the scientific method is most appropriate if one wants to uncover the processes by which both physical and human events occur (Cohen and Maldonado, 2007). It can be argued that positivism strongly defends that the only authentic knowledge is the one based on sense experience and positive verification and therefore does not suit this study.

In contrast realism does not wholly and solely depends upon deductive techniques, and therefore considers knowledge and research to be authentic when it has theory based on induction and analytical generalization but not through statistical claims (Schunk, 2008). Case study research is usually built on a realism perspective. Most probably the main reason for case study is to invent new relationships within reality and to develop new knowledge and understanding of the meanings and experiences among researcher, academics and other relevant actors involved in reality paradigms instead of just verify pre-determined hypothesis, principles, theories and laws (Schunk, 2008).

One of the main assumptions of realism is that reality itself has both objective and subjective characteristics (Ashley and Orenstein, 2005). For example, realism begins from the premise that whatever is knowable is also directly observable, measurable and quantifiable without the observer. Therefore, reality comprised of facts, value judgments and reliable processes that exist in generic forms (Ashley and Orenstein, 2005). However, some critics say that the view of realism is perceived by observers who are subject to biasness because their views are interpreted by themselves in such a way that can lead to the self construction of the meanings. Henceforth, it



has been pointed out that realism integrates several components of positivistic and qualitative research methodologies.

On the other hand surveys have been widely criticised as being inherently positivistic and quantitative (de Vaus, 2002). Positivism itself, or the idea that social science could employ the quantitative methodology of the natural sciences, has several times been ridiculed (de Vaus, 2002). Also it has been observed that the criticisms levelled against surveys have been highly associated with poorly conducted surveys and certain weaknesses in many surveys (de Vaus, 2002). It has also been strongly argued that the sustainable solution is not to neglect and abandon the process, but rather to employ authentic methods of undertaking good surveys.

One of the strong cases on survey approach is that social science also shares in the unity of the scientific method because most scientific endeavour presupposes the existence of regularities in the world, which could be, uncovered (Hanson, 2008). Several theories should be built to model these regularities and express the theoretical terms precisely and unambiguously, in order to show how they can be operationalised. These have led to formal propositions and rules about what counts as proof and disproof in scientific studies. This further conducts tests of those theories in as open and systematic a manner as possible, and checking that the rules are generalisable and not specific to a specific investigator, particular place or time, or a specific measuring instrument (Hanson, 2008).

This study has relied mainly on regulators, enforcement officials, fishery businesses and consumers' surveys to investigate, identify, and understand the barriers and benefits to compliance with international HACCP regulations in Sierra Leone. It was considered important to investigate and analyse the differences in the relevant variables relating to the fishery safety regulatory frameworks, degrees of enforcement, internal fishery safety and quality assurance system within the fishery businesses or self-regulation, consumers awareness and demands on fishery safety, and other relevant status of national fishery quality assurance programmes at fishery businesses, community and zonal levels within the western area of Freetown, Sierra Leone.



Therefore, it was the requirement of the writer to develop and implement an appropriate method of data collection and analysis. While the food safety demands have become increasingly important, especially to the public health, there is a growing need to break from the tradition of sampling and laboratory analysis in carrying out research in food safety, which stands the risk of food safety fallacy. Notwithstanding that, how to move away from the homogenisation of the association between variables observed among the different sampling population or interviewees to the aggregate whole is still a serious concern for field researchers.

By investigating regulatory, enforcement, fishery businesses and consumer, with obvious differences in terms of the built-up of convergent interviews, individual case interviews and focus groups discussions may identify and understand more clearly the barriers to compliance with international HACCP regulations in Sierra Leone, while at the same time minimizing the risks of the food safety fallacy. The surveys and data collection designs were influenced by the availability of adequate resources, but the use of additional field staff made it possible to ensure that the sample sizes achieved in this study are large enough to achieve the aims and objectives of this study.

The limitations of the qualitative methodology for study were fully acknowledged and provide enough evidences to expand, clarify and verify the results. Several researchers in many disciplines have strongly supported the paradigm of combining the quantitative and qualitative approaches (Hanson, 2008). Mixing qualitative and quantitative approaches together in a case study adds flavour and explanatory power to quantitative research (Hanson, 2008). But the author comfortably applied qualitative approach in convergent in-depth interviews, case interview and focus groups through methodological triangulation technique, without utilizing quantitative methodology to collect data for this study. Semi-structured interviews and a closed-ended or structured questionnaire were also used as important instruments for qualitative surveys. Realism further suits this research on the grounds that data collected were not perceived as direct ‘cause and effect’ relationships and therefore no established theory to test. The “reality” was that the barriers were the perceptions and feelings of those involve in national fishery safety infrastructure. Within the national fishery safety infrastructure, it was also “real” that several barriers to compliance with international HACCP regulations exist.



Constructivism does not suit well with this research because the actual realities faced by the fishery industries that have to comply with the law does not seem appropriate for constructivist approach, as constructivism is more concerned with internal views of the world (Charmaz, 2010). Critical theory is also similar to constructivism as it concerned with the subjective and the political, multi-cultural diversity and gender balance in social situation. This study did not pay much attention to these values even though some consideration was given to government regulations but this was purely related to professional or technical departments of line ministries whose activities are semi-autonomous. Therefore, critical theory was not seen as fitting with the aims and objectives of this study.

Realism paradigm was used in all cases in this research, because it seems to be most suited to the aims and objective of the study, the participants involved, and to the preferred ontology and epistemology of the author. The ontology and epistemology of realism assumed that the world is real, and there is a reality to be discovered in Sierra Leone. That is, it is real that Sierra Leone's fishery safety problems could be solved to meet equivalence with international trading partners if the barriers to compliance with international HACCP regulations are identified and clearly understood for targeted interventions. The writer argues that such a reality is observed through senses and a mind, which is not perfect, but has the potential to act and distort or bias the reality that is being investigated.

In the writer's opinion the realism perspective does not seek one answer to cause and effect, like positivism, or suggest that all problems are influenced by political, gender balance, multi ethnicity, cultural diversity or other factors like critical theory, or suggest that there are as many realities as there are many observers, as in the case of characteristics in constructivism. As a realist, he takes the view that research about causation of fishery safety problem and the export ban on fishery products in LDCs can be undertaken and achieve valid and reliable results through exploring many sources of data including many variations and explanations that can be subsequently determined. According to Thompson and Perry (2004), realism paradigm have potential to collect data from many sources but any accepted data shall be triangulated in order to



contribute in the improvement of knowledge and understanding of the social world that may influence causes and beliefs.

For research such as this that follows the realism paradigm, the ontological position is that reality exists but is only perceived imperfectly and so methodological triangulation from many sources is required if the author wants to produce valid and reliable knowledge. With regard to the epistemological position the result of the investigation using methodological triangulation are most probably correct. But some schools of thought believed that the validity, reliability and correctness of results of investigations from realism are to a large extent influenced by perceptions and biasness (Guba and Lincoln, 2005).

It is therefore essential that all researchers should be fully aware of the triangulation of data, with respect to the level of how the researcher's bias and the biases of those being researched may influence the processes and the results of the investigation. Another view point of realism paradigm is that though phenomena are 'real' and are distorted by bias and faulty perception; they again are subject to the influence of their environment and as such are located in a specific context of time, duration and events (Carson, Gilmore et al., 2001).

In addition to this, the contextualization of phenomena follows a sequence in terms of how interview questions are constructed in realism methodologies (Sobh and Perry, 2006). As reiterated earlier the positivistic paradigm believes that in the physical sciences, the existence of one negative result in an experiment is enough to disprove a theory or proposition (Easterby-Smith, Thorpe et al., 1991). For example, if the positivism paradigm theoretical proposition says that all swans are white, any black swan discovered will disprove a whole theory.

In another school of thought in case study methodology, one negative case will disprove a theoretical construction (Yin, 1994). But in realism one can hardly neglect contextual nature of phenomena for theories developed by case study and as such the chances of theoretical proposition are very high, and in this context most swans are white. The discovery of a metaphorical 'black swan' or negative case will not, necessarily, puzzle the results of realism based research, but it will become part of the overall assessment of the likelihood that findings



are valid, real and correct. In fact the negative result will also be used, in realism, to make provisions for further research by exploring the reason for why such a black swan should be found among the white swan.

3.5 The Application of Case Study Methodology Approach for this Study

A case study methodology in research mostly refers to the qualitative approach in data collection, and does not involve statistical claims (Yin, 2009). Case study has been traditionally criticised as lacking scientific rigour, objectivity and reliability and that they do not address the issues of generalizability, especially when compared with other social research methodologies. This is why case study researchers have to be extra careful in articulating research design, and implementation. But irrespective of this scepticism or criticism, there are some strengths of case study, and the approach is widely used in contemporary research as it could offer insights into subject under investigation that are not likely to be achieved with other approaches (Yin, 2009). Case study methodology enables the researchers to gain a holistic view of a certain phenomenon or subject under investigation, as it can provide a round picture for several sources of evidence utilized (Stake, 2010 & 2005; Yin, 2004).

The approach is also useful in capturing the evolving and immanent characteristics of “real-life” situation in an organizational setting including the ebb and flow of organizational events, especially when it is changing at a faster rate (Stake, 2005). In fact more evidences have confirmed that qualitative case study methodology also allows generalizability because result of voluminous findings using multiple cases can create various forms of replication (Heck, 2006; Yin, 1999 & 1994).

Qualitative case study approach is now considered as a useful tool for the preliminary, exploratory stage of a research project, and as a pre-requisite for the development of the ‘more structured’ tools that are necessary in numerous surveys and experiments (Daugherty, 2009). Yin (2009) has forthrightly addressed criticisms of the case study methodology and provided a solid defence of case study research and its breadth as a research method to reckon with in the contemporary world. Qualitative case study in a contemporary world ensures that the data is not explored through one lens, but rather through a variety of lenses that provide rooms for multiple



facets of the subject under investigation to be clearly revealed and understood (Yin, 2003 a, b; Stake, 2000).

Two proponents have provided two key approaches that guide case study methodology in contemporary world including Robert Stake and Robert Yin (Yin, 2009; and Stake, 2010 & 2008). The two proponents have sought to ensure that any topic of interest to researchers is well explored, and that the “real” meaning of the phenomenon is revealed (Yin, 2003 a,b; Stake, 1995). However each of them employed different techniques but all their techniques are worthy of application in modern research undertaken (Hancock and Algozzine, 2006). Yin classifies case studies as explanatory, exploratory, or descriptive and differentiates between single, holistic case studies and multiple-case studies (Yin, 2009, 2005, 2004, 2002a&b, 1999).

This research focuses on “how” and “why” questions, since it answers the question: why the fishery products in Sierra Leone are banned for export into international developed markets? (Because of HACCP barriers); and, how could Sierra Leone remove those barriers? (That is by identifying and understanding the barriers for targeted interventions). The author therefore confirms that this study is fit to be carried out by qualitative case study methodology. The perception of barriers to compliance with international HACCP regulation in Sierra Leone by regulatory, enforcement, businesses, and consumers falls within the scope of Yin’s, 1994 single-case design class 2, because it applies only to Sierra Leone. That means the unit of analysis is an embedded case (multiple units) because the focus of the investigation includes the perceptions of convergent interviewees, individual case interviewees and the focus groups that cut across the regulatory, enforcement, businesses and consumers. The application of single-case design, class 2, embedded case (multiple units) (See Table 5, below) in this research is a relentless effort to increase theoretical replication instead of relying on statistical claim to generalizability.

Table 5 Type of case study (Yin, 1994, page 39)

	Single-case design	Multiple-case design
Single unit of analysis	Type 1	Type 3
Embedded case (multiple units)	TYPE 2	Type 4



On the other hand, Stake describes case studies as intrinsic, instrumental, or collective (Stake, 2010 & 2008, 2005, 2000, 1995). Earlier, both Stake (1995) and Yin (2003 a, b) base their case study methodology on a Constructivist paradigm. This paradigm believes that the truth is a relative term and therefore depends upon individual perspectives (Hancock and Algozzine, 2006). In constructivist paradigm, the issue of man's subjective creation of meaning for phenomena is recognized, even though the notion of objectivity is not completely ruled out. However, this research is heavily based on "realism" paradigm, but it has been believed that "constructivism" is also built upon the premise of a social construction of "reality" (Searle, 2010).

One of the privileges the author enjoyed by using this approach was the close collaboration between the author and the participants or interviewees across the entire spectrum of fishery operations in Sierra Leone. Similarly, participants were enabled by giving them the opportunity to explain their own versions of the barriers that hindering the national fishery safety management and competitiveness. Furthermore, the participants were able to express their views and opinions on the "reality" of HACCP barriers that exist within the fishery businesses in Sierra Leone, and this subsequently enables the author to better understand the participants' responses and the overall HACCP barriers in the country.

The case study methodology in this research draws profoundly on established textbooks and articles on case study research and related areas written by many authors including but not limited to Glesne (2011); Yin, (2009, 2005, 2004, 2003a&b, 2002a&b, 1999 & 1994); Stake (2010, 2008, 2005, 2000 & 1995); Hancock and Algozzine (2006); Heck (2006); Mertens (2005); etc. However, the author endeavours to filter out key aspects of these proponents' case study research methodologies as much as possible to empower and motivate other researchers to capture, adapt and apply major principles of the research approach used in this study. Therefore, the study limits more on most of the areas of Stake and Yin as tabulated below, in Table 6.

Table 6: Definition and Rationale of Different types of Case Studies Heavily Used

Type of Qualitative Case Study	Brief Definition	Rationale
Explanatory	Seeks to answer a real –life question that is too complex for the experimental approach (Yin, 2003 a, b)	This is a business management and related study aims at identifying and analysing barriers to compliance with international HACCP regulations; level of understanding of HACCP; and related benefits in fishery safety management system in Sierra Leone that require convergent interviews, individual case interviews, and focus group workshop that are too complex to be investigated by experimental strategies.
Exploratory	For evaluating intervention, that has no clear, single set of outcomes (Yin, 2003 a, b).	Investigating barriers to compliance with international HACCP regulations; level of understanding of HACCP; and related benefits are new phenomena in Sierra Leone and there were multiple outcomes of which some of the outcomes were still in the pilot stage
Descriptive	Used to describe intervention or phenomenon and the real-life context in which it occurred (Yin, 2003 a,b).	This study is based on the “reality” that the problem with fishery safety and competitiveness in Sierra Leone is due to the complex barriers to compliance with international HACCP regulation that exist within the fishery safety management system in the country.
Collective	This is single case study but with embedded case of multiple units that are similar in nature (national stakeholders) and is a kind of collection of multiple units of a single case study (Stake, 2010 and 1995)	Due to the complexity of the phenomenon under investigation, the writer used multiple sources of data collection. This provides the author with a richer set of data and promotes the transferability of the study’s results to better enhance methodological triangulation. The writer corroborated the data from multiple perspectives to enhance the depth of understanding of barriers to compliance with international HACCP regulations; level of understanding of HACCP; and related benefits, and subsequently facilitates verification of results.

Moreover, the decision by the author to use the case study for this research was also based on the types of questions developed for answering, the level of control over behavioural events, and the degree of focus on contemporary issues as opposed to previous and existing situation surrounding national fishery safety and market competition. The types of research questions were most significant in the identification of HACCP barriers. Questions on HACCP barriers based on who, what and where were investigated through convergent interviews. This approach provided supports that enhanced deeper and more detailed investigations that were essential to



answer “How” and “Why” questions on the barriers to compliance with international HACCP regulations in fishery businesses in Sierra Leone. The case study approach also provided very good contemporary data on HACCP barriers for Sierra Leone as a LDC where the “real” problems in fishery product safety and market competitiveness cannot be manipulated.

The selection of the qualitative case study methodology for this research was also influenced by the aims, objectives and rationale of the study. Before selecting, a particular case study one must be able to establish whether you are looking to describe a case, explore a case, or compare between cases (Glesne, 2011; Denzin, and Lincoln, 2008 and 2005).

The writer uses a variety of evidence from different sources, such as convergent interviews, individual case interviews, and focus groups and this goes far beyond the range of sources of evidence collected from literature and previous studies on the subject. It has again been argued that the importance of a case study research largely depends upon when a “How” or “Why” question is being asked about a contemporary set of events such as HACCP barriers in Sierra Leone, of which the researcher has insignificant or no control over (Yin, 2004). However, qualitative case study cannot make statistical claim, but it makes claims based on theoretical replication. This makes the data to be seen as capable of being explained theoretically (Yin, 2004).

A hallmark of the case study approach in this research is the use of multiple data sources, and was a designed strategy by the author to enhance data credibility. The originality of this data collection in comparison to other qualitative approaches is that researchers can collect and integrate quantitative survey data, in order to expedite the process of achieving a holistic understanding of the problem under investigation. From the case study utilized here, the data from these multiple sources were then converged and triangulated rather than handled individually. For the author, each source of data was a “puzzle,” and lead to maximum contribution to the writer’s capability and strength to the identification and understanding of the barriers to compliance with international HACCP regulation; level of understanding of HACCP; and related benefits in fishery businesses in Sierra Leone.



The convergence interviews and data triangulation add power and flavour to the result of the investigation as various strands of data were braided together to promote more identification and deeper understanding of the barriers; level of understanding and benefits of HACCP. Since this was the first time to carry out this type of study in Sierra Leone coupled with the enthusiastic nature of the researcher and participants, the chances to collect data from various sources were extremely attractive. However, dangers started to emerge due to the rigorousness that was associated with this type of approach. One of the great problems encountered by the author using multiple sources of data was the collection of overwhelming amounts of data that demanded strong management and analysis. Often, researchers find themselves “lost” in the data, especially when numerous data and sources are encountered (Meyer, 2001). However, the author was able to put this danger under control by using the services of additional field staff to facilitate the collation and bring some orderliness by utilizing computerized data base management system, to facilitate the storage, retrieval and dissemination of the voluminous data within the triangulation team.

Yin and Stake also recommend the need for effective organization and management of data (Stake, 2010; Yin, 2009), and the utilization of computerized data base management system in this study is relevant to their recommendation. Under the current lapses and gaps in the food safety control system in Sierra Leone, the use of database management system was advantageous for this study, because the “reality” is that numerous raw data are available for independent observations throughout the entire spectrum of fishery businesses. The employment of computerized database management system improves the reliability of the qualitative case study approach utilized in this research, as it enables the writer to easily track, capture, store, retrieve, arrange, and disseminate at any time during the course of this study. The database was built on simple Microsoft excel that is also good to facilitate the recording of source of data, the time and date of the data collection, storage, and search capabilities.

3.6 The Use of Triangulation Technique

Triangulation is often used to indicate that more than two methods are used in a research with a view to double or triple checking results (Atkinson, Coffey et al., 2003). In the simplest term,



triangulation could be referred to as a process of “cross examination or verification” of research results. The use of triangulation in this study provides more confidence for the author by arriving at the same result despite the use of different methods. It has been argued that if a researcher uses only one method, there will be strong temptation to believe in personal findings (Denzin and Lincoln, 2008). Equally, the uses of two methods by a researcher could lead to serious clash of results or findings (Denzin and Lincoln, 2008). The use of three methods (triangulation) in this research to get at the answer to one question, gave the confidence to the author of knowing that at least two out of three would produce similar answers, and where three clashing answers were produced, the author decided to reframe the questions and/or reconsider the methods.

Triangulation technique in qualitative case study has been considered as a powerful tool that facilitates validation of data through cross verification or examination from more than two sources of data collection. The researcher combined multiple observers, theories, methods, and materials to overcome any weaknesses and/or intrinsic biases and any problem that may emanate from one method, one observer and one-theory investigations. Triangulation has become an alternative to traditional criteria such as reliability and validity testing, and therefore, a preferred line for verification or examination of research findings (Rolfe, 2006).

Triangulation in qualitative case study is required to increase the credibility and validity of the research results. Several proponents have attempted to provide a definition for triangulation. For example, triangulation is an *“attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint”* (Cohen, Manion, et al. 2000 p.112). Secondly, it is used for crosschecking data from multiple sources to verify validity and reliability (Cohen and Maldonad, 2007).

The utilization of multiple methods, that is, triangulation in order to verify a phenomenon, is a popular technique in several qualitative case studies (Denzin and Lincoln, 2008). This helps the author to avoid the problems that may exist in every single method, and subsequently create confidence for the writer, readers and end users that the results of the study are reasonably valid and reliable. This kind of confidence was very important for this study because the results of the study are new knowledge, theories and practice for Sierra Leone, and therefore readers and end users of these results should have no doubt of the validity and reliability. Secondly, if the



suggestions of this study are to be adopted, it will be a “change in perception” and national policy change and therefore every care must be taken to reassure the readers and users of the authenticity, reliability and validity of the findings of this study. Triangulation technique has been used by case study researchers to counterbalance weights, which prevent and control research being over-balanced by reliance on a single method to the exclusion of all others and is tantamount to individual or narrow perception of phenomenon.

Concerning the author’s ontological position, the realist paradigm assumes that a “real” reality exists outside of the scope and perception of those involved in a phenomenon, and therefore reassures that triangulation technique is more relevant for “realist” than those who believed in constructivist or critical theorist paradigms. In this triangulation, the researcher obtained the data from **convergent interviews, individual case interviews, and focus groups** by applying three measurements which coincided to produce some assurances that the data and points of data collections were valid and reliable. This further helped the writer to identify a critical node in the investigation where error with the results on HACCP barriers occurred including preventive control measures and subsequently, allowed other stakeholders to deeply examine or verify the data obtained.

3.7 The Application of Triangulation in the Study

Triangulation is the backbone for the case study methodology of this study. Multiple data gathered were designed and centred around three methods including the convergent interview, the individual case interview and the focus group workshop. The Multi-methodology used in this triangulation was desirable and feasible for the study and gave a more complete view of the HACCP barriers. Triangulation components during the multiple phases of the investigation made very specific demands on a general methodology to use the right tool for the task.

This case study drew on multiple sources of evidence such as **convergent interviews, individual case interviews, and focus groups**. However, each of these different sources demanded different approaches to their interrogation, and yielded different kinds of insights on barrier to compliance with international HACCP regulations in the fishery businesses in Sierra Leone. The



author also discovered that each source has its own strengths and weaknesses. This contributed to the richness of the case study evidence derived mostly from multi-faceted perspective from different sources. One of the great strengths of triangulation in this case study was that evidences collected from multiple sources were corroborated to produce the same fact and result.

Though this study is a dissertation at the primary stage, but a further outcome of the result, which strengthens the repeatability of the research, and increases the transparency of the findings is the degree of a well organized collection of the evidence base for the HACCP barriers. Therefore, the author included case study database built on Microsoft Excel including case note, interview notes or transcripts, and the record of analysis of the evidence. The author used these techniques to maintain a chain of evidences and ensured that the actual evidences are assessable in the database. Within the database, the author ensured that the data collection followed the triangulation protocol, and the links between the different components of the triangulation, questions and the propositions were made transparent.

Each component was categorised as a stage of data collection and that means there were three stages of data collection (convergent interview, case interview and focus group workshop). Another good strategy was that any discrepancy observed between the data collected at any of the three stages were used to triangulate the results in order to prevent any significant gap of HACCP barriers during the data collection. Like any other research techniques, the inspiration of triangulation has been criticized on several grounds (Creswell, 2004).

Firstly, it has been accused of subscribing to a naive “realism” that simply implies that there could be a single definitive account of the social world (Creswell, 2007). This type of realist position has come under several attacks from proponents in support of constructionist approach and argued that research results should be viewed as just one among many available interpretations of social life (Creswell, 2007). Proponents in support of a constructionist framework do not deny the potential of triangulation; however, they portray its utility in terms of adding a sense of richness and complexity to an inquiry (Denzin and Lincoln, 2005). In this regard, triangulation becomes an instrument for enhancing the credibility and persuasiveness of research findings.



Secondly, criticism in triangulation assumes that sets of data deriving from multiple research techniques could be unambiguously compared and verified as equivalent in terms of their strengths to answer a research question. The reason is that this type of assumption may fail to take account of the different types of social situations associated with the administration of different case study methodologies, especially those dealing with between-methods approach (Glesne, 2011). It has also been argued that triangulation assumes a variety of meanings due to its association with the combined use of multiple research techniques (Stake, 2010; Bogdan and Biklen, 2007).

Intrinsic in the surveying of triangulation in a research is the positivistic frame of reference, which regards multiple techniques as varying methodologies of an acceptable external reality (Corbin and Strauss, 2008). Therefore, the ontological assumption is that there could be an objective reality, but it is outside of the individual and their understanding of the world and environment around them. With respect to epistemological assumption of triangulation, the use of different methods will produce results that are not open to interpretation and could be established through direct observation and first hand experience through the senses and ensure that the same social phenomena are unaffected by the differing or multiple methodologies applied to establish the phenomena (Merriam, 2009).

By way of improving the integrity of this study, the author attempted to use triangulation method based on the writer, data gathering, and triangulation approaches. Data triangulation took place during data gathering at differing times and places but in three different stages to produce triangulation results. That means the following multiple sources including **convergent interviews, individual case interviews, and focus groups** were then triangulated.

3.8 Maintaining Professional Ethics and Practices

The researcher applied for ethical approval and got the ethical approval for this study from the research ethics panel at the University of Salford, (see Appendix 2, page 328). One of the professional ethics of a research is to ensure that individuals participating in surveys should not be put in a disadvantaged position and should appreciate the values of investigation techniques



(Coons, 2010). Thus, the author greatly took into consideration ethics and ethical problems whilst collecting data for this research. As a result, the author decided that the respondents' anonymity must be maintained and respected throughout the practices.

This was made clear to all respondents prior to the commencement of interviews. The author also went the 'extra mile' and told the interviewees that they were free to withdraw at any time during the investigation and that all information collected from them will be presented in general form and the contents of the interview responses will be used whole and solely for this research. The author realized that such a voluntary consent safeguarded the freedom of the respondents, which motivated and gave them the opportunity to express themselves freely during the data collection.

Since the data collection was across the national fishery safety infrastructure, the writer was highly sensitive on the prevention and controlling of questions and answers that would reveal sensitive political and trade confidential information. This awareness by the researcher guaranteed the anonymity of the respondents not to say anything that would compromise them. This guarantee of anonymity was predominantly significant in this study as the respondents were aware of the lack of central government priority in food safety and quality assurance and the ban on export of fishery products, due to non-compliance with internationally recognised fishery safety regulations compatible with HACCP system. Similarly, the respondents were aware of the fact that there were no appropriate fishery safety policy and standard to regulate by the government, whilst the fishery businesses have nothing to comply with in terms of fishery safety and quality assurance.

Some of the information on the barriers were highly sensitive and most of the interviewees were part of the government and fishery businesses, therefore, all amount of care was taken not to expose their incompetency and blame them for not doing much, but at the same time the researcher needs to retrieve the information on the barriers. The author also refrained from any video or audio recording and photographing of the interviewees during the data collection. However, all the interviewees said they had no objections for the author to write down their responses and enter them into the database for the research as long as their names are not indicated against their responses. In fact all of them were happy about the note taking which they



reviewed for accuracy after the interview. ‘The Consent Form: Recruitment of Stakeholders to Participate in Interviews on Data Collection, Adapted from Research Ethics Panel (REP), REP11/080, University of Salford’ (see Appendix 3, page 329) and ‘An Information Sheet for Consent Form for Recruitment of Stakeholders to Participate in Interviews on Data Collection, Adapted from Research Ethics Panel (REP), REP11/080, University of Salford’ (see Appendix 4, page 337) are the protocols for the selection and recruitment of the participants in order to adequately address potential ethical concerns; adapted from the guidelines provided by Research Ethics Panel (REP), Reference REP11/080, University of Salford.

3.9 Stage I: The Convergent Interview

The convergent interview was developed as a means of studying organisational change and development processes in various types of organisation in Australia, and it combines various features of structured and unstructured interviews, and uses a systematic process to refine the information collected (Dick, 1998). Convergent interview has many uses, but it is a technique that can be used to gather valuable information especially when there are some doubts about the information, which is to be collected and in fact very useful in under-researched areas marked by little or no availability of established theoretical and methodological frameworks (Creswell, 2007). It has also been argued that convergent interview can help researchers to take meaningful decisions on the types of questions they may want to ask if they want to collect information through surveying techniques (Creswell, 2004).

The investigation of barriers to compliance with international HACCP regulation in the fishery businesses in Sierra Leone is compatible with the requirements of convergent interview, because it has never been investigated in the country and there are little or no data available in this field for Sierra Leone. Similarly, the methodological and theoretical underpinnings for HACCP study in Sierra Leone, their food safety policy, regulation and standard are not extensive yet.

The convergent interview is ironical because it applies an unstructured interviewing process, which gradually becomes more and more structured as it goes on. In other words, it is a process of progressive and systematic structuring, unstructured data. That means several interviews are conducted up to the time significant results on the final theoretical construct is ready and strong



enough for advancement into further investigation. In this scenario, the first interview is carried out to obtain data and the data is advanced to produce the foundation for the second interview, and subsequently, the third and so on until the interview is closed.

One advantage of convergent interview is that it does not require pre-existing theory for its application, despite the fact that it is indirectly informed by the literature review undertaken before the commencement of the interview. It is also flexible in the sense that it provides room for the interviewees to articulate their thoughts, ideas and opinions and through the iterative process to purify these thoughts, ideas and opinions into clear and precise groups or categories of benefit for the investigation in question. The fact is that each interview develops the thoughts, ideas, opinions and categories further until a point is reached where no more interview could be relevant or all the potential questions and answers are no longer entertained. This point is called “theoretical saturation” where no more questions and answers are possible for a phenomenon under investigation.

This is similar to the term in chemistry known as “saturated solution”. In chemistry, specific amount of sugar or salt would start to dissolve in specific amount of water until it reaches a point known as “saturated solution” where no more sugar or salt can dissolve in that specific amount of water. The continuation of the interviews through acceptance or rejection of first interviewee’s thoughts, ideas and opinions enables the groups or categories of benefits to emerge in an unbiased, clear, systematic, structured manner.

The convergent interview is not an ordinary interview because it takes the form of an iterative process of joint searching and investigation with the interviewee and the interviewer as a means of in quest of clarification and correct interpretation and understanding of the thoughts, ideas, and opinions of the interviewee. According to Creswell (2007), it is an “iterative clinical technique” to derive explanation and interpretation of a phenomena following discussion between two people in a progressive and systematic questioning and answering. Conversely, the process of convergent interview takes a more “realistic” view in this study than the simple approach of Schein (1993). The reason is that the approach in this study carries meanings forward between interviews in order to organize, shape and structure not only the individual



interpretation and understandings of the HACCP barriers, but to come to a consensus and general thoughts, ideas, and opinions among individuals of relevant stakeholders on what the HACCP barriers might be to Sierra Leone's fishery businesses, towards safety and competitiveness of fishery products which are the main focus of these interviews.

3.9.1 Design of Categories and Questions for the Convergent Interviews

The author realized that there is no easy access to someone's personal opinions especially on matters that have legal implications such as national policy or regulatory system, degrees of enforcement, non-compliance, codes of practice, to name but a few. The writer therefore embarked on the application of convergent interviewing methodology to gather and structure such information to avoid or reduce to an acceptable level biasness of the interviewer, to assure the development of potential list of categories of barriers for further questioning in Stage II and Stage III.

The essence of this triangulation technique was to unveil the perceptions of the interviewees on the barriers to compliance with international HACCP regulations governing the trading of food across international borders that exist within the food safety regulatory, enforcement and commercial operations of the fishery business in Sierra Leone. This stage of triangulation involved the development of a temporal list of potential categories of HACCP barriers, single and then broad based questions, tables 7 to 20 below, for the Convergent Interviews to serve as the backbones for further questioning of relevant stakeholders on HACCP barriers during the case interviews and focus group workshop.

Table 7: Questions on Fishery Products Legislation (Developed for this study)

Category 1 : Fishery Product Legislation	
Questions:	
<ul style="list-style-type: none">• Is there a national fishery safety and quality assurance legislation compliance with Codex Alimentarius and EU legislation (with commitment from government regulatory authorities, based on risk analysis i.e. risk assessment, risk management and risk communication)?• Is there a national coordination body for food safety control activities?• What is the legal framework for national food control?• Is the national food control based on one national law or several different laws?• What fishery laws are currently in force and when were they enacted, repealed or amended?• Who are the implementing authorities of these laws?	



Table 8: Questions on Fishery Regulations and Standards Developed for this study) (Developed for this study)

Category 2: Fishery Regulations and Standards
<p>Questions:</p> <ul style="list-style-type: none"> • Are there regulations and standards related to fishery product safety and quality? • Which authority is empowered to make regulations and standards under the national food laws? • Do these authorities consult consumers, trade interests, and non-governmental organizations in the preparation of food regulations and standards? • Are there constraints on their implementation of these regulations and standards? • Have the food additives, pesticide and veterinary drugs residues, sanitary facilities at fishery processing and fishery service levels been taken into consideration in the development of fishery regulations and standards? • Do the fishery regulations and standards provide for Labelling including its composition; Date marking and marking of weights and measures; Sampling procedures; importation and exportation; in-process safety and quality control; licensing and registration of fishery premises; closure of unhygienic fishery premises; health control of fishery handlers or personal hygiene; medical examinations of fishery handlers; advertising of fishery products; use of safe packaging material; freshness examination of fishery products; provision and adequacy of sanitation measures on board vessels or any transportation and in-service terminals?; measures to be implemented in the event of natural disasters such as floods, cyclones, earthquakes, etc.; irradiation processing; HACCP and ISO certification by an appropriate authority; quarantine measures; warranty measures; Penalties; etc? • Is there a national policy for fishery quality assurance in catching, landing, industries, including traditional enterprises? • Are there rules for self-regulations, HACCP and quality assurance in fishery operations?

Table 9: Questions on Guidelines, codes of practice, advisory standards (Developed for this study)

Category 3: Guidelines, codes of practice, advisory standards
<p>Questions:</p> <ul style="list-style-type: none"> • Are there codes of hygienic practice in Sierra Leone for the production, processing, storage, and distribution of fishery products? • Do the codes specify cultivation of freshwater and saltwater species of fish; prohibit commercial harvesting of shellfish from contaminated or polluted waters; specific storage conditions, such as temperature or cold-chain-management in ports and stations for transportation by land, water or air of fishery products; specify traceability of fishery products; safe fishery products packaging material; and specify hygienic handling of fishery products by street vendors?. • Is there any review period for modification of codes of practice?

Table 10: Questions on Harmonization of Standards with international standards (Codex, EU, ISO, etc) (Developed for this study)

Category 4: Harmonization of Standards with international standards (Codex, EU, ISO, etc
<p>Questions:</p> <ul style="list-style-type: none"> • Are national food regulations harmonized with international standards? • Does Sierra Leone participate in Codex activities? • Is there a National Codex Committee and relevant technical committees to formulate national positions on fishery standards? • What is the position of the Sierra Leone with respect to SPS, TBT, ISO? • Are there enough trained persons for development and promulgation of fishery standard? • Is Sierra Leone a member of any regional groupings regulations and standards?



Table 11: Questions on Fishery inspection (Developed for this study)

Category 5: Fishery Inspection
<p>Questions:</p> <ul style="list-style-type: none"> • Are there training institutions for fishery inspectors in the country? • What is the ratio of fishery inspectors to population served? • What is the ratio of fishery inspectors to the number of fishery industries to be inspected? • Are fishery inspections carried out consistently by officers at different locations? • Does the inspection of fishery businesses include point of capture, onboard vessel, jetty, fishery processing plants, traditional drying and smoking processing, transportation, fishery products markets, street vending, and restaurants? • Are the fishery handlers' certificates, fishery establishments' permits or licenses, health certificates of fishery handlers included in the statutory inspection form for inspectors? • Are specific procedures, codes of practice, or guidelines for fishery inspections laid down with respect to sampling procedures, sealing storage, and transportation of samples, reporting schedules, collection of evidence of non-compliance, advice to fishery industry and market, consumer complaints, import/export inspections, and fishery processing plant inspections? • Are appropriate rapid testing field-kits available for fishery inspection? • What are the minimum qualifications for fishery inspectors? • Do fishery inspectors have opportunities for continuous professional development? • Are fishery inspectors provided the necessary logistics such as mobility, travel allowances, and personal protective equipment (PPE) for inspections?

Table 12: Questions on Fishery safety control laboratories including Public Health Laboratories (Developed for this study)

Category 6: Fishery safety control laboratories including Public Health Laboratories
<p>Questions:</p> <ul style="list-style-type: none"> • Are there laboratory facilities for chemical and microbiological analysis of fishery products? • Which institutions have fishery safety control laboratories? • How many laboratories are equipped for chemicals, biotoxins, and microbiological analysis of fishery products? • Are the national laboratories performing statutory work? • Do the laboratories participate in national monitoring programmes for contaminants such as aquaculture drugs residues, heavy metals and mycotoxins in fishery products? • Do the microbiological laboratories have appropriate equipment for sample collection, system for sample collection and dispatch? • Are bacteria, Viruses, Protozoa, Helminths, mycotoxins diseases, tested for in fishery products? • Are the chemical laboratories equipped to undertake wide range of chemical testings? • Do these laboratories have quality assurance or registration systems in place? • Are these laboratories accredited to ISO17025? • Are there guidelines for handling hazardous substances?

Table 13: Questions on Epidemiology and foodborne disease surveillance system (Developed for this study)

Category 7: Epidemiology and food borne disease surveillance system
<p>Questions:</p> <ul style="list-style-type: none"> • Is there any legal notification system of cases of Foodborne diseases in the country compatible with RASFF, INFOSAN, and GLEWS? • Are there compiled statistics and computerised database of national foodborne diseases? • Is there any national food safety information system (FSIS) supported by worldwide web list server to facilitate capture, storage, retrieval and dissemination of information on foodborne diseases? • Are there legal requirements for food industries to establish FSIS compatible with national FSIS? • Are there authorities mandated for national investigation of food borne diseases? • Is there any accredited public health laboratory, which is involved in food safety assurance? • Is Sierra Leone involved in Global Salm-survey?



Table 14: Food Safety expertise and training requirements (Developed for this study)

Category 8: Food Safety expertise and training requirements
Questions: <ul style="list-style-type: none"> • What categories of personnel are involved in fishery safety and fishery control? • What are their disciplines or specialties? • Are there personnel trained and qualified in HACCP and PRPs? • Are there personnel experienced in ISO certification system? • What are their educational and training requirements? • Are there provisions for continuing education, training, and periodic assessments of national capacity building needs in food safety?

Table 15: Questions on Extension, Competent Authority and Third Party Consultancy Firms (Developed for this study)

Category 9: Extension, Competent Authority and Third Party Consultancy Firms
Questions: <ul style="list-style-type: none"> • Do government regulatory authorities provide extension and advisory services to the fishery businesses and markets? • Is there any recognised EU competent authority (CA) in Sierra Leone to carry out assessment of fishery products? • Is the EU CA equipped and strengthened enough to establish and implement assessment system compatible with Codex Alimentarius and EU legislation? • Are there registered private consultancy firms to conduct third party auditing in food businesses? • Are the consultancy firms certified to issue HACCP and ISO certifications? • Do private consultancy firms authorized by law to provide extension and advisory services to the food industries and markets? • Are training courses conducted for fishery industries by government regulators and/ or consultancy firms?

Table 16: Questions on Fishermen (Developed for this study)

Category 10: Fishermen
Questions <ul style="list-style-type: none"> • What is the estimated total catch rate of fishery products annually? • What is the volume of catch of fishery products going into exports? • Is there evidence of increase juvenile catch? • How does juvenile catch affect fishery operations in the country? • Why there is an increase in juvenile catch? • What are the main production problems encountered by fishermen? • Are there associations of fishermen in the country? • Do fishermen receive technical assistance on fishery safety?

Table 17: Questions on Fishery Processors (Developed for this study)

Category 11: Fishery Processors
<ul style="list-style-type: none"> • How many registered fishery businesses in Sierra Leone? • Are these industries SMEs or larger businesses? • How the industries are described- Nationalized, Domestic or international? • Do the fishery industries have knowledge of GHP, GMP, HACCP, Quality assurance, certification and other fishery safety requirements? • What are the main fishery safety and quality assurance incidents in the fishery businesses? • What are the characteristics and main fishery safety and quality assurance problems associated with SMEs, including indigenous processors and street vendors? • What is the relationship between fishery businesses and national regulatory authorities or other agencies or NGO concerning fishery safety and quality assurance? • Do fishery processors receive any training and assistance provided by regulators other agencies? • What are the main concerns of fishery processors regarding the national fishery safety control system such as costs of compliance with legislation, fishery inspection, and so on?

- Describe the relationship between fishery processors and fishermen with regard to safety and quality assurance of fishery products?
- Describe the relationship between processors and the transport and retail sectors regarding fishery safety and quality assurance?

Table 18: Questions on Fishery Export (Developed for this study)

Category 12: Fishery Export

Questions

- What is the volume of the fishery products exported to developed countries markets within the last ten years?
- What are the main fishery products exported in terms of quantity and value, and the countries to which they are exported within the last ten years?
- What are the problems hindering export of fishery products to developed countries markets?
- What are the main causes of these problems?
- Are there significant fishery product rejection problems by international developed markets?
- Have economic studies been carried on these rejections and how to circumvent them?
- Is there a mechanism for the collection and dissemination of information on fishery exports rejected by foreign buyers?
- What fishery safety and quality assurance standards and requirements such as Codex, EU, international, national, retailers and NGO are likely to be requested in the future?
- Do the exporting sectors have a pro-active strategy for meeting the requested standards by the markets and consumers?
- What are the main problems for meeting the fishery safety and competitiveness requirements in terms of knowledge, facilities, investment capital, and training, running costs, government and fiscal support?
- What are the suggestions to overcome these problems?
- How do you classify Sierra Leone level of fishery export-small, medium or large?
- Is there a mechanism for monitoring fishery products exports?
- Which standards are used for authorizing exports of fishery products?
- Do these exported fishery products compete economically in the international lucrative markets?
- What are the types of contracts between fishery exporters and their international counterparts?
- What are the present fishery safety and quality assurance standards implemented for the existing exports?
- Are there certain species of fishery products with significant potential for exports?

Table 19: Questions on Fishery Research (Developed for this study)

Category 13: Fishery Research

Questions

- there studies on traditional fishery processing and transformation techniques indicating beneficial or detrimental effects on fishery safety and quality assurance in particular research on safe fishery production, processing, storage, transportation and distribution methods to reduce fishery losses and improve fishery safety and market competitiveness?
- Is research being carried out on the safety of cooked fishery products including street fishery products vending and fishery products sold in restaurants?
- Is there collaborative fishery products research in the country on a national, regional and/or international basis?
- Are there university facilities and human resources used by national institutions in charge of fishery safety and quality assurance, and fishery control?

Table 20: Questions on Consumer education and participation in fishery safety and quality assurance (Developed for this study)

Category 14: Consumer education and participation in fishery safety and quality assurance

Questions

- Is there a food safety and quality assurance information and communication policy in Sierra Leone?
- Are there national programmes designed for public education on food safety?
- Are consumers involved in food safety activities?

- Are consumers involved in formation of consumer committees?
- How are consumer committees funded, and by whom?
- Are consumer committees involved in food establishment competitions?
- Are consumer committees given access to laboratory testings?
- Is there a national system for complaints on food safety and economic fraud?
- Is food safety programme part of the national school curriculum at primary, secondary, and tertiary levels?
- Are there national consumer protection organizations?
- Do consumer protection groups have structures for monitoring the safety and quality of foods?
- What is the general level of awareness and knowledge among consumers about food safety and quality assurance in the country?
- What are the key concerns of consumers with respect to safety and quality assurance of food produced locally and imported?
- Are these concerns properly addressed by government and food industries?
- Are there national activities for ensuring that food for local consumption conforms to international HACCP regulations and standards?
- Are there government agencies involved in the production and delivery of food safety and quality assurance information and education materials?
- Do consumers pose any pressure on government and food industries to ensure food safety and quality assurance of locally produced and imported food products?

It was a type of a broad open-ended question about the experience and perception of the interviewees with HACCP system in order to solicit their view on the HACCP system, and proceeds further by using the responses to the questions to identify any barriers that hindered its adoption and implementation in the country. The barriers identified and listed in the first interview serves as the foundation and starting point for the second, whilst the second provides the bases for the third and so on. This process goes on systematically with the convergence developing through the elimination of those responses that are not significant to the phenomena under questioning.

The need for a divergence is to discover whether there is any component that could be utilised as a resource for the next stage of interview. By utilizing the major groups of barriers and the rejection of non-significant data, the questioning will continue to go on until it reaches the point of saturation. The author's contribution to the convergent interview is to question and where necessary clarify, but not to suggest, add or reject any of the of barriers. This assures that the classes of barriers accepted belong to those that derived from the thoughts, ideas, opinions, perspectives, and beliefs of the interviewees that clearly and rationally reflect their collective perspectives, beliefs and understandings.



3.9.2 Target Population and Location for the Convergent Interviews

The target population in this convergent interview comprised of the stakeholders involved in food operation with special emphasis on national fishery operations. The stakeholders were informed of the purpose of the investigation, and the author was clear and explicit about why they were the targeted population to avoid potential interviewees attributing sinister motives to the author.

Generally the target population selected for the convergent interview comprised of people who had knowledge and/or experienced in policy, regulation, standards, food safety and quality assurance including fishery safety, inspection, enforcement, production and processing, marketing, nutrition, health, environment, commerce, fishery research, and international norms. Since the aim of the study is to identify HACCP barriers in fishery businesses, the selection process for target population involved choosing 1 interviewee from each line ministry and/or its regulatory department, enforcement and five 5 registered fishery businesses.

A total of 22 interviewees were selected from the national regulatory, enforcement and businesses for the convergent interview as given in Table 21: Unit of Analysis: Convergent Interview Stage I (SI), below.



Table 21: Unit of Analysis: Convergent Interview-Stage I (SI) (Developed for this study)

REGULATORY	I#	ENFORCEMENT	I#	FISHERY BUSINESS	I#
1. Ministry Fisheries and Marine Resources	1	1. Sierra Leone Export and Investment Promotion Agency	12	1. Afric Fishing Company	20
2. Ministry of Agriculture and Forestry	9	2. Environmental Health Division	11	2. Atlans Fisheries Sierra Leone (SL) Limited	19
3. Ministry of Health and Sanitation	4	3. Sierra Leone Standards Bureau	16	3. Horse Fishing Company	22
4. Ministry of Food Security	15	4. Food and Nutrition Department	2	4. Okey Agencies Limited	13
5. Ministry of Trade and Industry	8	5. Institute of Marine Biology and Oceanography	10	5. Sierra Fishing Company	6
6. Ministry of Justice and Anthony General	17	6. Fishery Inspector (Department of Fisheries)	3		
7. Ministry of Finance	18	7. Central Veterinary Office and Laboratory	21		
8. Ministry of Foreign Affairs	14	8. Sanitary and Phytosanitary Division	5		
9. Ministry of Education	7				

Note: I# = Interviewee Number

This group of interviewees was heterogeneous and represented all the sectors of important stakeholders in the fishery safety infrastructure in the country. The reason is that fishery operation in Sierra Leone and its safety control are currently fragmented and is not effectively regulated. The Fishery Act 1994, amended 2007, governing the fishery operation is purely bylaw that is not compatible with international requirements based on evidence of science and technology. There are no fishery standards or specifications and the process of retrieving information on policy, regulation or legal framework, enforcement, standard, specification, production, processing, distribution, marketing and consumption is apparently complex, and therefore the more heterogeneous the interview groups the better for this research.



All the interviewees were selected from Freetown the capital city of Sierra Leone because this is where most of the regulatory, enforcement and fishery business activities are based. The convergent interviews were conducted in their offices or place of work, businesses, premises or their own desired locations in order to make tasks easier for them, considering the socioeconomic problem in the post-war conflict country coupled with challenges of SMEs. With these considerations, the practicalities and complexities of the HACCP barrier situations, and the desire for triangulation in this research, the data collection was found to be well organised, efficient and cost effective.

All the interviewees participated one by one and the interviews progress until saturation was reached at 16th interview. After 16th interview, no more new themes were suggested by the 17th to 22nd interviewees. It was also interesting to learn that the process of iteration in this interview is that the suggestion of new theme represents the output of the previous theme until saturation when no more new theme was suggested.

The method used to select the representatives from the stakeholders was based on three important factors including (i) their relevant knowledge and experience in policy, regulation or legal framework, enforcement, standard, specification, production, processing, distribution, marketing and consumption of fishery products; (ii) their availability during the time set out for this stage of interview; (iii) the need to have heterogeneous mixture of group so that most areas of the national fishery operations are covered to maximum.

Many more than 22 people wanted to participate in this first stage of interview, but the inclusion of more interviewees was hindered by the saturation at 16th interviewee. The interview would have stopped at interviewee 17th when it was realised that saturation was reached at interviewee 16th. However, five more people were interviewed to further confirm saturation. The selection of this first set of interviewees was critical for the whole research as the outcome of the first stage of the interview provides the foundation for subsequent stages of the interviews and the research as a whole. The author argued that the selection of the 22 technical interviewees was sufficient



for the first stage because the interviewer reached saturation at the 16th interview, and the literature review was unable to provide new theme outside those suggested by the interviewees.

For the process of convergent interview, the number of interviewees needed is dependent upon the nature and type of data required. In fact according to Dick (1998), 12 people is an ideal number for convergent interview if you want to assure stability of the views of the interviewees and prevent contamination of the interview. Some schools of thought also believed that saturation might occur as early as 12th interview during the convergent interview (Carson, Gilmore et al., 2001; Riege, 2003). In contrast, saturation in this study took place at the 16th interview, which adds credence to this study. The focus of the research was on barriers of HACCP in Sierra Leone and saturation at 16th interview provided assurance that the issue was thoroughly investigated. So far, 11 technical barriers of HACCP have been identified for developed countries, of which by history and nature have the appropriate food safety infrastructure installed and they have the requisite human resources (Gilling, Taylor et al., 2001). The suggestion of 18 themes at the point of 16th interview as saturation should not be a surprise because the problems of food safety in Sierra Leone are insurmountable.

3.9.3 Maintaining the Interviewee Talking and Questioning and Answering

An important feature of the technique applied by the researcher in this convergent interview was by allowing and maintaining the interviewees talking for an extended period of about 1 to 2 hours without leading them. This ensures that all information on the HACCP barrier is freely volunteered by the interviewee and largely gave assurance that it is not determined by the questions asked by the interviewer. The interviewer focused more on a "content-free" question in an atmosphere of sustained good rapport. A matrix was used to collect and organize responses of 22 participants used in the convergent interview, See Table 22 below, (also in Chapter 4, page 170) . The keys for the matrix are also given in Tables 23, 24 and 25 below, (also in Chapter 4, page 171)



Table 22: Matrix of Responses to Convergent Interview: Carson, Gilmore et al., 2001, Modified by the Author (Suggested Theme, Agree, Disagree, Not Applicable in HACCP barriers from Stage I-Convergent Interview: green shaded area represents suggested theme; light blue shaded area not applicable indicates that this category of theme/barrier was not in existence during that particular interview; white shaded area represents agree theme; greyed shaded area represents disagree theme; blue, red and yellow shaded areas represent saturation

Group	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Interview 1	st	st	na	Na	Na	Na	na	na	Na	Na	na	na	Na	na	na	na	na	na	na	na	na	na
Interview 2	ag	ag	st	St	na	Na	na	na	Na	Na	na	na	na	na	na	na	na	na	na	na	na	na
Interview 3	ag	ag	ag	Ag	st	St	st	na	Na	Na	na	na	na	na	na	na	na	na	na	na	na	na
Interview 4	ag	ag	ag	Ag	ag	Ag	ag	st	Na	Na	na	na	na	na	na	na	na	na	na	na	na	na
Interview 5	ag	ag	ag	Ag	ag	Ag	dg	ag	St	St	na	na	na	na	na	na	na	na	na	na	na	na
Interview 6	ag	ag	ag	Ag	ag	Dg	dg	ag	Ag	Ag	st	st	na	na	na	na	na	na	na	na	na	na
Interview 7	ag	ag	ag	Ag	ag	Dg	ag	dg	Ag	Ag	dg	ag	St	na	na	na	na	na	na	na	na	na
Interview 8	ag	ag	ag	Dg	ag	Dg	dg	ag	Ag	Ag	dg	ag	Ag	st	na	na	na	na	na	na	na	na
Interview 9	ag	ag	ag	Dg	ag	Dg	ag	ag	Ag	Dg	dg	ag	Ag	ag	st	na	na	na	na	na	na	na
Interview 10	ag	ag	ag	Dg	ag	Dg	ag	ag	Ag	Ag	dg	ag	Ag	ag	ag	st	na	na	na	na	na	na
Interview 11	ag	ag	ag	Ag	ag	Dg	ag	ag	Ag	Ag	ag	ag	dg	ag	ag	ag	st	na	na	na	na	na
Interview 12	ag	ag	ag	Ag	ag	Dg	ag	ag	Ag	Ag	dg	ag	dg	ag	ag	ag	ag	st	na	na	na	na
Interview 13	ag	ag	ag	Ag	ag	Dg	dg	ag	Ag	Ag	ag	ag	dg	ag	ag	ag	ag	st	na	na	na	na
Interview 14	ag	ag	ag	Ag	ag	Dg	dg	ag	Ag	Ag	dg	ag	Ag	ag	ag	ag	ag	ag	st	na	na	na
Interview 15	ag	ag	ag	Ag	ag	Dg	dg	ag	Ag	Ag	dg	ag	Ag	ag	ag	ag	ag	ag	ag	st	na	na
Interview 16	ag	ag	ag	Ag	ag	Dg	dg	ag	Ag	Ag	ag	ag	dg	ag	ag	ag	ag	ag	ag	ag	st	na
Interview 17	ag	ag	ag	Ag	ag	Dg	dg	ag	Ag	Ag	ag	ag	dg	ag	ag	dg	ag	dg	ag	ag	dg	ag
Interview 18	ag	ag	ag	Ag	ag	Dg	dg	ag	Ag	Ag	dg	ag	dg	ag	ag	ag	ag	ag	ag	ag	ag	ag
Interview 19	ag	ag	ag	Ag	ag	Dg	ag	ag	Ag	Ag	dg	ag	dg	ag	ag	ag	ag	ag	ag	ag	ag	ag
Interview 20	ag	ag	ag	Ag	ag	Ag	ag	ag	Ag	Ag	dg	ag	dg	ag	ag	ag	ag	ag	ag	dg	ag	ag
Interview 21	ag	ag	ag	Ag	ag	Ag	ag	ag	Ag	Ag	dg	ag	dg	ag	ag	ag	ag	ag	ag	dg	ag	ag
Interview 22	ag	ag	ag	Ag	ag	Ag	dg	ag	Ag	Ag	dg	ag	dg	ag	ag	ag	ag	ag	ag	dg	dg	dg
	at	at	at	At	at	Rt	at/rt	at	At	At	rt	at	Rt	at	at	at	at	at	at	at	at	at



Table 23: KEY: First Key for Table 18: Theme = Barrier (Developed for this study)

Suggested Themes or Barriers	Suggested Themes or Barriers
Lack of appropriate fishery policy (i.e compatible with Codex Alimentarius and EU Legislation);	Lack of the will of government
Lack of agreement;	Lack of PRPs in fishery businesses;
Lack of enforcement;	High illiteracy rate
Lack of outcome expectancy	Lack of consumer agency;
Lack of human expertise and training	Negative guideline factors;
Lack of Adequate Staff	Negative environmental factors;
Lack of finance	Lack of competence;
Lack of access to information on hazards	Lack of private consultancy firm;
Lack of awareness	Lack of cueing mechanism
Lack of self-efficacy	Lack of motivation
	Lack of understanding
	Lack of fishery standard or specification

Table 24: KEY: Second Key for Table 18: Suggested Theme or Agree or Disagree or Not Applicable (Developed for this study)

Responses to Convergent Interview	Abbreviation/Short Form
Suggest Theme	St
Agree	Ag
Disagree	Dg
Not Applicable	Na

Table 25: KEY: Third Key for Table 18: Accept theme or Reject theme (Developed for this study)

Definition of Saturation	Abbreviation/Short Form
Accept Theme	At
Reject Theme	Rt

The matrix given in Table 22, is a hypothetical illustration of the data gathered on themes during the convergent interviews. The actual outcome of themes presented by this matrix is fully described in the next chapter of this study. The sequence of suggestion of themes from the 22 interviewees in the matrix includes:

Interviewee 1: Themes A and B
Interviewee 2: Themes C and D
Interviewee 3: Themes E, F and G
Interviewee 4 : Theme H
Interviewee 5: Themes I and J
Interviewee 6: Themes K and L



Interviewee 7: Theme M

Interviewee 8: Theme N

Interviewee 9: Theme O

Interviewee 10: Themes P

Interviewee 11: Theme Q

Interviewee 12: Theme R

Interviewee 13: Themes S

Interviewee 14: Theme T

Interviewee 15: Theme U

Interviewee 16: Theme V

Interviewees 17 to 22 only agree and/or disagree with themes as no more new themes suggested.

Interviewee 1, suggested themes A and B and were agreed by all other interviewees and therefore retained for further investigations. Interviewee 2, suggested themes C and D, but only C was agreed by all other interviewees and therefore retained for further investigations. Theme D was also retained for further investigations because it was disagreed by few or three interviewees. Interviewee 3, suggested themes E, F and G, and E was agreed by all other interviewees and therefore retained for further investigations. Theme F was agreed by few or 6 interviewees and disagreed by all others and therefore not retained for further investigations; whilst only half of the interviewees agreed with G other half disagreed with the theme. This 50/50 agreement or disagreement made theme G a very special theme and was maintained for further investigations.

Interviewee 4 suggested theme H, Only 1 interviewee disagreed with theme H and therefore retained for further investigations as well. Interviewee 5, suggested themes J and I and were retained for further investigations because only 1 interviewee disagreed with theme J. Interviewee 6, suggested themes K and L, but few or 5 interviewees agreed with theme K and therefore not retained for further investigations. All other interviewees agreed with theme L and therefore retained for further investigations.

Interviewee 7, suggested only theme M but was agreed by few or 6 interviewees and therefore not retained for further investigations. Interviewee 8, suggested only theme N and was agreed by all interviewees and therefore retained for further investigations. Interviewee 9, suggested only theme O and was agreed by all interviewees and therefore retained for further investigations. Interviewee 10, suggested only theme P and was agreed by all interviewees except 1, and therefore retained for further investigations. Interviewee 11, suggested only theme Q and was



agreed by all interviewees and therefore retained for further investigations. Interviewee 12, suggested only theme R and was agreed by all interviewees except 1, and therefore retained for further investigations. Interviewee 13, suggested only theme S and was agreed by all interviewees and therefore retained for further investigations. Interviewee 14, suggested only theme T and was agreed by all interviewees except 3, and therefore retained for further investigations. Interviewee 15, suggested only theme U and was agreed by all interviewees except 2, and therefore retained for further investigations. Interviewee 16, suggested only theme V and was agreed by all interviewees except 1, and therefore retained for further investigations.

As the interviewer moved from interviewees 1, 2 to 6 the number of theme suggested were 2 themes per interviewee. However, as the interviewer approached interviewees 7 to 16 the number of theme suggested reduced from 2 to 1. In fact, from interviewees 17 to 22, no new theme was suggested, instead the interviewees argued to agree or disagree on the themes suggested by earlier interviewees.

The interviewer wanted to halt the interview at interviewee 17, but decided to continue the interview so that more volunteers would be interviewed for probability of suggesting more themes, since the food safety situation in Sierra Leone is too complex and is a long-standing issue, which requires insistent intervention at this stage. As the arguments for agreement and disagreement were matched with, the previous themes suggested, so saturation was reached and the process ended. The author compiled the list of accepted themes (**at**) and then goes forward as the basis for an interview schedule in the next stage of the process known as the case study interview for further data collection.

Apparently, the data collection would have been terminated at this stage since significant and substantial data were gathered and may be of great use to the research aims and objectives. Contrary to collecting such data from analysis of interviews, the convergent interview as applied here is both direct and unbiased by the interviewer as the interviewees were given the time, space and freedom to express their thoughts, ideas and opinions without inference by the interviewer. The entire process was found to be original in nature, efficient in terms of time, effort and clarity, cost effective and unbiased.



This interviewer attempted to converge on the phenomenon under investigation in the smallest but significant set of interviews to ensure that the variation on essential characteristics of the investigated phenomenon is sought to maximum. One of the advantages of convergent interview is that it converges on the essential issues of phenomenon under investigation by applying a continuous and iterative refinement of techniques and contents (Carson, Gilmore et al., 2001). It has been argued that critical literature review could ensure the acquisition of knowledge of phenomena under investigation, but this usually fall short when it comes to guiding the responses of the interviewees as compared to convergent interview that has been found to be explicit (Carson, Gilmore et al., 2001).

Despite this disparity between the literature and convergent interview, it is also important to note that the critical review of literature strengthened the interviewer to know when saturation was reached during the convergent interview. When the interviewer realised that no more new theme is suggested from the unstructured interview relevant to the previous suggested themes and the entire topic under investigation the roles of the literature also became very important to protect the convergent interview from potential contamination and the interviewer was quick to determine the saturation phase. In some instances the literature could produce new themes at the point of saturation and such themes can be agreed or disagreed by the interviewees, however in this interview the literature did not produce new themes perhaps due to the little or no availability of studies on HACCP barriers for Sierra Leone.

The author's greater eye contact and attention build earlier and better rapport during the convergent interview. The interviewer also used an informal mnemonic system to help him remember the themes as they arise from suggestions by interviewees. Note taking was all that was employed by the interviewer to collect the responses, enter in the matrix and subsequently input them into a database designed and developed for this study. In contrast, certain interviewers in other research find it hard to recall the data as they are provided unless they are recorded by tape. The interviewer preferred not to use a tape recorder as it doubles the time taken to conduct the interview, and to play it back. Some interviewees may also feel less frank to suggest with a recorder present. The interview itself follows various distinct stages.



The author set the interviewees at ease, with full attention of the interviewer. This was followed by self-introduction and explanation of the purpose of the interview, and established a person-to-person relationship. The interviewees were assured of their confidentiality and protection of all information provided and was written in a way that conceals the identity of individuals participating. The opening question keeps the interviewer talking, typically for about an hour or so. Using one to two hours for the duration of the interview was an important feature of the technique employed for this kind of interview. The author ensured that the questions during this part of the interview were best kept as content-free as possible to allow the interviewees to determine the content, rather by the questions asked. The author also used additional field staff in this process and started by putting the interviewees at ease. After he established rapport, the author began asking a single and then broad based questions, Tables 7 to 20 (pages 115-119), for the Convergent Interviews.

In this study, the interviewer asked questions like the following:

- What do you feel have been the strongest factor hindering the implementation of HACCP in national fishery businesses?; and
- Are there any problem within the national fishery operation because of non implementation of HACCP?; or
- What difference has occurred in the national fishery operations as a result of non-implementation of HACCP? Or
- What concrete changes in the fishery business that could be observed by non fishery actors as a result of non-implementation of HACCP?

The answers to these questions would be probed in order to see what lay behind the factors identified, but in a manner that no suggestions would be provided for the interviewees by the researcher. It should be noted that convergent interview is an attempt to access the inner thoughts, ideas, opinions and attitudes about the phenomenon under investigation by eliminating or minimizing any pollution of responses with prior knowledge, thoughts, ideas and opinions of the interviewer. It is true that theories and concepts from the critical reviews of literature, and researcher's knowledge and experience of the HACCP in fishery businesses play significant roles here. However, the answers suggested by the interviewees provided the centre focus in



clarifying, identifying and grouping themes or responses into barriers to compliance with international HACCP regulations that exist in national fishery businesses.

In certain cases, the interviewees responded with answers that accentuated the benefit of implementing HACCP, but also the answers were used to suggest themes for further investigation into barrier. For example, a response from one of the Managing Directors of national fishery business said that the contamination, spoilage and wastage of fishery products have inflicted serious losses to his business in terms of reduced market access due to fear of food safety, because his staff members are not following adequate good hygienic practices (GHP) and good manufacturing practice (GMP). This answer provided the basis for categorizing lack of PRPs as theme (L) by interviewee 6 and was agreed by all. This suggestion of theme L by interview 6L was then extracted, refined and re-directed back to the interviewee in the form of the question in terms of 'Do you feel that this might hinder compliance with international fishery safety requirements and market competition?'. For the fact that the answer suggested was affirmative, then this served as a foundation for next stage of interview.

Therefore the suggestion of theme L (barrier –lack of PRPs) by interview 6L was forwarded to the interview 6M in order to search for agreement or disagreement. This group of themes was then forwarded to all the subsequent interviewees to search for agreement and disagreement. Where the weight of agreements is more than the weight of disagreements at the completion of convergent interview, then the group was accepted (at) for further investigation at the next stage of the interview. In contrast where the weight of disagreement is more than the weight of agreement at the end of the convergent interview, then the group is rejected (rt) and does not go further to the next stage or stage II of the interview.

By keeping the rapport and in an atmosphere of cordiality it was realized that few questions and less time were needed for certain interviewees. However, keeping paper and mental notes of the key issues gave a chance to the interviewer to check his own impressions on the themes suggested by the interviewees; follow up on doubtful or ambiguous issues; probe more into questions not already answered by what the interviewee has suggested. Nevertheless, probes were not usually applied in the first few interviews, though they were included in later



interviews. Similarly, the number of probe questions typically increases from interview to interview on any doubtful part of the themes suggested. The reports took into account both the interview just completed, and any previous interviews and by the end of the series of interviews it comprised of two to three pages.

The author compared notes of one interviewee with the other interviewees by comparing information, which occurs in more than one report. Such comparison was logically organized in two types: in agree (ag) or in disagree (dg). The interviewer devised and applied probe question to identify how widely the phenomenon about the suggested themes occurs by testing apparent agreements and seek explanations of apparent disagreements. That is for every report that agreed, the interviewer tested the agreement by attempting to find out if it is ever untrue, and if so, under what circumstances. For example, during the interview some people have widely reported that a financial constraint is a disincentive for the adoption and implementation of HACCP in national fishery businesses. A probe question asked by the interviewer was that "in which operation is financial constraint not a disincentive?"

Where the report disagreed, some interviewees said that financial constraint is not a disincentive for the implementation of HACCP because international community is providing lot of financial support to support fishery business in Sierra Leone. A probe question asked was "to what extent do the Sierra Leone government receives financial support from international community to strengthen food safety operation? Are fishery businesses financially strong to implement HACCP system? What distinguishes the financial support provided directly to Sierra Leone government by international community and the finances needed for private sector development? In your opinion, why is financial support desirable for local food businesses, and why isn't?."

Another technique applied by the interviewer was the recycling of questions. New interviewees were also given the opportunities to access previous questions by recycling the questions to see possibilities of new themes arising that were not suggested by the previous interviewees. The interviewer continues to do so until three succeeding interviews have added no significant new themes to report before redundant the question and move on to the next step. At the end of each cycle, the most essential information is that required to decide the next cycle. At closing session,



the interviewer compiled a combined report in a matrix, table 18, page 145 for the next stage of triangulation. The matrix develops the information base and the interpretation of it gradually, from interview to interview.

The process of convergent interviewing came to a halt when nothing new is being gained from the interviews with respect to the aims and objectives of the research. By this stage the increasing refinement of the questioning finally ceases to effect any significant change as the process moves from the fairly unstructured questioning of the first interview of 1A, up to the point of the relatively heavily structured last interview of 1V at the end. It was also important to note that the ingredients and wholesomeness of the data collected improves further as the convergent interview moves further, wherein the groups of barriers now become more clearer and focused following the progressive redundant of the iteration processes.

By the end of the convergent interview, the filtering process was carried out by accepting groups of barriers or rejecting groups of barriers. For instance, interviewee 2 suggested that lack of enforcement of national fishery act 1994, amended 2007, has lead to the increase of juvenile fishing, poor hygiene, spoilage and wastage of fishery products. This suggestion was agreed by all other interviewees and the theme was accepted (at) to be forwarded to the case interview (stage II) for further investigation. In contrast, interviewee 3 suggested that lack of adequate staff employed by the fishery business is the cause of non adoption and implementation of sustainable fishery safety management in the local fishery businesses as a result of overworking staff leading to fatigue. All the other interviewees except 5, disagreed (dg) with this suggestion and therefore this theme was rejected (rt) and not forwarded for further investigation.

3.9.4 How were disagreements over suggested themes (barriers) resolved?

In resolving the disagreement between interviewees about the suggested theme of barriers the decision to accept or reject this barrier was made on the basis of the balance of 'votes' or agreements versus disagreements as explained above. It can be visualized that from the process of convergent interviewing divergent groups or themes (barriers) are not rejected without critical examination to guarantee that there is a consensus that the barrier is recognised and accepted by



the interviewees in the process. All the new barriers were also scrutinized to ensure that they are not the same barriers previously identified. This was highly significant to prevent the propagation of barriers that could have arisen from increasing the demand for fine distinctions between groups that ultimately do not make much sense for the interview process, or that the new barriers identified had been earlier identified and reconciled in the previously identified group.

3.9.5 Control of data biasness

The nature and process of conducting convergent interview ensure that the problem of interview bias usually faced by interviewers using other techniques are controlled, by placing the responsibility of refining questions, understanding and articulation of the phenomenon under investigation onto the interviewees instead of the interviewers. The whole activity is a dependent cycle of iteration of the interviewee but not the solely the interviewer. The convergent interview in this study involved interviewees that represented all the relevant stakeholders in fishery operations in Sierra Leone.

These stakeholders are the interviewees and the same people involved in agreeing or disagreeing with groups of barriers in this convergent interview. Moreover, the process of identifying and voting on whether to accept (at) or reject (rt) a group, was the sole responsibility of these stakeholders or interviewees. This method of giving the responsibility solely to the interviewees to agree (ag) or disagree (dg) or accept (at) or reject (rt), essentially removes the interviewer from an overly close involvement and interference with the outcomes of the interview and subsequently, prevent and control interviewer from data biasness.

The quality assurance of convergent interview lies in the linking of flexibility and structure in that a researcher can investigate a phenomenon that is understood by the interviewees, but at the same time the phenomenon under investigation might proved to be difficult for them to articulate due to their lack of in-depth knowledge of the subject matter content of the phenomenon in question. There are several reasons for that, but most probably because the subject matter content of the phenomenon is not typically their specialized disciplines and their preferred way



of dealing with the world. In addition, it is probable that they have not had the opportunity to actively participate in the new evolving phenomenon, especially in Sierra Leone where even academicians are out of touch or not adequately familiar with current advancement in science and technology.

Specifically, the topic of the barriers of HACCP is certainly new to most developing countries especially the LDCs. Even where people heard or talk about HACCP in LDCs it is very unlikely that they have clear understanding of what HACCP including its PRPs, codex 12 steps and principles are all about and consequently, have wrong and negative thinking about HACCP system in general. Many people not adequately knowledgeable and experience in HACCP but specialized in certain physical sciences have purported to be HACCP experts in these LDCs, building up naive ideas and perceptions of the barriers and benefits of HACCP. Some of the actions of these self-proclaimed HACCP experts have followed in threatening, costly, daunting, erroneous, and non-directive manners, which seem to create more confusion among the stakeholders in initiating any targeted intervention. It can be argued that these have led to the lack of basic understanding of HACCP among certain stakeholders who were unable to respond well to few questions during the interview. However, there was a need to overcome such a dilemma rather than abandoning the process. Techniques such as rotating around questions, asking of questions in differing ways, and the confirmation of what they have said, worked very well and found to be acceptable to the interviewees, of which some of them were advanced University (Doctor of Philosophy, Master of Philosophy, Master of Science-PhD/Mphil/MSc) degrees holders in areas relevant to the study, of which all of them were committed to spend even more time on the interview than proposed earlier.

Another credence gained by this study came from the design of undertaking the interview in the respective offices, businesses or work places of the interviewees. This approach strengthened the convergent interview and confidence of the interviewees to talk freely with confidence. The interviewees were much at ease in their own working environment in the midst of people, processes, procedures, materials and equipment with which they are familiar with, easily accessible to them and most likely serves as an important “aid-memoir” for them when suggesting themes or barriers, without meddling by the interviewer.



3.9.6 The Duties of the Author in Convergent Interview

The author's duties in the convergent interview were specific, unique, well defined and rest squarely on the processes of clarifying and focusing the interviews to ensure that useful data required to achieve the aims and objectives of the research are adequately obtained without bias. The author ensured that his duties or responsibilities remained objectively distanced from any suggestion of agreements or disagreements or acceptance or rejection of each theme or group of barriers. The author was in charge of the grouping of ideas, thoughts and opinions of the interviewees into groups of themes or barriers, and made sure that those groups are not ambiguous, too broad or scatter with too many different types of barriers to make groups unusable when it comes to analysis. Similarly, the author ensures that the groups are not too narrowly constructed to become complex, undirected or unfocused to the interviewees and thereby not providing appropriate reflection the interviewees understanding of the HACCP barriers. The interviewees however one looks at them, they are expert in their own fields, but may lack the adequate analytical and conceptual perspective of HACCP necessary to easily articulate their ideas, thought and opinions on barriers without some degree of questioning and exploration from the interviewer who is involved in HACCP practices.

3.9.7 Closing the Convergent Interview

Convergent interview in this study was a systematic and logical process of examination, discussion and questioning of interviewees with the aim to determine their ideas, thoughts, opinions, and understandings, to ensure that groups of adequate and suitable barriers are suggested for further investigations during the next stages of triangulation entitled stages II and III, respectively. This is one of the reasons why the interviewer decided to rely on note taking of what is suggested by the interviewees for examination, rather than just doing tape recording of the voices of interviewees.

The interviewer further tried to clarify the ideas, thoughts, opinions and understandings of the interviewees about the groups of barriers they determined through their own knowledge and experience of national fishery safety and competitiveness. The identification of group of barrier



was made difficult by the tendency of the interviewees to use very broad terms such as “problem with safety of fishery product is the cause of the export ban”; contrary to the specific example, such as “no PRPs in national fishery businesses”. As a result, certain description or explanation by the interviewees about their experience of lack of fishery safety system in fishery businesses needs to be converted into generic barriers by the interviewee guided by the researcher. The critical review of the group of barriers, aids the process of converging on significant concepts because it enables those ideas, which are synonyms to be eliminated or avoided to prevent data redundancy. On the other hand it also allows for those groups of barriers which are different all together to be reviewed and reconstructed in a more useful and realistic manner. Another important thing does by convergent interview involves allowing a kind of critical and diligent examination of the suggestions given so that the interviewees can deduce a group of barriers identified instead of the interviewer starts meddling by placing their own views or ideas onto the data collected.

Before closing this interview, the researcher identified the appropriate number of suggested barriers that would cover the ideas, thoughts and understandings conceptualized by the interviewees. The number of terms of barriers identified was also calculated to prevent too few terms or too many terms. The reasons are that too few barriers would suggest that several concepts were combined together and thus making them difficult to stand clearly and understand properly, whilst too many terms would suggest that group of barriers are being unnecessarily sub-divided and lead to proliferation of barriers with certain concepts not really suggested and shared by the interviewees.

In fact, too few groups of barriers could lead to the repetition of barriers initially identified, and the danger is that this is not enough to allow the degree of discrimination necessary to further examine the concept in stages II and III. Therefore generic barriers such as “problem with safety of fishery product is the cause of the export ban” could be identified, but would hardly become meaningful or useful to the study except further examination and clarification are made, because the researcher does not know exactly what are the true problems with the safety of fishery products.



Such a barrier would not even help the researcher to know if the problem with the safety of fishery products are solely workmanship problem or regulatory problem or management problem or technical problem or several different aspects of undefined problems could emerge without direction for targeted intervention. Equally too many groups of barriers could cause other problems especially when it comes to identify the correct number of terms because of over-grouping of barriers. The researcher therefore tried to avoid the situation where barriers after barriers are identified, but at the same time differ from each other in a very complex form that made it difficult to group them meaningfully to effectively achieve the aims and objectives of the research.

The researcher also observed that some of the terms suggested by the interviewees were conflated with other groups, and if such terms were not clearly identified it could cause difficulties in data analysis in the next chapter of this study. Therefore the process of examining terms, during the interview process, in this study avoided the danger for the interviewee to use a term or word in a way that the interviewer would not even understand and has not normally use it, and thus helped to prevent the misunderstanding of concepts between interviewee and interviewer.

3.9.8 Conclusions

Despite the numerous advantages of convergent interview in triangulation, there are still some problems associated with the method. In convergent interview, there is no objective way to know whether the correct number of groups of barriers have been determined, and that subsequent interviewing of the stakeholders later might suggest some more groups of barriers. The author therefore continued the interview until there was a degree of saturation wherein no more new group of data emerged or even forthcoming. This degree of saturation assures the researcher that most of the group of barriers is accessed, but it was also predicted or hypothesized that barriers that could be accrued over a longer term than that covered in this study may not have been covered. One of the bases of this prediction or hypothesis is that the barriers identified here are focused on national level where there are mixtures of SMEs of fishery businesses. Due to the chronic nature of fishery safety problems at national level, there will be no doubt that, more



barriers could be identified if this study is carried out in smaller businesses in future. Another drawback is that if a presently defined barrier ceased to exist after sometimes they may not be identified in convergent interview except where this will not be captured in the CI process, unless the work was repeated longitudinally.

Convincingly, the theme suggested in this first stage of interview is an agreed number of groups of barriers such that this can be understood and assessed by all stakeholders involved in fishery operations in the country in their determinations during Stages II and III. Eventually, the capturing of barriers has a certain degree of subjectivity, and therefore the eighteen groups identified are all sub-divisions, or subsets, of the overarching barriers. It was obvious during the interview process that several stakeholders were not theoretically or conceptually knowledgeable in HACCP, and their preferred way of understanding HACCP barriers seemed to be through their practical experiences and personal examples of events in fishery operations. For example when asked to conceptualise or articulate their experiences of HACCP barriers in national fishery businesses, the stakeholders often found it difficult to explain exactly what they meant, but with appropriate questioning, it was possible to dig out from the mass of impressions and experiences, a set of groups of barriers that they would agree had meaning for them and the country at large.

3.10 Stage II: The Individual Case Interviews

3.10.1 Introduction

Following the suggestions of themes or barriers in Stage I of the convergent interview, those barriers accepted were forwarded to Stage II for case interview which was conducted by using a kind of conventional approach. The process here involved the provision of definition of each suggested barrier and submitted to the interviewee for scoring or ranking. The main aim of the scoring process is to give chance for the individual interviewees to examine the suggested barriers and decide whether those barriers actually exist or not in the first place, and if they did, to determine whether they are significant to the national fishery safety and competitiveness problems. The author reiterated that the whole interview would have ended at stage I where the



barriers were initially suggested, but the essence of proceeding to stage II is an attempt to have further understanding of the subjective ideas, thought, opinions and views of the senior members of the stakeholders.

The process of determining the validity and reliability of the results were straight forward through the methods of sharing of ideas, thoughts, opinions and views on the groups of barriers suggested during convergent interview in Stage I. Individual interviewees in Stage II agreed and through their magnanimous support on those barriers suggested earlier, as what they also believed as valid as far as the fishery safety and competitiveness are concerned in Sierra Leone. The process of interviewing is vulnerable to biasness, but the validity of the outcome could become more certain by the agreement and consensus provided by various stages of triangulation methodology (Boyd and Chinyio, 2006).

3.10.2 Target Population and Location for the Individual Case Interviews

The target population for the individual case interviews comprised of 77 individuals who were not involved in stage I, and who were selected from top to bottom management structure, including a sample of intermediate, junior, and operatives staff across regulatory, enforcement and businesses as given in Table 26 below, unit of analysis for individual case interview.



Table 26: Unit of Analysis: Individual Case Interview-Stage II (SII) (Developed for this study)

REGULATORY	#	ENFORCEMENT	#	FISHERY BUSINESS	#
1. Ministry Fisheries and Marine Resources	10	1. Sierra Leone Export and Investment Promotion Agency	2	1. Afric Fishing Company	2
2. Ministry of Agriculture and Forestry	4	2. Institute of Agricultural Research	1	2. Coastal Fishing Company	2
3. Ministry of Health and Sanitation	3	3. Environmental Health Division	6	3. Horse Fishing Company	2
4. Ministry of Food Security	5	4. Sierra Leone Standards Bureau	8	4. Okey Agencies Limited	2
5. Ministry of Trade and Industry	2	5. Food and Nutrition Department	4	5. Sierra Fishing Company	2
		6. Institute of Marine Biology and Oceanography	5		
		7. Fishery Inspector (Department of Fisheries)	7		
		8. Commodity Marketing and Monitoring Unit	3		
		9. Central Veterinary Office and Laboratory	1		
		10. Crop Protection	1		
		11. Livestock Division	1		
		12. Sanitary and Phytosanitary Division	4		
TOTAL OF INTERVIEWEES	24		43		10

Note: # = Number of Interviewees

The purpose of the second round was also to test the perception of the stakeholders on the groups of barriers identified in the stage I interviews. A list of those stakeholders for Stage II interview is given in Table 27 below.



Table 27: KEY: Individual Case Interview Stage II (SII) (SII) (Developed for this study)

Interview	Policy Maker/Enforcement/Business	Interview	Policy Maker/Enforcement/Business
SII-1	Ministry Fisheries Marine Resources	SII-39	Sierra Leone Export and Investment Promotion Agency
SII-2	Sierra Leone Export and Investment Promotion Agency	SII-40	Ministry of Fisheries Marine Resources
SII-3	Ministry of Agriculture, and Forestry	SII-41	Sierra Fishing Company
SII-4	Ministry Fisheries Marine Resources	SII-42	Sierra Leone Standards Bureau
SII-5	Institute of Agricultural Research	SII-43	Environmental Health Division
SII-6	Ministry of Health and Sanitation	SII-44	Sanitary and Phytosanitary
SII-7	Environmental Health Division	SII-45	Sierra Leone Standards Bureau
SII-8	Sierra Leone Standards Bureau	SII-46	Food and Nutrition Department
SII-9	Food and Nutrition Department	SII-47	Institute Marine Biology Oceanography
SII-10	Ministry of Food Security	SII-48	Fishery Inspector (Department of Fisheries)
SII-11	Institute Marine Biology Oceanography	SII-49	Ministry of Food Security
SII-12	Sierra Leone Standards Bureau	SII-50	Ministry of Agriculture, and Forestry
SII-13	Sierra Fishing Company	SII-51	Horse Fishing Company
SII-14	Fishery Inspector (Department of Fisheries)	SII-52	Ministry of Fisheries Marine Resources
SII-15	Environmental Health Division	SII-53	Sanitary and Phytosanitary
SII-16	Commodity Marketing and Monitoring Unit	SII-54	Commodity Marketing and Monitoring Unit
SII-17	Horse Fishing Company	SII-55	Ministry of Agriculture, and Forestry
SII-18	Central Veterinary Office and Laboratory	SII-56	Institute Marine Biology Oceanography
SII-19	Ministry of Fisheries Marine Resources	SII-57	Food and Nutrition Department
SII-20	Environmental Health Division	SII-58	Ministry of Health and Sanitation
SII-21	Fishery Inspector (Department of Fisheries)	SII-59	Ministry of Fisheries Marine Resources
SII-22	Ministry of Fisheries Marine Resources	SII-60	Commodity Marketing and Monitoring Unit
SII-23	Institute Marine Biology Oceanography	SII-61	Ministry of Trade and Industry
SII-24	Ministry of Agriculture, and Forestry	SII-62	Food and Nutrition Department
SII-25	Sierra Leone Standards Bureau	SII-63	Fishery Inspector (Department of Fisheries)
SII-26	Okey Agencies Limited	SII-64	Coastal Fishing Company
SII-27	Ministry of Health and Sanitation	SII-65	Ministry of Food Security
SII-28	Environmental Health Division	SII-66	Environmental Health Division
SII-29	Institute Marine Biology Oceanography	SII-67	Fishery Inspector (Department of Fisheries)
SII-30	Afric Fishing Company	SII-68	Okey Agencies Limited
SII-31	Sierra Leone Standards Bureau	SII-69	Sanitary and Phytosanitary
SII-32	Crop Protection	SII-70	Sanitary and Phytosanitary
SII-33	Ministry of Fisheries Marine Resources	SII-71	Fishery Inspector (Department of Fisheries)
SII-34	Livestock Division	SII-72	Ministry of Food Security
SII-35	Sierra Leone Standards Bureau	SII-73	Afric Fishing Company
SII-36	Ministry of Fisheries Marine Resources	SII-74	Sierra Leone Standards Bureau
SII-37	Coastal Fishing Company	SII-75	Fishery Inspector (Department of Fisheries)
SII-38	Ministry of Trade and Industry	SII-76	Ministry of Fisheries Marine Resources
		SII-77	Ministry of Food Security

The case interviews of the individuals were conducted in their offices or place of work, businesses, premises or their own desired locations in order to make tasks easier for them, considering the socioeconomic problem in the post-war conflict country coupled with challenges of SMEs. With these considerations, the practicalities and complexities of the HACCP barrier situations, and the desire for triangulation in this research, the data collection was found to be well organised, efficient and cost effective.



3.10.3 Design of the Semi-structured Interview Questions for Stage II (SII).

The responses from the convergent interview provided suggested barriers and these barriers were used to develop semi-structured questions and scores for the Stage II individual case interviews, as can be seen in Table 28 below.

Table 28 Semi-structured Questions and Scores for Individual Case Interview (Developed for this study)

No.	Question on HACCP Barriers	Disagree (0)	Nearly Agree (1)	Agree (2)	Strongly Agree (3)	Remark
1	They thought that lack of appropriate fishery policy compatible with Codex Alimentarius and EU Legislation is a barrier to HACCP	0	1	2	3	
2	They thought that lack of fishery product standards is a barrier to HACCP	0	1	2	3	
3	They thought that lack of enforcement is a barrier to HACCP	0	1	2	3	
4	They thought that lack of understanding of HACCP is a barrier to HACCP	0	1	2	3	
5	They thought that lack of human expertise and training is a barrier to HACCP	0	1	2	3	
6	They thought that lack of access to information on hazards is a barrier to HACCP	0	1	2	3	
7	They thought that lack of awareness of fishery safety is a barrier to HACCP	0	1	2	3	
8	They thought that lack of self-efficacy is a barrier to HACCP	0	1	2	3	
9	They thought that lack of PRPs in fishery businesses is a barrier to HACCP	0	1	2	3	
10	They thought that lack of consumer agency is a barrier to HACCP	0	1	2	3	
11	They thought that negative guideline factors is a barrier to HACCP	0	1	2	3	
12	They thought that negative environmental factors is a barrier to HACCP	0	1	2	3	
13	They thought that lack of competence is a barrier to HACCP	0	1	2	3	
14	They thought that lack of private consultancy firm is a barrier to HACCP	0	1	2	3	
15	They thought that lack of cueing mechanism is a barrier to HACCP	0	1	2	3	
16	They thought that lack of motivation is a barrier to HACCP	0	1	2	3	
17	They thought that lack of outcome expectancy is a barrier to HACCP	0	1	2	3	
18	They thought that lack of outcome expectancy is a barrier to HACCP	0	1	2	3	



3.10.4 The Individual Case Interviews of Stakeholders

The case interviewees were different from the convergent interviewees and this situation was created to avoid bias that may develop through the interview process where the interviewees may have prior knowledge about the questions and the sequence of interview questions.

However, the interviewees could assume the nature of the questions in this stage that these barriers were suggested by certain stakeholders, but for certain reason this assumption may not significantly influence the responses of the interviewees at this stage. Firstly, they were not involved in any way whatsoever in the convergent interview and therefore have no idea about who actually suggested each of the barriers. Secondly, the scope of the interview at this stage is to investigate whether the interviewees have any reason to believe that these suggested barriers are applicable to their specific operations or the entire fishery operations in the country. In the situation where the interviewees believed that these barriers are applicable or not, it was investigated to what degree or level or strength they are? These were unveiled by asking the interviewees questions that will allow them to rank or score the barriers in the form of **“Disagree =0, or Nearly Agree = 1, or Agree = 2, or Strongly Agree = 3”**.

Nevertheless, none of the interviewees was given the opportunity to see or browse the questions, because the purpose of the questions is to guide conversation in line with those barriers suggested in stage I. In all cases of the interview process, the interviewees were given enough chance to modify their responses and explore the issues involved. For instance, at any time the interviewees wished to discuss and elaborate further on exactly what was meant by the suggested barrier, their views and perceptions of the barriers or whether they thought that barriers suggested could be classified differently or could be reframed to give different meaning or they thought that such a barrier don't even exist or whatever the case, the interviewer allowed the discussion or conversation to continue up to the point when the interviewee is satisfied with the interview.

Scoring system including **“Disagree =0, or Nearly Agree = 1, or Agree = 2, or Strongly Agree = 3”**, were used to record the responses of the interviewees and these were developed into a



matrix as illustrated in Table 32, Chapter 4, page 180. For simplification and ease of understanding a list summary of ranking of barriers from interviewee's comments were developed in Table 38, Chapter 6, page 258, but it was read to them by way of assuring them that the response recorded represented their views on the barriers.

Contrary to other studies on HACCP barriers, the cost of implementing HACCP was considered as an incentive or disincentive barrier under specific condition. In the case of SMEs or fishery, businesses it was strongly agreed (3) that financial constraint is an incentive or disincentive barrier, because financial support is needed to strengthen the capacity of the SMEs after their infrastructures were destroyed during the 10 years rebel war. But for the central government to establish a level plain field by enacting appropriate policies, standards, enforcement and training the cost is not a barrier, because several funding have been provided by the international community to the Sierra Leone Government for strengthening the capacity of food safety control system.

All the interviewees in stage II supported the argument that the government should not use financial constraint as a reason for not enacting and enforcing appropriate food safety policies and standards for the fact that Sierra Leone is receiving financial supports from international community to strengthen food safety control system. It was also argued that the lack of government priority to fund food safety control system is mainly cause by lack of understanding and awareness of modern food safety requirements, which are among the barriers identified. Therefore, the two barriers "lack of understanding" and "lack of awareness" replaced financial constraint as barrier because these could be the reasons for government failure to fund the repeal, replace and enforce food safety control system that is compatible with HACCP. HACCP is comparatively new to many developing countries especially LDCs despite widespread dissemination of its literature by international community and developed countries. Most LDCs including Sierra Leone are not applying considerable training, effort and time towards globally recognized food safety control system and are still not adequately aware of the HACCP practices. This was clearly manifested during the interviews where certain senior government regulatory authorities said they have not yet heard about HACCP and found it difficult to adopt it as national food safety policy. Also senior government officers interviewed were not willing in



general, to give details as to government financial expenditure in other areas of priority and this study did not quest for that, as the aim of the investigation was to unveil the barrier, though such areas could be relevant for further research.

Retrospectively, this study attempted to determine the impact, degree and strength of gain for each barrier identified by the application of a “Likert-type” scale of four divisions including **“Disagree =0, or Nearly Agree = 1, or Agree = 2, or Strongly Agree = 3”**. As indicated above this division implies that score 0 is the non-agreement by stage II interviewees on the barriers suggested by those in stage I, whilst a score of 3 is a total agreement that the barrier suggested exists in “ reality”. However, there were intermediate barriers between 0 and 3 including 1 and 2 based on the views and perceptions of the interviewees. These views and perceptions were fully recognised by the author even though the situation could be different for different countries. We should also remember that HACCP is specific and therefore the priorities of barriers in Sierra Leone could be different for other countries.

The score 1 implies that the barrier suggested has been nearly agreed but the stakeholders believed that it is not a strong barrier, and therefore has little or no significant to the successful implementation of HACCP in Sierra Leone. For example, the fishery business in Sierra Leone is not competitive as they are only producing for domestic consumption and most of the time or if not, all the time, the supply is far more than the demand and therefore the marketing environment is not busy enough to make staff often carry out many tasks simultaneously. That means at this stage in Sierra Leone “lack of cueing mechanism” has little or no significant on the successful implementation of HACCP. However, one would expect that this opinion might change when the fishery businesses become competitive by exporting products to developed and sub-regional markets following the commencement of implementation of HACCP.

The score of 2 indicates that the barrier is also agreed by the interviewees as significant but it is not strongly significant to the commencement of the implementation of HACCP in Sierra Leone. It is not strongly significant because it may not be the building block for the successful implementation of HACCP, but if not removed it could delay the implementation or could cause long-term failure of the system. For example, one of the barriers that scored 2 was the “lack of



motivation”. The stakeholders believed that lack of staff motivation could come in during the process of implementing HACCP but may not stop the commencement of HACCP. However, lack of staff motivation could lead to failure of HACCP after the implementation has started.

The score 3 implies complete and strong agreement of the barriers by the stakeholders in Stage II, and was considered the building block because without its eradication the commencement of the successful implementation of HACCP will hardly take place in Sierra Leone fishery businesses. For example, lack of fishery policy compatible with international modern fishery safety requirements such as EU legislation, Codex Alimentarius and so on was strongly agreed to be one of the most significant barriers, because without eradicating it, the commencement of successful implementation may not take place in Sierra Leone. These scales allow the determination of a value for each barrier and largely facilitated the prioritization of the barriers in terms of eradication through any targeted intervention by the stakeholders. For example, the first barrier to be eradicated could be the lack of appropriate fishery safety policy compatible with international fishery safety legislations and/or standards. This has been the single most important barrier in the fishery businesses in Sierra Leone, because the regulatory authorities are fragmented, uncoordinated and have nothing to regulate, whilst the fishery businesses have nothing to comply with by law in terms fishery safety and overall quality assurance.

Likert-type scales fit into this study since they are regularly used to measure attitude with success by providing several options of answers to a question or scenario (Cohen, Manion et al., 2000), and for the fact that the theoretical and conceptual framework of this study focused on “knowledge, attitude and behaviour”. Responses to interview questions have used various classifications ranging from 3 to 20 wherein 5 or 7 responses took the form of strongly disagree = 1 to strongly agree = 5 (Jamieson, 2004). It has also been argued that responses may either be even or odd numbers and there is always a choice of selecting less or more numbers depending on the situation and the research techniques (Cohen, Manion et al., 2000). The HACCP barriers in Sierra Leone fishery businesses are largely influenced by the “knowledge, attitude and behaviour” of government, fishery businesses and consumers, and therefore the satisfactory opinion of the stakeholders was paramount. In this regard, the author decided to avoid the use of too many classification of responses as this may lead to confusion or indecision among the



stakeholders where overly fine distinctions are being placed on interviewees who do not make such distinctions in their own minds.

In contrast to the position of the author it has been suggested that more categories may allow the interviewee more choice and also allows for more gradations in response; but the researcher was more confident with the use of less categorization to avoid confusion, conflict and dilemma among stakeholders who have not been able to implement HACCP and even not adequately familiar with the HACCP system altogether. Equally, using even numbers may tempt the stakeholders to make definite choice that could be biased, rather than taking the middle or undecided or neutral positions, which may happen when there are also odd numbers of response classifications available to the stakeholders, through the thinking and assessing the “real” fishery safety situation including critical analysis of the prevailing obstacles to fishery safety and market competition in the country.

In this study, there are as few as 4 responses available to the question about the HACCP barriers that are perceived by the stakeholders who have the authority and influence over the national fishery safety control system. The likert-type scales used here set the responses range to 0 at the left end of the scale indicating disagreement over the barrier suggested in stage I, to 3 at the right end of the scale indicating strong agreement of the barrier suggested in stage I, based on their knowledge, understanding and experience of fishery operations in Sierra Leone. In between the left and right ends of the scale, there are intermediary responses of 1 and 2 indicating less significant and significant barriers respectively. The application of these 4 characteristics of scale enabled the use of fewer options of responses to the questions to avoid confusion, conflict and dilemma among stakeholders, and creating the scenario for both even and odd numbers for the stakeholders to take middle and undecided or neutral positions.

In fact, during the pilot testing it was discovered that 4 to 5 options were the best for the stakeholders to cope with during the interviews considering their lack of adequate understanding and awareness of HACCP system. In the pilot testing it was clearly shown that there were no gradations of “Disagree” classification set at the left hand because it was obvious that if the stakeholders failed to perceive the existing barrier there were no need of any gradations of the



“Disagree” classification that could be meaningful for them and the aims and objectives of the study.

3.10.5 Likert-Type scale and the data collection and organization

A Likert-type scale is good in data collection especially the structuring of the data, but there is a limitation in the sense that it falls short of making statistical claims about the results of the investigation (Pell, 2005). For the purpose of this study, a Likert-type scale could be defined as an ordinal scale where four numbers from 0 to 3 given to the strength, significant or implication of each barrier, represent verbal statements and the intervals between values that are unlikely to be presumed equal in term of the way they affect the successful implementation of HACCP in fishery businesses in Sierra Leone. It is therefore essential to apply the mode or median to illustrate the central tendency of the data; whilst the application of the mean as a method of summarizing the cross case analysis of data is not statistically valid (Jamieson, 2004).

However, it is also important to note that the structuring of the data collected was undertaken through the application of a calculation of the mean, median and mode for differing groups of barriers in order to facilitate the cross-case analysis and to simplify the data for ease of understanding. Apparently, it should be noted that this is a subjective scale where there is slight objective distance between the different points across the entire scale. As a result, this likert-type scale indicates ordering of the barriers by the interviewees themselves with respect to the strength, significance and importance of these barriers to the Sierra Leone fishery safety control system and competitiveness, based on their best knowledge, understanding and experience. Some of the interviewees are long term serving civil servants who have between 25 to 30 years experience in their current capacity, and architect of the current Fishery Act 1994, amended in 2007.

However, it is not possible to know if different interviewees have apportioned the same strength or significance to all the various points on the likert-type scale. Consequently one interviewee gave a response indicating that the barrier is rated as strongly agreed and scored it as 3, whilst another interviewee rated the same barrier as strongly agreed but scored it as 2 by way of saving the top score for another barrier or not. It is also unlikely to know if an individual interviewee



has given the interval between deciding that a barrier exist or does not exist as far as they are concerned, and similarly come out with a decision on the strength or significance of barrier ranging from a 2 to a 3, is the same interval distance. Based on this reason it is statistically invalid to provide arithmetical mean for two or more scores, because the approach of adding a “no barrier exists for me” to “this was a very strong or important barrier for me”, to provide an “average barrier” is apparently not illustrating mathematical sense, guidance and direction.

Nevertheless, to invalidate and to make the research process redundant because of difficulties or emerging problems is not a solution, because overcoming and resolving such problems and the means to do so are parts of the learning process and significant contribution to knowledge. Therefore, it is often possible to develop useful insights from such calculations, especially in terms of the structure and relationships within the data as long as the researcher is able to come out with a clearly defined assumptions on which such manipulations are made (Pell, 2005; Jamieson, 2004). In fact Perry (1998), recommended the application of structured forms of data to capture insights from case study through the presentations of tables and graphs including bar charts and dot plots, which clearly define and depict the distribution of responses and the non-continuous nature of the data, so that those difficulties and related problems in data collections could be eradicated without making wrong manipulation. Thus, the researcher decided to use graphs and tables for the presentation of research findings of stages I and II of the triangulation methods utilized in this study.

3.11 Stage III: Focus Group Workshops and Interviews

3.11.1 Design of the Protocol for the Workshop Focus Group Discussion Guidelines for (including Interview Questions for Discussion) for Stage III (SIII).

The design of the Protocol for the Workshop Focus Group Discussion Guidelines for (including Interview Questions for Discussion) for Stage III (SIII) (see Appendix 5, page 331) followed a desk-based review of each barrier suggested and accepted in stages I and II as an attempt to complete the triangulation data collection on barriers. The Interview Questions taken from Protocol for the Workshop Focus Group Discussion Guidelines presented in Table 29 below (page 151 to 154), was designed to assist the focus group participants to discuss the 18 barriers



of which each barrier represented one full topic for discussion and 96 sub-questions. Verification and validation of the questions for stage III were developed by the additional researchers and the author.

Table 29: Interview Questions for Focus Group Discussions Extracted from the Protocol for Focus Groups Workshop Discussion Guidelines (Appendix 5, page 331)

Interview Questions for Focus Group Discussion

Part V

Interview Questions for Discussions

1. Lack of appropriate fishery policy (i.e compatible to Codex Alimentarius and EU Legislation)

- Is there a national fishery safety and quality assurance legislation compliance with Codex Alimentarius and EU legislation (with commitment from government regulatory authorities, based on risk analysis i.e. risk assessment, risk management and risk communication)?
- Is there a national coordination body for fishery safety control activities?
- What is the legal framework for national fishery control?
- Is the national fishery control adequate to ensure fishery products safety and quality assurance to improve competitiveness and public health?
- What are the advantages of having national fishery safety and quality assurance legislation compliance with Codex Alimentarius and EU legislation?

2. Lack of fishery standard or specification;

- Are there regulations and standards related to fishery product safety and quality?
- Which authority is empowered to make regulations and standards under the national fishery laws?
- Have the food additives, pesticide and veterinary drugs residues, sanitary facilities at fishery processing and fishery service levels been taken into consideration in the development of fishery regulations and standards?
- Do the fishery regulations and standards provide for Labelling including its composition; Date marking and marking of weights and measures; Sampling procedures; importation and exportation; in-process safety and quality control; licensing and registration of fishery premises; closure of unhygienic fishery premises; health control of fishery handlers or personal hygiene; medical examinations of fishery handlers; advertising of fishery products; use of safe packaging material; freshness examination of fishery products; provision and adequacy of sanitation measures on board vessels or any transportation and in-service terminals?; measures to be implemented in the event of natural disasters such as floods, cyclones, earthquakes, etc.; irradiation processing; HACCP and ISO certification by an appropriate authority; quarantine measures; warranty measures; Penalties; etc?
- What are the advantages of having appropriate national standards on fishery products safety and quality assurance compatible with modern fishery safety management system such as Codex Alimentarius and EU Legislation?

3. Lack of enforcement

- Why the rate of juvenile fishing or catch is on the increase in the country?
- Are regulators enforcing fishery act 1994, amended 2007?
- How would you describe the level of enforcement of the existing fishery act 1994, amended 2007– adequate, inadequate or none?
- Are regulators strengthened to effectively enforce fishery act 1994, amended 2007?
- What will be the impact of effectively implementing and enforcing the fishery act 1994, amended 2007?

4. Lack of understanding



- What are the abbreviations HACCP and PRP or GHP or GMP or SSOP stand for?
 - Are you familiar with the jargon and complexity of HACCP and PRP or GHP or GMP or SSOP stand for?
 - When last did you hear about the HACCP system?
 - Are you familiar with codex 12 steps and 7 principles of HACCP?
 - What are the benefits of understanding the HACCP system in fishery operations?
- 5. Lack human expertise and training**
- What categories of personnel are involved in fishery safety and fishery control?
 - What are their disciplines or specialties?
 - Are there personnel trained and qualified in HACCP and PRPs?
 - Are there personnel experienced in ISO certification system?
 - What are the advantages for the provisions for continuing education, training, and periodic assessments of national capacity building needs in fishery safety?
- 6. Lack access to information on hazards**
- Is there any legal notification system of cases of Foodborne diseases in the country compatible with RASFF, INFOSAN, and GLEWS?
 - Are there compiled statistics and computerised database of national foodborne diseases?
 - Is there any national food safety information system (FSIS) supported by worldwide web list server to facilitate capture, storage, retrieval and dissemination of information on foodborne diseases?
 - Are there legal requirements for food industries to establish FSIS compatible with national FSIS?
 - What are the advantages of national FSIS?
- 7. Lack of awareness**
- What is the general level of awareness and knowledge among stakeholders and public about fishery safety and quality assurance in the country?
 - What are the key concerns with respect to safety and quality assurance of fishery produced locally?
 - Are these concerns properly addressed by government and fishery businesses?
 - Are there national activities for ensuring that fishery products for local consumption conform to international HACCP regulations and standards?
 - What are the advantages of stakeholders and general public awareness in fishery safety and quality assurance?
- 8. Lack of self-efficacy**
- Is there a general perception in the country that people have the capability to organize and execute a course of action to resolve fishery safety problem and lift the export ban in short term?
 - Is there a general perception in the country that people have the capability to organize and execute a course of action to resolve fishery safety problem and lift the export ban in longer term?
 - Are fishery industries SMEs or larger enterprises?
 - Are SMEs discouraged from implementing HACCP due to the belief that it will be too difficult for them?
 - What are the advantages of self confident in national fishery safety management?
- 9. Lack of PRPs in fishery businesses**
- Are aware of the spoilages and wastages of fishery products in the fishery businesses in the country?
 - Are you aware of the fact that most of the fishery products expired or deteriorated in freshness on board vessels prior to landing or delivery to the fishery businesses?
 - Are there codes of hygienic practice in Sierra Leone for the production, processing, storage, and distribution of fishery products; and why the rate of spoilage and wastage of fishery products are high in fishery businesses in the country?
 - Do the codes specify cultivation of freshwater and saltwater species of fishery products; prohibit commercial harvesting of shellfish from contaminated or polluted waters; specific storage conditions, such as temperature or cold-chain-management in ports and stations for transportation by land, water or air of fishery products; specify



traceability of fishery products; safe fishery products packaging material; and specify hygienic handling of fishery products by street vendors?.

- What are the advantages of PRPs in fishery businesses?

10. Lack of consumer agency

- Are consumers involved in food safety activities?
- Are consumers involved in formation of consumer committees?
- Is there a national system for complaints on food safety and economic fraud?
- Do consumer protection groups have structures for monitoring the safety and quality of foods?
- What is the advantage of having consumer pressure groups?

11. Negative guideline factors

- Are stakeholders including fishery businesses familiar with all the codex 12 steps and 7 principles of HACCP in a simple straight forward, systematic and chronological manner?
- Are the HACCP guidelines generic and makes it difficult to use the each of the 12 steps
- Successfully?
- Do you need appropriate interpretation of all the HACCP guidelines prior to their adaptation and implementation?
- Are the guidelines adequate to provide an exact framework for the safety of fishery product?
- To the best of your knowledge or experience, what do you think are the advantages of detailed framework for HACCP guidelines?

12. Negative environmental factors

- Are there adequate environmental factors such as those relating to time, resources, and organizational structure to facilitate successful adherence to HACCP system and guidelines?
- Are fishery industries having problems with insufficient time, money, and staff for the implementation of HACCP?
- Is central government having problems with insufficient time, money, and staff for the enactment and enforcement of appropriate fishery safety policy and standard?
- Are there national laboratories accredited to ISO17025, and with capacity to conduct chemical and microbiological analysis?
- What are the advantages for institutional strengthening and capacity building?

13. Lack of competence

- Do the fishery businesses have knowledge of GHP, GMP, HACCP, Quality assurance, certification and other fishery safety requirements?
- Are stakeholders including fishery businesses conversant with the main fishery safety and quality assurance hazards and incidents in the fishery businesses?
- Are stakeholders able to monitor and evaluate fishery safety and quality assurance problems associated with SMEs, including indigenous processors and street vendors?
- Are there self-regulatory mechanisms in the fishery businesses?
- What is competence, and what impact it may have on fishery safety control system?

14. Lack of private consultancy firm

- Are there registered private consultancy firms to conduct third party auditing in food businesses?
- Are the consultancy firms certified to issue HACCP and ISO certifications?
- Do private consultancy firms authorized by law to provide extension and advisory services to the food businesses and markets?
- Are training courses conducted for fishery industries by government regulators and/ or consultancy firms?
- What are the advantages of the services of private consultancy firms in food safety and quality assurance?

15. Lack of cueing mechanism

- What is meant by cueing mechanism?
- Is cueing mechanism currently affecting the implementation of fishery safety programmes in fishery businesses?
- Is cueing mechanism an obstacle in a fishery business that is successfully implementing HACCP?
- Are staff members in SMEs currently carrying out many tasks simultaneously?
- What are the advantages of cueing mechanisms, can it serve as a reminder for prompt appropriate action?

16. Lack of motivation

- Are fishery industries motivated to adopt appropriate fishery safety and quality assurance system?
- Is there a level playing field created by appropriate regulation of imported food products against locally produced food products?
- Are certain imported food products sold at cheaper price against their locally produced counterparts?
- Do you think that staff motivation is one of the key problems to immediately address in fishery businesses under the current fishery safety problem?
- What are the advantages of staff motivation in fishery businesses?

17. Lack of outcome expectancy

- What is outcome expectancy?
- Are behaviours of stakeholders contributing to fishery safety problems?
- Are their feelings among SMEs that HACCP cannot make differences?
- Do the SMEs believe that they are doing it correctly for so many years now?
- What are the advantages of positive change of behaviour in food safety practices?

18. Lack of agreement

- Are there disagreements among stakeholders on HACCP principles?
- If yes, why? or if no elaborate
- What are the perceptions of fishery industries towards the credibility of regulatory authorities?
- Are fishery industries and fishery inspectors disagreed over procedures of fishery safety?
- What are the advantages of agreement in food safety activities?

3.11.2 The Nature and Diversity of the Focus Group

This study utilized three focus groups, which comprised of the Regulatory Authorities Group, Fishery Businesses Group and Consumers Group. For simplicity or ease of understanding, the groups were designated in this research as Regulatory Authorities Group = SIIIA; Fishery Businesses Group = SIIIB; and Consumers Group = SIIIC, to show that they are in stage III of the research design and to quickly identify the various groups they represent, especially during the workshop. The focus group workshop lasted for four days and these gave chances for each of the group to meet three times from day 1 to day 3 and all the group to meet together one time on the fourth day for final discussion and validation of the issues involved in determining and examining the barriers to compliance with international HACCP regulations in fishery businesses in Sierra Leone.



One thing that was unique to this workshop was that each of the focus groups carried out the same task no matter their professions or designation, wherein each group was allowed to discuss all the three categories of the data on barriers and comment separately for more comparison. The three categories of barriers were “*Knowledge, Attitude, and Behavioural*” but the bottom line was that the aim of the groups was not to suggest new barriers, but to check the validity and reliability of the findings of the research based on the research design. However, the diversity of the groups was important because the fishery safety problem in the country could be largely influenced by the regulators, businesses and consumers, hence, any findings of the studies could be easily adopted by the consensus of the national stakeholders. The author therefore thought necessary for each group of stakeholders to have the full opportunity to scrutinize each category of barriers prior to the final validation on the fourth day of the workshop.

There were 10 senior regulators of either Director, Executive Director or Chairman of Regulatory Board of group SIIIA; 11 Managers or Managing Directors from the 11 fishery businesses of which each business was represented for group SIIIB; and 7 Consumers selected from departments relevant to the study from Fourah Bay College (FBC) and Njala University College (NUC), University of Sierra Leone (USL) for group SIIIC. The services of three senior researchers were utilized as assistant interviewers and each was in charge of one focus group, whilst the author acted as the moderator, facilitator as well as the interviewer by walking around the group. The process of walking round the team is also recommended in HACCP in the situation where the HACCP team is not fully constituted such as in SMEs, the manager walks around the staff to discuss the implementation of various steps of the specific HACCP plan (Kane and Taylor, 2003). A key for list of participating ministries of regulators, fishery businesses, and consumers is given in Table 30 as follows on page 156.



Table 30: KEY and Unit of Analysis: Focus Group Interview Stage III (SIII) (Developed for this study)

REGULATORS-SIIIA	FISHERY BUSINESS-SIIIB	CONSUMERS-SIIIC
1. SIIIA1: Ministry of Fisheries and Marine Resources	1. SIIIB1: Afric Fishing Company	1. SIIIC1: Chemistry Department Fourah Bay College (FBC) University of Sierra Leone (USL)
2. SIIIA2: Ministry of Health and Sanitation	2. SIIIB2: Aljan Fishing Company	2. SIIIC2: Biology Department, FBC, USL
3. SIIIA3: Ministry of Agriculture and Forestry	3. SIIIB3: Ann Senkal Fishing Company	3. SIIIC3: Faculty of Environmental Science, Njala University College (NUC), USL
4. SIIIA4: Ministry of Food Security	4. SIIIB4: Atlans Fisheries Sierra Leone (SL) Limited	4. SIIIC4: Faculty of Education, FBC, USL
5. SIIIA5: Ministry of Trade and Industry	5. SIIIB5: Bangso Fishing Enterprises	5. SIIIC5: Chemistry Department, Njala University College (NUC), USL
6. SIIIA6: Ministry of Justice and Anthony General	6. SIIIB6: Coastal Fishing Company	6. SIIIC6: Biology Department, NUC, USL
7. SIIIA7: Ministry of Presidential Affairs	7. SIIIB7: Horse Fishing Company	7. SIIIC7: Institute of Food Science and Technology, NUC, USL
8. SIIIA8: Ministry of Finance	8. SIIIB8: Lam Fishing Company	
9. SIIIA9: Ministry of Foreign Affairs	9. SIIIB9: Okey Agencies Limited	
10. SIIIA10: Ministry of Education	10. SIIIB10: Scan Fishing Enterprises	
	11. SIIIB11: Sierra Fishing Company	



To preserve the anonymity of participants only the ministries, fishery businesses and the departments from FBC and NUC of USL of which they represented were mentioned in Table 30 above.

The 7 consumers selected in group SIIC are senior lecturers in Chemistry, Biology, Environmental Science, Education, and Food Science and Technology with Doctor of Philosophy (PhD) degrees, from constituent colleges, namely, Fourah Bay College (FBC) and Njala University College (NUC), University of Sierra Leone (USL). Some of them have been involved in various governmental and non-governmental projects related to food security. They are all members of the National Codex Committee (NCC) Technical Committees (TCs) in various areas such as TC for Fishery Products; TC for Animal Product; TC for General Food Products; and TC for Food for Special Dietary Uses (FAO/WHO, 2005). However, these NCCs are only constituted but they are not currently active or fully functional (FAO/WHO, 2005).

The use of the regulatory authorities in the focus group was justifiable as they are the appropriate leverage point and catalyst for policy development and “lack of appropriate fishery policy” was considered as one of the key barriers by Stages I and II of this research. In addition, the use of fishery businesses senior managements was justifiable because they are responsible for the safety or wholesomeness for the fishery products they produce and “lack of PRPs in fishery businesses” was considered as one of major barriers by Stages I and II of this research. On the other hand, the use of 7 consumers from already created NCC and TCs restricted the extent of selection of participants of the group SIIC that could be utilized. This restriction was really an essential aspect of having a small diverse of high calibre consumers who are academics and researchers with experience or understanding of disciplines that influence food safety and quality assurance.

Again, it could be presumed that the lack of knowledge, understanding and awareness of HACCP system in the country caused too few consumers to be technically qualified and available for interview in a workshop and many of those available had been used in Stages I and II of this study. In this regard, the nature and diversity of the participants selected were done so based on a degree of convenience to achieve the aims and objectives of the research. Therefore, the heterogeneous nature of the three focus groups in terms of their backgrounds and professions,



and their relevant knowledge and experience of the issues under investigation, assured the achievement of successful focus group research outputs.

The numbers of those involved in the focus groups workshop were recommended by the assistant interviewers who have also conducted several workshops and in most cases as facilitators at national, regional and international levels. However, according to certain school of thought there is no specified number of people needed in a focus group, despite suggestions that it should not be so large as to preclude interaction between all the participants, or too small that to provide little more data than could be obtained to achieve study aims and objectives from single interviews (MacIntosh, 1993).

The availability and utilization of 10, 11 and 7 participants to discuss the barriers to compliance with international HACCP regulation in fishery businesses in Sierra Leone seemed to have produced useful data and the groups seemed to interact very well throughout the workshop. The venue for the workshop also hosts most of the line ministries relevant to food regulation, but the conference hall itself is an independent entity and government has no influence over it. This was considered conducive and the stakeholders seemed confident and relaxed in the atmosphere of the general-purpose premises that can be hired by any group whether governmental, non-governmental, private sector, or the public for workshop, seminars or symposium. This neutral ground was felt to be more conducive to interaction and discussion than having the workshop at the governmental office, fishery business or the University.

3.11.3 Conducting the Focus Group Workshops and Interviews

Focus group interviews and discussions were coordinated and facilitated by organizing a 4 day workshop at the Miata Conference Center, Youyi Building, Freetown, due to the proximity, as this center is a centrally located venue that hosts the offices of all the line ministries in charge of food regulations. Additional interviewers and rapporteurs were also involved to assist the researcher in developing, verification and validation questions, interviewing and note taking in order to cover satisfactory sample size for the investigation. This workshop followed after data were collected from stages I and II of triangulation to discuss the findings and to undertake initial



work in verifying and validating results from stages I and II as an attempt to complete the triangulation data collection on barriers. The workshop followed desk-based review of each barrier suggested and accepted in stages I and II and a draft report was provided on the last day of the workshop for validation and finalization of barriers to compliance with international HACCP regulations in the Sierra Leone fishery businesses.

This workshop is compatible with the requirement(s) of focus groups because focus groups are semi-structured meetings of people held in an informal setting, moderated by a group leader and /or interviewer, with the aim of soliciting information on a phenomenon under investigation (Carey, 1994). In fact, focus groups are characterized by three major components. These three components distinguish focus groups from other types of meetings such as business meetings or ordinary group discussions, and it is the use of interactions between the participants of the focus groups to achieve specific aim and objective, and therefore different in its entirety other types of meetings, groups discussions or interviews.

The three components of differentiation of the focus groups from other groups meetings are; that it is a technique with the sole aim and objective of soliciting information and collecting data about a phenomenon under investigation; that interaction between the members of the groups is the source of the information accessed and data collected ; and that the researcher of the phenomenon under investigation plays an active role in the groups in order to create the kind of groups discussions suitable for data collection, even if assistant interviewers were involved (Morgan, 1996).

The method of focus groups data collection facilitated by the organization of workshop in this research created a major advantage, because the data were derived from the purposeful use of consistent, systematic and transparent interactions that urged each participants to say what is true or correct to the best of their experience about the “reality” of HACCP barriers in fishery businesses in Sierra Leone, without compromising their integrities and anonymities. This workshop approach was essential because the results of the research could have policy and overall national implications if the suggestions are to be adopted for targeted intervention.



It has also been suggested that focus groups may be held for different purposes, and the different aims and objectives being sought by the facilitators of focus groups could be utilized to illustrate differences among them. For instance, focus groups are converged together for the purpose of market and marketing research, because it is the specific phenomenon under investigation (Perry, 1998). Secondly, focus groups could be held for clinical reasons especially for medical phenomenon of special interest (MacIntosh, 1993). Thirdly, there are focus groups that converge around community action to determine the opinions and understandings of community members about specific phenomenon of special interest to the community or social interest. There are other several examples of focus groups but one that is common in typical research are usually those held in order to determine the ideas, thoughts, views, opinions and understandings of those who are involved in some actions related to the phenomenon under investigation.

In this study, the interviews and discussions of the focus groups were well organized, coordinated and facilitated by workshop in a parallel way to action research approach in order to access the ideas, thoughts, views, opinions and understandings of national stakeholders involved in fishery operations. However, it is important to note that the data was not being utilized in an action research approach in order to alter what the participants of the focus groups workshop were doing, instead it was utilized for triangulating data that were collected in the convergent and case study interviews, stages II and I respectively.

It can be recalled that the use of triangulation in this study involved three stages wherein results obtained in Stage I were passed on to Stage II for acceptance or rejection. Similarly, results from Stage II were used in the focus groups workshop in order to collect data that would either agree or disagree with the findings of Stages II and I. In other words, results from Stage III of the triangulation provided insights onto the ideas, views, thoughts, opinions and understandings of the national stakeholders on the barriers to compliance with international HACCP regulation that could be more easily collected in a group situation.

Moreover, the aim or objective of the focus groups workshop was to investigate and collect the group's ideas, views, thoughts, opinions and understandings on how the HACCP barriers as identified, could be used to initiate and support targeted intervention to overhaul the national



fishery safety and competitiveness problems by the stakeholders, who have little or no knowledge and experience in HACCP system. That is, by the end of the focus group workshop, the specific barriers to compliance with HACCP in fishery businesses were validated, and the benefits for removing those barriers in Sierra Leone fishery businesses were also envisaged.

According to Kitzinger (1996), there are several uses of focus groups and in research context, it has been widely applied in developing research questionnaires, enhancing the validity of questionnaires and gaining insights into the attitudes, ideas, thoughts, opinions, understandings and beliefs of the participants involved in the focus groups activities. Another school of thought said that focus groups could be smoothly combined with various other research techniques with the aim to improve the validity and reliability of research results (Morgan, 1996). This further justifies the use of focus groups workshop in combination with convergent interviews and case interviews, incorporating findings of questionnaires and field surveys, by means of methodological triangulation by this study.

Focus groups workshop was also essential for this study because it emphasized that the result represents the true ideas, thoughts, opinions, views and understanding of those stakeholders who participated, and those stakeholders were selected from the appropriate leverage points for national fishery safety policy development. In other words, the focus group workshop participants are the national stakeholders on fishery operations and therefore the right or correct or authorized or legal people to determine the national barriers to compliance with international HACCP regulations in fishery businesses, instead of the writer being central to the entire research. There was no doubt that the focus groups workshop technique allowed the development of continuous, systematic and transparent interaction, for the very fact that the participants discussed issues that directly affect their day to day activities. Interestingly, the participants discussed with their peers, and which made them to be more transparent, open and exploratory than they might have been in a “one-to-one” interview and discussion with an interviewer or facilitator.



For this workshop, participants were requested to converge and engage in discussions from 9:00 am to 4:00 pm, inclusive of 1 hour lunch, for four days, and there were six hours per day per group allowed for discussion and 4 days discussions and meetings held, a total available time of 24 hours per focus group. What is significant here is that there was adequate time to discuss the 18 barriers of which each barrier represented one full topic for discussions and the 96 sub-questions (see Table 29) in the protocol for focus groups discussions (see Appendix 5, page 331) designed specifically to assist the group adequately explore the issues involved in the research.

In fact, there is no standard set number of group meetings recommended in the literature, such as saying that the group meetings or workshop should be given a certain number of hours or days (Morgan, 1996). Practically, the number of days and hours for group workshop are largely influenced by the complexity of the topic under investigation and the nature, diversity, background, experience and knowledge of the participants of the groups on the phenomenon under investigation. Furthermore, the process of triangulation used in this study is designed in such a way to achieve saturation where no more new discussions are entertained. Therefore, as in the case of the Convergent Interviewing process the focus groups workshop discussions were intended to continue until saturation, that is, until no new data was being produced or all aspects of the barriers and questions were fully covered.

During the third day of the workshop each focus group arrived at this point of saturation wherein each of the three groups had covered all the barriers developed in Stages I and II of the triangulation. Subsequently, each group presented, justified and confirmed these on the fourth day of the workshop during final validation. During the final validation on the fourth day any differences that emerged were discussed and areas leading to the differences were highlighted after several disagreements and agreements based on the experiences and understanding of the participants. Where there were ties and difficulties the author used the relevant literatures of the study that are based on sound evidence of HACCP principles including science and technology to validate through the general consensus of the participants and assistants interviewers.



3.11.4 Problems encountered in the focus groups workshop

Carey (1994) said that open group discussion of common issues affecting peers might lead to stifling of arguments due to varieties of perceptions and individual opinions as well the introduction of group dynamism or scepticism. Such group dynamism and/or scepticism could breed unhealthy and unfriendly arguments especially on certain key issues that have a conflict of interest, and may undoubtedly cause group members to become less likely to be transparent and willing to divulge their true ideas, thoughts, opinions and understandings of the “real” world. Some people also react to crowd differently as there are extroverts and introverts that may cause certain group members to overshadow others, whilst others could be unwilling or shy to share their ideas, thoughts, opinions, views and understandings openly with others.

Consequently, there could be a potential problem in the focus group workshop especially where the members or participants are selected from diverse peer groups, leading to a consensus that certain participants do not share views in good faith, and therefore the possibility of hidden conflict of interest, role conflict and dilemma preventing full participation by certain members. The good thing is that the writer anticipated these difficulties and ensured that the positive aspects of the focus group workshop discussed above were strengthened to weaken and outweigh the negative aspects. Nevertheless, the disadvantage of the focus groups workshop was also considered to be fairly weak and therefore considered to be low risk in this research, because it represented only a subset of the overall research design, as there were other strategies and data gathered especially in stages I and II, and were also useful in checking the validity and reliability of the findings of the research.

3.11.5 Responsibilities of the Author in the Focus Group workshop and Interviews

The author utilized three assistant interviewers to assist in the workshop and interview process that was involved. The author acted as the moderator, facilitator and the key interviewer; and his role in focus groups is a key to deriving useful data for the research (Carey, 1994). The task of the author is to ensure that each of the questions in the interview questions is covered and that all participants have the opportunity to discuss freely and contribute significantly to the best of their knowledge, understanding and experience. The writer further ensured that the outputs of the



group discussions including responses to the questions are recorded. The recording of the group discussions was not done through audio or video tape recording for the same reason given earlier including fear that they may be quoted out of context, situation that could jeopardize their roles in national fishery safety control systems and competitiveness.

The recording of the focus groups was done by note taking and the utilization of assistant interviewers simplified the process and enables the author to cover the satisfactory sample size. The discussion was summarized and each group was asked if they are happy, satisfied and that the summary represented their views. They all unanimously agreed that the summary was a fair representation of what they said in the workshop discussion. There were also lot of flexibilities and where the group disagreed or wished to modify the focus group discussion notes; this was allowed smoothly until saturation was achieved. The whole process of the workshop interview and discussion followed iterations until each participant was satisfied that a reasonable record had been made, that undoubtedly reflect their views on the barriers.

The author was very aware of the danger of interviewer-bias and therefore was not underestimated considering the sensitive nature of the data to be collected. In workshop interview there could be a danger where the need to fully exhaust the numerous interview questions on all the barriers plus the requirements to move across the three groups almost at the same time, and the need to steer each group to some conclusions, can sometimes become a directive style where the group is forced and ignited to accept results that may not necessarily represent their actual views on the barriers. This urged the author to adopt the style recommended for focus group facilitation of low control or high process and crave the indulgence of the assistant interviewers to follow the same recommendation (Millward, 1995). As a result, the author and the assistant interviewers adopted and implemented a minimalist approach to the barriers including all the questions of the workshop discussions. Nevertheless, at the same time the author ensured that all of the contents under investigation have been adequately covered according to the research design, through a high degree of professionalism, and summarized all findings in timely manner, to achieve the aims and objectives of the research.



One of the major components in achieving the aims and objectives of a research study project through valid and reliable data from focus group interviews lies with the research design that is effective to guide the process of research, especially in terms of the protocol used in conducting the workshop where questions are discussed and answered in-group forum. The existence of such protocol and workshop strategy as effective research design allows the study to be replicated among the three focus groups, as was facilitated by the workshop in this study. The workshop focus group protocol helps to underpin the reliability and validity of the study as it allows the research to be repeated by others and can help overcome interviewer bias where transparency, honesty and fairness were openly exhibited in an explicit and systematic manner to the questions and examine the barriers.

The availability of clear and consistent research questions derived from the earlier parts of this study, that is questionnaires and Stages I and II questions on barriers, helped to satisfactorily achieve the internal validity from the focus group workshop. The focus group workshop protocol for this study is given in table 44 above. The protocol was designed in such a way as to direct and guide group discussions throughout the workshop as a means to facilitate conversation about the issues under investigation (Morgan, 1996). The core theme is to allow all the participants of the workshop to actively contribute from the beginning to the end of the workshop.

The questions and statements given in the protocol (Appendix 5, page 331) are followed systematically at each day of the workshop meetings and discussions. The nature and style of the protocol are developed in manner that allow moving from a general opening statement to cordially set the scene and inform each focus group about the background to HACCP including the aims and objectives of the research. It leads to a statement describing the rules and procedures that are set to protect the anonymity, the value of sharing ideas, views, opinions, and the freedom of speech about the issues of HACCP and barriers that hinder its successful implementation or whatever they think, whether positive or negative, right or wrong, sensible or non-sensible. This approach was able to create self-confidence among the participants and acquired a feeling of ownership, competence and trust in the procedures, assistant interviewers and author. At the end of the first part of the focus group workshop protocol, a room was created



for all the participants and the interviewers to do self-introduction prior to the commencement of interviewing, questioning, answering and discussions.

The main section of the focus group workshop interviewing, questioning, answering and discussions centred on the HACCP barriers that were identified in stage I and explored in stage II. In this regard, each focus group will be interviewed on the questions so that each member of the group would be allowed to say what they thought about each of the barriers. The questions were also structured in such a way that the manner in which barriers were suggested and presented earlier could be fully explored to satisfaction. For example, the barrier on “lack of enforcement” were broken down and presented into 5 questions:

- Why the rate of juvenile fishing or catch is on the increase in the country?
- Are regulators enforcing Fishery Act 1994, amended 2007?
- How would you describe the level of enforcement of the existing Fishery Act 1994, amended 2007– adequate, inadequate or none?
- Are regulators strengthened to effectively enforce Fishery Act 1994, amended 2007?
- What will be the impact of effectively implementing and enforcing the Fishery Act 1994, amended 2007?

The aim of such questions is to ensure that the questions did not lead the participants into an answer being sought, but rather opportunities and options were created for each focus group to agree or disagree with the whole barrier of “lack of enforcement”. The existence of enforcement as a barrier was explored through an oblique question that looked at the key areas in the fishery act 1994 that if effectively implemented and enforced could prevent and control the high rate of juvenile fishing or catching. The stakeholders are aware of the lapses in the enforcement system and this question is intended to dig out their views on the level of enforcements. When the “lack of enforcement” was agreed as a barrier, the next part of the discussion was an attempt to see what benefits that could be achieved by national fishery operations from removing these barriers. This is the purpose of the last question or question 5.



Once the answers and discussions on these questions by each focus group have been exhausted and reached saturation, the issue of “lack of enforcement” was re-examined again, but at this time in the presence of all the three groups during the final validation on the fourth day of the focus group workshop to ensure that all the group ideas on the topic were fully explored. The questions for all of the barriers followed this format of exploration in capturing the group’s views, thoughts and opinions to ensure that agreement or disagreement with the notion of a particular barrier could be critically challenged by all the groups prior to final decision, validation and confirmation as barrier or not.

The advantage was that the protocol questions and the workshop structure worked very well and straightforward, because there was no situation that warrants complete change of questions during the workshop as all the focus groups appear to understand the questions, and discuss and respond well throughout the workshop procedures. The duration of the workshop for questioning, answering and discussion was maximum 6 hours per day but the debate over each question varies according to the particular interests and concerns of the focus groups, but the bottom line was that the discussions and responses were good and cordial and each participant was satisfied with the outcomes of the focus group workshop. At the end of the validation process on the fourth day a final set of questions were posed on both the process of undertaking the focus group workshop and the decision to invite the members to participate in the workshop. The overall feedback about the nature of the structure, procedure and questions were positive and supportive and there was no suggestion on the need to apply different style, nature and approach in the future, rather all recommended the approach for future studies in even other different disciplines.

3.11.6 Conclusions

Conclusively, it can be visualized that the selection of an excellent research methodology and specific techniques derived from the aspiration to investigate an issue of interest that was open to qualitative case study approaches, produced a fruitful result and created a useful knowledge in the world of academia. The author’s preference for the qualitative case study methodological approaches in this research was also influenced by the type of knowledge being sought, which is essentially considered internal and subjective. What the writer means here is that the perception



and understanding of stakeholders towards “real” HACCP barriers that exist within the fishery safety systems in Sierra Leone were internal, but could be unveiled to maximum by using appropriate research methods.

The decision and readiness to use meticulously a three part structure of convergent interviews, case interviews and focus groups workshop were highly influenced by a need to gain triangulated data as an attempt to achieve the requirements for valid and reliable data collection. Secondly, it was a deliberate attempt to satisfy the long standing aspiration of the researcher to use a variety of attractive, motivating, amazing and sound tools in order to maximally achieve the aims and specific objectives set out in chapter one of this researcher. On the other hand, the author is fully aware of the fact that no research methodology can make perfect claims, or else no need for further research as all researchers would apply one straightforward method or methodology. The mistake or error in the selection of research methods for this study is counterbalanced by the kind of achievements, values, knowledge and academic contribution obtained from them.



Chapter 4: Results and Analysis

4.1 Introduction

In this chapter, data collected on the barriers and benefits by the research methodology described in chapter 3 is presented in such a way to straightforwardly inform the reader in terms of the organization and content. Largely, this analysis concentrates on the relationship between the last three objectives, data, the research methodology including the three stages of triangulation namely convergent interviews, individual case-interviews and focus group interviews. The researcher used tabulations and charts to express the data in order to facilitate proper understanding and analysis of the data.

4.2 Data Analysis of Stage I of Triangulation

4.2.1 Results and Analysis of Convergent Interviews

The Convergent Interview of the qualitative data collection provided 18 sets of categories of barriers that the members of the regulatory, enforcement and business (fishery businesses) areas perceived as obstacles to the compliance with international HACCP regulation. The 18 sets of categories of barriers were developed from 22 suggested themes of which four were rejected due to lack of sufficient supports perceived from the other interviewees, Table 22, Matrix of Responses to Convergent Interview (Carson and Gilmore, 2001) modified by the author, below and Tables 23, 24 and 25 keys for Table 22, developed by the author, below.



Table 22: Matrix of Responses to Convergent Interview: Carson, Gilmore et al., 2001, Modified by the Author (Suggested Theme, Agree, Disagree, Not Applicable in HACCP barriers from Stage I-Convergent Interview: green shaded area represents suggested theme; light blue shaded area not applicable indicates that this category of theme/barrier was not in existence during that particular interview; white shaded area represents agree theme; greyed shaded area represents disagree theme; blue, red and yellow shaded areas represent saturation

Group	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Interview 1	st	st	na	Na	Na	Na	na	na	Na	Na	Na	Na	Na	na	na	na	Na	na	na	na	na	na
Interview 2	ag	ag	st	St	Na	Na	na	na	Na	Na	Na	Na	na	na	na	na	Na	na	na	na	na	na
Interview 3	ag	ag	ag	Ag	St	St	st	na	Na	Na	Na	Na	na	na	na	na	Na	na	na	na	na	na
Interview 4	ag	ag	ag	Ag	Ag	Ag	ag	st	Na	Na	Na	Na	na	na	na	na	Na	na	na	na	na	na
Interview 5	ag	ag	ag	Ag	Ag	Ag	dg	ag	St	St	Na	Na	na	na	na	na	Na	na	na	na	na	na
Interview 6	ag	ag	ag	Ag	Ag	Dg	dg	ag	Ag	Ag	St	St	na	na	na	na	Na	na	na	na	na	na
Interview 7	ag	ag	ag	Ag	Ag	Dg	ag	dg	Ag	Ag	Dg	Ag	St	na	na	na	Na	na	na	na	na	na
Interview 8	ag	ag	ag	Dg	Ag	Dg	dg	ag	Ag	Ag	Dg	Ag	Ag	st	na	na	Na	na	na	na	na	na
Interview 9	ag	ag	ag	Dg	Ag	Dg	ag	ag	Ag	Dg	Dg	Ag	Ag	ag	st	na	Na	na	na	na	na	na
Interview 10	ag	ag	ag	Dg	Ag	Dg	ag	ag	Ag	Ag	Dg	Ag	Ag	ag	ag	st	Na	na	na	na	na	na
Interview 11	ag	ag	ag	Ag	Ag	Dg	ag	ag	Ag	Ag	Ag	Ag	dg	ag	ag	ag	St	na	na	na	na	na
Interview 12	ag	ag	ag	Ag	Ag	Dg	ag	ag	Ag	Ag	Dg	Ag	dg	ag	ag	ag	Ag	st	na	na	na	na
Interview 13	ag	ag	ag	Ag	Ag	Dg	dg	ag	Ag	Ag	Ag	Ag	dg	ag	ag	ag	Ag	ag	st	na	na	na
Interview 14	ag	ag	ag	Ag	Ag	Dg	dg	ag	Ag	Ag	Dg	Ag	Ag	ag	ag	ag	Ag	ag	ag	st	na	na
Interview 15	ag	ag	ag	Ag	Ag	Dg	dg	ag	Ag	Ag	Dg	Ag	Ag	ag	ag	ag	Ag	ag	ag	ag	st	na
Interview 16	ag	ag	ag	Ag	Ag	Dg	dg	ag	Ag	Ag	Ag	Ag	dg	ag	ag	ag	Ag	ag	ag	ag	ag	st
Interview 17	ag	ag	ag	Ag	Ag	Dg	dg	ag	Ag	Ag	Ag	Ag	dg	ag	ag	dg	Ag	dg	ag	ag	dg	ag
Interview 18	ag	ag	ag	Ag	Ag	Dg	dg	ag	Ag	Ag	Dg	Ag	dg	ag	ag	ag	Ag	ag	ag	ag	ag	ag
Interview 19	ag	ag	ag	Ag	Ag	Dg	ag	ag	Ag	Ag	Dg	Ag	dg	ag	ag	ag	Ag	ag	ag	ag	ag	ag
Interview 20	ag	ag	ag	Ag	Ag	Ag	ag	ag	Ag	Ag	Dg	Ag	dg	ag	ag	ag	Ag	ag	ag	dg	ag	ag
Interview 21	ag	ag	ag	Ag	Ag	Ag	ag	ag	Ag	Ag	Dg	Ag	dg	ag	ag	ag	Ag	ag	ag	dg	ag	ag
Interview 22	ag	ag	ag	Ag	Ag	Ag	dg	ag	Ag	Ag	Dg	Ag	dg	ag	ag	ag	Ag	ag	ag	dg	dg	dg
	at	at	at	At	At	Rt	at/rt	at	At	At	Rt	At	Rt	at	at	at	At	at	at	at	at	at

**Table 23: KEY: First Key for Table 18: Theme = Barrier (Developed for this study)**

Suggested Themes or Barriers	Suggested Themes or Barriers
Lack of appropriate fishery policy (i.e compatible with Codex Alimentarius and EU Legislation);	Lack of the will of government
Lack of agreement;	Lack of PRPs in fishery businesses;
Lack of enforcement;	High illiteracy rate
Lack of outcome expectancy	Lack of consumer agency;
Lack of human expertise and training	Negative guideline factors;
Lack of Adequate Staff	Negative environmental factors;
Lack of finance	Lack of competence;
Lack of access to information on hazards	Lack of private consultancy firm;
Lack of awareness	Lack of cueing mechanism
Lack of self-efficacy	Lack of motivation
	Lack of understanding
	Lack of fishery standard or specification

Table 24: KEY: Second Key for Table 18: Suggested Theme or Agree or Disagree or Not Applicable (Developed for this study)

Responses to Convergent Interview	Abbreviation/Short Form
Suggest Theme	St
Agree	Ag
Disagree	Dg
Not Applicable	Na

Table 25: KEY: Third Key for Table 18: Accept theme or Reject theme (Developed for this study)

Definition of Saturation	Abbreviation/Short Form
Accept Theme	At
Reject Theme	Rt

There were 22 interviewees and as the interviewer moved from interviewees 1 to 6 two different themes were suggested by each interviewee except interviewee 3 who suggested three different themes and interviewee 4 who suggested only one theme. As the interviewer moved to interviewees 7 to 16 each of the interviewee suggested only 1 theme. In fact, as the interviewer moved to interviewees 17 to 22 no new theme was suggested. At the same time, the interviewees were able to develop and refined definitions for themes suggested. Table 31 below (General Unit of Analysis) and Table 21 page 122 (Unit of Analysis for Convergent Interview), provide more information on the regulatory, enforcement and business that participated in convergent interview.



Table 31: General Unit of Analysis (Developed for this study)

REGULATORY- FOOD POLICY MAKER	REGULATORY- FOOD POLICY ENFORCEMENT	FISHERY BUSINESS	CONSUMER REPRESENTATIVES
1. Ministry Fisheries and Marine Resources	1. Sierra Leone Export and Investment Promotion Agency	1. Afric Fishing Company	1. Chemistry Department Fourah Bay College (FBC) University of Sierra Leone (USL)
2. Ministry of Agriculture and Forestry	2. Institute of Agricultural Research	2. Aljan Fishing Company	2. Biology Department, FBC, USL
3. Ministry of Health and Sanitation	3. Environmental Health Division	3. Ann Senkal Fishing Company	3. Faculty of Environmental Science, Njala University College (NUC), USL
4. Ministry of Food Security	4. Sierra Leone Standards Bureau	4. Atlans Fisheries Sierra Leone (SL) Limited	4. Faculty of Education, FBC, USL
5. Ministry of Trade and Industry	5. Food and Nutrition Department	5. Bangso Fishing Enterprises	5. Chemistry Department, Njala University College (NUC), USL
6. Ministry of Justice and Anthony General	6. Institute of Marine Biology and Oceanography	6. Coastal Fishing Company	6. Biology Department, NUC, USL
7. Ministry of Presidential Affairs	7. Fishery Inspector (Department of Fisheries)	7. Horse Fishing Company	7. Institute of Food Science and Technology, NUC, USL
8. SIIIA8: Ministry of Finance	8. Commodity Marketing and Monitoring Unit	8. Lam Fishing Company	
9. Ministry of Foreign Affairs	9. Central Veterinary Office and Laboratory	9. Okey Agencies Limited	
10. Ministry of Education	10. Crop Protection	10. Scan Fishing Enterprises	
	11. Livestock Division	11. Sierra Fishing Company	
	12. Sanitary and Phytosanitary Division		



These comprised of number of Senior Executive Representatives of Policy Makers from line Ministries; Executive Directors, Directors and Managers of Enforcement Agencies; and Managing Directors and Senior Managers of the Fishery Businesses.

The identification of a category of theme/barrier and its definition during the convergent interview process was a sequence of progressive suggestions followed by refinement of agreement or disagreement with both the category and its definition by the interviewees. The interviewees either agreed or disagreed with each category until at a particular point classified in this study as saturation when no new themes are suggested; the final vote was taken on what should be accepted as a category of barriers and what should be rejected, at the end of the process. The interviewer was able to determine the point of saturation following repetition of previously suggested theme and the absence of revealing new themes, but the choice was essentially that of the interviewees since it is their sole 'votes' that made for the decision on acceptance or rejection.

The stage of initiation of a new category was not pre-determined by the interviewer, because all the suggestions of categories came from the interviewees' responses. Therefore, during the convergent interview the author noticed that the suggestion of new category could take place at any time during the process although it is unlikely to happen at the last interview, because by definition, any new category of barrier introduced at this stage indicates that point of saturation had not yet been reached. On the other hand, the introduction of a category towards the beginning or towards the end of the convergent interview does not necessarily mean that it is less or more important barrier perceived by the interviewees. The hypothesis here is that the categories of barrier selected by the beginning of the convergent interview are likely to have more significance to the interviewees on the perceived reality that such a category will be forefront in their minds for long time as major stakeholders in the national food safety infrastructure.

For some of the themes suggested the hypothesis was established, however, this hypothesis is not necessarily the case for all the themes across the entire convergent interview process. 'Lack of appropriate fishery policy; Lack of enforcement; and Lack of human expertise and training',



came early as were originated by 1st, 2nd and 3rd interviewees respectively in the convergent interview, and were accepted by all the respective subsequent interviewees and ranked among the most important of the categories. In the same way, ‘Lack of PRPs in fishery businesses; Lack of understanding; Lack of fishery standard or specification’ came late as were originated by , 6th, 15st and 16th interviewees respectively in the process, yet turned out to be among the most important of all the categories at the end of the process.

‘Lack of agreement; Lack of outcome expectancy and Lack of self-efficacy’, came early as were originated by 1st, 2nd, and 5th interviewees respectively in the convergent interview but only to be ranked as the 13th, 16th, and 18th respectively categories of barriers out of 18 barriers at the end of the process, Table 25.

Table 22 (page 170) is a tabulation of the convergent interview showing the categories of themes/barriers indicated as A, B, C, D up to V across the top suggested by the interviewees and gives the interview number at the left hand side corner. The abbreviation ‘st = Suggested Theme’ has been used to show where in the convergent interview a particular category of barrier was suggested; the abbreviation ‘ag = Agree’ shows that a category of barrier that had been suggested during a previous interview had been accepted by the subsequent interviewee; whilst the abbreviation ‘dg = Disagree’ shows that the category of barrier suggested during the previous interview had been rejected by the subsequent interviewee. The abbreviation ‘na = not applicable’ signifies that this category of barrier was not extant during that particular convergent interview.

The last row with blue, red and yellow columns provides the final vote of convergent interview of which blue indicates that the barrier was accepted; red indicates that the barrier was rejected; whilst yellow indicates 50% rejection and 50% acceptance of the theme. The theme with 50:50 acceptance: rejection is ‘Lack of finance’ and subsequently defined as incentives or disincentives but not a technical barrier to compliance with international HACCP regulation in Sierra Leone. All the suggested themes that were accepted were selected to proceed to the second stage of the interview (Individual Case Study Interview-Stage II (SII)), whilst themes rejected were not selected to proceed to Stage II. Where the votes are tied among the stakeholders, the category is



rejected and not submitted to Stage II although this was a moot point; the position was taken to eliminate or reduce to an acceptable level, the number of categories in order to prevent an unnecessarily complex set of terms being developed that has potential to distort the process. This also indicates that the categories of barriers suggested are essentially the interviewees own perceptions.

Table 22, page 170 above, shows that the theme ‘Lack of appropriate fishery policy’ (that is, compatible with Codex Alimentarius and EU Legislation) was suggested by the 1st interviewee and was accepted by all other interviewees (2nd to 22nd interviewees) during the process and was consequentially accepted as a barrier. It was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for ‘Lack of appropriate fishery policy’ there was no negative vote. This type of support vote was also given to the following themes by their respective next interviewees: ‘Lack of Agreement’; ‘Lack of Enforcement’; ‘Lack of Human Expertise and Training’; ‘Lack of Awareness’; ‘Lack of PRPs in Fishery Businesses’; ‘Lack of Consumer Agency’; ‘Negative Guiding Factors’; ‘Lack of Competence’; and ‘Lack of Cueing Mechanism’; and were consequentially accepted as barriers. They were accepted because the votes supporting the categories of barriers outweighed any negative votes, albeit that for these themes there were no negative votes.

The theme ‘Lack of outcome expectancy’ was originated by the 2nd interviewee; it was accepted by 3rd, 4th, 5th, 6th, 7th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, and 22nd interviewees and was consequentially accepted as a barrier even though it was rejected by the 8th, 9th and 10th interviewees. It was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for ‘Lack of outcome expectancy’ there were only three negative votes.

The theme ‘Lack of Adequate Staff’ was originated by the 3rd interviewee, was then rejected by the 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th and 19th interviewees and accepted by the 4th, 5th, 20th, 21st, and 22nd interviewees; the balance of agree versus disagree being in favour of ‘Disagree’ meant the category of barrier was rejected.



The votes for the theme ‘Lack of finance’, suggested by the 3rd interviewee was tied among the next interviewees. ‘Lack of finance’, was accepted by 4th, 7th, 9th, 10th, 11th, 12th, 19th, 20th and 21st interviewees, but rejected by 5th, 6th, 8th, 13th, 14th, 15th, 16th, 17th, 18th and 22nd interviewees. This is an ironic occurrence since one of the findings of this thesis is that all the fishery businesses in Sierra Leone are SMEs who need financial assistance to grow and expand. However, the objective of the study was to access the perceptions of the regulatory, enforcement and business without bias or influence from the interviewer.

Interviewees who disagreed with ‘Lack of finance’ as a technical barrier revealed that several financial assistances have been provided by development partners or donors to strengthen the capacity of national food safety infrastructure, but the fishery product is still banned from export. Nevertheless, the stakeholders perceived financial assistance as an incentive to SMEs but not as a technical barrier to compliance with international HACCP regulation in the fishery businesses in Sierra Leone. The interviewer was able to determine the rationale behind the stakeholders’ classification of ‘Lack of finance’ as an incentive or disincentive for SMEs but not a technical barrier. The reason is that if ‘Lack of finance’ is a technical barrier, Sierra Leone can hardly justify why the country is unable to meet international HACCP regulations, especially after the war when international community increases the provision of financial assistance for the country, but the choice was essentially that of the interviewees since it is their sole ‘vote’ that made for the decision on agreement and disagreement of technical barrier.

The theme ‘Lack of Access to Information on Hazards’ was originated by the 4th interviewee; it was accepted by 5th, 6th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, and 22nd interviewees and was consequentially accepted as a barrier even though it was rejected by the 7th interviewees. It was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for ‘Lack of Access to Information on Hazards’ there was only one negative vote.

The theme ‘Lack of Self-efficacy’ was originated by the 5th interviewee; it was accepted by 6th, 7th, 8th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, and 22nd interviewees and was consequentially accepted as a barrier even though it was rejected by the 9th interviewees. It



was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for 'Lack of Self-efficacy' there was only one negative vote.

The theme 'Lack of the will of Government' was originated by the 6th interviewee, was then rejected by the 7th, 8th, 9th, 10th, 12th, 14th, 15th, 18th, 19th, 20th, 21st, and 22nd interviewees and accepted by the 11th, 13th, 16th, and 17th interviewees; the balance of agree versus disagree being in favour of 'Disagree' meant the category of barrier was rejected.

The theme 'High Illiteracy Rate' was originated by the 7th interviewee, was then rejected by the 11th, 12th, 13th, 16th, 17th, 18th, 19th, 20th, 21st, and 22nd interviewees and accepted by the 8th, 9th, 10th, 14th and 15th interviewees; the balance of agree versus disagree being in favour of 'Disagree' meant the category of barrier was rejected.

The theme 'Negative Environmental Factors' was originated by the 10th interviewee; it was accepted by 11th, 12th, 13th, 14th, 15th, 16th, 18th, 19th, 20th, 21st, and 22nd interviewees and was consequentially accepted as a barrier even though it was rejected by the 17th interviewees. It was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for 'Negative Environmental Factors' there was only one negative vote.

The theme 'Lack of Private consultancy Firm' was originated by the 12th interviewee; it was accepted by 13th, 14th, 15th, 16th, 18th, 19th, 20th, 21st and 22nd interviewees and was consequentially accepted as a barrier even though it was rejected by the 17th interviewee. It was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for 'Lack of Private consultancy Firm' there was only one negative vote.

The theme 'Lack of Motivation' was originated by the 14th interviewee; it was accepted by 15th, 16th, 17th, 18th, and 19th interviewees and was consequentially accepted as a barrier even though it was rejected by the 20th, 21st and 22nd interviewees. It was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for 'Lack of Motivation' there were only three negative votes.



The theme ‘Lack of Understanding’ was originated by the 15th interviewee; it was accepted by 16th, 18th, 19th, 20th, and 21st interviewees and was consequentially accepted as a barrier even though it was rejected by the 17th and 22nd interviewees. It was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for ‘Lack of Understanding’ there were only two negative votes.

The theme ‘Lack of Fishery Standard or Specification’ was originated by the 16th interviewee; it was accepted by 17th, 18th, 19th, 20th, and 21st interviewees and was consequentially accepted as a barrier even though it was rejected by the 22nd interviewee. It was accepted because the votes supporting the category of barrier outweighed any negative votes, albeit that for ‘Lack of Fishery Standard or Specification’ there was only one negative vote.

4.2.2 Summary

The convergent interview (Stage I) in this study fundamentally addressed objectives 2 and 3. Firstly, it determined whether the national stakeholders across regulatory, enforcement and business areas understand HACCP through identification of three barriers including ‘Lack of understanding’; ‘Lack of human expertise and training’; and ‘Lack of awareness’ in the national fishery safety infrastructure. The identification of these barriers means that there is lack of adequate understanding of HACCP across the food safety management system in the country. This is to achieve objective number two of this study stated below: Objective 2: *“To determine the level of understanding of HACCP among those involved in the national fishery safety infrastructure – from policy and regulation officials to enforcement officers and compliance in businesses”*.

Secondly, the convergent interview (Stage I) identified the perceived barriers of these regulators, enforcement officers, and managing directors and senior managers of the fishery businesses that exists within the national food safety infrastructure. This is to achieve objective number three of this study stated below: Objective 3: *“To identify the perceived barriers which exist within the national food safety infrastructure which prevent the implementation of HACCP”*.



4.3 Data Analysis of Stage II of Triangulation

4.3.1 Results of Individual Case Interviews and Analysis of Individual Barriers

Data Analysis of Stage II Triangulation examines the results of individual barriers of individual case interviews as determined by the process of Stage II and provides a profile of each category of perceived barriers derived from the scores given by the regulatory, enforcement and business. The data is developed into charts for ease of examination, explanation and understanding and the matrix of results is formulated and harmonized. The researcher finds this approach advantageous because it ensures that an across-case profile for each perceived barrier permits for an examination, explanation and understanding of how different regulatory, enforcement and businesses rate and assess the significance of the barriers suggested in Stage I of Triangulation, with regards to the barriers to compliance with international HACCP regulation in the Sierra Leone's fishery business.

Moreover, the across-case profiles are presented in their ranked order with 6 different categories of barriers which were scored highest coming as the first-sixth but in alphabetical order (A, C, E, L, U and V) of keys of theme/barriers. The 7th category immediately follows the first-sixth and onwards to the least supported categories of barriers at the end of the process.

Subsequently, the Stage II: individual case interview results were developed from 77 interviews held with regulators, enforcement officers and fishery businesses using a set of categories of barriers derived from Stage I and developed into a set of semi-structured questions, see table 24 below. The researcher developed eighteen questions and each question covering one category of barriers identified, and each of the 77 interviewees was asked all the 18 questions. This approach was important to allow each of the 77 interviewees to provide opinion on each of the 18 barriers developed from Stage I, through the Likert-type scale of 0 to 3. The score 0 was allocated to a barrier that regulators, enforcement officers and businesses did not agree accrued from their personal experience of national fishery safety control system ; a score of 1 if they nearly agreed with the barrier; 2 if they agreed; and a 3 if they strongly agreed. At the end of the process, the final results of the 77 interviews were collated and tabulated below in Table 32.



Table 32: Barrier Response from Case Interview Process Stage II (Adapted for this study from Kane, 2007)

Group	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
SII-1	3	2	3	2	3			3	2	3		3		1	2	3	1	3	0	2	3	3
SII-2	3	1	3	1	3			3	3	3		3		3	2	1	2	3	1	2	3	3
SII-3	3	2	3	3	3			2	2	3		3		3	1	2	1	3	1	2	3	3
SII-4	3	2	3	1	3			2	2	3		3		3	2	2	1	3	1	2	3	3
SII-5	3	3	3	3	3			2	3	2		3		2	2	2	1	3	1	2	3	3
SII-6	3	2	3	1	3			3	1	2		3		3	2	0	1	3	1	2	3	3
SII-7	3	2	3	1	3			3	2	3		3		3	2	0	2	3	1	2	3	3
SII-8	3	2	3	1	3			3	2	1		3		1	2	2	2	3	1	1	3	3
SII-9	3	2	3	3	3			3	2	1		3		2	2	2	3	3	2	2	3	3
SII-10	3	3	3	1	3			3	2	2		3		2	2	2	3	3	1	2	3	3
SII-11	3	3	3	1	3			3	3	1		3		3	1	2	2	3	1	2	3	3
SII-12	3	3	3	2	3			1	3	1		3		3	1	2	1	3	1	2	3	3
SII-13	3	3	3	0	3			3	3	1		3		3	2	2	1	3	2	2	3	3
SII-14	3	3	3	0	3			3	2	1		3		3	2	2	1	3	1	1	3	3
SII-15	3	1	3	0	3			3	2	1		3		3	2	2	1	3	1	2	3	3
SII-16	3	3	3	1	3			3	2	1		3		2	2	2	2	3	1	2	3	3
SII-17	3	1	3	1	3			1	2	2		3		3	2	1	1	3	1	2	3	3
SII-18	3	3	3	1	3			1	2	1		3		2	2	2	1	3	1	2	3	3
SII-19	3	3	3	1	3			3	2	1		3		3	2	2	1	3	1	2	3	3
SII-20	3	1	3	2	3			3	2	1		3		3	2	2	1	3	1	2	3	3
SII-21	3	3	3	1	3			3	2	1		3		2	2	1	1	3	1	2	3	3
SII-22	3	3	3	2	3			3	2	1		3		3	2	2	2	3	0	2	3	3
SII-23	3	2	3	1	3			0	2	1		3		3	2	0	1	3	1	2	3	3
SII-24	3	3	3	2	3			3	2	1		3		1	3	2	1	3	1	3	3	3
SII-25	3	3	3	1	3			1	2	1		3		3	3	2	1	3	1	2	3	3
SII-26	3	3	3	1	3			2	3	1		3		3	3	2	1	3	1	2	3	3
SII-27	3	3	3	2	3			2	2	1		3		1	3	2	1	3	1	2	3	3
SII-28	3	3	3	1	3			2	2	1		3		3	3	2	1	3	0	2	3	3
SII-29	3	2	3	1	3			2	3	1		3		2	2	2	2	3	1	2	3	3
SII-30	3	1	3	3	3			2	3	1		3		3	2	2	1	3	1	2	3	3
SII-31	3	2	3	1	3			2	3	1		3		3	2	2	1	3	1	3	3	3
SII-32	3	2	3	1	3			2	3	1		3		3	2	2	3	3	2	2	3	3
SII-33	3	2	3	1	3			2	3	1		3		3	2	3	3	3	1	2	3	3
SII-34	3	2	3	3	3			2	3	1		3		3	2	2	3	3	1	2	3	3
SII-35	3	2	3	3	3			2	2	1		3		3	2	2	3	3	1	1	3	3
SII-36	3	2	3	1	3			2	3	1		3		3	2	0	3	3	1	2	3	3
SII-37	3	1	3	1	3			2	2	2		3		3	2	2	1	3	1	2	3	3
SII-38	3	2	3	1	3			2	2	1		3		3	3	2	1	3	1	2	3	3
SII-39	3	2	3	1	3			2	2	1		3		3	3	1	3	3	1	2	3	3
SII-40	3	2	3	1	3			2	2	1		3		3	3	2	3	3	1	2	3	3
SII-41	3	2	3	1	3			2	2	1		3		3	3	2	3	3	1	3	3	3
SII-42	3	2	3	1	3			2	2	0		3		3	3	2	3	3	1	2	3	3
SII-43	3	2	3	1	3			2	2	1		3		3	3	2	1	3	1	2	3	3
SII-44	3	1	3	1	3			1	2	1		3		3	3	3	1	3	1	2	3	3
SII-45	3	1	3	2	3			1	2	1		3		3	3	2	1	3	1	2	3	3
SII-46	3	1	3	1	3			1	2	1		3		3	3	2	1	3	2	2	3	3
SII-47	3	1	3	1	3			0	2	0		3		3	3	2	1	3	1	3	3	3
SII-48	3	2	3	1	3			0	2	1		3		3	3	2	1	3	1	2	3	3
SII-49	3	2	3	1	3			1	2	1		3		3	2	1	1	3	1	2	3	3
SII-50	3	2	3	1	3			3	3	3		3		3	3	1	3	3	1	2	3	3
SII-51	3	2	3	1	3			1	2	3		3		3	3	2	2	3	1	2	3	3
SII-52	3	2	3	2	3			2	2	3		3		3	3	2	3	3	3	2	3	3
SII-53	3	2	3	1	3			3	2	3		3		3	3	2	2	3	1	2	3	3
SII-54	3	2	3	1	3			1	2	3		3		3	3	2	1	3	3	2	3	3
SII-55	3	2	3	1	3			3	3	3		3		3	3	2	1	3	3	2	3	3
SII-56	3	2	3	2	3			3	3	3		3		3	3	2	1	3	3	2	3	3
SII-57	3	2	3	0	3			2	3	3		3		3	1	2	1	3	3	2	3	3
SII-58	3	1	3	3	3			2	3	2		3		3	3	1	1	3	3	2	3	3
SII-59	3	1	3	2	3			1	3	1		3		3	2	2	1	3	3	2	3	3
SII-60	3	2	3	2	3			2	2	3		3		3	2	2	1	3	3	2	3	3
SII-61	3	1	3	1	3			2	3	3		3		3	2	1	1	3	3	2	3	3
SII-62	3	1	3	1	3			2	3	2		3		3	2	2	3	3	3	2	3	3
SII-63	3	1	3	1	3			2	3	2		3		3	2	2	3	3	3	2	3	3
SII-64	3	3	3	2	3			2	3	2		3		3	2	2	2	3	1	1	3	3
SII-65	3	1	3	2	3			2	3	2		3		3	2	2	3	3	2	2	3	3
SII-66	3	1	3	2	3			2	2	2		3		3	1	2	2	3	3	2	3	3
SII-67	3	3	3	2	3			2	3	2		3		3	3	2	3	3	2	2	3	3
SII-68	3	1	3	2	3			1	3	2		3		3	3	2	3	3	1	2	3	3
SII-69	3	1	3	3	3			3	3	2		3		3	2	2	3	3	3	2	3	3
SII-70	3	1	3	3	3			3	3	1		3		3	3	2	3	3	2	2	3	3
SII-71	3	3	3	3	3			3	1	0		3		3	3	2	3	3	2	2	3	3
SII-72	3	1	3	3	3			3	3	1		3		3	3	3	1	3	3	2	3	3
SII-73	3	1	3	3	3			3	3	1		3		3	3	3	3	3	2	2	3	3
SII-74	3	1	3	3	3			1	3	1		3		3	3	2	3	3	3	2	3	3
SII-75	3	1	3	3	3			1	1	2		3		3	3	2	1	3	3	3	3	3
SII-76	3	2	3	3	3			1	3	1		3		3	3	2	1	3	1	2	3	3
SII-77	3	2	3	2	3			1	3	1		3		3	3	2	1	0	3	2	3	3



The Table above gives the key of each policy maker or regulatory, enforcement and businesses starting from SII-1 to SII-77 specified under the group column on the left hand side of the table. The categories of barriers are given along the first row at the top of the table listed from A on the extreme left to V on the extreme right hand side. The categories F, K and M shaded in light pink were among earlier suggested theme/barrier in Stage I but were completely rejected at the end of Stage I, and therefore not submitted to Stage II. The category G (financial constraint) shaded in light green was among the earlier suggested themes or barriers in Stage I but was downgraded to incentives or disincentives instead of technical barrier at the end of Stage I, and therefore not submitted to Stage II. The score given by the regulatory, enforcement and businesses to each category of barrier are provided in each cell in Table 32 above.

For instance SII-1 is one of the senior staff members of Ministry of Fisheries and Marine Resources (Statutory Fishery Regulatory Authority) interviewees, who accepts all the barriers except 'S' (Lack of cueing mechanism), with 'A' (Lack of appropriate fishery policy), 'C' (Lack of enforcement), 'E' (Lack of human expertise and training), 'H' (Lack of access to information on hazards), 'J' (Lack of self-efficacy), 'L' (Lack of PRPs in fishery businesses), 'P' (Negative environmental factors), 'R' (Lack of private consultancy firm), 'U' (Lack of understanding), and 'V' (Lack of fishery standard or specification) being barriers **'strongly agreed' (score = 3)** they had experienced in fishery safety control regulation. Similarly, 'B' (Lack of agreement), 'D' (Lack of outcome expectancy), 'I' (Lack of awareness), 'O' (Negative guideline factors), and 'T' (Lack of motivation) being barriers **'agreed' (score = 2)** they had experienced in fishery safety control regulation; whilst 'N' (Lack of consumer agency) and 'Q' (Lack of competence) being barriers **'nearly agree' (score = 1)** they had experienced in regulatory activities.

In another interview SII-15, one of the senior staff members of Environmental Health Division (Statutory Fishery Safety Enforcement Authority-Ministry of Health and Sanitation) interviewees, who accepts all the barriers except 'D' (Lack of outcome expectancy), with 'A' (Lack of appropriate fishery policy), 'C' (Lack of enforcement), 'E' (Lack of human expertise and training), 'H' (Lack of access to information on hazards), 'L' (Lack of PRPs in fishery businesses), 'N' (Lack of consumer agency), 'R' (Lack of private consultancy firm), 'U' (Lack of understanding), and 'V' (Lack of fishery standard or specification) being barriers **'strongly**



agreed (score = 3) they had experienced in fishery safety enforcement. Similarly, 'I' (Lack of awareness), 'O' (Negative guideline factors), 'P' (Negative environmental factors), and 'T' (Lack of motivation) being barriers *'agreed'* (score = 2) they had experienced in fishery safety enforcement; whilst 'B' (Lack of agreement), 'J' (Lack of self-efficacy), 'Q' (Lack of competence) and 'S' (Lack of cueing mechanism) being barriers *'nearly agree'* (score = 1) they had experienced in enforcement of fishery safety management activities.

In the 41st interview, SII-41 one of the representatives of senior management of Sierra Fishing Company (SME but largest fishery business in Sierra Leone) interviewees, who accepts all the barriers with 'A' (Lack of appropriate fishery policy), 'C' (Lack of enforcement), 'E' (Lack of human expertise and training), 'L' (Lack of PRPs in fishery businesses), 'N' (Lack of consumer agency), 'O' (Negative guideline factors), 'Q' (Lack of competence), 'R' (Lack of private consultancy firm), 'T' (Lack of motivation) 'U' (Lack of understanding), and 'V' (Lack of fishery standard or specification) being barriers *'strongly agreed'* (score = 3) they had experienced in complying with fishery safety requirement in the fishery business. Similarly, 'B' (Lack of agreement), 'H' (Lack of access to information on hazards), 'I' (Lack of awareness), and 'P' (Negative environmental factors), being barriers *'agreed'* (score = 2) they had experienced in complying with fishery safety requirements; whilst 'D' (Lack of outcome expectancy), 'J' (Lack of self-efficacy), and 'S' (Lack of cueing mechanism) being barriers *'nearly agree'* (score = 1) they had experienced in compliance activities.

Similar trends of interviews and scoring applied to all categories of barriers and the results are clearly organized above in Table 32 above. In an attempt to more clearly characterise the analysis of results of Stage II interviews, the researcher formulated a chart for each category of barrier and the score given by each regulatory, enforcement and businesses for that particular category of barrier. Given below are 18 charts given in rank order with 6 different categories of barriers which were scored highest coming as the first-sixth but in alphabetical order (A, C, E, L, U and V) of keys of theme/barriers; the 7th category immediately follows the first-sixth and onwards to the least supported categories of barriers as the last chart.

Figure 7: Barrier 'A': Lack of Appropriate Fishery Policy: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research: 'Priority Rank= 1'

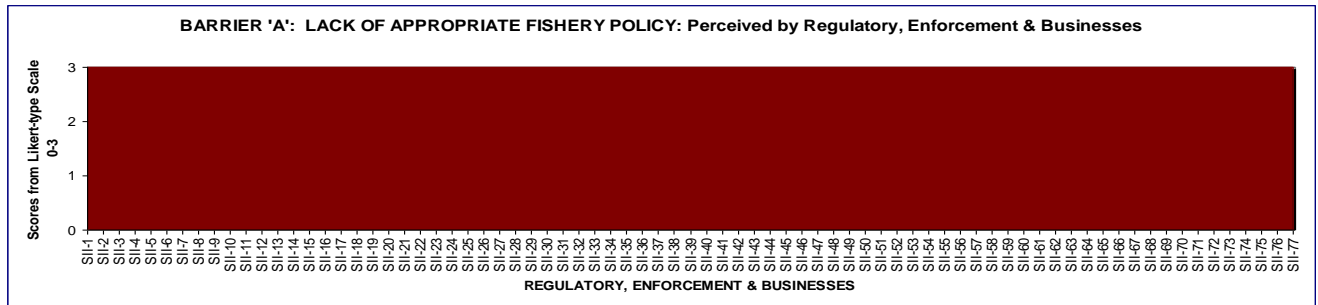


Figure 8: Barrier 'C': Lack of Enforcement: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research- 'Priority Rank= 1'

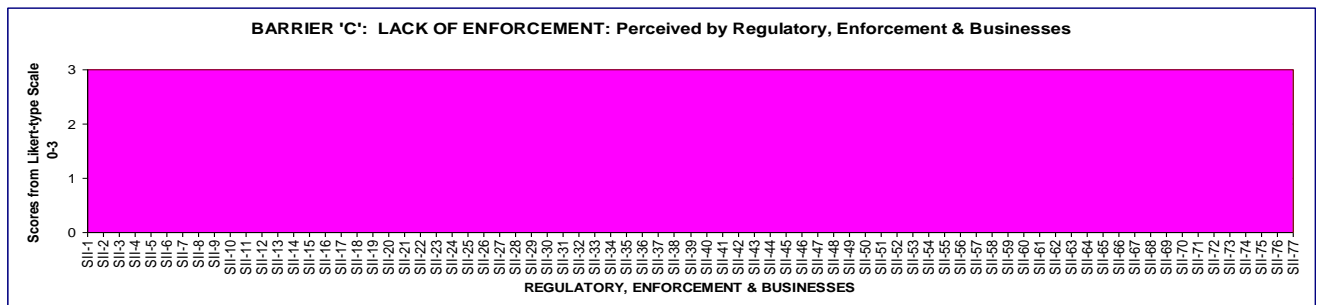


Figure 9: Barrier 'E': Lack of Human Expertise & Training: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research- 'Priority Rank= 1'

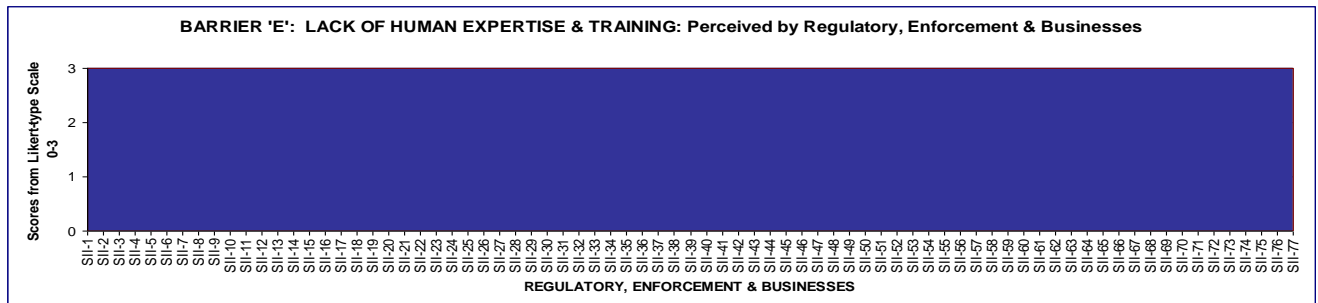


Figure 10: Barrier 'L': Lack of PRPs in Fishery Businesses: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research- 'Priority Rank= 1'

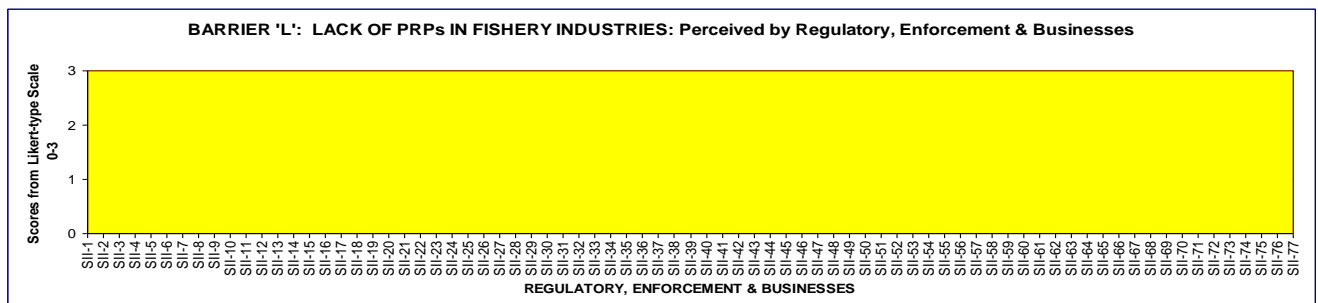


Figure 11: Barrier 'U': Lack of Understanding: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-*'Priority Rank= 1'*

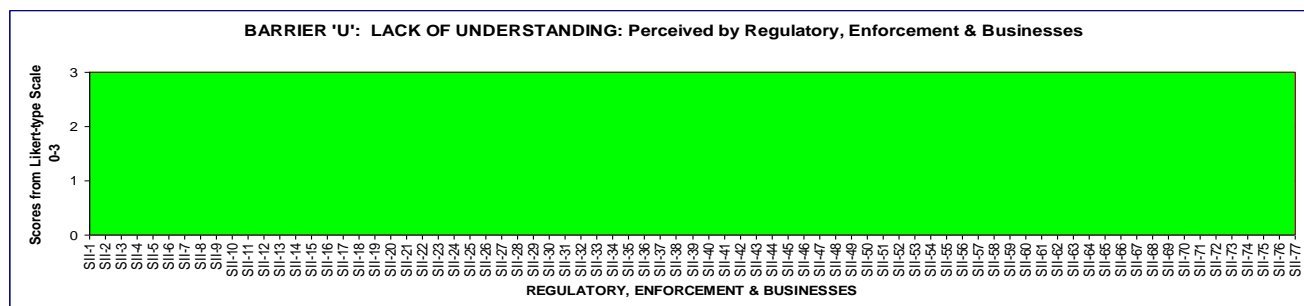
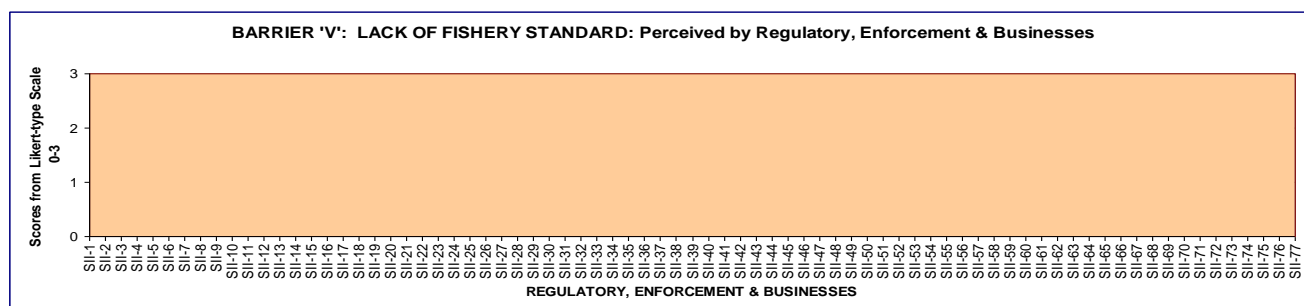


Figure 12: Barrier 'V': Lack of Fishery Standard or Specification: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-*'Priority Rank= 1'*



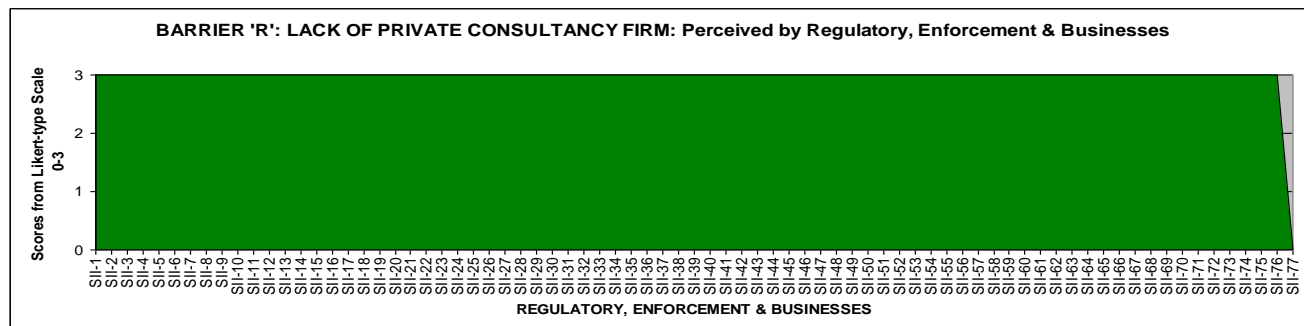
Six themes namely, 'lack of appropriate fishery policy', 'lack of enforcement', 'lack of human expertise and training', 'lack of PRPs in fishery businesses', 'lack of understanding', and 'lack of fishery standard or specification' (Figures 7 to 12) were barrier categories that received equal and first rank for all of the regulatory, enforcement and businesses, with a highest score of 231 each, and recording a score 3 for each of these barriers. This reflects that relevant or up-to-date and enforceable fishery policy, human expertise and training, PRPs in fishery businesses, understanding of HACCP, and fishery standard or specification are essential components and at the forefront of a modern and national food safety control system.

It also reflects that sound fishery policy, human expertise and training, PRPs in fishery businesses, adequate understanding of HACCP, and fishery standard or specification are essential to create an enabling and predictable environment in which to develop and enforce national fishery safety measures based on HACCP system, in a bid to protect the rights of consumers, establish clear, appropriate and fair rules that facilitate trade, and define the

responsibilities of producers, processors, manufacturers, traders and consumers, helping to ensure that fishery product is safe, wholesome and fit for human consumption.

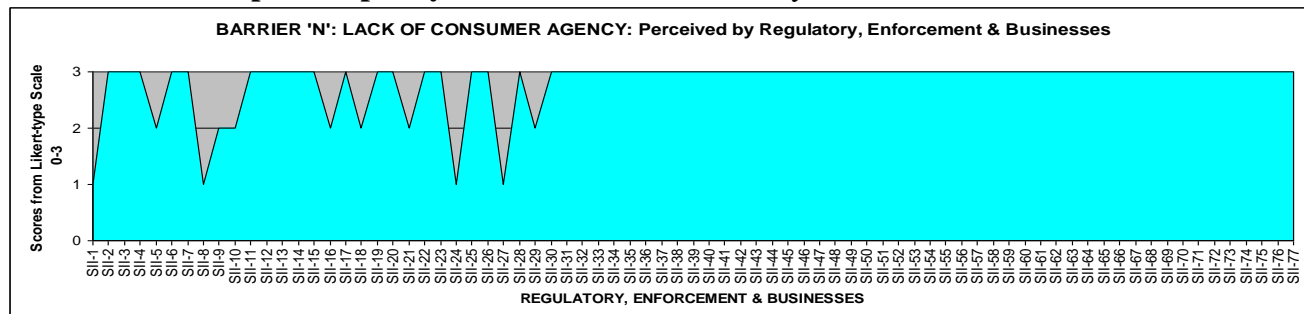
The mean score for the regulatory, enforcement and businesses for each of the six barriers above was 3 and considered these barriers equal and scored as the highest. The mode for a response on each of these categories of barriers was 3 reflecting that the regulatory, enforcement and businesses felt strongly that these barriers have served as major obstacles to the compliance with international HACCP regulations in fishery businesses in Sierra Leone.

Figure 13: Barrier 'R': Lack of Private Consultancy Firm: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-*'Priority Rank= 7'*



The barrier 'lack of private consultancy firm' (Figure 13) was also a very highly scored barrier prioritized 7th in ranked order for all of the regulatory, enforcement and businesses with a total score of 228. All regulatory, enforcement, and businesses scored this barrier as a 3, except one (SII-77) who disagreed with the barrier and scored it as a 0. However, the mode was 3 which reflected the overall feeling that the fundamental process within Sierra Leone food system is the use of private consultancy firm to assist in driving continuous improvement, by identifying weaknesses in a food safety management system and recommend changes for improvement. The regulatory, enforcement, and businesses scored this barrier higher in terms of their mean score with a result of 2.96 (equivalent to 3). This suggests that the regulatory, enforcement, and businesses valued that the provision of technical input from expertise from private consultancy firm is not a new concept and could offer advice and guidance on selecting the appropriate standards and strategies for successfully implementing the standards or guidelines.

Figure 14: Barrier 'N': Lack of Consumer Agency: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-‘Priority Rank= 8’



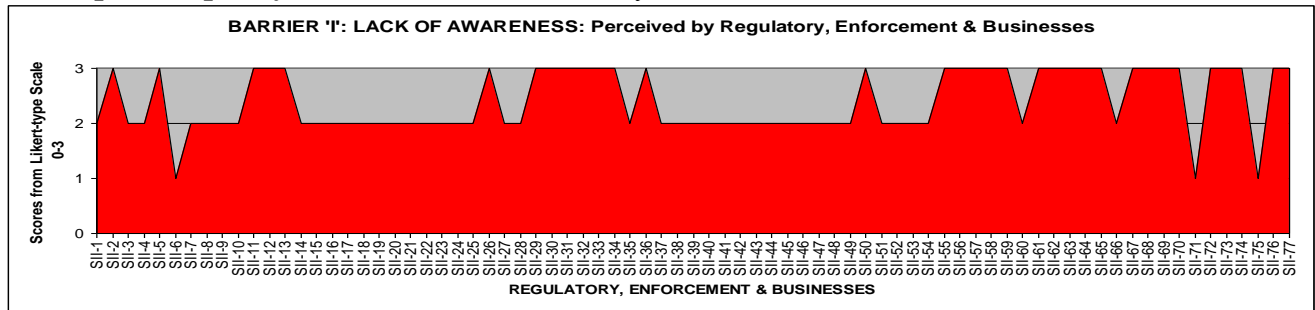
The ‘lack of consumer agency’ barrier (Figure 14) referred to the absence of independent organisation that can be viewed as pressure groups which are antagonistic to government agencies, but capable to participate directly in formulating food control regulations, put more effort including checks and balances into regulatory enforcement, and with formal channels of communication between food control organizations and consumers including consumer complaints programmes. This was ranked across all regulatory, enforcement and businesses as the 8th with an overall score of 216.

The mode for this barrier was also scored 3 and shows that it is a high ranking barrier. This reflects that consumers should be critically concerned about the safety of the food they eat and therefore play active role in various national food safety control programmes including but not limited to food laws and regulations; foodborne disease surveillance and investigation systems; food control management; inspection services; recall and tracking systems; food monitoring laboratories; information, education, communication, and training; funding and affordability of the national food safety program.

However, SII-3, SII-8, SII-24 and SII-27, ‘nearly agreed’ (score 1) with this barrier, but sixty-six other regulatory, enforcement and businesses ‘strongly agreed’ (score 3), whilst seven ‘agree’ (score 2). This suggests that there is a complete agreement on this barrier. The ‘lack of consumer agency’ had an overall mean score of 2.8 and mean score of 3 for those who ‘strongly agreed’ with it as against a mean score of 1 for those who ‘nearly agreed’; suggesting that the regulatory, enforcement and businesses valued this as a higher barrier. This reflects that the establishment and active participation of consumer protection organizations are essential in the

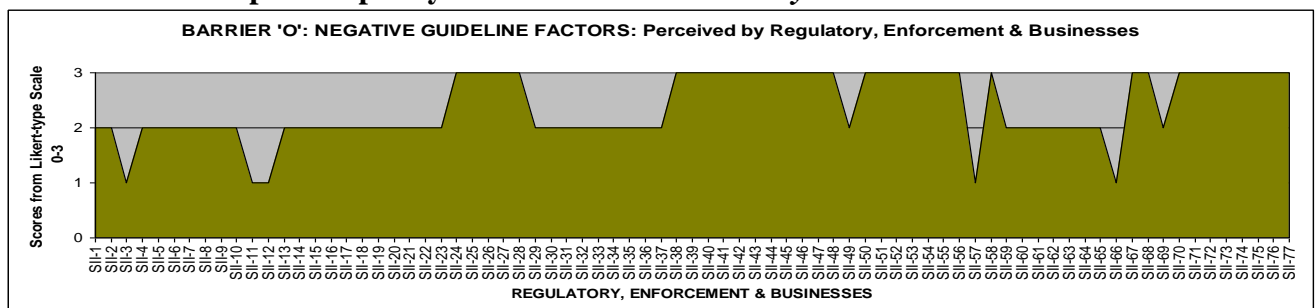
country as in many parts of the world, to promote stronger national food safety programs, to reduce food-related deaths and illness, and to deter the use of food as a target of contamination.

Figure 15: Barrier 'I': Lack of Awareness: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-*'Priority Rank= 9'*



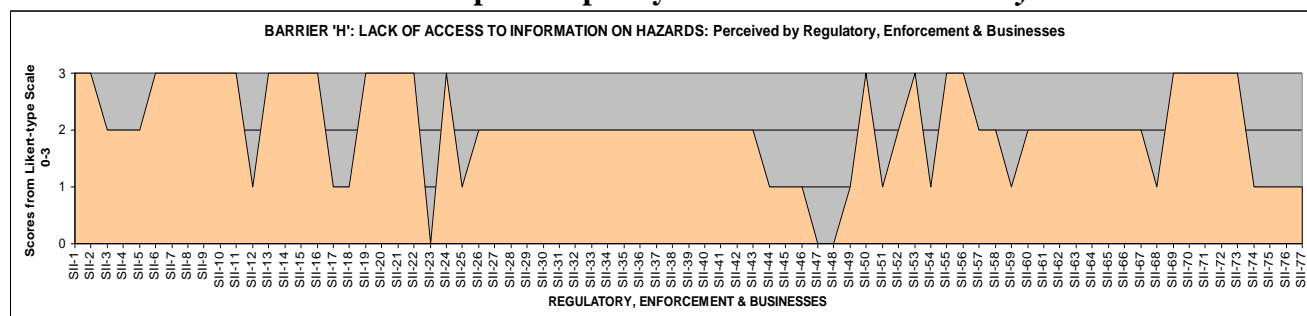
'Lack of awareness' (Figure 15) is the non-familiarity with the general principles, simple practicalities, main rules, and responsibilities of food safety management system such as HACCP by regulatory, enforcement and businesses and considered a barrier to the compliance with international HACCP regulation in the country. This barrier was ranked as the 9th category with a total score of 184 for all regulatory, enforcement and businesses. The mode was a score of 2 so it was a secondary barrier as against the first eight, giving only a moderate or 'somewhat' score. This barrier had an overall mean score of 2.4 with thirty-three regulatory, enforcement and businesses 'strongly agreed' (score 3); forty-one 'agreed' (score 2); and three 'nearly agreed' (score 1). It revealed that more regulatory, enforcement and businesses value this barrier though secondary to the first eight barriers, and therefore considered significant barrier to the compliance with international HACCP regulation in the country.

Figure 16: Barrier 'O': Negative Guideline Factors: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-*'Priority Rank= 10'*



‘Negative guideline factors’ (Figure 16, page 187) as a technical barrier to compliance with international HACCP regulation by Sierra Leone fishery businesses refers to as the technical and difficult nature of HACCP principles, steps and its pre-requisite programmes, and other guidelines of which the regulatory, enforcement and businesses lack the ability and skills to adopt and implement without being appropriately defined, explained, simplified, and interpreted by experts. This was the 10th ranked barrier category with a total score of 183 for all regulatory, enforcement and businesses. The mode was a score of 2 so it was a secondary barrier when compared to the first eight, giving only a moderate or ‘somewhat’ score. This ‘Negative guideline factors’ barrier had a mean score of 2.4 with thirty-four regulatory, enforcement and businesses ‘strongly agreed’ (score 3); forty-eight ‘agreed’ (score 2); and five ‘nearly agreed’ (score 1). It revealed that more regulatory, enforcement and businesses value this barrier though secondary to the first eight barriers, and therefore considered significant barrier.

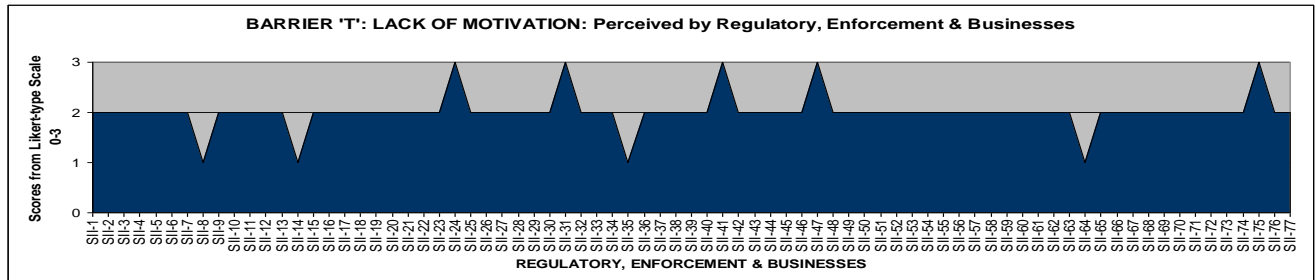
Figure 17: Barrier 'H': Lack of Access to Information on Hazards: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-‘Priority Rank= 11’



The ‘lack of access to information on hazards’ (Figure 17) category of barrier refers to as inadequate or lack of communications between the regulatory, enforcement, businesses and consumers on significant food safety hazards; existing, emerging and re-emerging foodborne diseases and their outbreaks, and have served as impediment to the adoption and implementation of HACCP in Sierra Leone. The ‘lack of access to information on hazards’ is the 11th ranked barrier category with a total score of 158 for all regulatory, enforcement and businesses. The mode was a score of 2 so it was a secondary barrier when compared to the first eight, giving only a moderate or ‘somewhat’ score. This barrier had a mean score of 2.1 with twenty-six regulatory, enforcement and businesses ‘strongly agreed’ (score 3); thirty-two ‘agreed’ (score 2); sixteen ‘nearly agreed’ (score 1); and three disagreed (score 0). It revealed that more regulatory,

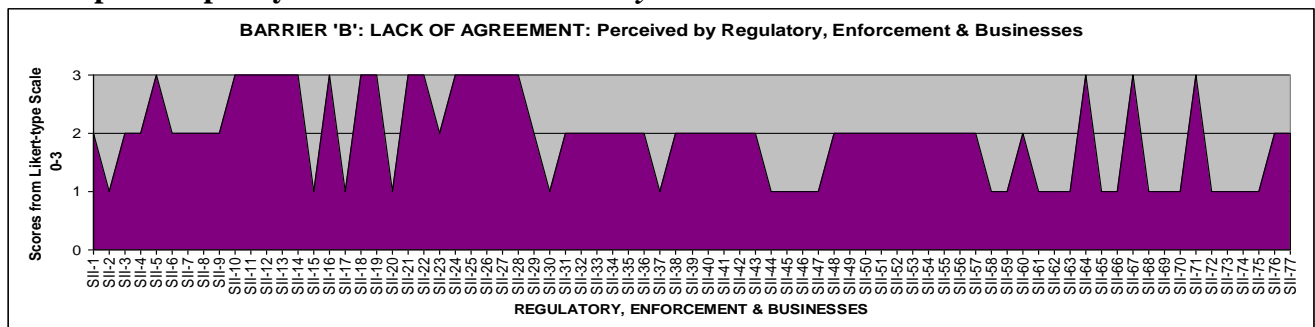
enforcement and businesses value this barrier though secondary to the first eight barriers, and therefore considered significant barrier.

Figure 18: Barrier 'T': Lack of Motivation: By Regulatory, Enforcement & Businesses- Developed Purposely for this Research- 'Priority Rank= 12'



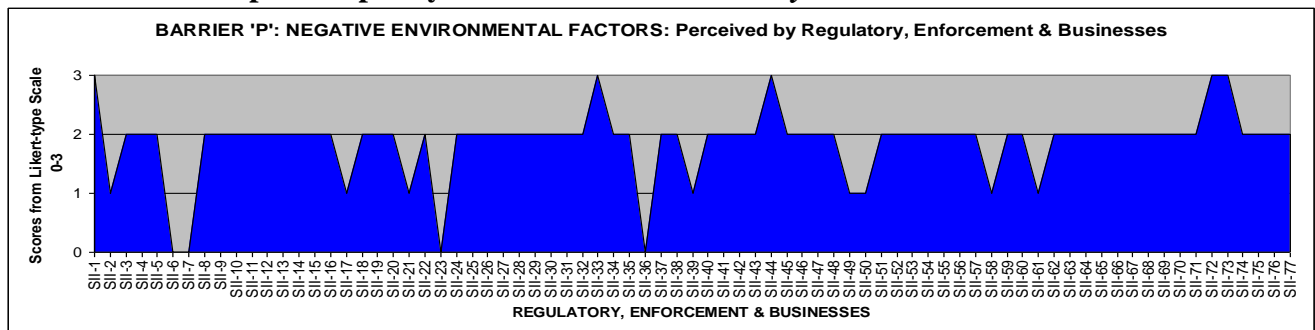
‘Lack of Motivation’ (Figure 18) barrier refers to the absence of praise, respect, recognition, empowerment, inner directing drive, and a sense of belonging and ownership to know and do what regulatory, enforcement and businesses supposed to do to improve quality of work. This was the 12th ranked barrier category with a total score of 155 for all regulatory, enforcement and businesses. The mode was a score of 2 so it was a secondary barrier when compared to the first eight, giving only a moderate or ‘somewhat’ score. This barrier had a mean score of 2.0 with five regulatory, enforcement and businesses ‘strongly agreed’ (score 3); sixty-eight ‘agreed’ (score 2); and four ‘nearly agreed’ (score 1). It revealed that more regulatory, enforcement and businesses value this barrier though secondary to the first eight barriers, and therefore considered significant barrier to the compliance with international HACCP regulation in fishery businesses in Sierra Leone.

Figure 19: Barrier 'B': Lack of Agreement: By Regulatory, Enforcement & Businesses- Developed Purposely for this Research- 'Priority Rank= 13'



The ‘lack of agreement’ (Figure 19, previous page 189) barrier is the perception of the regulatory, enforcement and businesses that effective food safety systems in the country is undermined by the existence of excessive bureaucracy, fragmented legislations, duplication of regulatory activity, multiple jurisdictions, lack of coordination, and weaknesses in surveillance, monitoring and enforcement system, due to lack of credibility, trust and clue about HACCP system leading to a significant barrier to achieve agreement on HACCP among their target audience. This category of barrier is the 13th in ranking with a score of 149 overall and a mode of 2, so once again it is secondary barrier when compared to the first eight, giving only a moderate or ‘somewhat’ score. This barrier had a mean score of 1.9 with nineteen regulatory, enforcement and businesses ‘strongly agreed’ (score 3); thirty-four ‘agreed’ (score 2); and twenty-four ‘nearly agreed’ (score 1). It revealed that more regulatory, enforcement and businesses value this barrier though secondary to the first eight barriers, and marginal to the 9th, 10th, 11, and 12th barriers. However, it is noticeable that significant number of up to 24 regulatory, enforcement and businesses do not fully regard it as a barrier, but it is also considered significant barrier because of the full support from 53 out of 74 regulatory, enforcement and businesses.

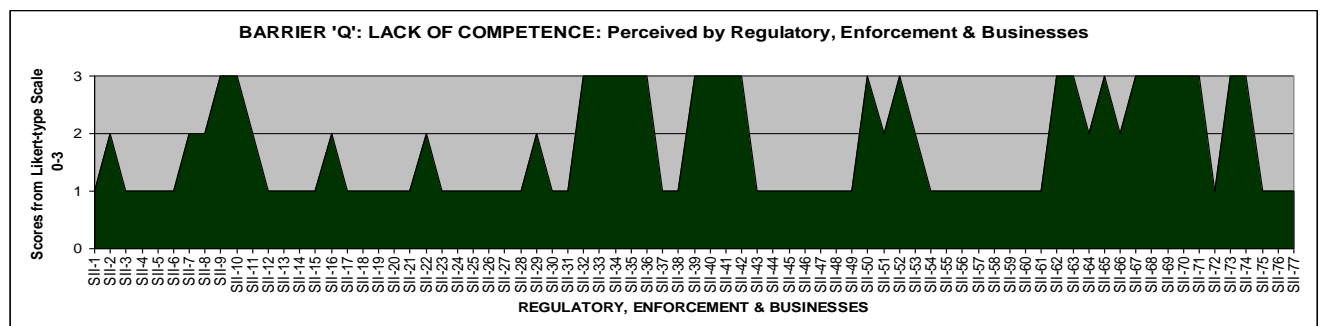
Figure 20: Barrier 'P': Negative Environmental Factors: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-‘Priority Rank= 14’



The ‘negative environmental factors’ (Figure 20, above) barrier refers to the absence of appropriate management structure and human resources of the poorly resourced small and medium size enterprises (SMEs) who lost most of their premises, staff, equipment and facilities during the ten years rebel war in the country. This category of barrier is the 14th in ranking with a score of 143 overall and a mode of 2, so once again it is secondary barrier when compared to the first eight, giving only a moderate or ‘somewhat’ score. This barrier had a mean score of 1.9 with

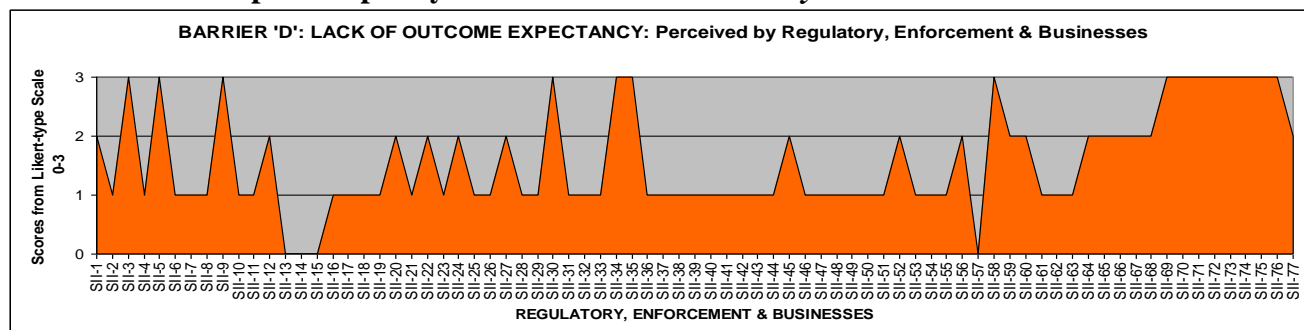
five regulatory, enforcement and businesses ‘strongly agreed’ (score 3); sixty ‘agreed’ (score 2); eight ‘nearly agreed’ (score 1); and four ‘disagreed’ (score 0). It revealed that more regulatory, enforcement and businesses value this barrier though secondary to the first eight barriers, and marginal to the 9th, 10th, 11, and 12th barriers. However, it is noticeable that 8 regulatory, enforcement and businesses do not fully regard it as a barrier whilst 4 completely disagreed with it as a barrier, but it is also considered significant barrier because of the full support from 65 out of 74 regulatory, enforcement and businesses.

Figure 21: Barrier 'Q': Lack of Competence: By Regulatory, Enforcement & Businesses- Developed Purposely for this Research- ‘Priority Rank= 15’



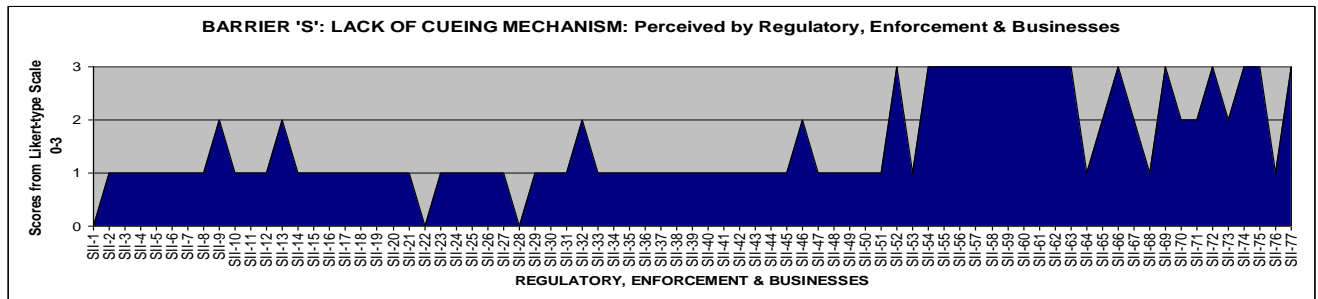
The ‘lack of competence’ (Figure 21, above) barrier refers to the poor policy and guidance that have created overconfidence among regulatory, enforcement and businesses whilst doing the wrong things, and subsequently caused lack of receptiveness and competence required to make modifications of their fishery safety management system that will comply with international food safety system of choice such as HACCP. This category of barrier is the 15th in ranking with a score of 134 overall and a mode of 1 suggesting that it is only a weak category compared to the previous 14 barriers. The mean scores for the regulatory, enforcement and businesses is 1.7 with twenty-three regulatory, enforcement and businesses ‘strongly agreed’ (score 3); eleven ‘agreed’ (score 2); and forty-three ‘nearly agreed’ (score 1), suggesting that there is a slightly full recognition for this barrier and noticeable number of regulatory, enforcement and businesses who only partially regard it as a barrier. However, it is also considered significant barrier because of the full support from 34 and partial support from 43 regulatory, enforcement and businesses.

Figure 22: Barrier 'D': Lack of Outcome Expectancy: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research- 'Priority Rank= 16'



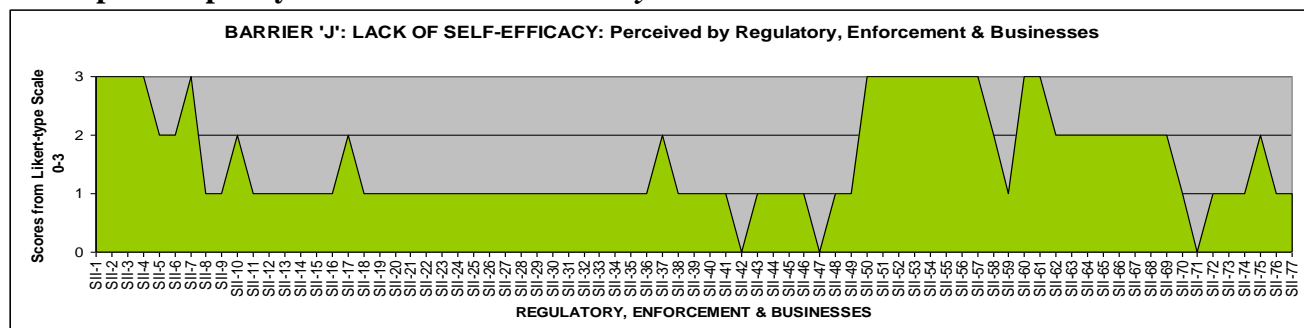
The 'lack of outcome expectancy' (Figure 22, above) barrier is the perception of the stakeholders that the duplication of regulatory activity, fragmented surveillance and uncoordinated efforts have made it difficult for the country to develop strategies for food safety with clearly defined objectives, and consequently, the identification of priorities for prevention of potential hazards; and as a result they are not sure whether HACCP or traditional behaviour is the best for their target outcome. This category of barrier is the 16th in ranking with a score of 120 overall, and a mode of 1 similar to barrier Q figure 19 above, and suggesting that it is only a weak category compared to the previous 14 barriers. The mean scores for the regulatory, enforcement and businesses is 1.6 with fifteen regulatory, enforcement and businesses 'strongly agreed' (score 3); seventeen 'agreed' (score 2); forty-one 'nearly agreed' (score 1), and four 'disagreed' (score 0) suggesting that there is a slightly full recognition for this barrier and noticeable number of regulatory, enforcement and businesses who only partially regard it as a barrier. However, it is also considered significant barrier because of the full support from 32 and partial support from 41 that significantly outweighed the 4 regulatory, enforcement and businesses who disagreed with this barrier.

Figure 23: Barrier 'S': Lack of Cueing Mechanism: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research-‘Priority Rank= 17’



The ‘lack of cueing mechanism’ (Figure 23, above) barrier refers to as the absent of appropriate mechanisms to remind timely and speedy appropriate actions to achieve food safety objectives by fishery businesses in a busy environment such as the street vending. This category of barrier is the 17th in ranking with a score of 117 overall, and a mode of 1. But this barrier is very marginal, because only 26 regulatory, enforcement and businesses fully agreed with it as a barrier and makes interpretation of the scores difficult especially in terms of mode. The mean scores for the regulatory, enforcement and businesses is 1.5 with seventeen regulatory, enforcement and businesses ‘strongly agreed’ (score 3); nine ‘agreed’ (score 2); forty-eight ‘nearly agreed’ (score 1), and three ‘disagreed’ (score 0) suggesting that this barrier is not valued very highly by the regulatory, enforcement and businesses. However, it is also considered significant barrier because of the full support from 26 and partial support from 48 that significantly outweighed the 3 regulatory, enforcement and businesses who disagreed with this barrier.

Figure 24: Barrier 'J': Lack of Self-efficacy: By Regulatory, Enforcement & Businesses-Developed Purposely for this Research 'Priority Rank= 18'



The 'lack of self-efficacy' (Figure 24, above) barrier refers to as the lack of skills and capabilities by the fishery regulatory, enforcement and businesses to adopt and implement HACCP and therefore considered HACCP difficult and too technical or scientific. This category of barrier is the 18th in ranking with a score of 116 overall, and a mode of 1. As in barrier 'S', figure 22 above this barrier is very marginal, because only 30 regulatory, enforcement and businesses fully agreed with it as a barrier and makes interpretation of the scores difficult especially in terms of mode. The mean scores for the regulatory, enforcement and businesses is 1.5 with fifteen regulatory, enforcement and businesses 'strongly agreed' (score 3); fifteen 'agreed' (score 2); forty-four 'nearly agreed' (score 1), and three 'disagreed' (score 0) suggesting that this barrier is not valued very highly by the regulatory, enforcement and businesses. However, it is also considered significant barrier because of the full support from 30 and partial support from 44 that significantly outweighed the 3 regulatory, enforcement and businesses who disagreed with this barrier. It is the last of the categories of barriers in ranking.

4.3.2 Summary

The individual case interview (Stage II) in this study also addressed objectives 2 and 3. Firstly, it ranked barriers such as 'Lack of understanding'; 'Lack of human expertise and training'; and 'Lack of awareness', which determined the level or degree of understanding of HACCP among the national stakeholders across regulatory, enforcement and business. This is to achieve objective number two of this study stated below: Objective 2: *"To determine the level of*



understanding of HACCP among those involved in the national fishery safety infrastructure – from policy and regulation officials to enforcement officers and compliance in businesses”.

Secondly, the individual case interview (Stage II) confirmed the validity of the barriers identified in stage I, through ranking or prioritising the barriers perceived across regulatory, enforcement and businesses. This is to achieve objective number three of this study stated below: Objective 3: *“To identify the perceived barriers which exist within the national food safety infrastructure which prevent the implementation of HACCP”.*

4.4 Analysis of Results of the Focus Groups Workshop Stage III

4.4.1 Perceptions of the Focus Groups on HACCP Barriers and Benefits

This section of the data analysis provides results from sessions of 4 days workshop held with three focus groups SIIIA, SIIIB and SIIIC on the topic of the barriers to compliance with international HACCP regulation in Sierra Leone fishery businesses. These sessions were undertaken using a focus group methodology in order to explore groups’ perceptions on the barriers identified in stages I and II, and subsequently, the benefits of successful implementation of HACCP in fishery businesses. This stage of data collection addressed objectives 2, 3 and 4 of this study. A focus group methodology involves an organized discussion with particular stakeholders with the aim to collect large amount of qualitative information on the attitudes, beliefs, perceptions and experiences of different stakeholders in a relatively short time (Le Manach, Dura, et al., 2011; McParland and Flowers, 2011) .

Appendix 5, (page 331), was the protocol used to organize the three focus groups for this stage. This protocol also provides clear and explicit objectives for the focus groups discussions. In the first three days, each group was asked to comment separately on all the 18 barriers from Stages I and II and resultant benefits, whilst in the fourth day all the groups were asked to present their individual group comments followed by general comments by all the groups on what they perceived as the barriers and benefits of HACCP in fishery businesses in Sierra Leone. The protocol has questions in Table 29, on page 151 to 155) around the barrier categories derived from Stages I and II of the research, and also from associated areas of interest suggested by the



stakeholders in the earlier stages of the research. The questions were mainly open-ended, clearly formulated and easily understood, and tried as much as possible to ensure that the easiest and most general questions should come first. The questions were also neutral so it cannot attempt to influence the answer. The last question on each barrier focuses on the benefit that can be accrued from the removal of that barrier which is perceived by the national stakeholders as a means of encouraging the adoption and implementation of the HACCP system in the fishery businesses.

However, this benefit is only obtained from the focus groups discussions and given about the sources and provenance of this data; it is difficult to assess the relevance of such views because the regulatory, enforcement, businesses and consumers involved have no experience in the implementation of HACCP. Therefore, it is useful to compare these perceived expected benefits of implementing HACCP against those benefits suggested by international HACCP regulators. Details of the comparisons are given in chapter 5 of this study and are important in that regulatory, enforcement, businesses and consumers are making claims that may or may not be evidenced in the national fishery safety infrastructure; but their claims are significant since they are the driving force for encouraging the adoption and implementation of HACCP in the country.

The assistant interviewers were impartial and the researcher created a good atmosphere, encouraged responses and discussion, listened and probed for further information. The composition of each focus group was unique wherein all regulators were in group SIIIA, fishery businesses in group SIIIB and consumers in group SIIIC. These types of compositions of the groups enabled each group to speak freely and openly, perhaps, because each group comprised of selection of people with similar experiences or backgrounds or interests.

The researcher also argues that the use of the three different focus groups was necessary to obtain three differing views before a final unanimous view is obtain on the barriers and benefits. For example, on the barrier 'A' 'lack of appropriate fishery policy (that is compatible with Codex Alimentarius and EU Legislation)', though was unanimously accepted at the end of the focus groups workshop, there were different views of opinions in the beginning. That is, focus group SIIIA from regulatory supports the barrier that exists in the fishery policy even at their



initial discussions, but those from group SIIIB from fishery businesses argued strongly to oppose the barrier at their initial discussions.

The following basic equipment and supplies including flipcharts, markers, note cards, pencils, a clock and refreshments, were available throughout the focus groups discussions and contributed to the success of the focus groups. The researcher consolidated and summarized the results of the responses of the groups under the headings used in the focus group protocol. Generally, all the participants were quite responsive in answering questions, irrespective of the fact that certain pauses and periods of quiet were also detected at the beginning of the discussions. For example, sometimes the participants said, ‘this is not up to my knowledge and experience, but may ended up giving a very good example of how such a barrier affects fishery businesses in the country. Some of the examples came from their own personal knowledge or experience or how it personally affects them.

Example, a barrier ‘L’ lack of PRPs in fishery business was initially seen to be unfamiliar to the fishery businesses group but after some pauses and quiet responsive a member from the group explained that one of the complaints they have receive from visitors or customers is the smell of urea or ammonia in and around their premises. “One visitor said that they were over 100 meters away from our fishery business when they started smelling urine,” he added. He further explained that the actual smell is ammonia, which occurs in fishery business due to poor cleaning, sanitization and overall good hygienic practices.

Quite often, a detailed and lengthy explanation of one respondent in a group for a particular barrier served as the overall perception of the group, especially when the group nods in agreement and no other additional comment by other group members. In fact, each group often seemed enthusiastic to wish us to move onto the next question rather than building up unhealthy challenges on what has been clearly explained by one or more members of the group. At any rate, there were very few examples of criticisms and challenges, but these were mostly either tacit agreement, or explicit agreement, or providing similar examples of the barrier under discussion.



The researcher did not notice anyone hesitating or refusing to answer and discuss the question on the barrier. Sometimes one group looked to the researcher in order to confirm that what they were saying was not going to be contradicted by the other groups. Unfortunately, the researcher made it clearly in the protocol for stage III not to join in the discussion by the focus groups, but did occasionally make comments when it was appropriate and not likely to attempt to provide answers to the questions. For example, such comments were normally in the form of a clarifying certain terminologies in HACCP and/or complement on some of the comments made by the specific groups on certain barriers.

4.4.1.1 Lack of Appropriate Fishery Policy (i.e Compatible with Codex Alimentarius and EU Legislation)

The groups felt that fishery policy in this country has yet to catch up with the latest developments, with modern quality and safety concepts such as GMP and HACCP missing from them. They explained further that the Fishery Act 1994, amended 2007, does not Conform to the provisions of the pertinent international standards, and regulatory instruments especially the prescription and minimum standards defined by the Codex Alimentarius Commission, EU and other international agreements, conventions and treaties some of which Sierra Leone is a Signatory. When asked if there is a national coordination body for fishery safety control activities, the group replied that the food safety control system in the country is currently fragmented and there is no established national food safety control authority that collaborates with the line ministries and their existing decentralized structures at the provincial and district levels to promote and coordinate food safety activities in the country.

The group also referred to the Fishery Act 1994, amended 2007, as the only current legal framework for national fishery control, but unfortunately, it is not adequate to ensure fishery products safety and quality assurance to improve competitiveness and public health. The perception of group was that the review and update of existing rules and regulations on fishery safety to reflect current realities and emerging issues and international best practice that include HACCP could create an enabling environment for effective delivery of safe fishery products along the food chain in Sierra Leone and among its international partners.



The stakeholders argue that where proper regulation are implemented and enforced bad fishery businesses will voluntarily drive themselves from the fishery businesses, whilst good businesses will be protected, developed and expanded. The perception of the stakeholders is that those fishery businesses willing to comply with the appropriate regulation will be protected by law and the non-conforming businesses will not be able to compete and must either leave the market or start compliance for their products to have access to the market and subsequently, this will ensure adequate food control, consumer and government trusts.

4.4.1.2 Lack of fishery standard or specification

The group unequivocally said that there are no national standards for all food products including fishery products in Sierra Leone. However, they pointed out that the Sierra Leone Standards Bureau (SLSB) that is mandated to develop and promulgate national standards is in the process of adopting the ISO Directives parts one and two; the ISO Guide 21, parts one and two as the procedures for the development of national standards. They reiterated that in 1999, the SLSB constituted 12 Technical Committees for the process of developing standards, but for unknown reasons the 12 have been dormant and dissolved since 2004, and there are no viable efforts made up to date to revive even a few of the Committees.

When asked whether potential fishery standards would take into consideration food additives, pesticide and veterinary drugs residues, sanitary facilities, labelling and traceability systems, they were uncertain but thought that SLSB is the Codex contact point in Sierra Leone and may ensure that any fishery standards shall comply with requirements of Codex Alimentarius.

The concept of ‘the content of national fishery standards’ was a difficult one for the groups to define with any definite format, layout and composition, and such comments as ‘all national food standards must comply with Codex standards, EU Legislation, other reputable international standards’ were used to define what should be the contents of national fishery standards. They were also optimistic that national standards for all food products, services, systems processes and material based on Codex standards, EU Legislation and other reputable international standards



and best practices will reduce food borne diseases in Sierra Leone, and subsequently, lift ban on export of fishery products, improve the image and economic relationship between Sierra Leone and developed countries.

4.4.1.3 Lack of Enforcement

The group acknowledged that a high juvenile fishery products landing is a national problem in Sierra Leone and is mostly a targeted fishing practice, due to none enforcement of the current fishery act 1994, amended 2007. They reiterated that the fisheries act currently remains in ‘black and white’, but practically its existence has been doubtful. The consumer focus group pointed out that fishermen for long time have been taken advantage of the weakness of fishery act and lack of its effective implementation, and further take advantage of their political connections to ignore national fishery law; and as a consequence, the politicians use this practice as a tool to campaign for local positions in the fishing communities. There were also common statements from all the focus groups that ‘due to lack of appropriate fishery policy and standards, there is little or nothing to enforce’, and enforcement officers ‘lack the appropriate knowledge, skills, capacity and resources’ to carry out effective enforcement. In fact, they argued that effective enforcement of the current fishery act may not adequately improve product safety, reduce public medical cost, reduce health and socio-economic problems, improve food security, and facilitate developed market access, but perhaps may reduce to an acceptable level juvenile fishing practices and depletion of marine capital.

4.4.1.4 Lack of Understanding

The groups argued that the jargon and difficulties associated with the HACCP system make understanding difficult, and therefore a technical barrier to successful adoption and implementation in fisheries businesses. They believed that successful implementation of HACCP depends on the ability of fishery businesses to make the most of the analytical framework the system provides, but currently, the businesses lacked the adequate knowledge and skills in key areas such as hazard analysis; critical control points; critical limits and other principles and steps in HACCP. The groups reiterated that most fishery businesses staff cannot define or explain abbreviations such as HACCP and PRP or GHP or GMP or SSOP and for some of them it is the first time to come across them. They also believed that there is lack of management commitment



and understanding of codex 12 steps and 7 principles of HACCP, due to prevailing traditional practices. The focus groups believed that understanding of HACCP is an acquisition of Knowledge and skills, and could lead to attitude and behavioural changes, and further aims at enhancing competency, confidence and successful adherence.

4.4.1.5 Lack of Human Expertise and Training

The questions under this barrier were not clearly understood by the industry focus group at the initial stage of the interviews, because they considered ‘lack of human expertise and training’ as the same barrier as ‘lack of understanding as far as the production of fishery products is concerned’. The fishery business group claimed that the ‘lack of understanding’ of HACCP is because of lack of expertise and training.

However, comments from the other two focus groups of regulatory and consumer argued that the ‘lack of human expertise and training’ is a different barrier from ‘lack of understanding’ in the Sierra Leone context. The groups said that businesses in Sierra Leone hardly employed trained and qualified people that have graduated from University and specialized in a given area of discipline. They reiterated that businesses preferred to employ only people who may read and write English and later train them on the job and understand the basic production. After several disagreements, all the groups at the end agreed that ‘lack of human expertise and training’ and ‘lack of understanding’ are different technical barriers for Sierra Leone fishery businesses.

The three focus groups considered the barrier ‘lack of human expertise and training’ as the absence of individuals in fishery businesses who have successfully gone through a University curricula in HACCP system that is equivalent to Codex HACCP protocol and, where appropriate, involve external certification of courses and/or teaching material. They closed their arguments on this barrier by saying that completion of successful University HACCP training as described above, by staff members in the fishery sector, may provide an appropriate motivational or reward framework that may also be linked to longer-term employment or promotional benefits or other staff retention strategies.



4.4.1.6 Lack of Access to Information on Hazards

The groups thought that lack of access to food safety information in the country was another real issue and they gave examples of this, such as, ‘the absence of a national system for rapid dissemination of information on foodborne disease outbreaks via websites or list servers, print media, radio, television, and other means, carrying commentary from many sources, including the press and interest groups, on the reasons for and consequences of foodborne disease incidents’. The regulatory focus group pointed out that ‘there is no national databases that capture, store, analyse and retrieve food safety information such as on microorganisms pertinent to the identification of foodborne pathogens, to assist decision making in a short time frame, potentially allowing decisions to be made and practices to be auctioned in real time.

The fishery businesses focus group also revealed that ‘the local businesses have no traceability system for fishery product before conception to the consumer as an integral part of fishery products safety supply chain management’. The consumer focus group felt that ‘the country has neither legal notification and early warning systems nor mandatory requirement on businesses to report cases of Foodborne diseases, for public health agencies to detect foodborne outbreaks and limit the spread of human disease’. The overall perception of the regulatory, enforcement, businesses and consumers was that access to information on food safety hazards ensures ‘appropriate communications between the regulatory and enforcement authorities, businesses and consumers on food safety’. “This cannot only expedite the adoption and implementation of HACCP in fishery businesses, but aid the practical application of national risk assessment and decision trees to bring logical sequences to establishing and modifying national food safety management practices, improve FBD surveillance, communication, traceability, improve trade negotiation and trade, and facilitate lifting of export ban, they added”.

4.4.1.7 Lack of Awareness

All the groups felt that science-based analytical tool that enables management to introduce and maintain a cost-effective and sustainable food safety and quality assurance programme are new concepts in the Sierra Leone fishery sector. The focus group from fishery businesses argued that



‘fishery product is the most consumed protein in the country and they are not aware that anyone in the country has died from consuming fishery products’. ‘They reiterated that under the current food safety system fishery products are easily affordable by the local populace, but cost of fishery product will not be easily affordable by local populace after the introduction of HACCP, as a result of serious socio-economic problems in the country, that has gone through almost a decade of civil war’. These statements by fishery business created series of arguments between the three groups on the 4th day of the interview. The regulatory group came out strongly against the business group by commenting that ‘for continuing safety of fishery products, full records must be kept of each operation, the efficacy of the operation must be verified on a regular basis, and the HACCP system must be in place now, but not to wait till somebody dies or when a foodborne pathogen emerges with public health significance’.

The consumer group said ‘the statement by the business is another evidence that our local businesses are still not aware of the HACCP despite its wide spread dissemination worldwide’. The consumer group further argued that ‘consumers today are becoming more sensitive towards food safety and quality concerns and therefore they believe that the cost of implementing HACCP cannot make fishery products unaffordable by the local populace’. At the end of the discussions all the groups believed that ‘food safety and quality awareness provides better understanding about the need for food safety management, so that food processors will be assured of a greater security of control over product safety, assure government trust, business excellence, expansion, profitability, and may be used as part of a defence of ‘Due Diligence’.

4.4.1.8 Lack of self-efficacy

When asked whether they have the capability to organize and execute a course of action to resolve fishery safety problem and lift the export ban, an immediate response was that they were ‘very confident’ that the capacity and skills are still not there, they went on to say that even the ‘basic foundation in all the businesses are still far away from meeting GHPs and GMPs’; meaning ‘fishery businesses still not following the basic hygiene rules or couldn’t care about regulation or no regulation’; whilst ‘regulatory authorities don’t have the basic fishery safety



requirements to regulate’; ‘enforcement officers have no fishery safety entities to enforce’; and ‘consumers lacked the unity and strength to voice their anger in the market’.

The groups believed that what they have been doing for over a decade in terms of fishery product safety management are inadequate and have no confident up to date that they had capacity, skills and strength to comply with the international HACCP requirements. The groups also mentioned about the failure of several international funding projects on food safety in the country during their discussions, and the consequent deterioration of the fishery businesses that are all SMEs in terms of growth, development and expansion. One consumer said ‘the infrastructure status of all our fishery businesses are still the same for the past ten or more years despite the huge amount of funding from the international community to improve this sector’. The groups also specifically discussed the failure of the ongoing EU funded projects up to date to lift the export ban on fishery products, and suggested that they were now, ‘quite certain’ they could not defend what they are doing in terms of complying with the international HACCP requirements.

The important thing, one of the more out spoken speakers said, was ‘...we can now show everyone we are not up-to-date and just as bad as were ten to twenty years back’. Others have the opinion that, ‘ self-efficacy will enable national stakeholders to organize and execute a course of action to identify strengths, weaknesses, opportunities and threats (SWOT) to resolve fishery safety problems and lift the export ban; show everyone what we need to prioritize and reduce cost of production; open a new chapter to start the ball rolling’.

4.4.1.9 Lack of PRPs in Fishery Businesses

The groups claimed to know a good deal about the spoilages and wastages of fishery products in the fishery businesses in the country, and on their own personal probing, these were essentially due to workmanship problems including none development and implementation of sanitation standard operating procedures (SSOPs), GHP, GMP and overall PRPs. One consumer said that there is lack of basic systems of health and hygiene quality assurance in the fishery businesses. “ Fresh and frozen fishery products are sold in an open air without chilling and frozen facilities or ice, whilst fishermen add sand on fishery product onboard vessels and the at the point of landing



with the hope that it will increase the shelf-life not even knowing that they're adding more microbes to the fishery product", he added.

The groups also pronounced awareness of the large amount of spoilt fishery products at point of landing and receipt and these have contributed greatly to discard, wastage and shortage of essential national protein. One regulator revealed that 'all fishery businesses have not put in place appropriate GHP including maintenance of hygienic rooms, machines, production personnel, planned training courses and medical examinations, cleaning and preventing control activities, washing, disinfecting, integrated pest management (IPM); and other means used to achieve and maintain adequate hygienic conditions. "Even if these codes of hygienic practices are not clearly spelt out in the current fishery act, businesses should voluntarily implement them as they are unavoidable ... 'eating spoilt fishery product can't be good for consumers", she added.

The groups felt that paying special attention to all the potentially dangerous factors affecting the consumer's health could guarantee public health safety. They believed that the role of the regulators in making it an obligation to ensure that the appropriate infrastructure is in place and that environmental pollution is minimized, could leave the fishery businesses with no choice but to ensure that premises, work surfaces and equipment are designed, constructed and maintained appropriately to facilitate cleaning and to minimize any possibility of cross-contamination; personal hygiene are available to staff; adequate, calibrated monitoring equipment is available and used correctly; and visual assessment, where possible, rapid tests are used to provide real time results in fishery businesses. "Successful implementation of HACCP in fishery businesses may require improvements in the infrastructure and facilities, both within the fishing community and the fishery businesses", the groups added. The national stakeholders were unified in their perception that PRPs in fishery businesses will create commitment to improve fishery safety and quality, preventive control of foodborne diseases, improve quality of life, reduce litigation, improve food control and consumer confidence, because the building block for HACCP is the adoption and implementation of PRPs.



4.4.1.10 Lack of Consumer Agency

These questions about consumer agency were quickly responded to by the consumer focus group, supported by the other two groups, and at the beginning of the interviews these enthusiasms led to unlimited responses. The groups claimed that ‘they have never had about consumer protection organization in the country, and cases of foodborne diseases (FBD) are not reported and investigated, partly because consumers are not involved in any national food safety programme’. One outspoken speaker from the groups said that ‘there are no credible statistics available in the country on FBD but many people have died from typhoid fever, cholera, and several other gastro-enteritis’. Another speaker said that ‘typhoid fever had overtaken malaria in this country, because every day more people are diagnosed in the hospital for typhoid fever more than malaria, but no one is speaking on behalf of the consumers to trace the sources of infections’. The groups also argued that consumers do sometimes complain unilaterally, ‘but the businesses usually ignored their complaints or regard them ‘crazy or drunk’, because no one cares for the consumer interests’.

The speaker from the fishery business said, ‘it is easy to complain about fishery product, but complains have never been followed up by an organized body, and even those who complain would prefer to buy the same complained product if sold at a cost cheaper than the original cost’. “In fact if they complained about product yesterday and the same product is being sold at a cheaper price today than the price yesterday, they will buy that entire product”, he added. Regulatory group said that ‘consumer complaints are not acknowledged because businesses know that there is no one advocating on behalf of the consumers’.

The groups did feel that ‘the constitution of consumer protection organization might help ensure the presence of better consumer protection group, increase consumer confidence and deal with customer complaints, exerting pressure on regulators and businesses through consumers’ pressure group’. They recapitulated that ‘there is need to create mass awareness of food safety and quality in the country through different media, and a well constituted consumer pressure group would act as a catalyst to such awareness and for increasing the pace of HACCP adoption



and implementation by our SMEs, assure consumer trust, reduce public medical cost, reduce health & socio-economic problems, and reduce poverty’.

4.4.1.11 Negative Guideline Factors

The groups were very open about their none familiarity with the codex 12 steps and 7 principles of HACCP, and seemed to regard such gap as an expected situation in the entire spectrum of food safety management in the country. ‘We all make no mistakes, this obstacle is part of our current life’, said one; another said, ‘what can you expect, it’s obvious at times in the country that is out of touch with modern changes in food safety management; there are obsolete policies, migration of experts, none consumer advocacy group and all exacerbated by the more than a decade civil war, our food safety problem is not like the normal problems you know in many other countries’.

The groups seemed to be of the opinion that ‘the using of appropriate interpretation of all the HACCP guidelines, development of HACCP modules for specific products, and establishment of national centres for HACCP innovation prior to adaptation and implementation may help to eliminate or reduce to an acceptable level the difficulties in the adoption and implementation of codex steps and principles of HACCP’. But the comment was made, ‘it’s hard to tell if we are so focused on knowing the interpretation of the guidelines without going through the formal training in HACCP, so we are maybe doing things to facilitate the implementation of HACCP by our SMEs – understanding might get better after the HACCP practitioners received formal training in it’. Another said, ‘despite the formal training I really like the detailed framework for HACCP guidelines, it will help remind everyone what should be happening and what we should be doing, so that must help make less errors and increase even voluntary implementation to achieve food safety objectives and improve quality of life’.

4.4.1.12 Negative Environmental Factors

The groups thought that factors such as those relating to time, resources, and organizational structure to facilitate successful adherence to HACCP system were real issues for SMEs. In their discussions they gave examples of this, such as, ‘the central government has



received huge financial supports from international community to strengthen national food control system especially in the last decade after the rebel war, but none of these are reflected in food businesses, who lost most of their premises, staff, equipment and facilities’. One speaker said that ‘government needs to use the funds provided by the international community to assist the indigenous businesses to expand and recruit more staff’; this voice was echoed by another speaker who said that ‘due to lack of adequate staff businesses don’t seem to have sufficient time and the few staff are so busy, they don’t really listen to something that is not to do with the immediate job in hand of getting the food produced’; and another, ‘before we used HACCP we need to talk about things the central government would do to change the entire culture of ‘bad practice’, sometimes it was like going round in a vicious circle’. The observation of one of the group’s member was, ‘we don’t really like to see one business implementing HACCP whilst others don’t care but they produce the same products that equally compete in the same markets, this will be unfair’---isn’t it?. The groups felt that ‘there is also lack of government supports in providing ‘a level plain field’ including the provision of national laboratories accredited to ISO17025, with capacity to conduct chemical and microbiological analysis, in the enforcement’. The groups believed that appropriate management structure and national government intervention for the poorly resourced small and medium size enterprises (SMEs) who lost most of their premises, staff, equipment and facilities during the ten years rebel war, could help them solve problems that had gone on for over decades.

4.4.1.13 Lack of Competence

This was another barrier that raised a frown in all the three groups. Answers began with comments like, ‘our knowledge, skills and experiences in GHP, GMP, HACCP, Quality assurance, certification and other fishery safety requirements is very poor – worst than most other developing countries, I think, but we can always do better if given the opportunity, I suppose’. Most of the respondents felt that none conversant with the main fishery safety and quality assurance hazards and incidents in the fishery businesses are major problems for all actors in fishery sector, but felt that acquiring knowledge and skills in GHP, GMP, HACCP, Quality assurance, certification and other fishery safety requirements could help over the long run; for example, ‘I think things can get better as we become more knowledgeable and skilful in



these areas for sure’, and consequently acquire ownership of our national fishery safety infrastructure.

4.4.1.14 Lack of private consultancy firm

The groups were noisy in their belief in the ‘lack of private consultancy or third party organization in the country that specialized and accredited in food safety and quality assurance activities including but not limited to HACCP and ISO certification systems’. An example of this behaviour was stated earlier by the groups, ‘we have never seen private food safety and quality consulting, auditing and training institution with expertise in food safety and quality that are capable to bring modern perspective to food safety and overall quality assurance by combining extensive, practical hands-on experience, sustainable, risk-based food safety compliance, management and operations to fishery businesses, regulatory and enforcement, and consumers.’ The groups further stated that they thought the establishment and operation of such a third party as described above could bring what knowledge, skills and experiences they have to fine tune national food safety control system, because they would know how, where, what and when possible to make changes in the system to improve food control’.

4.4.1.15 Lack of Cueing Mechanism

This part of the discussion led to the most smiles and laughs of the whole as the fishery businesses that are all SMEs and highly facilitating street vending seem very sensitive to the whole issue of how much they are making in profits and how busy their businesses were on average. It was not only a sensitive issue between the interviewer and the fishery businesses but also it appeared to be a sensitive topic between the other focus groups. This may not be surprising since all the fishery businesses are in competition with each other, albeit they have friendly and open relationships in general especially when it comes to street trading.

After the initial introversion in discussing anything to do with money or success with extra customer demand, they were mostly fairly neutral on the barrier of ‘lack of cueing mechanism’ since it has to do with profit making. One respondent said, ‘I don’t think success in HACCP in



fishery businesses is negatively affected by anything very much in terms of attracting customers ‘cause they don’t know it is happening, or that we are implementing it’.

The other groups said, ‘we’ll know a lot more when we have HACCP in place or so, it’s very hard to judge things like profits, because it depends on so many things, like the best practice that attracts more consumers nowadays, ability of businesses to export, attractive price for value added products, to list but a few’. During the course of the discussion the comment was made that, in terms of profits or extra customer attraction, to larger extent, depend upon appropriate mechanisms to remind timely and speedy appropriate actions by staff of businesses to frequently monitor, record and document compliances and non-compliances and subsequently, carryout gap analysis in safety, quality, quantity and overall profit maximization;’ the groups further pointed out that the current techniques of overlooking elements of prerequisite programmes such GHP, GMP/SSOP often by the busy staff of SMEs would only continue to damage the reputation of businesses if the situation remains unresolved’. “Appropriate cueing mechanism to guarantee effective implementation of HACCP and all its PRPs to ensure safe and quality foods for our consumers in a busy market environment increase our reputation”, the groups added.

4.4.1.16 Lack of Motivation

The groups were enthusiastic in their belief in ‘lack of motivation’ in the national fishery safety control activities. An example of this attitude came in one of the first comments of each focus group discussions, ‘ we have voluntarily spent a lot of time and effort to update our food safety and quality assurance system internally, but those out-there won’t bother, whatever they are seeing and hearing to empower or even recognize us’. The groups felt that during the war ‘businesses suffered a lot or collapsed and the general feeling was that government through the support of international community was to empower in building up infrastructure from the ashes of war but to no avail, despite the large amount of foreign aid provided for food sector’. The groups also thought that there is no level plain field; market is full of fraudulent and unfair trading practices; another speaker said that the inflow and competition of substandard products in the country has left the local businesses with little or no choice but also produce and sell substandard products to equally compete’.



One speaker asked, why should a local business produce high quality product when the same product are imported into the country with a very poor quality and sold at a cheaper price in the local market?. The groups did not feel that ‘the regulatory authorities are protecting the local businesses’. The groups suggested strongly that what were lacking from national food control system in terms of enticement were recognition, empowerment, and inner directing drive that award voluntary compliance with food safety and quality assurance by all actors in the food businesses. Another speaker also said ‘that consumers are also not that much sensitive about quality assurance because the cheaper the product the higher the demand in the local market’; and businesses therefore supply more substandard product at a very low cost’. The groups also suggested that ‘the best way of persuading people to improve standard is real incentives to create a sense of belonging and ownership, because the onerous is on them to achieve business excellence’.

4.4.1.17 Lack of outcome expectancy

When asked about ‘outcome expectance’ and HACCP, the groups were uncertain and thought that all fishery businesses are SMEs and their aim is to produce for local consumptions where consumers prefer cheaper products due to socio-economic problems. The felt that local fishery businesses have confidence in their traditional attitude as they have been doing so for decades and don’t believe that implementing HACCP will have real impact on overall fishery safety management for local consumption’. One speaker said that ‘the export ban is only affecting those businesses that want to export but for those producing only for national consumption, I don’t think they are foreseeing any positive outcome’.

The groups when asked about ‘what difference HACCP can make’, ‘ they seemed to feel that this was associated more with large businesses or developed countries with multiple trading partners than just producing for domestic consumptions’. The concept of ‘outcome expectancy’ was a difficult one for the groups to define with any definite sense of its meaning, and such comments as ‘you have to be careful because if there is an increase in consumer awareness many customers will ignore your products if not coming from HACCP certified establishment’; and ‘consumers will start reading the labelling and traceability tags to find out where the fishery



products were produced or whether the business is complying with HACCP system’. The groups however, cautioned and ended up with various questions, ‘is there any business that don’t want to grow and expand?’, ‘suppose you have a contract with international trading partner that use HACCP as a mandatory requirement?’; ‘suppose someone dies from consuming your product?’; or ‘suppose without HACCP you will not be allowed in fishery business in Sierra Leone?’; “only outcome expectancies can attempt to provide answers to these questions”, the groups added.

4.4.1.18 Lack of agreement

The groups were very open about the likelihood of disagreements among stakeholders in food safety control system. The groups also revealed that a number of Ministries, Departments and Agencies (MDAs) are involved in a number food safety programmes and activities aimed at enforcing the food control system in Sierra Leone. One speaker said that ‘each MDA engages aspects of food safety which sometimes overlaps with the responsibilities of others’; ‘currently no comprehensive and integrated approach to food safety and quality control exists and consequently, the food safety programmes and activities by these agencies suffer significant duplication and ill-coordination’.

It’s like a survival of the fittest where everyone pursues personal interest, no one can be held accountable in case of any food safety problem’, said one; another said, ‘what can you expect, its chaos at times in the business, when several regulators visit one business at a time when you are not ready for them, it’s not like the doctor’s you know’; today you have one person from one regulatory body and tomorrow you have another person claiming from the same regulatory body you met yesterday’. Another speaker said ‘clashes usually occur over conflicts of interest where many regulators visited one business at the same time to do the same job’. The groups seemed to be of the opinion that the implementation of effective food safety systems in the country has been undermined by the existence of excessive bureaucracy, due to fragmentation and duplication of regulatory activity, and led to confusion, multiple jurisdictions, lack of coordination, and existence of unaccountability, to list but a few’. The groups felt that the establishment of a multi-sectoral body to oversee coordinate and harmonize the food safety and quality control systems along the food chain in Sierra Leone could be a major way forward in



facilitating the adoption, implementation and enforcement of HACCP system in fishery businesses in Sierra Leone.

4.4.2 Summary

The findings of focus groups interviews were conveyed through summaries of the interviews in order to illustrate how the research objectives have been addressed and what the resultant data was, as much details as possible to determine the validity and reliability of the results of this study. Firstly, they confirmed in group that there is lack of adequate understanding of HACCP among the stakeholders in the country. This answered the question in objective 2, as stated “*to determine the level of understanding of HACCP among those involved in the national fishery safety infrastructure – from policy and regulation officials to enforcement officers and compliance in businesses*”. Secondly, they confirmed in group interview setting that the 18 barriers identified, ranked, prioritised and validated from Stages I and II are extant within Sierra Leone’s food safety management system. This answered the question in objective 3, as stated “*to identify the perceived barriers which exist within the national food safety infrastructure which prevent the implementation of HACCP*”. Moreover, focus groups also perceived 22 benefits that can be achieved from successful implementation of HACCP in Sierra Leone, against 12 benefits proposed by other international HACCP regulators. This is an indication that the objective 4, “*to determine how the benefits of HACCP as suggested by other national HACCP regulators differ from those benefits perceived by local regulatory, enforcement and commercial representatives in Sierra Leone*”, was also achieved.



Chapter 5: Discussions

5.1 Introduction

In this chapter, the researcher attempts to discuss the detail of the findings from the three stages of the qualitative technique of triangulation research method used for this study. The findings of the three stages including convergent interviews, individual case interviews and focus groups interviews were conveyed in chapter 4 through tabulation, chart and summaries of the interviews in order to illustrate how the research objectives have been addressed and what the resultant data was, as much details as possible. This chapter further discussed barriers and benefits perceived in this study against those in the literature review. Table 33 page 262, and theoretical and conceptual framework page 265, below, provided detail discussions on barriers and benefits perceived in this study against those suggested by other international HACCP regulators. Table 33 and conceptual framework addressed the question in objective 1, that is, *“to critically review, examine and analyse existing literature relevant to the study topic”*.

The author acknowledges that though 18 barriers were identified by this study, but the complexity of the fishery safety problems in Sierra Leone makes this study to suggest that HACCP barriers for fishery businesses is still not exhaustive. Nevertheless, these 18 barriers are new and original as they have never been discovered in Sierra Leone before, thus may be arranged into three groups including *knowledge*, *attitude* and *behaviour* in the conceptual framework (figure 31, page 273) below, so that effective fishery safety management system through HACCP is achieved in Sierra Leone. The conceptual framework can be used to identify and locate the HACCP barriers by the regulatory, enforcement and business to adopt and implement effective tailor-made targeted interventions to remove the barriers for successful implementation of HACCP system in fishery businesses.



5.2 Discussion of Results of Convergent Interviews

It is important that categories of barriers are the perceptions of the interviewees, but the author thought it relevance to support the stakeholders clarify their thinking by seeking to define the barriers they are mentioning in a way that will allow it to be used to ask other stakeholders to agree or disagree the category as a particular type of barrier. Therefore, definitions of each category of barrier were developed from the ideas of the interviewee who first suggested the particular theme/barrier. Subsequently, these definitions were developed or refined to ensure that any related idea which the later interviewees perceived to add in the category was captured.

For example, ‘Lack of Appropriate Fishery Policy’ as a perceived barrier was first mentioned by interviewee 1 who saw the concept of ‘fishery policy’ as essentially referring to the *‘goals and objectives of effective fishery safety management foundation in any country, and therefore sound fishery safety policy is that which adequately addressed fishery safety and overall quality assurance concerns in national governmental fishery control system’*, this was then used as the definition for the next interviews 2, 3, 4, and 5 in their perceptions of lack of appropriate fishery policy. The first few interviewees tried to provide direct definition of what should be a fishery policy in the Sierra Leone setting, but interviewee 6 wished to modify the definition to be compatible with ‘lack of appropriate fishery policy’ and so came out with a new explanation that include the drawbacks of the current national fishery Act. Therefore, the explanation by interviewee 6 was that *‘the current Fishery Act 1994, amended in 2007 in Sierra Leone does not provide coordinated and sustainable approaches to the holistic fishery safety management system for the country to appreciate the major public health and economic implications of fishery safety, and consequently, fishery safety remains a low priority in national policy making’*. Interviewee 7 accepted the two definitions as ‘fishery policy’ and ‘lack of appropriate fishery policy’ in the national setting but was concern about what should be the definition for ‘fishery policy’ and why they perceived that ‘fishery policy’ as defined is actually lacked in the Sierra Leone fishery control system. Interviewee 7 critically reviewed the two definitions and proposed a new definition as *‘that which enables the government to understand the public health and economic benefits of improving fishery safety management systems, to guide and facilitate the development of coherent national fishery safety strategies, in consultation with all stakeholders,*



including the regulatory, enforcement, fishery industry, relevant research institutions and consumers’.

The interviewees 8, 9 and 10 accepted the three definitions because all support the perception that Sierra Leone lacks appropriate fishery policy that provide clear mandate and authority for the stakeholders to preventively control fishery safety hazards, foodborne diseases and food wastages, and subsequently promote food security, export potential, environmental sanitation, employment and protection of biodiversity. Interviewee 11 attempted to provide a single definition that will encompass all the given definitions of ‘fishery policy’, that specifies what entities lacked in the current fishery Act that made it a barrier to compliance with international HACCP regulation. Interviewee 11 gave the new definition by stating that *‘the national fishery policy of Sierra Leone is the statutory requirement for effective adoption, implementation and enforcement powers of fishery safety and quality assurance, for sufficient consumer protection against fraudulent practices and contaminated fishery products, that may lead to the domestic production and importation of unsafe and substandard fishery products as well as trade rejections and export ban of fishery products from the country’*. This definition was accepted directly by interviewee 12.

Interviewee 13 was still not satisfy but critically reviewed all the definitions and gave a new definition by adding news words or phrase including... [requirements for Codex Alimentarius, HACCP, EU Legislation and other reputable international standards for fishery products control systems]. The reviewed and modified version of ‘fishery policy’ by interviewee 13 was that ‘*Sierra Leone fishery policy can be defined as ‘a course of action with clear objectives, and expressed as formal national policy statements or positions in line with international requirements for Codex Alimentarius, HACCP, EU Legislation and other reputable international standards for fishery products control systems, to provide all stakeholders with clear mandate and authority to preventively control fishery safety hazards, foodborne diseases and food wastages, and subsequently promote food security, export potential, environmental sanitation, employment and protection of biodiversity’*. Interviewees 14 and 15 accepted the version of the definition given by the interviewee 13 as the definition for Sierra Leone fishery policy.



Interviewee 16 slightly modified the definition of ‘fishery policy’ given by interviewee 13 to align with the suggested barrier ‘lack of appropriate fishery policy (i.e compatible with Codex Alimentarius and EU Legislation)’ by adding the following words or phrases –‘absence of; Sierra Leone Fishery Act 1994, Amended 2007’—to the definition. Interviewee 16 gave the final definition for ‘lack of appropriate fishery policy (i.e compatible with Codex Alimentarius and EU Legislation)’ as--- *‘absence of course of action in Sierra Leone Fishery Act 1994, Amended 2007, with clear objectives, and expressed as formal national policy statements or positions in line with international requirements for Codex Alimentarius, HACCP, EU Legislation and other reputable international standards for fishery products control systems, to provide all stakeholders with clear mandate and authority to preventively control fishery safety hazards, foodborne diseases and food wastages, and subsequently promote food security, export potential, environmental sanitation, employment and protection of biodiversity’.*

This last definition was accepted by interviewees 17, 18, 19, 20, 21, 22 and the rest of the interviewees as that it encompassed all or part of their understanding of this barrier and did not leave out any notion the stakeholders felt should have been included. The barriers identified from the Stage I or the convergent interview process and their associated definitions are tabulated below, Table 33 below, pages 217 to 222.

Table 33: Definitions of Barriers Perceived by the Stakeholders during Stage I: Convergent Interview (Developed for this study)

Key	Perceived Barrier/ Theme	Perceived Definition
A	Lack of appropriate fishery policy (i.e compatible with Codex Alimentarius and European Union (EU) Legislation)	“A food policy is a: formalised, coherent set of statements by governments which set a framework for the control of food production, processing, distribution, retailing and trade so as to encourage the consumption of nutritious food by the population” (Darrall, 1991, p31). Lack of appropriate fishery policy was defined by the stakeholders as <i>‘absence of course of action in Sierra Leone Fishery Act 1994, Amended 2007, with clear objectives, and expressed as formal national policy statements or positions in line with international requirements for Codex Alimentarius, HACCP, EU Legislation and other reputable international standards for fishery products control systems, to provide all stakeholders with clear mandate and authority to preventively control fishery safety hazards, foodborne diseases and food wastages, and subsequently promote food security, export potential, environmental</i>

		sanitation, employment and protection of biodiversity’.
B	Lack of Agreement	<i>‘The stakeholders believed that effective food safety systems in the country is undermined by the existence of excessive bureaucracy, fragmented legislations, duplication of regulatory activity, multiple jurisdictions, lack of coordination, and weaknesses in surveillance, monitoring and enforcement system, due to lack of credibility, trust and clue about HACCP system leading to a significant barrier to achieve agreement on HACCP among their target audience’.</i>
C	Lack of Enforcement	Stakeholders defined lack of enforcement <i>‘as absence of appropriate food safety enforcement structure and advice that set out the rights and responsibilities of enforcement authorities and food businesses, and help ensure that food safety and legal requirements are maintained, monitored, and evaluated’.</i>
D	Lack of Outcome Expectancy	Change of management behaviour brings changes in the vision or belief that affects the achievement of a target outcome (Anderson, 2009). In outcome expectancy there is vision or belief that carrying out certain behaviours will influence the actual achievement of change (Bandura, 1991). <i>‘The Stakeholders believed that the duplication of regulatory activity, fragmented surveillance and uncoordinated efforts have made it difficult for the country to develop strategies for food safety with clearly defined objectives, and consequently, the identification of priorities for prevention of potential hazards. As a result, they are not sure whether HACCP or traditional behaviour is the best for their target outcome. A great number of stakeholders have confidence in their traditional behaviours as they have been doing so for decades and don’t believe that implementing HACCP will have real impact on overall fishery safety management’.</i>
E	Lack of Human Expertise and Training	Human expertise and training are valuable assets in any business (Le Deist and Winterton, 2005). Lack of human expertise and training is defined by stakeholders <i>‘as lack of personnel trained, qualified and experience in HACCP coupled with migration of scientist to abroad to seek better opportunities and perpetuated by the absence of food Safety programmes such as HACCP in the national curricula’.</i>
H	Lack of Access to Information on Hazards	The stakeholders defined Lack of Access to Information on Hazards <i>‘as inadequate or lack of communications between the regulatory, enforcement, businesses and consumers on significant food safety hazards; existing, emerging and re-emerging foodborne diseases and their outbreaks, and have served as impediment to the adoption and implementation of HACCP’.</i>
I	Lack of Awareness	The stakeholders defined lack of awareness <i>‘as lack of adequate familiarity with the general principles, simple practicalities, main</i>

		<i>rules, and responsibilities of food safety management system such as HACCP by regulatory, enforcement and business’.</i>
J	Lack of Self-efficacy	Self-efficacy is a perception that a particular person has the pre-requisite skills to effectively organize and execute a course of action (Bandura, 1997). Certain schools of thought referred to self-efficacy as a psychological concept that determines change of behaviour and that certain individuals may avoid tasks that they perceived as exceeding their skills, strengths and capabilities (Fletcher-Janzen, 2007; Anderson, 2003). Lack of self-efficacy was perceived by the stakeholders <i>‘as the lack of skills and capabilities by the fishery regulatory, enforcement and businesses to adopt and implement HACCP and therefore considered HACCP difficult and too technical or scientific’.</i>
L	Lack of PRP in Fishery Businesses	<i>‘The stakeholders believed that the science and practice of guaranteeing the safety of fishery product to eat without causing harm to the consumer are absent in the fishery businesses. The stakeholders said there are no record and documentation on the adoption and implementation of preventive control of noxious substances; appropriate layout and construction of premises, equipment, facilities and their maintenances; ensuring continuous availability of potable water complying with WHO Standard for drinking water; ensuring that people coming in contact with fishery product adopt good hygienic practices; ensuring that fishery products are produced, processed, transported, distributed and stored under conditions that preclude contamination; appropriate temperature control and monitoring; ensuring integrated pest management, to list but a few’.</i>
N	Lack of Consumer Agency	The stakeholders defined lack of consumer agency <i>‘as absence of independent organisation or groups that can be viewed as pressure groups which are antagonistic to government agencies, but capable and strengthened enough to participate directly in formulating food control regulations, put more effort including checks and balances into regulatory enforcement, and with formal channels of communication between food control organizations and consumers including consumer complaints programmes’.</i>
O	Negative Guideline Factors	HACCP involves behavioural or organizational changes and the new roles and responsibilities of each stakeholder need to be explicitly identified and presented clearly and simply (Boustras, Bratskas et al., 2011). Stakeholders defined negative guideline factors <i>‘as the technical and difficult nature of HACCP principles, steps and its pre-requisite programmes, and other guidelines of which they lack the ability and skills to adopt and implement without being appropriately defined, explained, simplified, and interpreted by experts’</i>

P	Negative Environmental Factors	<p>Negative environmental factors are usually external factors related to resources including time, incentives, disincentives, management structure and human resources (Schaufele and Sparling, 2011; Gilling, Taylor et al., 2001). Stakeholders defined negative environment factors <i>'as absence of appropriate management structure and human resources of the poorly resourced SMEs who lost most of their premises, staff, equipment and facilities during the ten years rebel war, and therefore caused a notable barrier in the implementation of HACCP'</i>.</p>
Q	Lack of Competence	<p>The concept of competence generally refers to functional areas and emphasized a key organizational resource that could be exploited to gain competitive advantage (Le Deist and Winterton, 2005). Core competence is defined as "the collective learning in the organisation, especially how to co-ordinate diverse production skills and integrate multiple streams of technologies" (Prahalad and Hamel, 1990, p82).</p> <p>The virtue of the competence approach is that it recognises the complex interaction of people, knowledge, skills and technologies that serve as driving forces to firm performance and addresses the importance of learning and path dependency in its development (Hamel and Prahalad, 1994).</p> <p><i>'The stakeholders earlier did not know that they were not doing things correctly until when European Union (EU) banned export of all fishery products from Sierra Leone. After the EU export ban they realized that they lack the competence in international food safety management system especially the skill or ability of the HACCP or to carry out HACCP according to codex protocols. The stakeholders reiterated that they have been doing the wrong things for decades with confidence, and it is only when EU consultants with expertise in HACCP assesses their national fishery safety control system that mistakes are noticed. Managing Directors from fishery businesses also said that they have processed fishery products for all their careers and thought they know how to manage fishery safety but after the EU export ban they realized that they don't know fishery safety system such as HACCP. They confirmed that the food safety system they have in place could nowhere match the codex HACCP standard or equivalent. Similarly, regulatory and enforcement officers also believed that they have been misguided by the current Fishery Act 1994, amended in 2007, in their attempts to identify and implement an internationally recognised fishery safety management system such as HACCP. Regulatory and enforcement officers also convinced that the poor guidance created overconfidence among them whilst doing the wrong things. Their long overconfidence that they are doing things correctly even though what they are doing are wrong, has caused lack of receptiveness and competence required</i></p>

		<i>to make modification of their fishery safety management system that will comply with international food safety system of choice such as HACCP’.</i>
R	Lack of Private Consultancy Firm	Lack of Private Consultancy Firm is defined by the stakeholders ‘ <i>as the absence of effective private food safety and quality consulting, auditing and training institution with expertise in food safety and quality that are capable to bring modern perspective to food safety and overall quality assurance by combining extensive, practical hands-on experience, sustainable, risk-based food safety compliance, management and operations to growers, processors, manufacturers, food service operators, retailers, distributors, regulatory and enforcement’.</i>
S	Lack of Cueing Mechanism	Lack of cueing mechanism is defined by the stakeholders ‘ <i>as the absent of appropriate mechanisms to remind timely and speedy appropriate actions to achieve food safety objectives by fishery businesses in a busy environment such as the street vending’.</i>
T	Lack of Motivation	Motivation can be considered as a powerful tool in the work environment that can encourage employees to work at their most efficient levels of production (Weightman, 2008). Stakeholders defined lack of motivation ‘ <i>as the absence of praise, respect, recognition, empowerment, inner directing drive, and a sense of belonging and ownership to know and do what regulatory, enforcement and businesses supposed to do to improve quality of work’.</i>
U	Lack of Understanding	‘ <i>The stakeholders said that the nature and complexity associated with HACCP has caused lack of understanding of the system and thus serving as a significant barrier to the adoption and implementation of HACCP in the fishery businesses. They reiterated that there is no educational programme whether formal or informal in the country on the principles, steps and the overall HACCP system in the country. From regulatory, enforcement to businesses there is no one trained or have attained a recognized HACCP qualification and makes stakeholders consider lack of understanding of HACCP as a significant barrier to compliance with international HACCP regulation in the national fishery businesses’.</i>

V	Lack of Fishery Standard or Specification	Food standard or specification could be explained as a set of food safety and quality criteria that a food must meet if it is to be suitable for human consumption, such as source, composition, appearance, freshness, permissible additives, and maximum bacterial content (Bender, 2005). The stakeholders defined lack of fishery standard or specification <i>‘as the absence of nationally or internationally accepted procedure and guideline (voluntary or mandatory) that applies to various aspects of fishery production, handling, marketing and trade to enhance and/or guarantee the safety and overall quality assurance of fishery products from Sierra Leone’</i> .
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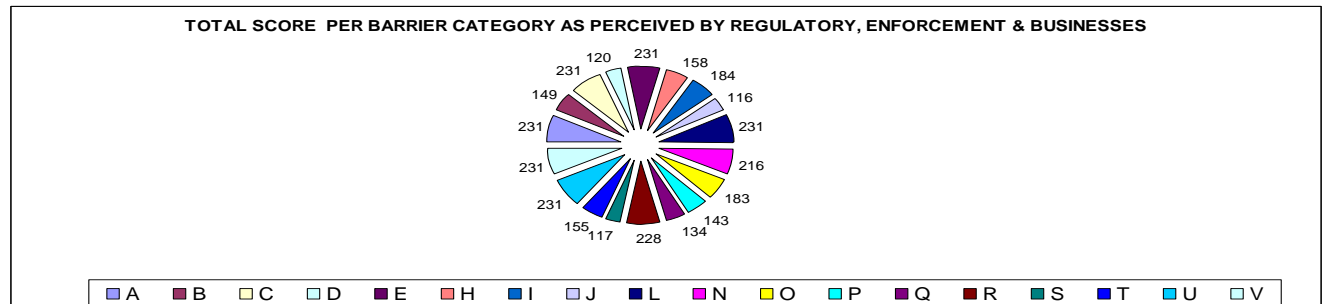
5.2.1 Conclusion

From the types of barriers identified and the definitions given by the stakeholders, the author argued that objectives 2 and 3 of this study were achieved. Fundamentally, there is lack of adequate understanding of HACCP among the stakeholders and perhaps one of the main reasons why HACCP certification has not been achieved. Many barriers were also identified as compared to the number of barriers reviewed under the literature.

5.3 Discussion of Results of Individual Case Interviews (Stage II)

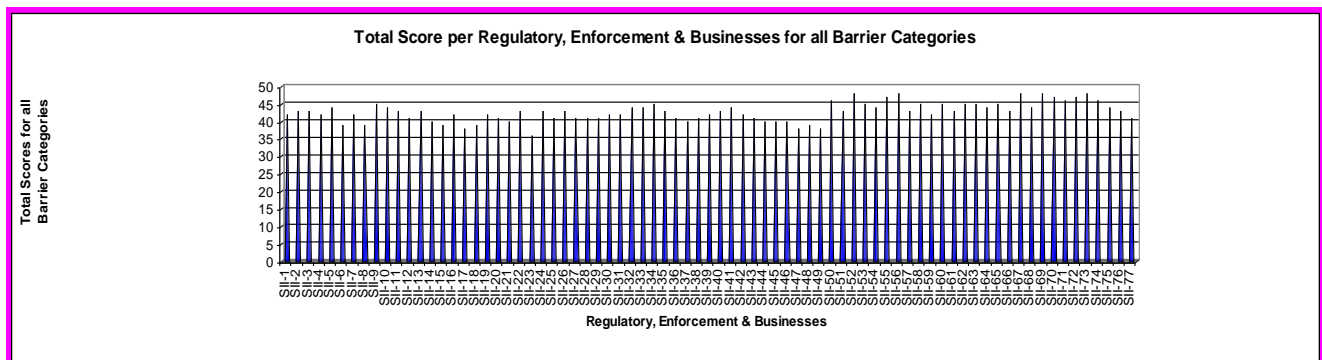
The maximum sum of the scores that was expected to be was 231, which derive from the 77 regulatory, enforcement and businesses who were scoring each barrier with a maximum barrier scored as 3. Out of the possible 231 scores, six out of the eighteen barriers scored 231 each or about 100% of the maximum score possible. It is also important to note that the lowest scored barrier scored 116 or about 50% of the maximum scored possible.

Figure 25: Total Score per Barrier Category as perceived by Regulatory, Enforcement & Businesses-Developed Purposely for this Research



As given in Figure 25, this would suggest that the regulatory, enforcement and businesses saw these entire barriers as being significant overall, to the compliance with international HACCP regulations in fishery businesses in Sierra Leone. This chart also enables the identification of the most significant barrier, secondary barrier, and very marginal barrier, by their total scores and in terms of the mode and mean overall score for regulatory, enforcement and businesses.

Figure 26: Total Score per Regulatory, Enforcement and Businesses for all Barrier Categories-Developed Purposely for this Research



It is apparent from the results that all the regulatory, enforcement and businesses questioned in Stage II saw barriers to compliance with international HACCP regulation in fishery businesses in Sierra Leone, and even those who did not score the barrier towards the highest saw that there were significant barriers that could be recorded. Whilst the results of the interviews in Stage II

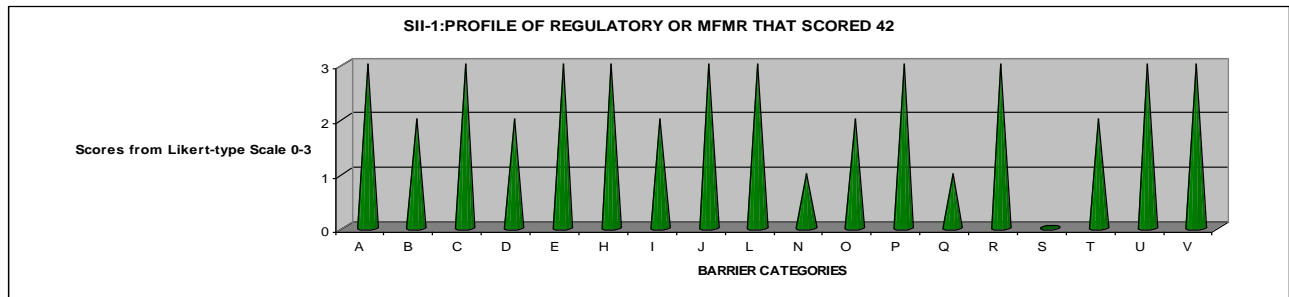


differ in terms of the types of barrier that were regarded as being significant to each regulatory, enforcement and businesses, the overall score by each of the 77 regulatory, enforcement and businesses did not fall below an overall 36 with the highest being 48. From Figure 26 above, it would seem apparent from the range of the scores by each regulatory, enforcement and businesses that there is some commonality of opinion between them over the barriers, at least in terms of their total score obtained from the perception of each regulatory, enforcement and businesses. The total expected score for each of the 77 regulatory, enforcement and businesses that could have been for all 18 identified barriers was 54 with a maximum barrier scored as 3. Out of the possible 54 scores, five out of the seventy-seven regulatory, enforcement and businesses scored 48 each or about 89% of the maximum score possible. It is also important to note that the lowest scored by regulatory, enforcement and businesses was 36 or about 67% of the maximum scored possible.

The significance of this chart (Figure 26) is that it enables the easy and quick identification of satisfactory nature of the regulatory, enforcement and businesses with the barriers to compliance with international HACCP regulation in fishery businesses in Sierra Leone suggested in Stage I. This chart also suggests that all the regulatory, enforcement and businesses saw the barriers, as being significant overall to the compliance with international HACCP regulation in fishery businesses in Sierra Leone, but the significance of each barrier does not seem to be equal to each regulatory, enforcement and businesses.

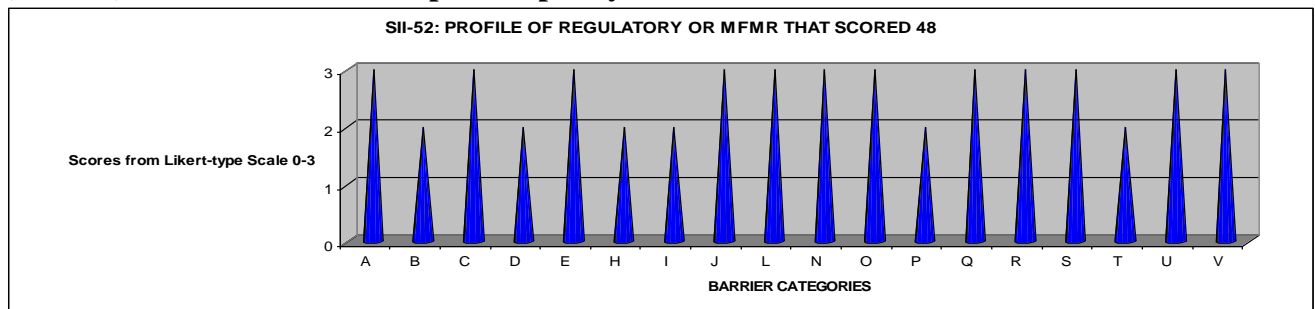
The chart also depicts that it was uncertain to determine the significance of each barrier based on whether the interviewees come from regulatory or enforcement or businesses. That means the significance of each barrier to each regulatory, enforcement and businesses is influenced by individual perception based on knowledge and experience in food safety and overall quality assurance and consequently, varies with specific individual internal evaluation of such barrier. This underscores the fact that there is no appropriate food law in the country and the food safety management system is uncoordinated and fragmented. For instance, SII-1 was an interviewee from regulatory or Ministry of Fisheries and Marine Resources (MFMR) and scored 42 or about 78% of the maximum scored possible.

Figure 27: SII-1: Profile of Regulatory or Ministry of Fisheries and Marine Resources (MFMR) that scored 42- Developed Purposely for this Research



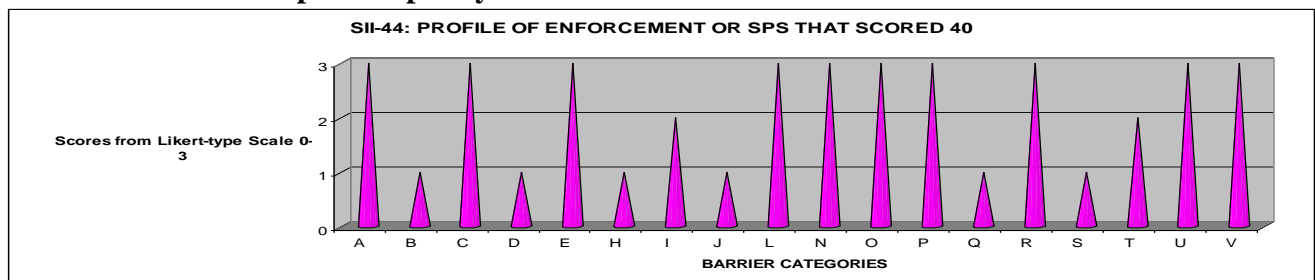
But SII-52 interviewee from the same regulatory or MFMR scored 48 or about 89% of the maximum scored possible.

Figure 28: SII-52: Profile of Regulatory or Ministry of Fisheries and Marine Resources (MFMR) that scored 48-Developed Purposely for this Research



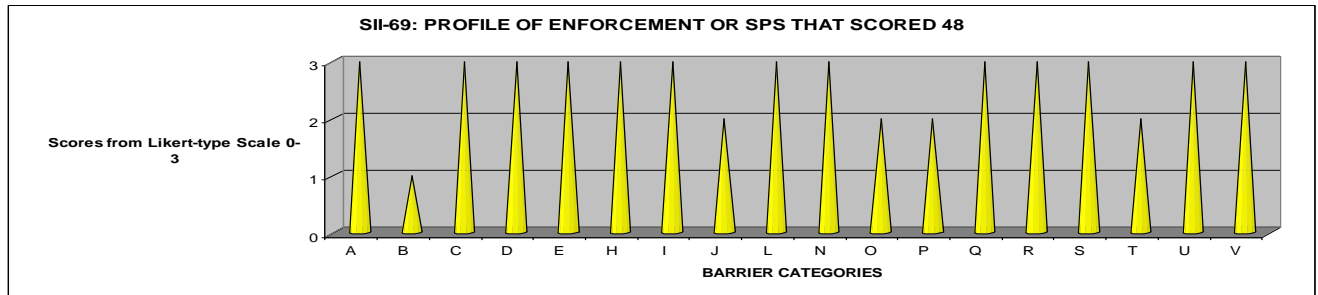
Similarly, SII-44 was an interviewee from enforcement or Sanitary and Phytosanitary (SPS) department and scored 40 or about 74% of the maximum scored possible.

Figure 29: SII-44: Profile of Enforcement or SPS that scored 40- Developed Purposely for this Research- Developed Purposely for this Research



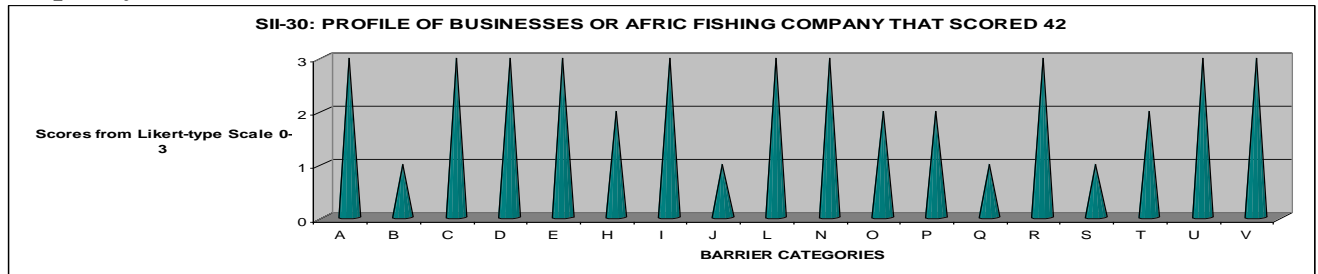
But SII-69 interviewee from the same enforcement or SPS department scored 48 or about 89% of the maximum scored possible.

Figure 30: SII-69: Profile of Enforcement or SPS that scored 48-Developed Purposely for this Research



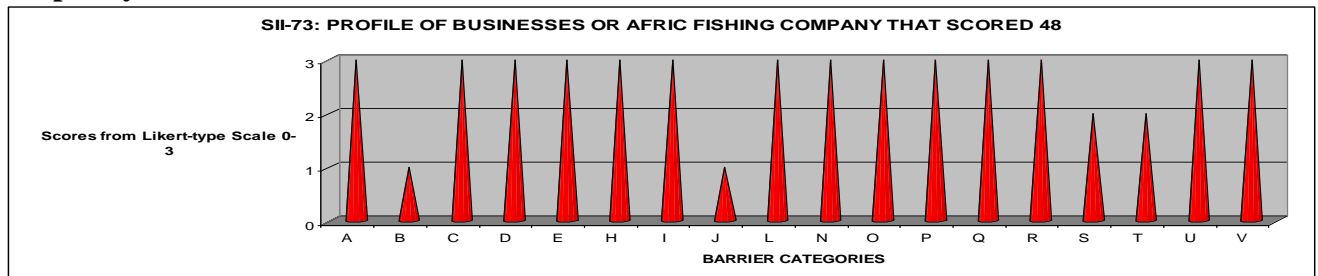
Equally from the business SII-30 was an interviewee from Afric Fishing Company and scored 42 or about 78% of the maximum scored possible.

Figure 31: SII-30: Profile of Business or Afric Fishing Company that scored 42- Developed Purposely for this Research



But SII-73 interviewee from the same business or Afric Fishing Company scored 48 or about 89% of the maximum scored possible.

Figure 32: SII-73: Profile of Business or Afric Fishing Company that scored 48- Developed Purposely for this Research



These types of profiles moved across the board during Stage II or 'Individual Case Interview', and interestingly there were mixed perceptions for barriers for even interviewees from the same sector such as regulatory or enforcement or business.



The author argues that if the regulatory authorities, enforcement officers, or senior managers of fishery businesses already had good coordination and appropriate national food safety policy or standards that are properly harmonized it is likely that they would not value or prioritise any barrier differently from their sector counterparts. It can also be argued that the regulatory authorities, enforcement officers, or senior managers of fishery businesses that value or prioritise most barriers are those that have knowledge and experience about such barriers or are highly affected by those types of barriers in their daily operations, and vice-versa. These arguments were supported by some of the examples of comments given below by various interviewees that influence their decision to place high or low value or priority on particular types of barriers.

SII-1 was one of the representatives of Ministry of Fisheries and Marine Resources (one of the national fishery regulators who scored 3 or ‘strongly agreed’ with the barrier ‘A –Lack of Appropriate Fishery Policy’ suggested in ‘Stage I’ interview) made the following comments: *‘The development of relevant and enforceable fishery policy is an essential component of a modern fishery safety control system. From my knowledge, experience and understanding Sierra Leone and several other countries in the sub-region currently have inadequate fishery policy and this have got negative impact on the effectiveness of all fishery safety control activities carried out in the country. I believed this has justified the ban on export of fishery products from Sierra Leone to developed markets’*. Interestingly, all other interviewees in ‘Stage II’ gave the same priority and scored 3 or ‘strongly agreed’ with barrier ‘A –Lack of Appropriate Fishery Policy’.

On the other hand SII-1 scored 0 or ‘disagreed’ with the barrier ‘S-Lack of Cueing Mechanism’ suggested in ‘Stage I’ interview and made the comment that: *‘I am not sure at all that the encountering of large turnout of customers at a time by street vendors could prevent them from practicing HACCP if the country has relevant and enforceable fishery policy’*. There were mixed scores for this barrier ranging from 0-3 based on individual perceptions. In fact SII-77 was one of the representatives of Ministry of Food Security (one of the national food regulators who scored 3 or ‘strongly agreed’ with the barrier ‘S-Lack of Cueing Mechanism’ suggested in ‘Stage I’ interview) made the following comments: *‘HACCP requires consistent record keeping and documentation to serve as a due diligence but in street food vending where turnout of customers is high, and in most cases disorderliness is increased, it will be difficult for vendors to effectively*



implement HACCP and all its pre-requisite programmes (PRPs). I've been in a regulatory activities long time and controlling street food vending are hard to come by at the best of times, and once we recognised this as a technical barrier we are going to find out a way forward'.

SII-74 was one of the representatives of Sierra Leone Standard Bureau (one of the national standard enforcement institutions who scored 3 or 'strongly agreed' with the barrier 'V –Lack of Fishery Standard or Specification' suggested in 'Stage I' interview) made the following comments: *In addition to absence of appropriate fishery policy, there are no national fishery and other food standards that address the broad issues involved in achieving food safety objectives. Acquiring national food standards are a viable approach to delivering food safety goals, because fishery and other foods sectors require a food chain that is highly controlled and supplied with good data on food safety risks and risk management strategies and as such may not be feasible for Sierra Leone to export food products to developed markets under the current circumstances.* Interestingly, all other interviewees in 'Stage II' gave the same priority and scored 3 or 'strongly agreed' with this barrier.

SII-28 was one of the representatives of Environmental Health Division (one of the national food hygiene and safety enforcement institutions who scored 3 or 'strongly agreed' with the barrier 'B –Lack of Agreement' suggested in 'Stage I' interview) made the following comments: *Effective development, implementation, and enforcement of an integrated food control strategy; operation of food control programme; securing funds and allocating resources; setting policy and standards; participation in international food control related activities; developing emergency response procedures; carrying out risk analysis; to list but a few at national level, require agreement and operational coordination. Contrarily, Sierra Leone lacked established leadership, coordinated function and administrative structures with clearly defined mandate to carryout regulatory measures, monitoring system performance, facilitating continuous improvement, and providing overall policy guidance to determine detail of such functions.*

On the other hand SII-15 another representatives of Environmental Health Division scored 1 or 'nearly agreed' with the barrier 'B –Lack of Agreement' suggested in 'Stage I' interview and made the comment that: *To certain extent I can support the consolidation of all responsibility for protecting public health and food safety into a single food control agency through 'agreement',*



but I mostly preferred a multiple agency system based upon the need for different regulatory and enforcement agencies specialized in the development of the specific sector such as fisheries, meat and meat products, fruit and vegetables, milk and milk products. This is similar to the system that currently operates in the country but I am not sure at all that the framework and administrative structure require for such multiple system is available. May be we try something new.

SII-13 was one of the representatives of Sierra Fishing Company (one of the fishery businesses who scored 3 or ‘strongly agreed’ with the barrier ‘H –Lack of Access to Information on Hazards’ suggested in ‘Stage I’ interview) made the following comments: *There is lack of interactive exchange of information and opinions in the national food control system and have negatively impacts the risk analysis process concerning hazards and risks, risk related factors and risk perceptions, among risk assessors, risk managers, consumers, businesses, the academic community and other interested parties, including the explanation of risk assessment findings and the basis of risk management decisions in the implementation of HACCP. I believed that this obstacle will impede rapid dissemination of information on foodborne disease outbreaks, active surveillance networks, traceability of individual animals or crops from (or before) conception or germination to the consumer as an integral part of food supply chain management, and provision of high quality, online educational packages to food business personnel otherwise precluded from access to such courses.*

On the other hand SII-41 another representatives of Sierra Fishing Company scored 2 or ‘agreed’ with the barrier ‘H –Lack of Access to Information on Hazards’ suggested in ‘Stage I’ interview and made the comment that: *I am more confident in the way we share food safety information but a lot more needs to be done to improve on situation. I don’t think that it has made a lot of difference in concrete terms. I’ve been in fishery business a long time and information on hazards are hard to come but I don’t think it will stop us completely from implementing HACCP. At any rate, we may still need a system that facilitates rapid capture, storage, retrieval and dissemination of food safety information to support effective implementation of HACCP, but I don’t think it is indispensable.*



These were the types of comments provided by the regulatory, enforcement and businesses in ‘Stage II’ and influenced greatly their perceptions and opinions on the barriers suggested in ‘Stage I’ through the scores 0-3 using the Likert-scale. It would be useful to add the scores for each barrier in order to rank the barriers that reported the highest scores from the regulatory, enforcement and businesses, and rank those barriers that reported the high to the lowest scores in order to suggest the priority of removing them.

Table 34 below suggests the ranking or prioritization of barriers to compliance with international HACCP regulation in fishery businesses in Sierra Leone as reported by the regulatory, enforcement and businesses, and ranked in order of the totalled scores given by the individual case interview process in ‘Stage II’.

Table 34: RANKING/PRIORITISING OF HACCP BARRIERS IN FISHERY BUSINESSES IN SIERRA LEONE (Developed for this study)

BARRIER	SCORE	RANK
A. Lack of Appropriate Fishery Policy	231	1 st
C. Lack of Enforcement	231	1 st
E. Lack of Human Expertise and Training	231	1 st
L. Lack of PRPs in Fishery Businesses	231	1 st
U. Lack of Understanding	231	1 st
V. Lack of Fishery Standard or Specification	231	1 st
R. Lack of Private Consultancy Firm	228	7 th
N. Lack of Consumer Agency	216	8 th
I. Lack of Awareness	184	9 th
O. Negative Guideline Factors	183	10 th
H. Lack of Access to Information on Hazards	158	11 th
T. Lack of Motivation	155	12 th
B. Lack of Agreement	149	13 th
P. Negative Environmental Factors	143	14 th
Q. Lack of Competence	134	15 th
D. Lack of Outcome Expectancy	120	16 th
S. Lack of Cueing Mechanism	117	17 th
J. Lack of Self-Efficacy	116	18 th

The highest score per barrier expected to be scored was 231 per barrier. This highest score is derived from the maximum score of 3 that could be given to any one barrier by each of the 77 interviewees from regulatory, enforcement and businesses in ‘Stage II’. According to Table 34,



six of the barriers including lack of appropriate fishery policy; lack of enforcement; lack of human expertise and training; lack of PRPs in fishery businesses; lack of understanding; and lack of fishery standard or specification, were significantly more highly regarded as a barrier than were the lack of private consultancy firm; lack of consumer agency; lack of awareness; negative guideline factors; lack of access to information; lack of motivation; lack of agreement; negative environmental factors; lack of competence; lack of outcome expectancy; lack of cueing mechanism; and lack of self-efficacy.

The last four including lack of competence; lack of outcome expectancy; lack of cueing mechanism; and lack of self-efficacy were almost marginal in the level of barrier that the regulatory, enforcement and businesses perceived. However, these barriers are also significant to compliance with international HACCP regulation in the fishery businesses in Sierra Leone because even the least scored barrier of 116 for lack of self-efficacy represents about 50% of the total expected score.

The ranking shows clearly that the regulatory, enforcement and businesses rated lack of appropriate fishery policy; lack of enforcement; lack of human expertise and training; lack of PRPs in fishery businesses; lack of understanding; and lack of fishery standard or specification as having the highest barrier to compliance with international HACCP regulation in fishery businesses in Sierra Leone. The close relationship between the first-six barriers and the equal scoring of these barriers can be seen perhaps as being both something that links with the reality of the existing lack of capacity of the national food control system. These six categories of barriers were equally scored as 231 each and like lack of appropriate fishery policy, lack of enforcement; lack of human expertise and training; lack of PRPs in fishery businesses; lack of understanding; and lack of fishery standard or specification are closely related matters in national food control strategy. In an attempt to link the relationship between lack of appropriate fishery policy and lack of enforcement; lack of human expertise and training; lack of PRPs in fishery businesses; lack of understanding; and lack of fishery standard or specification, one may visualize an overlapping perceptions, that is, producing different perceptions but one issue.



The barrier ‘lack of appropriate fishery policy’ was defined as *‘absence of course of action in Sierra Leone Fishery Act 1994, Amended 2007, with clear objectives, and expressed as formal national policy statements or positions in line with international requirements for Codex Alimentarius, HACCP, EU Legislation and other reputable international standards for fishery products control systems, to provide all stakeholders with clear mandate and authority to preventively control fishery safety hazards, foodborne diseases and food wastages, and subsequently promote food security, export potential, environmental sanitation, employment and protection of biodiversity’*. But analyzing the definition of ‘lack of appropriate fishery policy’ the following phrases ---- *‘absence of course of action’*, ----- *‘clear mandate and authority’*, --- *‘control fishery safety hazards, foodborne diseases and food wastages’*, ----- *‘employment’* -- *‘positions in line with international requirements for Codex Alimentarius, HACCP, EU Legislation and other reputable international standards for fishery products control systems’*— may form essential elements of ‘lack of enforcement’, ‘lack of fishery standard or specification’, ‘lack of PRPs in fishery businesses’, ‘lack of human expertise and training’, and ‘lack of understanding’, respectively, as derived from the ‘Stage I’ Convergent Interview.

However, the researcher argues that ‘lack of appropriate fishery policy’; ‘lack of enforcement; lack of human expertise and training; lack of PRPs in fishery businesses; lack of understanding; and lack of fishery standard or specification’ were perceived subjectively by the interviewees which gave the definition of these barriers derived from the ‘Stage I’ Convergent Interview.

Generally, it is likely that there is a degree of overlap between certain categories of barriers and these close relationships can be identified perhaps in the scores given to certain categories of barriers. For instance, ‘lack of private consultancy firm’ and ‘lack of consumer agency’ scored 228 and 216 respectively; ‘lack of awareness’ and ‘negative guideline factors’ scored 184 and 183 respectively; ‘lack of access to information on hazards’ and ‘lack of motivation’ scored 158 and 155 respectively; ‘lack of agreement’ and ‘negative environmental factors’ scored 149 and 143 respectively; ‘lack of competence’ and ‘lack of outcome expectancy’ scored 134 and 120 respectively; and ‘lack of cueing mechanism’ and ‘lack of self-efficacy’ scored 117 and 116 respectively.



The researcher therefore argues that some of these categories of barriers are pivotal to the problems of national food control system. This is to suggest that such categories of barriers are meaningful, because they have been perceived, determined and corroborated by the case interviewees who are involved in the national regulatory, enforcement and business systems, and are familiar with the strengths, weaknesses, opportunities and threats (SWOT) of the national food control system.

This interview process generates information that is useful to help select the best or most valuable barriers. In terms of strength, the interviewees are familiar with the internal asset such as skills, motivation, technology, finance, coordination, which enables the country to effectively carry out its food safety management system and take advantage of opportunities, or deal with threats. The interviewees are also familiar with the internal deficits including but not limited to inadequate staff skills, insufficient equipment, out-dated procedures that have prevented the country to comply with international HACCP regulations over decades. The researcher also argues that the interviewees' perceptions are also based on their understanding of external circumstance and national obligation to membership in regional or global trade groupings, increased consumer awareness or attention to food safety that could positively affect the country's role and operations. This may be also influenced by external circumstance or trend such as economic or political crisis, transboundary foodborne disease that could negatively affects the country's ability to meet the requirements of international HACCP regulation.

5.3.1 Conclusion

From the discussion of results from stage II, barriers such as 'lack of human expertise and training' and 'lack of understanding' were among the six barriers that scored the highest and ranked first. Therefore, the authrr argued that there is lack of adequate understanding of HACCP among the stakeholders across regulatory, enforcement and business. This answered the question in objective 2 of this study as stated below: *“to determine the level of understanding of HACCP among those involved in the national fishery safety infrastructure – from policy and regulation officials to enforcement officers and compliance in businesses”*. Similarly, the validation, ranking and prioritisation of barriers indicate that the significant barriers to compliance with



international HACCP regulations are extant in Sierra Leone as perceived by the stakeholders. This answered question in objective 3 of this study as stated below: *“to identify the perceived barriers which exist within the national food safety infrastructure which prevent the implementation of HACCP”*.

5.4 Discussion of Results of Focus Group Interviews (Stage III)

5.4.1 General Reaction to Focus Group Discussions

At the end of the focus groups discussions on the 4th day of the workshop, the groups were asked if they had any problem about the Focus Groups and the way the workshop was organized, the number of questions asked and the interviewing techniques. The groups responded positively; ‘it was a great moment in our professional career and we got no problem with any element of the workshop’; ‘in fact we are proud to be involved in HACCP system research; another speaker said that ‘they had enjoyed the workshop a lot and it was the first opportunity for the regulatory, business and consumer to work together and discuss issues that could be relevant to national food control’; and this view seemed to be shared by all the participants.

5.4.2 Discussing HACCP benefits perceived against those from the literature

Only 12 benefits were identified for other national HACCP regulators from the critical review of literature, but as many as 22 benefits were determined by this study. Moreover, the use of the three focus groups provides and prioritizes benefits of implementing HACCP for all sectors of national stakeholders including government regulatory authorities, fishery businesses and consumers. These benefits and ranks are given in Table 34, against those benefits suggested by other HACCP regulators analysed in chapter 2. To a larger extent, this study argues that these benefits could encourage successful implementation of HACCP by the government regulatory authorities and the fishery businesses, and subsequently, empower consumers to advocate compliance with food safety in Sierra Leone.

Table 34 below, is divided into 2 main columns including first column for ‘**ranked HACCP benefit perceived by the 3 focus groups (SIIIA, SIIIB, SIIIC)**’, and the second column called



‘ranked HACCP benefit by other HACCP regulators’. The 2 main columns are separated by a thick pink-white line for ease of identification. The first column **‘ranked HACCP benefit perceived by the 3 focus groups’** is sub-divided into 5 columns including **‘ranked’**, **‘SIHA’**, **‘SIIB’**, **‘SIIC’**, and **‘benefit’**; whilst the second column is also sub-divided into 3 main columns including **‘ranked’**, **‘other specific regulators’**, **‘benefit’**, and of which the column for **‘other specific regulators’** is further sub-divided into 5 sub-columns including **‘FSA’**, **‘FSIA’**, **‘FDA’**, **‘WHO’** and **‘SFAC’**.

The first main column on the left provides a list in order of the importance of these benefits to the regulatory, enforcement, businesses and consumers. Thus the second main column on the right hand side is the comparative column for benefit of other HACCP regulators derived from the section of Table 1, chapter 2, page 42. Comparatively most of the wordings of the two columns of benefits are different and a few are either identical. Moreover, it can be argued that the notions underpinning some of the ideas in these two columns are either indistinguishable or represent very similar explanations. The author attempted to discuss some of these similarities and differences below.

For instance, where the regulatory, enforcement, businesses and consumers have listed **‘Preventive Control of FBD’** as a benefit of HACCP, the other national HACCP regulators, discussing the benefits of HACCP for several food businesses have given, **Prevention of Foodborne Illness (FBI)** as a possible benefit which corresponds with the **‘Preventive Control of FBD’** notion identified in this study, and were all ranked first including others. **‘Similarly, ‘Reduced Litigation’** is listed by the regulatory, enforcement, businesses and consumers, and is given by other national HACCP regulators as **‘Legal Protection’**, though reduced litigation ranked second and legal protection ranked first; whilst **‘Improved Food Control’** is listed by the regulatory, enforcement, businesses and consumers, and is given by other national HACCP regulators as **‘Better Risk Management’**, and all ranked first.

Table 35: Analysis of HACCP benefits perceived in Sierra Leone against those by other HACCP regulators: Adapted for this study from Kane, 2011

Ranked HACCP benefit perceived by 3 focus groups (SIIIA, SIIIB, SIIIC) in Sierra Leone					Ranked HACCP benefit by other HACCP regulators						
Ranked	SIIIA	SIIIB	SIIIC	Benefit	Ranked	Other Specific Regulators					Benefit
						FSA	FSIA	FDA	WHO	SFAC	
1 st				Cost effective production	1 st						Prevention of FBI
1 st				Improved product safety	1 st						Reduction in Costs
1 st				Preventive control of FBD	1 st						Legal Protection
1 st				Increased market access	1 st						Better Risk Management
1 st				Increased food safety awareness	2 nd						Customer Confidence
1 st				Improved food control	2 nd						Improved Market Access
1 st				Improved trade negotiation & trade	2 nd						Product Improvement
1 st				SMEs expanded	2 nd						Team Ownership
2 nd				Consumer & Government Trust	3 rd						Improved Relationships
2 nd				Consumer confidence	3 rd						Improved Management
2 nd				Reduced public medical cost	3 rd						Improved Trading
2 nd				Reduced Poverty	3 rd						Process Based
2 nd				Reduced Litigation							
2 nd				Improved FBD surveillance & communication							
3 rd				Increased ‘Due-diligence’							
3 rd				Reduced health & socio-economic problems							
4 th				Reduced unemployment							
4 th				Improved food security							
4 th				Better consumer protection group							
4 th				Improved quality of life							
4 th				Improved staff Motivation							
5 th				Increased Traceability							



The first main column which is for the regulatory, enforcement, businesses and consumers is ranked by the 3 focus groups on the basis of importance of HACCP to three sectors of stakeholders namely government regulatory authorities, businesses and consumers, with most prioritized benefit being listed as 1st through to the least recognised given at 5th. However, the ranking of benefits in the first column follows a pattern, that is, where eight different benefits were given equal priority as the most important benefits; perhaps they are at the forefront in the minds and the visions of the stakeholders for several years but have been unable to be perceived due to improper approach in the past.

For example, one of the first benefits identified by fishery businesses from the successful implementation of HACCP is the “increased market access”; whilst consumers prioritised “increased food safety awareness” among others; and government regulatory authorities prioritised “improved food control” as one of the first benefits of HACCP in the country. Subsequently, other benefits following those eight listed as 1st were given 2nd, 3rd, 4th, and 5th, including six benefits prioritised as 2nd; two benefits prioritised as 3rd; five benefits prioritised as 4th; and one benefit prioritised as 5th, listed according to the three focus groups.

The prioritisations of benefits were supported by either all the 3 focus groups or 2 focus groups though some sector specific benefits were supported by only one focus group. For example seven benefits including “improved product safety”, “preventive control of FBD”, “increased food safety awareness”, “consumer and government trust”, “improved FBD surveillance and communication”, “reduced health and socio-economic problems”, and “increased traceability” were supported by all 3 focus groups. Ten benefits including “increased market access”, “improved food control”, “improved trade negotiation and trade”, “SMEs expanded”, “reduced public medical cost”, “reduced poverty”, “reduced unemployment”, “improved food security”, “improved quality of life”, and “improved staff motivation”, were supported by 2 focus groups. Five benefits which were sectors (government regulatory authorities, businesses and consumers) specific including “cost effective production”, “consumer confidence”, “reduced litigation”, “increased due diligence”, and “better consumer protection group” were supported by one focus group.



The government regulatory authority (SIIIA) and fishery businesses (SIIIB) focus groups prioritised seven benefits as 1st, whilst the consumer focus group (SIIIC) prioritised four benefits as 1st but prioritised the highest number of benefits (five benefits) as 2nd. SIIIA prioritises four benefits as 2nd, whilst SIIIB prioritises three benefits as 2nd. This type of trend of priority of benefits continues and can be argued that the trend is normal because each sector of stakeholders has specific benefits that affect them directly or indirectly and have been at the forefront in their minds for decades.

The listing from other national HACCP regulators is given based on the benefits that were listed by the WHO, the FSA, the FSIA and the FDA and one regulatory advisor, the SFAC. Thus where three of the regulators in the second column give the prevention of FBI as an important benefit of HACCP, then this benefit was placed top in the table and prioritised as ‘1st’ along with the other benefits of HACCP listed as 1st. Furthermore, other benefits were prioritized 2nd or 3rd on the basis of the frequencies they were prioritized by other national HACCP regulators as important benefits for food businesses practicing HACCP system as their food safety management system.

5.4.3 Discussing Theoretical and Conceptual Framework

5.4.3.1 Theoretical Framework

This study applies the knowledge of “HACCP awareness to adherence model” developed by Samantha Gilling, Eunice Taylor, Kevin Kane, and Joanne Taylor (Gilling, Taylor et al., 2001), and practical experience of the obstacles to the adoption and implementation of HACCP in developed and developing countries, to develop appropriate and specific conceptual framework for this study. The components, applicability, reliability and validity of this conceptual framework emerged from the methodological triangulation technique through convergent interview, case interview and focus group workshop, covering all the relevant stakeholders in fishery operations in Sierra Leone.

The usability of Gilling, Taylor et al., 2001 model was investigated in the United Kingdom, and this is the first time this model has been applied in Sierra Leone to develop framework that



comprises 18 barriers to compliance with HACCP. This conceptual framework provides appropriate tool through which barriers can be seen clearly in order to develop target intervention to remove them.

Gilling, Taylor et al, 2001 model illustrates 11 major barriers that hinder successful HACCP system adherence including a lack of awareness, understanding, agreement, self-efficacy, outcome expectancy, motivation, presence of a cueing mechanism, and competence; and negative environmental factors, guideline factors, and external factors. It can be argued that the proposed HACCP barrier model reveals the complex nature, scope and structure of potential knowledge, attitude, and behaviour-related barriers that hinder successful adoption and implementation of HACCP in food businesses. The barrier model and its components provide excellent opportunities and tools that are appropriate to identify and locate HACCP barriers in food operations to facilitate targeted interventions.

Identification of barriers that impede adherence to public health practice has gone through certain theoretical revolutions (Momaya, 2001), thus the propositions of the “HACCP awareness to adherence model”, owed its origin from those revolutions. Initially, medical research has identified potential barriers to clinical practice guideline adherence, and these findings were used to develop awareness to adherence model, of which 5 barriers were identified on the pathway to adherence (Gilling, Taylor et al., 2001). These 5 barriers were increased to 9 by incorporating social cognitive concepts into educational framework, and subsequently, the medical model was adapted by talented and experienced HACCP practitioners to produce food safety models entitled “HACCP awareness to adherence model” (Gilling, Taylor et al., 2001).

However, the model suggested that the 11 barriers identified are not exhaustive and therefore further investigation into the barriers would bring significant benefits to successful adoption and implementation of HACCP to assure food safety, competitiveness an overall improvement in public health and standard of living. The barriers that hinder successful implementation of HACCP have been identified generically within the field of psychology and health research and have facilitated targeted interventions elsewhere (Gilling, Taylor et al., 2001).



This study developed conceptual framework for fishery business in Sierra Leone and increased the number of barriers from 11 in Gillings, Taylor et al., 2001 model to 18; thus, this study identifies 7 new barriers that have never been uncovered by previous HACCP studies. The barriers were also grouped into 3 stages namely *knowledge*, *attitude* and *behaviour* as proposed by Gilling, Taylor et al, 2001, and results of triangulation qualitative case study approach in this study. All stakeholders in fishery operations suggested, discussed and accepted the components in the conceptual framework of this study.

During the interviews, all the stakeholders acknowledged the occurrence of HACCP barriers within the fishery operations in Sierra Leone from the primary producers, secondary producers, to the final consumers. However, barriers that impede successful implementation of HACCP have only been identified generically for foods within the “HACCP awareness to adherence model”. HACCP is specific to product, process and environment and with specific food products such as fishery products in Sierra Leone the emphasis will be on factors that hinder safety, nutritional, integrity, freshness attributes and competitiveness.

Those impediments have significantly blocked fishery products from Sierra Leone to international developed markets such as European Union (EU), United States (US), Japan, Canada and many others, thus not surprising for the increase in barriers from 11(in the “HACCP awareness to adherence model”) to 18 (those identified in the fishery operations in Sierra Leone).

Safety of fishery products is mostly influenced by technical barriers that hinder the implementation of modern fishery safety management programmes such as HACCP in the fishery businesses (FDA, 2011). The author argues that the non-freshness and spoilage of fishery product have been caused by non-implementation of sustainable fishery safety management system due to several technical barriers, and therefore could be prevented.

The assessment of the barriers focuses on the full inter-linkages between the entire operations of the fishery products from government regulatory, enforcement, businesses, consumer, external support and other common factors from the point of capture up to the dining table (farm-to-fork). Market competitiveness is a major aspiration and strategic development goal for any



manufacturing or producing country to fully benefit from trade in free and fair market conditions by ensuring that the nation's products and services meet the requirements of trading partners, whilst expanding "real" foreign exchange earnings and strong economy (Rosli, 2010).

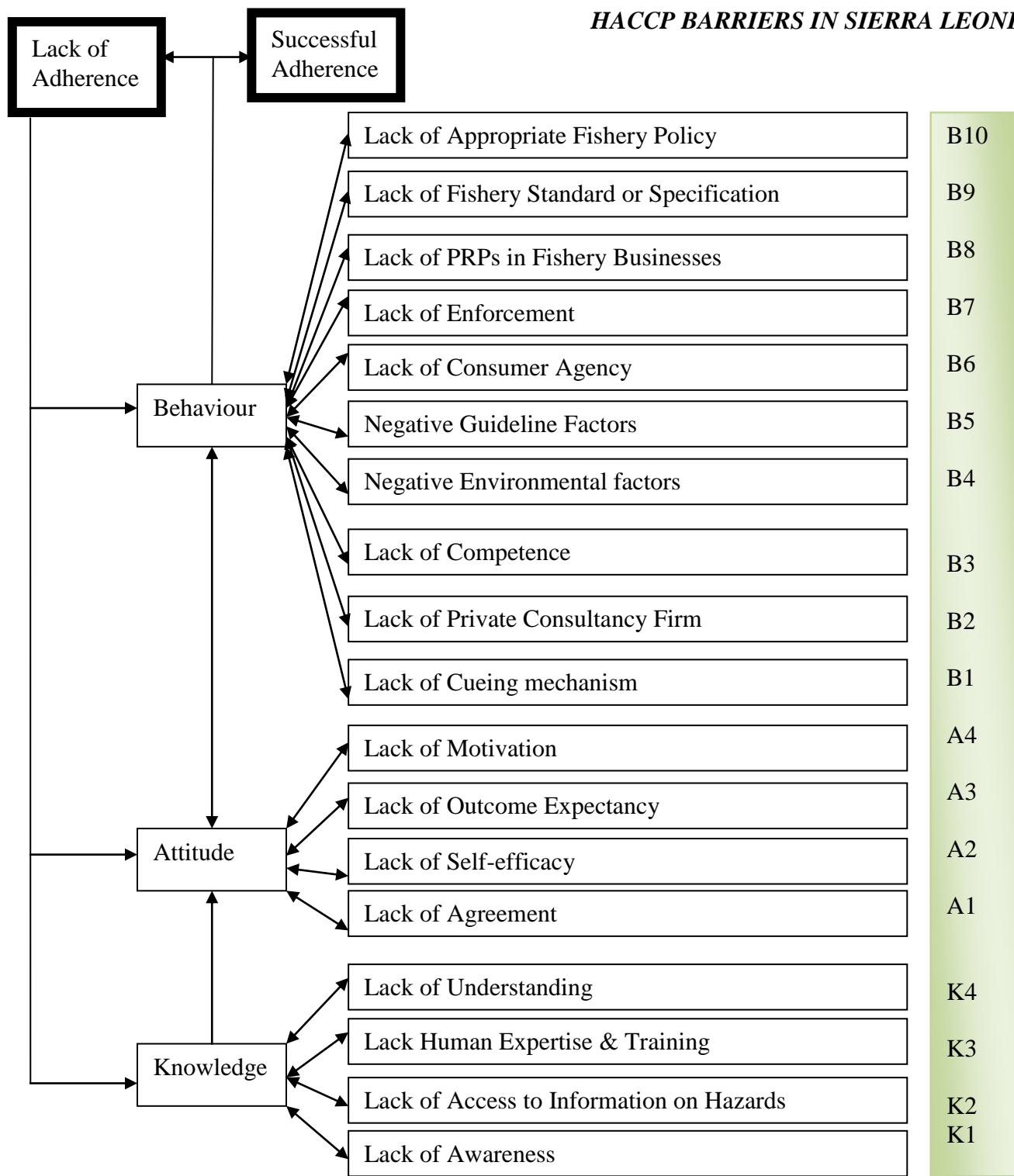
Sierra Leone was selected for this study because it is one of the least developing countries (LDCs) in the world with most recent example of fishery export ban to international developed markets due to fishery safety problems, spurring demand for improvement in fishery products safety and competitiveness. The country has also been classified as one of the potential medium term supplier of the fishery products worldwide (Megapesca, 2000). While this ban may be erroneously attributed to unfair trade discrimination due to geographical factor, but the author argued that there could be underlying food health, safety, hygiene and quality factors influencing this scenario (*that is, barriers to compliance with international HACCP regulations*).

The theory used to develop conceptual framework for this study is supported by the stakeholders through their perceptions on barriers and the theory is considered useful to develop a conceptual framework on barriers that hinder the HACCP implementation in fishery businesses in Sierra Leone. This study suggests that further investigation and understanding of the theory on the conceptual framework of barriers are essential for assessment and location of barriers to facilitate successful implementation of HACCP in fishery businesses in Sierra Leone.

5.4.3.2 Conceptual Framework

A conceptual framework for this study is given in the chart below (Figure 33). It is developed from applying the following: the knowledge on the proposed "HACCP awareness to adherence model"; the results of the qualitative case study triangulation used in this research; and the author's years of experience in the development and implementation of HACCP in both developed and developing countries.

Figure 33: Conceptual Framework (Gilling, Taylor et al., 2001) (Modified for this study)





The key barriers and strengths of the framework are highlighted, but detailed description and analysis of each barrier are provided in chapter four of this study.

However, it must be understood at the outset that while this conceptual framework shows all the 11 components and casual relationships of the “HACCP awareness to adherence model”, it is important to point out that those 11 components were also reported in the outcomes of this research, and this study did not limit the barriers only to those components and relationships as originally given in the model. The actual components and relationships of the conceptual framework of this study are based on the “reality” of 18 barriers, which include 7 new barriers important to Sierra Leone fishery products, but not previously uncovered by other HACCP studies.

That is, the fishery product safety and its market competitiveness in Sierra Leone are hindered by 18 components of more complex barriers to compliance with international HACCP regulations governing the trading of food across international borders that exist within the food safety regulatory, enforcement and commercial operations of the fishery business in Sierra Leone. The barriers are grouped into three stages including knowledge, attitude, and behaviour barriers. The initial identification and grouping of the barriers were carried out by the use of the convergent interview of 22 stakeholders. These barriers were subsequently presented to case and focus group interviewees for verification, ranking and validation. The 18 barriers are grouped into 3 categories including **knowledge**; **attitude**; and **behavioural** as given in Figure 33 above.

Due to the complexity, severity and the long existing nature of national food safety problems, HACCP barriers identified by this study may not be exhaustive. However, this study may serve as a springboard and strong way forward to unearth the difficulties and obstacles that hinder successful implementation of HACCP system in fishery businesses in Sierra Leone. Each of the components of the barriers possesses significant threat to fishery safety and competitiveness in Sierra Leone. The sequential application of knowledge, attitude and then behaviour would facilitate targeted intervention to remove those barriers, because you cannot change behaviour without the effect of knowledge or attitude (Gilling, Taylor et al., 2001).



Without the knowledge and understanding of HACCP concepts by all different stakeholders, their behaviour and attitude towards fishery safety and market competitiveness would be ineffective and compromised. Within the Sierra Leone context lack of adequate knowledge in food safety management system such as HACCP is an important group of barrier, which requires targeted intervention at regulatory, enforcement, business and consumer levels. Targeted intervention here could be training of stakeholders to acquire understanding, awareness, expertise, and information on hazards (K1, K2, K3 and K4) in HACCP so that they can think, feel and behave in compliance with international requirements for HACCP regulation.

The author argues that appropriately trained human resources are vital assets and must be used effectively by all food businesses to ensure effective development and implementation of the HACCP system. In Sierra Leone, the fishery businesses are SMEs who tend to employ only the personnel they need to carry out production tasks. From experience, the priority of these SMEs is maximization of productivity or quantity and pays little or no attention to safety of fishery products.

Their operations involve a busy day-to-day existence of maximizing quantity without training and designating staff to get involved in long-term planning of safety of products. This has made the establishment of a HACCP team in these SMEs problematic, because they have no adequate knowledge in food chemistry, microbiology, manufacturing, production, engineering, food safety and quality, to name but a few. The major difficulty for the Sierra Leone fishery businesses is employing experienced and/or technically trained personnel with the relevant understanding, awareness and expertise in HACCP, to appreciate all the potential fishery safety hazards.

It has also been argued that employees of the SMEs may be too close to the process and have in-depth knowledge about the processes carried out (Taylor and Kane, 2005). This underscores the significance of the successful implementation of the training programmes in HACCP covering all the personnel of a food business, from the senior management down to the operatives. Effective training in food safety creates understanding, awareness, and motivation in the workforce of food safety management. Training provides technical and practical knowledge



enabling staff members to participate in HACCP development and implementation and change the attitudes and behaviour of the people all together. In fact training is a legal requirement by Council Regulation EC No 853/2004 (EC, 2004) on the Hygiene of Foodstuffs and *de facto* mandatory by Codex Alimentarius in food safety management (CAC, 2011).

The second stage in this framework is the attitude stage that comprises several components including lack of agreement, self-efficacy, outcome expectancy and motivation (A1, A2, A3 and A4). In Sierra Leone fishery businesses, the commitment for the involvement of the senior management in the preparation, development and application of the HACCP system is fundamentally lacked. There is also lack of a real commitment by the government, business and consumers to understand fully what HACCP is all about. This has lead to lack of understanding about the reason for using it; motivation; expected benefits or outcome; prioritising resources such as time, costs, and labour; self-efficacy or self-confidence; and perception that they have the capability to develop and implement HACCP system. SMEs also disagreed with regulators about HACCP because the regulators too don't have confidence in themselves and unable to create awareness and understanding among the businesses, and for the fact that the regulatory authorities have not been able to create any positive impact on prerequisite programmes for HACCP in the fishery businesses ever since.

The third stage of the framework is the behavioural stage comprises of components such as lack of cueing mechanisms, private consultancy, competence; negative environmental and guideline factors; lack of consumer agency; lack of enforcement; lack of PRPs; lack of fishery standards and specification; and lack of appropriate fishery policy (B1, B2, B3, B4, B5, B6, B7, B8, B9, and B10). One of the key factors responsible for these barriers of HACCP in Sierra Leone is the lack of government awareness of the significance of food safety and quality assurance, and is, probably, the single most important factor needed in the development and implementation of a successful fishery safety policy, standards or specifications that are compatible with international requirement for HACCP regulation. The national government awareness in the significant of food safety and quality assurance is useful in supporting safety and competitiveness of fishery products operations.



There is also a problem of dual role of the government regulatory authorities who have to be the educator and the enforcer of the legislation simultaneously in the absence of credible and constituted consumer protection agency and private consultancy firms specialized in food safety. Moreover, different departments from different line ministries have been assuming the responsibilities of food safety regulation with different specific mandates in the absence of national food law and food safety coordinating body.

The establishment of Sierra Leone Standards Bureau (the Bureau) by Act 2 of 1996 (Decree) was to coordinate the activities of standards including food standards, but the Bureau presently lacked the capacity including trained personnel, resources and power to perform its mandates. This dilemma makes effective repeal and review of the current fishery act to match the international requirement of HACCP regulation difficult or otherwise impossible. There are also roles conflicts, fragmentations of food safety control system and lack of targeted intervention by the government and international community at large.

The fourth stage of the conceptual framework shows the outcome of the process, which could be success or failure depending on the action taken. This stage is singled out because it is not the process of identifying and locating the barriers but rather the outcome of the process used in the actual identification. Removal of the barriers is an appropriate and targeted intervention by the government, business, consumers and other interested parties and progress to successful implementation of HACCP to ensure safety and competitiveness of fishery products. In the case of the latter or failure, the framework provides a feedback mechanism to facilitate identification and location of the barriers for problem solving.

Responses from the stakeholders confirm the importance of the conceptual framework for the HACCP barriers in fishery businesses in Sierra Leone. Their perceptions on HACCP barriers are in support of the framework within the three stages of barriers (*knowledge, attitude and behaviour*). This would mean collective responsibilities to everyone in Sierra Leone at this era to achieve food safety through identification, location and understanding of HACCP barriers for targeted interventions. Within the conceptual framework, each component offers possibilities to identify HACCP barriers in Sierra Leone fishery businesses and therefore each evolves a new



research suggestion. However, similarity in the names of the barriers within the conceptual framework and those of Gilling, Taylor et al., 2001, model not necessarily means that the barriers are the same in their entirety.

Critical reviews of literatures show that barriers that impede the adoption and implementation of HACCP have only been identified generically because various terminologies are used to refer to barriers such as ‘burdens’, ‘bureaucratic nightmares’ or ‘hassles’ (Taylor and Kane, 2005; Taylor and Taylor, 2004a & b; Von Holy, 2004; Taylor, 2001) and sometimes there are various types of interpretations given to one notion of barrier or a sub-division of one notion. Some of the barriers in Gillings, Taylor et al, 2001, model have the same names with those perceived in Sierra Leone, but when it comes to definition or interpretation they are different barriers all together. That means some of the barriers in Gilling, Taylor et al, 2001, have no resonance with the fishery safety infrastructure in Sierra Leone despite carrying the same names.

For example, the barrier ‘lack of agreement’ in Gilling, Taylor et al.2001, model is also perceived in Sierra Leone exactly as ‘lack of agreement’, but in terms of definition they are completely different barriers. In Gilling, Taylor et al., 2001, pp712, model ‘lack of agreement’ means “*a main barrier to successful guideline adherence can arise from disagreement with the principles of HACCP evoking statements from interviewees such as : It’s just a bureaucratic stamp*”; whilst ‘lack of agreement’ perceived in Sierra Leone means: *‘the stakeholders believed that effective food safety systems in the country is undermined by the existence of excessive bureaucracy, fragmented legislations, duplication of regulatory activity, multiple jurisdictions, lack of coordination, and weaknesses in surveillance, monitoring and enforcement system, due to lack of credibility, trust and clue about HACCP system leading to a significant barrier to achieve agreement on HACCP among their target audience’*.

Similarly, the barrier ‘external/customer factor’ by Gilling, Taylor et al, 2001, p 714, means: “*In a food business, barriers to successful HACCP may occur externally as well as within the company itself. For example, it is not uncommon to find that customers (such as large supermarket chains) insist upon their own HACCP methodology that may not explicitly follow the HACCP guideline*”; whilst customer barrier perceived in Sierra Leone entitled, ‘lack of consumer agency’ means: *absence of independent organisation or groups that can be viewed as*



pressure groups which are antagonistic to government agencies, but capable and strengthened enough to participate directly in formulating food control regulations, put more effort including checks and balances into regulatory enforcement, and with formal channels of communication between food control organizations and consumers including consumer complaints programmes’.

These differences continue to exist among the barriers in Gillings, Taylor et al, 2001, model and the conceptual framework of this study; thus the names of some of the barriers may appear the same but there are major and/or minor differences which suggest that the barriers perceived in Sierra Leone are characteristics to the local environment irrespective of using the knowledge of Gillings, Taylor et al., 2001, model as one of the theories behind the conceptual framework. This study suggests that the different categorisation; sub-division of a single barrier; different interpretations of one type of barrier of HACCP; and used of various terminologies such as ‘burdens’, ‘bureaucratic nightmares’ or ‘hassles’ in place of barriers, should be among areas that are currently under research in HACCP.

5.4.4 Conclusion

The next chapter attempts to explain each research objective and how the research problem is resolved. Also discussed in the next chapter is the contribution to knowledge of this work in the area of theory; and also how it contributes to practice in terms of the possible actions of regulators, enforcement officials, fishery businesses and consumers’ roles in food control activities for the first time. The researcher further attempts the discussion of the limitations of the research methodology in this chapter and suggestions for undertaken future research.



Chapter 6: Conclusions and Implications

6.1 Introduction

This chapter concludes the entire research, explains each research objective and how the research problem is resolved. Another key issues discussed in this chapter are the conclusion to the originality of the research technique, implications for national fishery safety policy, regulations and aid agencies. This chapter also consists of a discussion of the limitations of the methods and suggestion for developing future research. The chapter concludes with some general comments, resulting from this research, on the significance of information, originality and obstacles that impede successful adoption and implementation of HACCP in fishery businesses in Sierra Leone.

6.2 Conclusions and explanations of the research problem

The problems of fishery safety and compliance with HACCP in Sierra Leone been determined through this research can be seen as essentially an issue of perspective. In other words, it is possible to see that these problems negatively affect the different needs of the regulatory, enforcement and fishery businesses and it does so in differing ways. One possible conclusion on problems such as overlapping and confused government regulatory authorities; incomplete and inappropriate regulation; lack of enforcement; lack of training and consultancy organizations; poor attitudes and understanding including other HACCP barriers identified in this research can be seen in Table 36 below where barriers are classified in terms of whether they are involved in **knowledge**, or in **attitude** or in **behaviour**.



Table 36: Classification of Barriers to Compliance with International HACCP Regulations in Fishery Businesses (Developed for this study)

Knowledge	Attitude	Behaviour
Lack of awareness	Lack of agreement	Lack of cueing mechanism
Lack of access to information on hazards	Lack of self-efficacy	Lack of Private Consultancy Firm
Lack of human expertise/training	Lack of outcome expectancy	Lack of competence
Lack of understanding	Lack of motivation	Negative environmental factors
		Negative Guideline Factors
		Lack of Consumer Agency
		Lack of Enforcement
		Lack of PRPs in Fishery Businesses
		Lack of Fishery Standard or Specification
		Lack of Appropriate Fishery Policy

One may also argue that these are all facets of the same problem, namely, lack of compliance to international HACCP regulations. It is also useful to consider that all of the barriers are concerned with food safety problem in national fishery safety infrastructure, but six barriers including ‘lack of appropriate fishery policy’, ‘lack of enforcement’, ‘lack of human expertise and training’, ‘lack of PRPs in fishery businesses’, ‘lack of understanding’, and ‘lack of fishery standard or specification’, are the ones that are most highly regarded by the regulatory, enforcement and businesses and were ranked first; whilst ‘lack of private consultancy firm’, ‘lack of consumer agency’, ‘lack of awareness’, ‘negative guideline factors’, ‘lack of access to information on hazards’, ‘lack of motivation’, ‘lack of agreement’, ‘negative environmental factors’, ‘lack of competence’, ‘lack of outcome expectancy’, ‘lack of cueing mechanism’, ‘lack of self-efficacy’, were ranked from 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, and 18th, respectively.



It can also be argued that what is valued as a technical barrier by regulatory, enforcement and businesses is not the opportunity to make an increased income or the opportunity to reduce costs, but rather the chance to improve fishery safety infrastructure that is a complex problem with many aspects and has led to a continued ban on the export of fishery products to developed countries.

Results showed that all of the regulatory, enforcement, and businesses do not adequately understand HACCP principles and steps, whilst most of them do not have competency in HACCP. The barrier 'lack of understanding' was among the highest knowledge gap level identified by regulatory, enforcement and businesses. This gap in HACCP knowledge level of national stakeholders may be due in part to the 'lack of human expertise or training', 'lack of access to information on hazards', and 'lack of awareness'.

In terms of knowledge, attitude and behaviour barrier categories, this study concludes that 'lack of awareness', 'lack of access to information on hazards', 'lack of human expertise or training', 'lack of understanding' could be translated as the inability of the regulatory, enforcement, and business sectors to develop a proper attitude toward HACCP principles and steps. In fact, the researcher argues that inadequate knowledge levels are the reason for lack of adoption of the HACCP principles and steps in fishery businesses in Sierra Leone. During the data collection process, barriers which suggest that the regulatory, enforcement, and businesses have not yet reached knowledge levels of HACCP system were expressed. Ideally, regulatory, enforcement, and businesses should have attained full comprehension to develop the proper attitude towards the HACCP system. Theoretically, the conceptual framework developed in this study suggests that each regulatory, enforcement, and business must have full 'knowledge' of what the HACCP principles and steps are all about in order to develop the right 'attitude' to ensure the appropriate 'behaviour' that would lead to the efficient functioning of the HACCP plan.



6.3 Conclusions and explanations of the research objectives

6.3.1 Objective 1: To determine the level of understanding of HACCP among those involved in the national fishery safety infrastructure – from policy and regulation officials to enforcement officers and compliance in businesses

The detailed explanation to the objective 1, of this research is specified in chapter 4, the data analysis where a listing of barriers including ‘lack of human expertise and training’, ‘lack of awareness’, ‘lack of self-efficacy’, ‘negative guideline factors’, ‘lack of competence’, and ‘lack of understanding’, that the regulatory, enforcement and businesses perceived were extant or existing barriers as a consequence of lack of adequate understanding of HACCP among those involved in national fishery safety infrastructure. These were derived from the convergent interviewing process of Stage I. Also, the relative ranking of each category of barrier revealed that ‘lack of human expertise and training’ and ‘lack of understanding’ were among the six barriers that were ranked 1st; whilst the barriers ‘lack of awareness’, ‘negative guideline factor’, ‘lack of competence’ and ‘lack of self-efficacy’ ranked 9th, 10th, 15th and 18th respectively; thus indicating lack of adequate understanding of HACCP among those involved in the national fishery safety infrastructure. This shows support for this objective and this data being confirmed by the individual case interviews of Stage II. Moreover, triangulation of the data and corroboration of the categories of barriers supporting this objective were provided by the report on the Focus Groups from Stage III.

The regulatory, enforcement and businesses perceive the barriers of ‘lack of human expertise and training’, ‘lack of awareness’, ‘lack of self-efficacy’, ‘negative guideline factors’, ‘lack of competence’, and ‘lack of understanding’, as essentially sets of strong feelings about lack of adequate understanding of HACCP among those involved in the national fishery safety infrastructure. Some of these barriers are more or less prioritized overall, but two of them are among the highest prioritized barriers. ‘Lack of human expertise and training’ include such things as lack of personnel trained, qualified and experienced in HACCP coupled with loss of personnel following the migration of scientist abroad to seek opportunity and make worse by the absence of food Safety programmes such as HACCP in the national curricula of schools and universities in Sierra Leone.



The nature and complexity associated with HACCP has caused lack of adequate understanding of the system and thus serving as a significant barrier to the adoption and implementation of HACCP in the fishery businesses, as perceived by the regulatory, enforcement and businesses. They reiterated that there is no educational programme whether formal or informal in the country on the principles, steps and the overall HACCP system. Moreover, there is no one trained or have attained a recognized HACCP qualification and makes stakeholders consider lack of understanding of HACCP as a significant barrier to non compliance to international HACCP regulation in the national fishery businesses.

‘Lack of awareness’ though ranked 9th includes such things as the non-familiarity with the general principles, simple practicalities, main rules, and responsibilities of food safety management system such as HACCP by regulatory, enforcement and business; ‘negative guideline factor’ ranked 10th in terms of priority of barriers but explains lack of understanding of HACCP as the technical and difficult nature of HACCP principles, steps and its pre-requisite programmes, and other guidelines of which those involved in the national fishery safety infrastructure lack the ability and skills to adopt and implement without being appropriately defined, explained and interpreted by experts. ‘Lack of Competence’ ranked 15th and after the EU export ban stakeholders realized that they lacked the competence in international food safety management systems especially their skill or ability to carry out HACCP according to codex protocols; whilst ‘lack of self-efficacy’ was the least prioritized among all the barriers but included such things as the lack of skills and capabilities by the fishery regulatory, enforcement and businesses to adopt and implement HACCP and therefore considered HACCP difficult and too technical or scientific .

The types of barriers that are related to the level of understanding of HACCP by regulatory, enforcement and businesses suggest that the present national system of fishery safety infrastructure cannot adequately address the requirements of international HACCP regulation. If no barriers on understanding of HACCP were seen or all the barriers seen were less prioritised in the results, then it could be said that those involved in national fishery safety infrastructure adequately understand HACCP and the system could cope with the issue of compliance. For



instance, the six barriers indicating lack of understanding, and the ranking of barriers of ‘lack of human expertise and training’ and ‘lack of understanding’ as first in terms of priority may be taken as markers for the absence of adequate understanding of HACCP system in the fishery safety infrastructure. Equally, all the regulatory, enforcement and businesses see these barriers as first obstacles to eliminate or reduce to an acceptable level, if the fishery safety infrastructure wants to achieve effective adoption and implementation of HACCP.

The other barriers ‘lack of awareness’, ‘negative guideline factor’, ‘lack of competence’ and ‘lack of self-efficacy’ may also be seen closely implicating the absence of adequate understanding of HACCP in national fishery safety system, since being also certain that there is lack of familiarity with the general principles, simple practicalities, main rules, and responsibilities of HACCP; lack of ability and skills to adopt and implement HACCP; lack of receptiveness and competence required to make modifications of the fishery safety management system that will comply with international HACCP regulation.

However, other important barriers were also identified but are not solely confined to objective 1, because this objective is more strictly connected with the lack of understanding of HACCP. If HACCP does address the differential needs of the national fishery safety infrastructure then it is more likely to succeed if special attention is paid to both formal and informal education in HACCP system. HACCP is an internationally recognised tool and a management system as much as it is a system for food safety and therefore the principles, steps, skills, and approaches must be appropriately understood by those who adopt and implement it. This means that understanding of HACCP may migrate into the fishery sector management, administrative and operational structures, as a whole adoption and implementation strategy through formal and informal training programmes and the overall national curricula. Certainly, the value given to the barriers that support objective 1, as seen from the ranks and priorities indicated above for lack of understanding of HACCP in national fishery safety infrastructure would seem to support this view.



6.3.2 Objective 2: To identify the perceived barriers which exist within the national food safety infrastructure which prevent the implementation of HACCP

The details of the perceived barriers which exist within the national food safety infrastructure that prevent the implementation of HACCP identified in this study are given in Chapter 4. It can be seen from the individual listing of barriers that they have differing ranking in terms of priorities of impact on the prevention of implementation of HACCP in fishery businesses, Table 34, Chapter 5, page 230.

There are 18 barriers that been uncovered through the Stage I (Convergent Interview) and consequently confirmed, ranked or prioritised by the Stage II (Individual Case Interviews), and further discussed and confirmed in Stage III (Focus Groups Discussions). From the ranking in Stage II, 6 barriers are all ranked 1st which suggests that the 6 barriers including ‘lack of appropriate fishery policy’, ‘lack of enforcement’, ‘lack of human expertise and training’, ‘lack of PRPs in fishery businesses’, ‘lack of understanding’, and ‘lack of fishery standard or specification’, have equal priorities in terms of impact on national fishery safety infrastructure.

One may want to ask as a question like this. Why 6 different barriers are prioritized equally by regulatory, enforcement and businesses? The researcher argues that these are the perceptions of those involved in the national fishery safety infrastructure and they are the ones most familiar with their fishery safety control system, culture, attitude, and behaviour. On the other hand the data suggest that over the past decade (1990 – 2000), Sierra Leone underwent a number of economic, social and political instabilities including rebel war, military overthrow, economic decline, unemployment, decrease in food production, combined with demographic changes including internal population displacement, loss of livelihoods and emigration of a significant proportion of the skilled labour in the country.

Consequently, the vulnerable food control system was dismantled wherein all sectors including regulatory, enforcement and businesses have to start all over again from the ashes of war. Furthermore, there were emergence and re-emergence of foodborne diseases such as cholera, typhoid outbreaks as well as persistently high levels of gastro-enteritis during this period. This could have led to the breakdown and collapse of system and infrastructure across the regulatory,



enforcement and businesses, and causes negative impact and increase the vulnerability of national food safety infrastructure.

The other 12 out of a total of 18 barriers including ‘lack of private consultancy firm’, ‘lack of consumer agency’, ‘lack of awareness’, ‘negative guideline factors’, ‘lack of access to information on hazards’, ‘lack of motivation’, ‘lack of agreement’, ‘negative environmental factors’, ‘lack of competence’, ‘lack of outcome expectancy’, ‘lack of cueing mechanism’, ‘lack of self-efficacy’, are ranked from 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, and 18th, respectively. Again, these rankings are the perceptions of those involve in the national fishery safety infrastructure. In fact, 18 of the regulatory, enforcement and businesses ranked 6 barriers as a 0 in the individual case interviews, because they did not perceive these 6 barriers as being important to the national fishery safety infrastructure. Table 34, page 230, gives more of the detail of the way different regulatory, enforcement and businesses perceived all the barriers in terms of impact on national fishery safety infrastructure.

On the other hand, all the regulatory, enforcement and businesses agreed with large number of barriers and Table 37 below shows more of the details of the way perceived barriers were agreed in large number. No regulatory, enforcement and businesses agreed with less than 16 barriers as being importance to national fishery safety infrastructure, and no regulatory, enforcement and businesses listed new additional barriers during Stage II (Individual Case Interview). In terms of numbers of regulatory, enforcement and businesses, 2 agreed with 16 of the barriers; 14 agreed with 17 barriers; whilst 61 agreed with 18 barriers. This suggests that the majority of regulatory, enforcement and businesses perceived that there should be 18 barriers important to national fishery safety infrastructure because only 2 perceived 16 barriers and 14 perceived 17 barriers. Thus, this study concludes that there are 18 barriers which exist within the national food safety infrastructure which prevent the implementation of HACCP in fishery businesses in Sierra Leone.



Table 37: Barriers versus Regulatory, Enforcement and Businesses (Developed for this study)

<i>Number of Barriers</i>	<i>Number of Regulatory, Enforcement and Businesses</i>
16	2
17	14
18	61

Out of the total 18 barriers identified, 12 of them were agreed by all (77) of the regulatory, enforcement and businesses in Stage II albeit at different scores: these barriers include ‘A-Lack of Appropriate Fishery Policy’; ‘B-Lack of Agreement’; ‘C-Lack of Enforcement’; ‘E-Lack of Human Expertise and Training’; ‘I-Lack of Awareness’; ‘L-Lack of PRPs in Fishery Businesses’; ‘N-Lack of Consumer Agency’; ‘O-Negative Guideline Factors’; ‘Q- Lack of Competence’; ‘T-Lack of Motivation’; ‘U-Lack of Understanding’; and ‘V-Lack of Fishery Standard or Specification’. Only 16 out of 77 regulatory, enforcement and businesses in Stage II disagreed with 6 barriers including ‘D-Lack of Outcome Expectancy’; ‘H-Lack of Access to Information on Hazards’; ‘J-Lack of Self-Efficacy’; ‘P-Negative Environmental Factors’; ‘R-Lack of Private Consultancy Firm’; and ‘S-Lack of Cueing Mechanism’. However, since 61 out of 77 agreed with all 18 barriers and majority carries the vote, this study concludes that 18 barriers are extant in national food safety infrastructure, which prevents the implementation of HACCP in fishery businesses in Sierra Leone.

The author also argues that some of the 6 barriers disagreed with achieved good or satisfactory ranking in terms of priority of impact. For example the barrier ‘R-Lack of Private Consultancy Firm’ is ranked 7th which is equivalent to 2nd prioritized barrier in terms of significance in national food safety infrastructure, and achieves 3 rating of the Likert-scale by 76 out of 77 interviewees in Stage II. In another example barriers ‘H-Lack of Access to Information on Hazards’; ‘P-Negative Environmental Factors’; and ‘D-Lack of Outcome Expectancy’ are ranked 11th, 14th, and 16th or equivalent to 6th, 9th and 11th positions respectively. This ranking further concludes that all the 18 barriers are perceived relevant to national food safety infrastructure, which prevents the implementation of HACCP in fishery businesses in Sierra Leone.



It can further be concluded that the ranking of the 18 barriers can be summarized into positions of first (1st) to thirteen (13th) to suggest different strengths of impacts on the national fishery safety infrastructure that prevents compliance with international HACCP regulations: firstly, the 6 barriers ranked equally as 1st by all regulatory, enforcement and businesses can be together ranked as 1st; and secondly 12 barriers ranked second through thirteen agreed by all regulatory, enforcement and businesses, Table 38.

Table 38: Summaries of Ranking of HACCP Barriers To Suggest Different Strengths of Impacts (Developed for this study)

BARRIER	RANK/SUGGESTED STRENGTHS OF IMPACTS
A.Lack of Appropriate Fishery Policy	1 st –Strength of impact
C.Lack of Enforcement	
E.Lack of Human Expertise and Training	
L.Lack of PRPs in Fishery Businesses	
U.Lack of Understanding	
V.Lack of Fishery Standard or Specification	
R.Lack of Private Consultancy Firm	2 nd –Strength of impact
N.Lack of Consumer Agency	3 rd – Strength of impact
I.Lack of Awareness	4 th – Strength of impact
O. Negative Guideline Factors	5 th – Strength of impact
H.Lack of Access to Information on Hazards	6 th – Strength of impact
T.Lack of Motivation	7 th – Strength of impact
B.Lack of Agreement	8 th – Strength of impact
P. Negative Environmental Factors	9 th – Strength of impact
Q. Lack of Competence	10 th – Strength of impact
D. Lack of Outcome Expectancy	11 th – Strength of impact
S.Lack of Cueing Mechanism	12 th – Strength of impact
J.Lack of Self-Efficacy	13 th – Strength of impact

It can be argued that ‘lack of appropriate fishery policy’, ‘lack of enforcement’, ‘lack of human expertise and training’, ‘lack of PRPs in fishery businesses’, ‘lack of understanding’, and ‘lack of fishery standard or specification’, are ranked first in terms of impact on national fishery safety infrastructure that prevent the compliance with international HACCP regulations. These are perceived by the stakeholders to be the strongest sets of barriers of the national fishery safety infrastructure. It can therefore be concluded that after this set of 6 strongest barriers, the trend of impacts may be followed in descending order by ‘lack of private consultancy firm’, ‘lack of consumer agency’, ‘lack of awareness’, ‘negative guideline factors’, ‘lack of access to information on hazards’, ‘lack of motivation’, ‘lack of agreement’, ‘negative environmental



factors', 'lack of competence', 'lack of outcome expectancy', 'lack of cueing mechanism', 'lack of self-efficacy', respectively. The generated definitions for the 18 categories of barriers perceived by the regulatory, enforcement and businesses in this study are given in table 28, chapter 5. These definitions were developed into a ladderized barrier concept category in the conceptual framework covering knowledge as a component of acquired truth; attitude as a change of mind set due to acquisition of knowledge; and behaviour as the action taken following acquisition of knowledge and development attitude, Figure 33, chapter 5, page 242, of this research. Ladderized barrier allows stakeholders to properly identify and understand barrier category as they progress between knowledge; attitude and behaviour and vice-versa. It opens opportunities for target interventions and acquiring benefits of HACCP to stakeholders.

This research further concludes that the conceptual framework designed in this study suggests the 18 barriers that must be overcome by the regulatory, enforcement and businesses to finally reach a point conducive to compliance with international HACCP regulations in fishery businesses in Sierra Leone. The conceptual framework begins with acquisition of knowledge through overcoming 4 barriers including 'lack of awareness'; 'lack of access to information on hazards'; 'lack human expertise or training'; and 'lack of understanding'. This is followed by proper attitude development through overcoming 4 barriers including 'lack of agreement'; 'lack of self-efficacy'; 'lack of outcome expectancy'; and 'lack of motivation'. Resultantly this will lead to eventual behavioural change through overcoming 10 barriers including 'lack of cueing mechanism'; 'lack of private consultancy firm'; 'lack of competence'; 'negative environmental factors'; 'negative guideline factors'; 'lack of consumer agency'; 'lack of enforcement'; 'lack of PRPs in fishery businesses'; 'lack of fishery standard or specification'; and 'lack of appropriate fishery policy', preventing compliance to international HACCP regulations in Sierra Leone fishery businesses. Nevertheless, the research concludes that the conceptual framework attempts to provide niches for 18 barriers identified within the major categories in the national fishery safety infrastructure. This objective was pursued to identify the perceived barriers, which exist within the national food safety infrastructure, which prevent the implementation of HACCP. From the categories of barriers identified, the study may further conclude that more intensive knowledge based intervention strategies specifically designed for regulatory, enforcement and businesses could be formulated and implemented as an initial step to



compliance with international HACCP regulations. In terms of attitude and behaviour barriers categories, this study concludes that absence of proper *knowledge* in HACCP within the national fishery safety infrastructure could be translated to the inability of the regulatory, enforcement and businesses to develop the proper *attitude* and *behaviour* toward the HACCP principles and steps, and consequently the reason for non-adoption and implementation of HACCP in fishery businesses in Sierra Leone.

6.3.3 Objective 3: To determine how the benefits of HACCP as suggested by other national HACCP regulators differ from those benefits perceived by local regulatory, enforcement and commercial representatives in Sierra Leone

The difference between HACCP benefits suggested by other national HACCP regulators and those benefits perceived by regulatory, enforcement and commercial representatives in Sierra Leone could be determined more easily if there were more data on HACCP benefits in the literature. The researcher however argues that the information provided about the sources and provenance of this data including the methodology of the data collection are limited to assess the relevance of such views to a fishery sector in Sierra Leone that is basically SME and has never adopted and implemented HACCP system before. On the other hand it is useful to compare the accrued benefits of implementing HACCP with the aim of revealing the differences and agreements between the views of those businesses presented by other national HACCP regulators who actually have the experience in adopting and implementing HACCP, with those of the regulatory, enforcement, businesses and consumers in Sierra Leone who have not obtained HACCP certification but have the intention to do so. It can be argued that the benefits that accrue from the implementation of HACCP produced by other national HACCP regulators are utilized apparently to encourage the adoption of the HACCP system.

It can also be argued that there are probabilities to see ranges of similarities as well as differences between the two columns of benefits, that is, ‘ranked HACCP benefit perceived by the 3 focus groups’, and the ‘ranked HACCP benefit by other HACCP regulators’, in terms of idea or notion they represent. On the other hand the two columns illustrate where some benefits listed fail to overlap, because you can see that some benefits are unique to the specific stakeholders (government regulatory authorities, businesses and consumers) of food control system in Sierra Leone, but were not identified by other HACCP regulators in the literature



review. Table 34, below makes more emphasis on the number or categories of benefits perceived by the focus groups against those by other HACCP regulators in the literature review, and the way these benefits match each other. About 22 benefits were perceived by the stakeholders in Sierra Leone as compared to 12 benefits by other HACCP regulators. The less number of benefits listed by other HACCP regulators suggests that there may be a corresponding lack of understanding by the other HACCP regulators of what are the real benefits of HACCP to the LDCs such as Sierra Leone in undertaking HACCP.

The benefits perceived by the 3 focus groups that match with those benefits in the literature review are linked to each other by the mauve-purple shaded area of the column **“matching of benefit”**. These include 12 benefits namely, “preventive control of FBD”, “cost effective production”, “reduced litigation”, “improved food control”, “consumer confidence”, “increased market access”, “improved product safety”, “improved staff motivation”, “consumer and government trust”, increased due diligence”, “improved trade negotiation and trade”, and “improved FBD surveillance and communication. The benefits which are considered by the 3 focus groups but are not listed in the literature review have been greyed out in the column of **“matching of benefit”** below the mauve-purple area. These include ten benefits, namely, “increased food safety awareness”, “SMEs expanded”, “reduced public medical cost”, “reduced poverty”, “reduced health and socio-economic problems”, “reduced unemployment”, “improved food security”, “better consumer protection group”, “improved quality of life”, and “increased traceability”. Two of these 10 benefits including “increased food safety awareness” and “SMEs expanded” are among those benefits that were ranked 1st by the focus groups, whilst “reduced public medical cost” and “reduced poverty”, were ranked 2nd by the focus groups, and the rest of them ranked 3rd to 5th in order of national priorities.

In Table 39, below, the notion of “preventive control of FBD” was ranked 1st among others, supported by all sectors of stakeholders in the country, and matches with “prevention of FBI” by the other regulators in the literature review. If this matching is a fair linkage of the two notions, it is noticeable that the benefit of “preventive control of FBD” is at the forefront in the minds of the stakeholders, and one of the 4 top priorities of other HACCP regulators.



Table 39: Compare and contrast benefits perceived by 3 focus groups (SIHA, SIHB, SIHC) with other regulators: Adapted for this study from Kane, 2011

Ranked HACCP benefit perceived by 3 focus groups (SIIIA, SIIIB, SIIIC) in Sierra Leone					MATCHING OF BENEFITS	Ranked HACCP benefit by other HACCP regulators						
Ranked	SIIIA	SIIIB	SIIIC	Benefit		Benefit	Other Specific Regulators					Ranked
							FSA	FSIA	FDA	WHO	SFAC	
1 st				Preventive control of FBD		Prevention of FBI						1 st
1 st				Cost effective production		Reduction in Costs						1 st
2 nd				Reduced Litigation		Legal Protection						1 st
1 st				Improved food control		Better Risk Management						1 st
2 nd				Consumer confidence		Customer Confidence						2 nd
1 st				Increased market access		Improved Market Access						2 nd
1 st				Improved product safety		Product Improvement						2 nd
4 th				Improved staff Motivation		Team Ownership						2 nd
2 nd				Consumer & Government Trust		Improved Relationships						3 rd
3 rd				Increased ‘Due-diligence’		Improved Management						3 rd
1 st				Improved trade negotiation & trade		Improved Trading						3 rd
2 nd				Improved FBD surveillance & communication		Process Based						3 rd
1 st				Increased food safety awareness								
1 st				SMEs expanded								
2 nd				Reduced public medical cost								
2 nd				Reduced Poverty								
3 rd				Reduced health & socio-economic problems								
4 th				Reduced unemployment								
4 th				Improved food security								
4 th				Better consumer protection group								
4 th				Improved quality of life								
5 th				Increased Traceability								



Not surprisingly, this indicates that the regulatory authorities, food businesses and consumers have the national responsibility to prevent FBDs. This means that the aim of achieving food safety through the preventive control of FBDs in Sierra Leone is a shared responsibility by all sectors; perhaps all sectors consider FBD as one of the major obstacle or barrier of achieving HACCP certification. This outcome may also be argued that for Sierra Leone the key role of reducing FBD does not only rest with one sector but to all sectors including regulatory authorities, businesses and consumers, partly because businesses and regulatory authorities have lost their reputations and consumer awareness is weakened due to lack of credible consumer advocacy group. Thus if other regulators believe that the responsibility of preventing FBD in LDCs rests squarely with the regulatory authorities, they got it wrong for at least in terms of prevention of FBD in Sierra Leone.

Another significant distinction between the two benefits is “reduction in cost” and “legal protection” are scored 1st by the other regulatory authorities, yet the matching counterparts including “cost effective production” and “reduced litigation” are not even regarded by the regulatory authorities in Sierra Leone, though “cost effective production” was scored 1st and “reduced litigation” 2nd by the businesses. On the other hand “increased market access” was scored 1st by the local regulatory authorities and businesses, yet on the basis of matching term the benefit “improved market access” was not ranked as the most important and was placed 2nd by the other regulatory authorities. Similarly, the benefit “improved staff motivation” is ranked 4th by local regulatory authorities and businesses, but the matching counterpart “team ownership” by other regulatory authorities is scored 2nd.

This study therefore argues that the number, mismatching, and different priority ranking of benefits between other regulatory authorities from the literature and the sectors of national stakeholders may represent a simple consequence of the data collection techniques, thus ranking benefits given by other HACCP regulators obtained from the literature review does not fully substantiate their overall understanding of HACCP, especially for Sierra Leone. Nevertheless, it may serve as a springboard to understand a significant difference and similar viewpoints between the national stakeholders in Sierra Leone against other HACCP regulators. It can also be argued that the notions and meanings of benefits by other HACCP regulators in the literature may be



more applicable to developed countries that have most of the infrastructures in place and achieving HACCP certification than it does for Sierra Leone and perhaps other LDCs, who have not yet achieve HACCP certification due to technical barriers. In terms of benefits of HACCP by other regulators in the literature review, they fall short to adequately understand what is appealing to the LDCs such as Sierra Leone, and consequently, risk of not capturing their attention, enthusiasm, zeal, appetite and willingness to successfully implement HACCP. This study therefore concludes that if the LDCs such as Sierra Leone is to successfully adopt and implement HACCP, all sectors of the national stakeholders including regulatory authorities, businesses and consumers need to be convinced of its benefits or values in terms of their own perceptions based on the viewpoint of national priorities and the challenges they face, but not in the particular viewpoint of other HACCP regulators.

Another assumption is that it is most unlikely that this work by other national HACCP regulators giving less than 12 benefits of HACCP refers to the SMEs in LDCs since little or no HACCP work has been undertaken with most of these types of countries and businesses due to several technical barriers such as those identified by this study. However, the author argues that discrepancies of this nature are significant or not surprising in that several regulatory authorities are making claims that may not be evidenced in the actual national environments; and consequently have no resonance with the businesses of these countries who have the responsibilities of voluntarily adopting and implementing HACCP. Unlike other studies, this research utilized research methodology that was able to collect data on benefits from the perceptions of the actual regulatory, enforcement, business and consumers of one of the poorest countries in the world who are familiar with their entire food safety infrastructure and directly affected.

6.4 Suggested strategies to remove HACCP barriers perceived in Sierra Leone

During the focus groups discussions (Stage III of triangulation) the regulatory, enforcement, businesses and consumers perceived the benefits that can be accrued from the successful implementation of HACCP, after the removal of barriers determined and ranked in Stage I and



Stage II of triangulation. The responsibility to overcome these barriers lies with all the stakeholders, including governments, businesses, and consumers.

The use of the three focus groups in this research was therefore essential for these stakeholders to consult and determine priorities of benefits that will motivate successful implementation of HACCP. In order to help facilitate strategies for the implementation of HACCP in Sierra Leone, the three focus groups discussions specifically analysed the benefits and barriers to the implementation of the HACCP system. The focus groups further suggested strategies in order of priorities to overcome barriers to compliance with HACCP of international trading partners.

The focus groups argued that the achievement of HACCP benefits in Sierra Leone requires adequate strategies to eradicate the barriers. This study suggests that the full attainment of these strategies could increase the need for all the stakeholders throughout the country to successfully and voluntarily implement HACCP and to become more empowered by the HACCP benefits.

It can also be argued that if the country properly realizes these strategies, it can amplify its unique internal capabilities and strengths by comparing and aligning with complementary capabilities in other countries that have achieved HACCP in order to achieve benefits of HACCP. In other words, these strategies in Table 40 below could be Sierra Leone's articulated aims or responses to remove HACCP barriers perceived by the three focus groups.

Table 40: Ranking of HACCP barriers and suggested Strategies to remove them as perceived in Sierra Leone (Developed for this study)

Ranked	Barrier	Suggested Strategies
1 st	Lack of appropriate fishery policy	HACCP be part of fishery policy
1 st	Lack of enforcement	Compel businesses to implement policy and regulations
1 st	Lack of human expertise & training	Acquire skills and knowledge in HACCP
1 st	Lack of PRPs in fishery businesses	Mandatory adoption & implementation of PRPs
1 st	Lack of understanding	Sustainable training in HACCP
1 st	Lack of fishery standard or specification	Develop and enforce mandatory standards
2 nd	Lack of private consultancy	Establish national HACCP Centre
3 rd	Lack of consumer agency	Constitute and support consumer advocacy group
4 th	Lack of awareness	Nationwide sensitisation
5 th	Negative guideline factors	Implement simplified & specific HACCP modules
6 th	Lack of information on hazards	Establish national Food Safety information system
7 th	Lack of motivation	Provide incentives
8 th	Lack of agreement	Coordination of national food control system
9 th	Negative environmental factors	Develop infrastructure
10 th	Lack of competence	Capacity building
11 th	Lack of outcome expectancy	Implement total quality management (TQM)
12 th	Lack of cueing mechanism	Management commitment to food safety
13 th	Lack of self-efficacy	Building integrity and professionalism

6.4.1 Implications of the Study for Aid Agencies

Theoretically, this study implies that the regulatory, enforcement and businesses in Sierra Leone cannot effectively adopt and implement HACCP system in national fishery businesses, without eradicating the barriers from this process. The author therefore argues for an approach to be considered that would focus more on how to remove such barriers that impede compliance with



international HACCP regulation, and less on the benefits that can accrue. The results of this research also reveal that the barriers perceived by the regulatory, enforcement and businesses differ and this may influence the way interventions are focused. Among a total of 18 barriers perceived by stakeholders, 6 of them were ranked equally as 1st, indicating the most important barriers that impede the compliance with international HACCP regulations; and this could mean that any approach to eradicating such barriers should take these specific barriers as a special challenge.

The results suggest that the barriers to compliance with international HACCP regulations for LDCs such as Sierra Leone, that has overlapping and confused government regulatory authorities; incomplete and inappropriate regulation; lack of enforcement; lack of training and consultancy organizations; and poor attitudes and understanding of food safety in businesses and at street vending level; are different, at least to some degrees, in needs and perceptions, as compared to developed countries (Jevsnik, Hlebec and Raspor, 2008 & 2006).

Moreover, the barrier of ‘financial constraints’ is not significant in the perceptions of the regulatory, enforcement and businesses in Sierra Leone and was categorised as neither an incentive or disincentive; this would fit with the fact that much financial support has been provided for the sector by the international community but all to little avail. On the other hand, the research suggest that those aid agencies from overseas may have little understanding of the barriers of HACCP for Sierra Leone; and perhaps this is the main reason why financial aid has so far failed to correct the complex problems of HACCP in Sierra Leone.

6.4.2 Implications for national fishery safety policy and regulation

For decades now, up to the time of this research, food safety control in Sierra Leone has been weakened by the existence of flawed legislation, multiple jurisdictions, and weaknesses in surveillance, monitoring and enforcement (CAC, 2011). Consequently, the country lacks the appropriate policy instruments and enforcement tools that would promote the practice of adopting and implementing HACCP. The effect of these policy and regulatory failures on the fishery sector is seen clearly in Sierra Leone’s inability to export its products to EU and other



developed markets. The fishery sector now seeks to achieve improved food safety, quality and nutrition, but this requires a high level of political and policy commitment. Only the Government can provide the political and policy commitment to make HACCP a legislative requirement, and only the Government can provide the regulatory, enforcement and businesses advice needed to strengthen fishery safety infrastructure. Hopefully, this study will strengthen the will of those with political power to change regulatory and policy priorities so that HACCP is given the focus it deserves.

HACCP, is cost effective and even SMEs in LDCs can cope with the demands of HACCP, if they have the right tools and support. Moreover, this study has shown that there are barriers in Sierra Leone that need to be eradicated if they are to adopt and implement the HACCP system, and that these barriers are many and specific, and their appropriate identification lies in the perceptions of national regulatory, enforcement, and businesses. It is hoped that this research will send a strong signal to those involved in the regulatory, enforcement and businesses sectors that if they want to adopt and implement HACCP, they need to understand these barriers and the benefits. And they need to encourage policy makers to choose the most suitable options for their fishery safety infrastructure in terms of legislation, infrastructure and enforcement mechanisms. These barriers prevent the proper exploitation of fishery resources and overcoming them would benefit the Sierra Leone economy and its public health.

In terms of benefits of HACCP it is apparent from this study that the national HACCP regulators are not fully familiar with most of the benefits they should emphasise to encourage businesses to adopt and implement HACCP. The literature review suggests 12 benefits of HACCP, but regulators in this study perceive that there are as many as 22 benefits of HACCP for SMEs in Sierra Leone, but these are not communicated effectively to those who could benefit. The overarching problem with communicating benefits is that regulators all over the world are caught between achieving compliance through enforcement and sanctions and achieving compliance through persuasion and motivation. In Sierra Leone this study seems to show that motivations to encourage, facilitate and support businesses to adopt HACCP are not adequate.



This study suggests to regulatory, enforcement and businesses that Sierra Leone's fishery industry would have many benefits from successfully adopting and implementing the HACCP system. These include economic benefits that are tangential to the successful implementation of HACCP. This study therefore suggests that exploring the direct economic barriers to HACCP in Sierra Leone fishery safety infrastructure would be another productive and interesting area of research.

Furthermore, the results of this study reveal that the adoption and implementation of HACCP in fishery businesses in Sierra Leone are impeded by 18 barriers, and for the fact that these barriers are perceived by those directly involved in national fishery safety infrastructure, it would therefore seem reasonable to assume that they exist in practice and are 'real'. If national regulatory authorities are to promote the adoption and implementation of HACCP system in fishery businesses as a means of meeting international food safety requirements, then it might communicate information about these barriers and make it part of national fishery control requirements and national guidelines for educating all those involve in fishery practices. The information about barriers and the benefits has great significance with regulatory, enforcement and businesses in the national fishery safety infrastructure.

Considering the results of this study, the source and method of data collection, one may suggest that the identified HACCP barriers and the benefits are resonance in the sense of resolving the problems of national fishery safety infrastructure, thus it would seem apparent that communicating these barriers will shift the decision making calculation of regulatory, enforcement and businesses positively toward the direction of adopting HACCP in local fishery businesses. Where the regulatory, enforcement and business know and acknowledge the barriers, then the overall weighting in favour of HACCP may mean that the national stakeholders are more in favour of the adoption and implementation of HACCP. On the contrary, the regulatory, enforcement and businesses are likely to reject HACCP system if they do not know and acknowledge the barriers.

The results of this study, in terms of barriers and benefits, suggests an extra arm for the regulatory, enforcement and businesses, which do not adopt HACCP as a food safety



management system of choice, not because they do not want to do so, but mainly because they are unaware of the barriers and benefits of the system. In other words, the outcomes of this research will influence the regulatory, enforcement and business sector, because it now seems that there are 18 barriers to be eradicated, and consequently, 22 benefits will be gained from the successful adoption and implementation of HACCP in local fishery businesses. However, the author further argues that awareness of the barriers within the fishery safety infrastructure and the benefits to be accrued from eradicating those barriers are milestones for the regulatory, enforcement and business to adopt HACCP; but a concern still remains to be addressed, that is, whether the local fishery businesses have the energy, strength, commitment and dedication to pursue the process. This study suggests that the regulatory and enforcement authorities need to carry out considerable work and even go extra miles to address this concern.

6.4.3 Limitations to the triangulation methodology in this study

In every research, there are limitations, and this research, which seeks to unravel the perceptions of regulatory, enforcement and businesses in Sierra Leone fishery safety infrastructure, with regard to the HACCP barriers that exist to its adoption and implementation, is not exempted. For example, the study does not seek to evidence these perceptions on the barriers through data collection outside of the understandings of those interviewed since it is their perceptions being uncovered. The author argues that the triangulation methodology of three stages of data collection coupled with the contextual conditions and constraints of each stage force certain compromises, but importantly, the objective reality of these understandings does not invalidate the perceptions that exist, and do not compromise the overall quality of this study. Table 41, below attempts to highlight the limitations of triangulation methodology utilized by this study.

Table 41: Constraints, Compromises and Evaluations of the Three Stages of Triangulation Methodology Compared (Adapted from Connell, Lynch et al., 2001) (Modified for this study)

Constraints, compromises and evaluation	Stage I (SI)	Stage II (SII)	Stage III (SIIM)
Constraints	There are no literatures on HACCP for Sierra Leone and made it difficult to evidence the barriers reported by the interviewees. This limits the agreement or disagreement about the categories of barriers perceived.	Likert scale of 0 to 3 used suggests an arbitrary and the scoring of barriers by scale was subjective and, it may have limited the chances of the interviewees showing more subtle and nuance understandings, especially where a barrier exists in a particular place at a specific period of time, but not always and forever.	The attitude and affiliation among senior members of regulatory and businesses specially during all the groups discussions on the 4 th day, made the participants to be very careful about how they speak, argue and criticise, and even the way they comments on the barrier categories and associated benefits.
Compromises	Converging interviewees bolsters self-confidence and self-esteem in those who may think that they have little to offer. This encourages stakeholder to assume ownership of the outcome.	Interviewees familiar with problems in the national food control systems, businesses and at street vending level, and regard certain barriers as inevitable, and deserving of the higher score of 3 from the Likert scale.	The groups try to follow the model and guideline for discussion.
Evaluation	Great depths of interviewing and holistic approach generate good structured data and may spark easy buy-in for future target intervention.	Good ranking of barriers but non-restriction on derived categories of barriers could have offer more analysis	The model and guideline permit only information sharing but not allow to completely change the meaning and the multidisciplinary nature of the groups. Involvement of consumers likely influences the outcomes excessively.

that may deliver significant advantages to the national food control system..

6.4.4 Limitations to the Stage I (SI): Convergent Interviews

The processes of convergent interviewing (CI) in this study were effective in identifying barrier categories. All the participants including interviewees and interviewers found this method



efficient for data collection as compared with more traditional methods of qualitative data collection, such as unstructured interviews. The CI also avoids researcher bias during the process of developing categories and definitions of HACCP barriers, because the exclusion or inclusion of categories of barrier in this research was the sole responsibility of the regulatory, enforcement and businesses interviewed. They identified what barriers existed for them and what did not from their own perspective. It can be recalled from the statement of problem of this research that the food safety system in Sierra Leone is fragmented and not coordinated and most of the actors in the fishery safety infrastructure are not adequately familiar with the HACCP system; but converging interviewees bolsters self-confidence and self-esteem in those who may think that they have little to offer. The approach of identifying barriers from the perception of national stakeholders demonstrates to people ways in which they can take more control of food safety management systems; and consequently, encourages stakeholder to take ownership of the outcome. This may also spark creativity in the regulatory, enforcement and businesses involved; and encourage a collaborative approach that may deliver significant advantages to the national food control system.

However, the researcher notes that convergent interview alone is not enough to produce a clear buy-in with understanding and evaluation of how the HACCP participatory process works and commitment in developed interviewees. This may perhaps be due to the absence of concrete data including hard and electronic copies of published manuscripts on the concept of HACCP in Sierra Leone to substantiate the perceived barriers. The author argues that the barriers perceived by the regulators, enforcers and businesses could be further earned by more in-depth studies and might better achieve, notwithstanding the greater challenges of interviewing large number of regulators, enforcers and businesses.

It may be that more tactical interviewing would more adequately capture the subtleties of thought that might be a part of the regulatory, enforcement and businesses understandings. For example, the categories of barriers suggested by previous interviewees may not only constrain the thinking of the subsequent interviewees, but they may also find the process some how handicapped due to the fact that all of the categories of barriers were previously suggested and the only option available for last set of interviewees is agreement or disagreement with the barriers. It is possible



that more conventional unstructured interview techniques might capture more of the rich picture and suggestions of subsequent interviewees as well.

6.4.5 Limitations to the Stage II (SII): Individual case interviews

One of the key advantages in this study is that, this method provides a one-to-one setting that establishes a comfortable atmosphere for the interviewee to speak freely with the interviewer. The method simplifies the capturing of data through the development of a set of key questions around the barriers suggested in Stage I of this research. Consequently, this put the data into a position to be easily structured for smooth and efficient analysis.

However, subtleties and nuances emerged from an individual case interview and these tend to remain covered in some of the 77 interviewees. Participants and the author noticed that individual case interviews are lengthy and time consuming, because the interviewer found it extremely difficult to conduct more than a couple in a day without sacrificing certain elements of quality.

It can also be recalled that the Likert scale of 0 to 3 used in this process suggests an arbitrary degree for some of the interviewees. It has to be accepted that the scoring of barriers by scale was subjective and to certain extent, it may have limited the chances of the regulatory, enforcement and businesses participants showing more subtle and nuance understandings, especially where a barrier exists in a particular place at a specific period of time, but not always and forever. In fact, some of the scoring of barriers through the Likert scale may have sometimes been influenced by the personality of the interviewee. In other words, the common sense of gratitude or appreciation of the interviewee personality such as, regulatory officer, enforcement officer or managing director of a fishery business, may influence how they responded to certain questions.

Moreover, there may have been a sense that the regulatory, enforcement and businesses understood fully the overlapping and confused government regulatory authorities; incomplete and inappropriate regulation; lack of enforcement; lack of training and consultancy organizations; and poor attitudes and understanding of food safety in businesses and at street



vending level, and therefore regard certain barriers as inevitable, and as such, deserving of the higher score of 3 from the Likert scale.

Despite the limitations, the study suggests that the scoring of barriers via the Likert scale is less important than the profile of the category of barriers which in reality reflect the views and perceptions of the interviewees. Consequently, the relative scores given to the barriers reflect more of their feelings and perceptions than any nominal scores, because the relative scores indicate which barrier they value more relative to the others.

6.4.6 Limitations to the Stage III (SIII): Focus Group Interviews

One of the advantages of the focus groups discussions in this study is that respondents tend to enlarge and refine their responses through their interaction with other group members, and this seems to naturally lead to good data on the benefit of HACCP as well, in addition to information on barriers that emerged from SI and SII. Furthermore, the situation and atmosphere of the group's discussions were more exciting and make groups members feel more secure in expressing themselves. The interviewees seem to be uninhibited in expressing themselves and their appreciation of the barriers of HACCP from the SI and SII interviews. In fact, the groups were seen to be supportive of the advantages that the process encouraged full and open expression of perceptions, experiences, and attitudes and viewed the whole process positively.

However, the data from SI and SII contain a wide range of barriers, the identification of issues and the reasons the group members hold positions on issues, had to be based on a careful analysis of each barrier through adhering to the focus groups protocol. Throughout this stage, groups responded occasionally without overly much consideration of detail. The author argues that the structure and the protocol of focus group interview may have established, inadvertently, the circumstances that led to positive positions on barriers. Again, the general feeling among the focus groups members seemed honestly supportive of the notion that barriers of HACCP exist and impede its adoption in local fishery businesses; and that removing such barriers brings about benefits to the businesses that successfully implemented the HACCP system. On the other hand,



individual focus group responses largely were supportive of the overall focus groups level of agreement on the barriers and associated benefits.

Similarly, individual members of each group seems to go along with the group rather than express their personal opinions, irrespective of the fact that some more vocal members with strong opinions sometimes altered the group's expressed view substantially. For example, the barrier of 'lack of outcome expectancy' was not felt overly significant to the focus group of Fishery Businesses Group (SIIB) who are all SMEs and seem to be satisfied with the local market situation, where there are no proper food safety compliance but they are making their money, and because some of them don't care about export, the group tends to down-grade this barrier. However, one member of the group was from one of the businesses that would hope profiting by end of the fishery export ban, and spoke vehemently to support the barrier of 'lack of outcome expectancy' and the benefits of 'increased market access' of which the group strongly supported at end.

The outcome from the focus group discussions indicate that knowledge, attitude and behaviour of the theory and practice of HACCP were just not available in the national fishery safety infrastructure, but they are aware of the requirements and that there are barriers that exist within the infrastructure on its adoption. Some of the regulatory, enforcement, businesses and consumers that participated in the focus group discussions are not well conversant with the terms hazard analysis critical control point (HACCP), pre-requisite programmes (PRPs), which may indicate that they do not adequately understand the issue of modern food safety management system. However, those consumer representatives from the University of Sierra Leone and certain members from the regulatory, enforcement and businesses with some background theories of HACCP system tend to serve as the major source of information and guidance for the rest of the groups, and practically, these members were considered the sole source for most of the information which the focus groups receive and rely upon. With respect to the perceptions, feelings and attitudes on individual barrier categories and associated benefits, these points can be derived from Chapter 4 of this thesis. The entire Focus Groups were useful because they were able to review each category of barrier that had been generated during the SI process.



However, it was noticed that the results were not as enlightening as had been expected from the focus groups protocol. The focus groups protocol in appendix 4, contains five separate questions for each of the 18 barriers derived from SI, and the questioning followed the basic structure of the protocol. Though the discussions followed fairly structured in line with the protocol, but at times, set patterns failed to provide enough information that are characteristics of the personalities and experiences of participants who are senior members of regulatory, enforcement, businesses and consumers. The author opines that certain outcomes of the focus groups discussions would be altered if the author were to carry out further research on similar topic.

The author observed a steady progress in the interviews of the focus groups, however, certain elements in their operation and structure especially on reflecting on their perceptions, feelings and attitudes, may not have been handled properly with great care and subtlety. In most sessions of discussions, it was apparent that the focus groups were not producing much negative perceptions or feelings or attitudes on the barriers presented from SI and SII processes. In other words, the focus groups were overwhelmingly positive about the barrier categories presented in the focus groups questions. This study suggests that this could, of course, reflect ambitious set of feelings and beliefs about the complexity of the problems in the national fishery safety infrastructure and the existence of real barriers that impede the compliance with international HACCP regulations by national fishery businesses. The author hopes that the outcomes of the focus groups were the real perceptions, feelings and attitudes of the senior stakeholders that may facilitate the buy-in of the findings, but again argues that the absence of negative perceptions or argument about the national fishery safety system and its perceived barriers was surprising to certain extent and may implies that the focus groups did not fully meet the expectations of the research as was initially hoped during the process of developing research design.

6.4.7 Reflection on the focus groups responses

The nature of responses from the discussions of the focus groups suggest that certain factors may have contributed to the lack of negative perceptions on the barriers from SI and SII processes. Firstly, it seems that the focus groups were a mixture of three sets of different



components of national food safety infrastructure including SIIIA (Regulatory Group), SIIIB (Fishery Business Group) and SIIIC (Consumer Group). Therefore, the best way to have organize the discussions was to interview each group separately and preferable at the different premises of one of the members of each set of group. One can assume that this would not only be a familiar ground for the discussions, but there would be at least some written materials, diagrams, charts or pictures to refer to and would feel more comfortable than the public hall or centre used as the venue for discussions.

However, the author argues that having a meeting of this kind, in the premises of a workplace; then considering the sensitivity of the information being sought that concerned about the complexity of the problems in regulatory system; them involving very senior members of the regulatory, local businesses, and consumers from institution of higher learning, implied that, politicians, the statutory authorities and other dignitaries had to be officially informed and consequently, the list of participants could be made public and most likely observers and journalist would be sent to observe and report the process.

If this happens, the anonymity of the participants would no longer be preserved and consequently the participants would not reveal their honest perceptions and feelings about the problems that exist within the national fishery safety infrastructure. Furthermore, interviewing each group separately would have obtained views that are egocentric because there may be no constructive and objective criticism and would have usher great problems in the data analysis.

Secondly, the presence of senior members of regulatory and enforcement officers in these discussions especially all the groups discussions on the 4th day, meant that the participants from the fishery businesses who supposed to be most familiar with what happens in the fishery businesses were going to be very careful about how they speak, argue and criticise, and even the way they comments on the barrier categories and associated benefits. The list of barriers were suggested by other members of the regulatory, enforcement and businesses that are unknown to the focus groups, but since they were all aware of the reality of the problems it was easy for participant to concord than criticise or ‘dig-out’ issues that may expose either regulatory or enforcement or businesses in such an open forum. Experienced reminds that in a situation where



there are no enforcement and nothing to enforce, there is a thin line between regulators, enforcement officers and businesses in terms of relationships----‘they always need one another and as one proverb says-----“scratch my back and I scratch your back” ’ - simply means help me and I help you.

The overall conclusion on the focus group is that there was little or no opportunity for the groups to reject most of the data from SI and SII processes as was expected by the researcher. The author argues that the issues of political interference, anonymity, media coverage, group identity, group make-up, the presence of an authority, and the consequential reality of the complex problems in the national fishery safety infrastructure mitigated against a more negative perceptions and discussions on the barrier categories presented for critical discussions. Similarly, the focus groups may have been disappointed about the author of this thesis which seems to be indicated by adding very little to barriers determined by the SI process, despite the fact that all the benefits associated with each of the barriers were determined solely by the focus groups. Nevertheless, the corroboration of the results of the SI and II in the study promotes objectivity, reliability, validity, and consequently strengthens the research design that mainly based on triangulation.

6.4.8 Evaluation of Triangulation Methodology Utilised

This section evaluates triangulation as a methodology used in this research to collect data and consequently increase the validity of the research findings. Typically, all good research practice obligates the researcher to use methodology s/he desires between what one would like to do and what one is capable of doing. The author decides to triangulate, that is, to explore multiple methods and data sources, with the aim of enhancing the validity of the outcomes of this study. Experiences show that regardless of different resources, time, constraints, epistemological, or methodological perspectives research has to go on to enable researcher to collect the type and quality of data s/he wants to collect. In this study the researcher wants to experience not only a wide range of qualitative methods of data collection but to also collect data, conceptualize studies, corroborate observational data, expect three data sources and methods to lead to a single



data about the barriers of HACCP that exist within fishery safety infrastructure in fishery businesses in Sierra Leone, in order to withstand any critique.

Another main reason for selecting this methodology for this research is that if flaws happen with one method it will be used to strengthen the other method to achieve the best results while overcoming the emerging deficiencies. The author's assumption is that the bias inherent in any particular data source or particularly method will be cancelled out when used in conjunction with other data sources, and methods. In another assumption, the author feels that the utilization of triangulation in this study causes a convergence of results upon the perceptions, feelings and attitudes on HACCP barriers from those involved in fishery safety infrastructure.

By examining the metaphors during the progression of the three stages of triangulation in this study, it is apparent that the three stage approach utilised achieved all these goals. One can even see that the patterns shown in the data reflect a considerable degree of theoretical replication that suggests the underlying realities of existence of barriers in national fishery safety infrastructure were being tapped; and that, although it has to be said with a degree of trepidation and with appropriate shades of conditionality and uncertainty, triangulation enables the collection and analysis of valid, reliable and replicable data for this research.

This study was conducted by utilizing a qualitative methodology as an essentially a strategy that facilitates the elimination of biasness and allows the dismissal of plausible rival explanations such that a truthful perceptions of national stakeholders on HACCP barriers in fishery businesses in Sierra Leone can be identified. In particular, the methodology used ensures a degree of subjectivity and demanded attention to controlling bias and establishing valid propositions not found in quantitative studies; because traditional quantitative techniques were considered incompatible with this epistemology.

However, the author argues that this explanation is not necessary when considering matters such as validity and reliability of the work undertaken through the uses of case study methodologies. In other words, experience reminds that case study methodologies are well supported as a means of uncovering data and shaping that data, especially when it has to do with issues such as



perceptions, feelings and the understandings of people. The research on determination of HACCP barriers that impede compliance with international HACCP regulation in fishery businesses in a LDC is an exploratory study, because it sought to find out what the national stakeholders including regulatory, enforcement and businesses perceive about the barrier categories that may be in existence.

With this methodology, one may suggest that the questions of why the stakeholders felt in this way, and what were the constraints, and what influences the shaping of their perceptions on HACCP barriers were not an objective. Despite this notion, this research attempted to suggest few of the factors that may have likely influence in the shaping of regulatory, enforcement and businesses perceptions of the HACCP barriers in fishery safety infrastructure in Sierra Leone. The outcomes of this research also suggests that the issue of a systematic uncovering of cause and effect is one that might be better dealt with by the use of a quantitative methodology, through the use of a model, and making statistical claims. This again suggests some reasons that investigating behaviour and perception in food safety infrastructure such as HACCP concepts would consequently allow for testing via the tools of qualitative methodology.

The qualitative methodology utilized by this study seems to be considered subjective in much the same way, as the interviewees were subjective; that is, interviewees made claims, which are their perceptions and therefore their sole property. One may derive that the subjectivity of this work is inherent in the qualitative methodology utilized, irrespective of the fact some guidelines or rules were prepared as attempts to prevent bias and to clearly state the degree of subjectivity that exists in the entire process.

Conversely, the interviewer, the interviewees and the interaction between them apparently engaged in exchanging of global opinions, feelings and perceptions at least more than barriers and benefits of HACCP under investigation. The researcher is nearly an academic and HACCP practitioner from a food safety and quality management background, who previously worked as a national stakeholder but now working as an international civil servant, and will therefore have a different and mixed views of the world of work than that shared by the national stakeholders,



who exist on the margins of serious socio-economic problems and who have to make a living by hook or crook on daily basis.

Another possibility is that different regulatory, enforcement, businesses and consumers have different global views based on their specific situations. The interviewees from regulatory, enforcement, businesses and consumers which the interviews of SI, SII, and SIII, were selected tended to be members of a particular set, and by their specific characteristics, they were different all together even if they are from the same set.

For example, the regulatory, enforcement, businesses and consumers volunteered to participate in the data collection of this study. As a result, they demonstrated willingness and enthusiasm to expend time and effort on HACCP system studies that they were even not fully aware of in terms of international or modern food safety management in their daily operations. They all tended to cooperate with the researcher and the research team; they were all deeply concern about the deteriorating situation of the national food control system; they were concern about export ban on fishery products from Sierra Leone; they were concern about the growing trend of foodborne diseases in the country; and they appeared to be knowledgeable in different disciplines of food operations apart from HACCP.

The issue of gender was not an objective of this study but the participants were mixtures of both men and women though at different proportion representing different ethnicity, political, management, administrative, academic, research, and business groups. Considering these multi-disciplinary, multi-facet or multi-characteristics, the perceptions, feelings and attitudes of interviewees on HACCP barriers and benefits may have been affected differently, which underscores the view that any generalisation of data needs to be cautiously approached. In this regard, the degree of congruence found in the results across a fairly dissimilar or sundry set of regulatory, enforcement, businesses and consumers through qualitative methodological triangulation guaranteed meaningful, resonance and a degree of validity and reliability of the study outcomes.



6.4.9 Suggestions for further research

HACCP is new and as for all other science and related concepts, it is dynamic and as such there are many areas of future work, which could be originated from this study. For example, further investigation into how these barriers can be removed would bring significant benefit not only for Sierra Leone but also to many other LDCs for successful adoption and implementation of HACCP system in their food safety management infrastructure.

New research can also derive from this study and may involve extending the work to other LDCs or other food sectors such as poultry, beef, fresh fruits and vegetables, spices and herbs to list but a few or repeat it for fishery products to other times and to other people within the same country but with different methods and approaches. The author suggests the use of a quantitative methodology in order to uncover ‘cause and effect’ abundantly in terms of not only what the barriers and benefits of HACCP are perceived to be, but also what actually influences such perceptions from national stakeholders.

It would also be worthwhile to repeat the Individual Case Interviews or Stage II of this study immediately or not more than 12 months in order to try to capture more perspectives or update on perspectives especially on the ranking and priority or weighting of barriers of HACCP developed in this study.

This study suggests that the different categorisation; sub-division of a single barrier; different interpretations of one type of barrier of HACCP; and used of various terminologies such as ‘burdens’, ‘bureaucratic nightmares’ or ‘hassles’ in place of barriers, accrue an important area of new research in HACCP .

The author suggests that it would also be useful to repeat the Focus Group Interviews in near future, but this time round a more careful consideration should be given to the group multidiscipline and diversity nature of the meeting to determine whether more data could be derived than those collected in this research. Moreover, there were lot of positive comments by the Focus Group on the barriers determined in Convergent Interviews and therefore would be



worthwhile to repeat Focus Group Interviews in not more than 12 months to find out whether members of the groups had become familiar with more negativities of the barriers of HACCP along with the positive comments they provided in this study.

These suggestions are very useful so that any potential defects in this study would be addressed. For example, the Focus Group element of Stage III could be repeated but in such a way, that certain factors that excessively influenced the participants would be excluded. In this study, factors such as group dynamics were well acknowledged because the members of the focus group were selected across the entire regulatory, enforcement, businesses and consumers and is a real issue creating conflicts of interest in one way and strongly cohesive groups that share similar philosophy, attitude and behaviours in another way.

It can be argued that the presence of regulatory and enforcement authorities, and academics as consumers might have influenced certain members of the groups especially the fishery business group to be less critical about the barriers than they might have been interviewed alone in their fishery businesses or in a differing context outside the regulatory and enforcement authorities or great academics. Similarly the wish to seek the avoidance of conflict in a group situation could also be considered as a big factor responsible for little or no criticism and negative perceptions on the barriers of HACCP derived from Stage 1, particularly considering the linking of barrier to a mandate or characteristics of the group.

For example, barriers such as 'Lack of Appropriate Fishery Policy'; 'Lack of Enforcement'; 'Lack of PRPs in Fishery Businesses'; and 'Lack of Consumer Agency' can be linked to regulatory, enforcement, businesses and consumers respectively. Therefore, it would be useful and enlightening to repeat this work with a slightly different in the nature and composition of the groups. This strategy would have merits not only in terms of gathering more data about barriers of HACCP but also provide more criticisms and negative perceptions along side with the positive ones, and consequently, facilitate the exclusion of the negative influences on potential group dynamic at work in the Focus Groups discussions.



The author suggests that this research should be repeated using a ‘Nominal Group Technique and its Applications in Managing Quality in Higher Education’ (Abdullah and Islam, 2011), that is specifically useful for groups that are not in the habit of interacting, or groups where one can find high levels of tension or groups in which status difference among participants has potential to inhibit open and frank conversation. In such a technique where the groups dynamic, diversity and cohesive effects are eliminated by keeping members of the groups apart, allowed structured brainstorming, participants work in the presence of each other but allowed to record ideas independently instead of stating ideas verbally, but yet insights and ideas are shared, it will generate and prioritise a large number of ideas, and consequently the ideas which receive majority of the votes from regulatory, enforcement, business and consumers can be selected. Subsequently, perceptions of the regulatory, enforcement, business and consumers would be accessed in a way that is uncontaminated with annoying influences including but not limited to authority control or the bias of the different profession, intellect, calibre and/or status difference of the groups.

Experiences also show that there are some natural factors that can directly or indirectly support the suggestions above on the longitudinal study of the perceived barriers of HACCP. One important influence is the short life expectancy of the regulatory and enforcement officers, staff of the fishery businesses, and easy access to consumers. In Sierra Leone public administration appointment of senior regulatory and enforcement, officers are political appointments, but the maximum life expectancy of any government is five years. Secondly, local fishery businesses are SMEs with negative growth and consequently staff members are expected to be redundant on average every year. Thirdly, changing consumer representation is always possible because everybody is a consumer. Taking these into consideration, repeating this study is highly possible by recruiting new interviewees.

Since HACCP is new, bringing out a new approach is significant to the concepts of food safety management and is in dire need by all proponents of food safety. As a result, longitudinal study such as this would not necessarily mean comparing like terms, but would rather be comparing similar systems with varieties of the methodological approaches for comparison, validity, and value added innovations for this type of work. The perceptions of the national stakeholders in



this study, reject financial constraint as a technical barrier to HACCP, the author still argues that it is difficult to believe that economic barrier of HACCP do not exist in LDCs and such argument is worth for further research.

In an attempt to pause this argument, the author suggests that there are many different ways this area could be researched further. Fishery products, HACCP, SMEs, LDCs, international trade, fair trading practices and consumer protection are important topics and influence health and economy in significant ways both nationally and internationally. Therefore, any future studies connected to these areas could only add to the fairly scanty literature that exists and consequently, contribute to development of an under-researched area of academic and practical tools for food availability, safety and quality.

6.5 Conclusion to the HACCP Barriers and Benefits

The barriers responsible for this gap in the food safety infrastructure in Sierra Leone are many, varied and may be even overemphasize, but it has been revealed by this research that it is not impossible for fishery businesses in Sierra Leone that are SMEs, to adopt and implement HACCP if these barriers are properly identified; ...I mean identified through the perceptions of those involved in national fishery safety infrastructure. The author argues that the barriers and benefits determined by this work have value not only to Sierra Leone but for many other LDCs.

The results show that these are significant barriers since most of the regulatory, enforcement, businesses and consumers believe that they are a cause of ban on export of national fishery products and most of the cases of foodborne diseases in the country. However, the author argues that the claim of many developed countries that: 'your fishery product is banned for export because of non-compliance with HACCP requirements', is hard to contest, although merely saying lack of compliance to food safety requirements suggests that, at least, something is going wrong somewhere. Without clear performance measures on the efficacy of food safety management system through the perceptions of the national stakeholders involve, it is difficult to make comparative judgments on the reasons for failure of the system or its success over a period.



Different other strategies have been developed in the country's fishery safety infrastructure, but these have not assess outcomes directly, because the ongoing strategy of investing money to carry out sampling and expensive microbiological analysis on fishery products measure only the end-product, but not the process and events within the fishery supply chain that give the end-product. Since it is not possible to carryout 100% sampling, what is the possibility that the samples they analyse for microbiological criteria are the ones infected or not? Therefore, end product testing is not guarantee to assure food safety compliance though it can be used for verification purposes rather than measures of food safety outcomes (Kane and Taylor, 2003). The author therefore argues that the reason for export ban on Sierra Leone's fishery products and the solution to lift the ban and protect public health are difficult to assess without clear measures of HACCP barriers and benefits such as the one undertaken by this study.

If the outcomes of this research, and beyond all reasonable doubts that these outcomes are the real perceptions of the regulatory, enforcement, and businesses involve in national fishery safety infrastructure, act to convince them that there are barriers that exist within the infrastructure, and there are benefits for eliminating those barriers, these may act as incentives for voluntary adoption, implementation and effective monitoring of compliance: then this study have achieved some of its aims and objectives.

Nevertheless, one of the significant barriers for the implementation of HACCP determined by other HACCP regulators in the literature of this study is 'financial constraint' or 'cost', but this barrier was rejected or downgraded by the local regulatory, enforcement and businesses on their perception that Sierra Leone Government is receiving lot of financial supports from international community to support fishery sector, but the export ban is still going stronger.

A question is therefore asked; are the costs of HACCP insignificant in terms of implementation and maintenance in SMEs? The food standard agency (FSA) appear to propose this in their Regulatory Impact Assessment (RIA) which suggests that SMEs can successfully implement SFBB/SBHP or HACCP for caterers with very minute expenditure of time, effort or money (FSA, 2004). Experience with Sierra Leone food control system shows that all the fishery industries are SMEs, and the perceptions of regulatory, enforcement and businesses on rejecting



or downgrading financial constraint as a barrier is supported by RIA of FSA; however, this notion requires more investigation and was suggested by this study for further research.

6.6 Conclusion to the Originality of the Research Technique

New approaches and original ideas such as the way this HACCP study is designed and presented, allow the regulatory, enforcement, businesses and consumers to cope with and to understand this methodology of food safety management system.

The concept of barriers and benefits of HACCP is certainly new to most LDCs. Currently valid data on HACCP barriers and benefits are not available in Sierra Leone food safety control infrastructure; and there are also very few barriers and benefits of HACCP identified by previous researchers, perhaps, because of several limitation of suitable methodologies to carry out deep research into the HACCP system.

The type of design and presentation of qualitative triangulation techniques used as the methodology for this research triumph over the several margins of HACCP research techniques. This research technique was able to identify 7 new barriers and 10 new benefits of HACCP in fishery safety infrastructure in Sierra Leone that were never uncovered before. This means that more new barriers and benefits have been discovered in the research of HACCP that were not considered by previous researchers.

The novelty of placing the responsibility of refining questions, understanding and articulation of the phenomenon under investigation onto the interviewees instead of the interviewers was amazing, and consequently, turned the whole activity of interviewing into a cycle of iteration of the interviewee but not solely the interviewer.

Another credence gained by this study was the innovation of technique to undertake the convergent interviews in the respective offices, industries or work places of the interviewees. This innovation did not only strengthened the convergent interview and confidence of the interviewees to talk freely with confidence, but put the interviewees much at ease in their own working environment in the midst of people, processes, procedures, materials and equipment



with which they are familiar with, easily accessible to them and most likely serves as an important “aid-memoir” for them when suggesting themes or barriers, without meddling by the interviewer.

In another development, the research design for this study is a success story and therefore suggests that a new research tool for collection of data on the study of HACCP has been extended for academics and practitioners all over the world interested in HACCP research and innovation. Like many abstract concepts, HACCP is hard to understand and hard to define, perhaps because is still new, but certainly a good understanding of HACCP still requires innovation of research tools such as the one used in this study and can be helpful to all food sectors in the country.

6.7 The summary

This research has investigated the topic of barriers to compliance with international HACCP regulations in fishery industry of Sierra Leone, in the context of the perceptions of regulatory, enforcement, and businesses through an assessment of their determination of the barriers that impede the adoption and implementation of HACCP. The study reveals that these regulatory, enforcement, and businesses do see these barriers as the factors responsible for the non-compliance with international HACCP regulations; and consequently, EU export ban on fishery products and many cases of outbreaks of foodborne diseases in Sierra Leone.

These barriers are allocated over a number of categories; and areas of benefits after elimination of these barriers were determined by the regulatory, enforcement, businesses, and consumers. The barriers range from the most prioritized, to the marginal and to the least prioritized. The benefits differ from those benefits determined by other national HACCP regulators mostly in terms of their numbers and to some extent in terms of perceived importance, and consequently, reflect the underlying differences between the HACCP benefits in Sierra Leone and those for developed countries. The number of barriers reported by this study is higher than most of the barriers by previous studies, and these differences not only appear ‘real’, but may relate to the aspects of different research methodologies used to uncover, and they are highly crucial. The



importance of ‘financial constraint’ as a technical barrier to regulatory, enforcement, and businesses was rejected or downgraded to incentives or disincentives. This rejection is supported by RIA by the FSA.

The results of this study contribute to the academic discipline of HACCP in food safety management; because the findings expand knowledge in an under-researched area that is new, fast evolving and crosses a number of boundaries. The study of HACCP in fishery businesses in Sierra Leone has an impact in terms of the study of management, policy, regulation, standards, enforcement, food safety, consumer awareness, SMEs and the links between them. In terms of policy, regulation, standards, enforcement and practice, the existence of barriers and associated benefits perceived by the regulatory, enforcement, and businesses, in this study offer regulators, enforcement officers and businesses suggestions for targeted intervention. The outcomes of this research may also suggest guidance for fishery businesses to adopt and implement the HACCP system, which may subsequently contribute to the lifting of EU export ban on fishery products, solution of preventing and controlling outbreaks of foodborne diseases and the protection of public health.

6.8 Coda

The Standards and Trade Development Facility (STDF) of the World Bank along with the Standards Bureau of Sierra Leone has agreed to fund a project in Sierra Leone based on the work outlined in this dissertation. It is likely that this project will help overcome the barriers and achieve the outcomes outlined in this work. This represents an endorsement of this work by a significant authority in international food safety management and regulation. This endorsement may serve as a vehicle to facilitate the dissemination of this research through publication via textbooks, libraries, internationally recognised journal, magazines, and world-wide web.



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Appendix 1: Summary of Specific Sources of Literature, Author, Title and the Number of Documents Found Related to the Study, Developed for this study.

Number of Barriers	Number of Benefits	Source, Author, Year and Title of Literature
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TOTAL 217	TOTAL 198	



Appendix 2: Letter of Ethical Approval



Appendix 3: Consent Form: Recruitment of Stakeholders to Participate in Interviews on Data Collection, Adapted from Research Ethics Panel (REP), REP11/080, University of Salford

CONSENT FORM

FOR RECRUITMENT OF STAKEHOLDERS TO PARTICIPATE IN INTERVIEWS ON DATA COLLECTION ON BARRIERS TO COMPLIANCE WITH INTERNATIONAL HACCP REGULATIONS: A WHOLE CHAIN APPROACH TO THE NATIONAL FISHERIES FOOD SAFETY MANAGEMENT SYSTEM OF SIERRA LEONE

Please tick the appropriate boxes

Yes No

Taking Part

I have read and understood the project information sheet dated 30th May 2010.

☐ ☐

I have been given the opportunity to ask questions about the project.

☐ ☐

I agree to take part in the project. Taking part in the project will include being interviewed and recorded (on paper by note taking only, and photograph or video will not be allowed throughout the data collection). Name and signature stated on the consent form are only for selection purposes and will not be mentioned anywhere in the findings of this study.

☐ ☐

I understand that my taking part is voluntary; I can withdraw from the study at any time and I do not have to give any reasons for why I no longer want to take part.

☐ ☐

Use of the information I provide for this project only

I understand my personal details such as phone number and signature will not be revealed to people outside the project.

☐ ☐

I understand that my words may be quoted in publications, reports, web pages, and other research outputs, and if permitted, through the University of Salford, United Kingdom.

☐ ☐

Please choose one of the following two options:

I would like my real name used in the above

☐

I would **not** like my real name to be used in the above.

☐

Use of the information I provide beyond this project

I agree for the data I provide to be archived at the University of Salford Library. This is purely discretion of the University of Salford.

☐ ☐

I understand that other genuine researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.

☐ ☐

I understand that other genuine researchers may use my words in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.

☐ ☐

Name of participant[printed] Signature

Date

MOHAMED SHERIFF

Researcher

Signature

30th May 2010

Date

Project contact details for further information: Names, phone, email addresses, etc.

MOHAMED SHERIFF

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Moh_shero@yahoo.co.uk

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Attachment: Information Sheet: For consent form for recruitment of stakeholders to participate in interviews on data collection, Table 43.



Appendix 4: An Information Sheet for Consent Form for Recruitment of Stakeholders to Participate in Interviews on Data Collection, Adapted from Research Ethics Panel (REP), REP11/080, University of Salford

Title of Thesis: Barriers To Compliance With International HACCP Regulations: *A Whole Chain Approach to the National Fisheries Food Safety Management System of Sierra Leone*

PURPOSE OF THE RESEARCH

The purpose of this research is to attempt to uncover the perceived barriers to compliance with international HACCP regulations that exist in food safety management in Sierra Leone. Considering the problems faced by the national food safety management system in Sierra Leone in achieving an acceptable level of food safety standards so that fish exports can be resumed the question needs to be asked as to what barriers exist that are preventing HACCP standards being achieved?. Studies have been made by the European Union (EU) and others into improving the system of food safety but these have not resulted in any significant advancement towards achieving compliance with HACCP and internationally accepted food safety standards. In 2009, the EU reiterated its ban on fishery products from Sierra Leone even though attempts at improving food safety had been made for over ten years. This is the first time a research has attempted to investigate the perceptions of those involved in the national food safety management system including regulators, enforcement officials and businesses, by someone who is deeply familiar with the local culture, language and attitude of those involved in national food safety management system.

WHAT IS INVOLVED IN PARTICIPATING?

Potential participants will be invited to participate in an interview either face-to-face or via telephone for approximately 1 hour.

BENEFITS AND RISKS

There are no identifiable risks for the participant in this research. There are no direct benefits to the participants but there will be the benefit of having contributed to the discovery of new research that may improve food safety nationally and internationally.

TERMS FOR WITHDRAWAL

Participants have a right to withdraw at any time without prejudice and without providing a reason

What will happen to existing, already provided, data in the event of withdrawal?

The participation of those that will be interviewed will be purely based on consent and anyone may withdraw at any time. Any data collected from a participant who withdraws will be destroyed.

USAGE OF THE DATA

During Research

The researcher will analyse the data into categories and determine meanings from the data.

Dissemination- Through Publication by Salford University, United Kingdom. To be determined by Salford University.

Storage, archiving, sharing and re-use of data –Through the library maintained by Salford University, United Kingdom. To be determined by Salford University.

STRATEGIES FOR ASSURING ETHICAL USE OF THE DATA

Procedures for maintaining confidentiality

A simple letter of invitation and consent form will be used for selecting the participants from the stakeholders. The anonymity of the people recruited will be maintained and respected throughout the data collection. The people recruited will be freed to withdraw at any time during the investigation and that all information collected from them will be presented in general form, and the contents of the interviews, invitation letter and consent form for recruitment will be used wholly and solely for this research. The author will take all appropriate measures to safeguard the voluntary consent of the people, and the selected interviewees will be given the opportunity to express themselves freely during the data collection. All data will be recorded on paper by note taking, and photograph or video will not be allowed throughout the data collection. Name and signature stated on the consent form are only for selection purposes and will not be mentioned anywhere in the findings of this study.

Anonymising data where necessary, especially in relation to data archiving- Through the library maintained by Salford University, United Kingdom. To be determined by Salford University.

DETAILS OF THE RESEARCH

Funding source-Self –sponsored Student

Sponsoring institution-Not applicable

Name of project- Barriers To Compliance With International HACCP Regulations: *A Whole Chain Approach to the National Fisheries Food Safety Management System of Sierra Leone*

Contact details for researchers: Mohamed Sheriff

1 El-Safa Street, El-Seouf Shamaa

El-Falaky, Alexandria, Egypt

Telephone: 0020148478551

E-mail: mifsheriff@live.com

Moh_shero@yahoo.co.uk

How to file a complaint: Directly to the Researcher Supervisor by Mail, E-mail or Telephone or physical contact:

Dr. Kevin Kane, Room 616c, Maxwell Building, University of Salford, Salford, Greater Manchester, M5 4WT, Tel: 0161-295-2239: email k.kane@salford.ac.uk.



Appendix 5: Protocol for Focus Groups Workshop Discussion Guidelines

Protocol for Focus Groups Workshop Discussion Guidelines

Subject: Barriers To Compliance With International HACCP Regulations: *A Whole Chain Approach To The National Fisheries Food Safety Management System Of Sierra Leone*

Focus Groups 1, 2 and 3 or SIIIA, SIIIB and SIIC respectively

Part I

Introduction

1. Greetings -Politely, and welcome remark.

My name is Mohamed Sheriff- I am humble to introduce myself as a PhD student of the University of Salford. It's a great pleasure to thank you for attending this workshop on data collection on the barriers to compliance with international HACCP Regulations in Fishery Businesses in Sierra Leone. Three other experienced researchers as interviewers assist me and they will do self-introduction as we proceed with workshop.

2. We know you have all taken part either directly or indirectly in the national fishery operations in one of the other and should by now have an idea of the status of fishery safety control mechanism and market competition. We are also aware of that fact the fishery products from Sierra Leone are currently banned for export to international developed markets such European Union including United Kingdom, United States of America, Japan and so on, due to non compliance to international fishery safety and competitiveness requirement that is compatible to Hazard Analysis Critical Control Point (HACCP). Since you may be aware of this ban and the reasons for the ban, you may visualise any barrier or disadvantages existing in the national fishery safety control system by reflecting your day-to-day activities. By finding out if you feel there are any barriers, we will be able to develop and explain a comprehensive list of barriers to compliance with international HACCP regulations that exist in the fishery industries in Sierra Leone. Such list and explanation could facilitate good understanding of the causes of the export ban for the national stakeholders, and could form a major component of useful suggestion for any targeted intervention, that the country may like to undertake to fine-tune the national fishery safety assessment system to enhance competitiveness in the nearest future.

HACCP focuses on preventive control strategy and "equivalence" approach to liberalize the international trade without compromise to safety and quality assurance of fishery products. Trade in fishery products is becoming more global in nature. Fishery products sectors have a more global perspective and more often are looking to processing product that will meet the requirements of domestic and export markets. Successful adoption and implementation of HACCP-based approaches will lead to greater harmonization of fishery products safety inspection approaches. "Farm to fork" regulations apply to domestic products within the EU member states and imported products. All fish and fishery products processors are required to operate preventive control measures that incorporate all the 7 principles and 12 steps of HACCP. By this exporters must demonstrate that their fishery products were produced, processed or handles in a safe and acceptable manner through the application of quality assurance systems that incorporates HACCP, SSOP, GHP and GMP

3. In this workshop activities I would like to ask you a series of questions related to HACCP to give your views, thoughts and opinions on HACCP barriers or factors that hindering implementation of HACCP in national fishery businesses. In the process of answering please express your thoughts and concerns about each of the questions and equally allow other members of your group to the same until a consensus is reached and all the group members are satisfied with the answer for each question. Your ideas, views, thoughts and opinions are valuable to me and I would like you to say whatever you think, whether positive or negative, right or wrong.

Part II

Codes of Practice



1. Kindly note that there are no right or wrong answers to any of these questions. Therefore, I encourage everyone to feel free to state their own viewpoints, feelings, and personal experiences throughout the workshop.
2. My dream and hope are to receive contributions from all participants throughout this workshop. The more views, thoughts and opinions I receive from you, the better for all of us to identify the “real” HACCP barriers that exist in the fishery industries in Sierra Leone for your targeted interventions as key stakeholders in order to improve fishery products safety, competitiveness and public health.
3. During this workshop all suggestions are welcomed, whether positive, negative, correct or incorrect. In fact, no suggestion is positive, negative, correct or incorrect until it is discussed by the focus group and proved positive, negative, correct or incorrect. I am very flexible, I can always repeat the questions as many times as possible, and if you do not have an answer or do not understand the question, you may always ask me to repeat or explain but not to provide the answer. Such a good rapport is always needed even if you do not have an answer to a question. Thus there should be nothing like saying, “no idea” or “this is above me”, because every answer in this workshop is correct until the group discussion prove that the answer is wrong.
4. Always feel free and relax to express yourself if you disagree with someone’s views.
5. I would also like to point out that it is important to say whatever you think, but please realize that you don’t have to say something that could damage the reputation of another person’s department or mandate or any activity whatsoever or anything about your job that makes you feel uncomfortable with this workshop.
7. This is a research workshop and not political forum and therefore we all should reframe from creating negative propaganda against the government or anyone.
8. In this workshop we should not apportion blames to anyone or institutions even when some of the questions are related to the mandates of such institutions.
6. The author and the assistant interviewers cannot answer any questions related to the barriers because we do not want to influence your responses in any way whatsoever. The author particularly is here to gain knowledge and understanding on barriers from your ideas, views, thoughts, opinions and long years of experience with national fishery operations system. I remained to be your student and your opinions are very valuable to me in achieving the aims and objectives of this research. Kindly keep all questions during the group discussions and ask them after the group has reached saturation, and thereafter I will be willing and happy to answer your questions or give you relevant references from the literatures of this study for further readings.

Part III

Procedure for Recording Answers

1. The author and assistant interviewers will make notes during the workshop interviewing and discussion, pay close attention to every answer and discussion check at the end that you agree that we captured correctly, what you said. No one will be identified or quoted in any way whatsoever. Note taking will begin after our introductions. No photographs, audio or video note taking will be applied throughout the workshop.
2. The workshop discussion is strictly confidential and the data obtained will be used solely for the purpose of this research. I hope that we all concord.
3. The focus of the workshop is a group discussion but kindly speak one after the other.
4. There are lot of areas to cover and the interviewer may have to change the subject at any time or move ahead in the middle of our discussions as and when necessary, but you may always stop the interviewer for clarification but not the answer.

Part IV

Self-Introductions

The participants of this focus group workshop are representatives of prominent stakeholders known to the researcher.

Self-introduction is optional to preserve the anonymity, but I have already introduced myself and I would like to encourage everyone to do the same if they feel to do so.

Part V

Interview Questions for Discussions

Lack of appropriate fishery policy (i.e compatible to Codex Alimentarius and EU Legislation)

Is there a national fishery safety and quality assurance legislation compliance with Codex Alimentarius and EU legislation



(with commitment from government regulatory authorities, based on risk analysis i.e. risk assessment, risk management and risk communication)?

Is there a national coordination body for fishery safety control activities?

What is the legal framework for national fishery control?

Is the national fishery control adequate to ensure fishery products safety and quality assurance to improve competitiveness and public health?

What are the advantages of having national fishery safety and quality assurance legislation compliance with Codex Alimentarius and EU legislation?

Lack of fishery standard or specification;

Are there regulations and standards related to fishery product safety and quality?

Which authority is empowered to make regulations and standards under the national fishery laws?

Have the food additives, pesticide and veterinary drugs residues, sanitary facilities at fishery processing and fishery service levels been taken into consideration in the development of fishery regulations and standards?

Do the fishery regulations and standards provide for Labelling including its composition; Date marking and marking of weights and measures; Sampling procedures; importation and exportation; in-process safety and quality control; licensing and registration of fishery premises; closure of unhygienic fishery premises; health control of fishery handlers or personal hygiene; medical examinations of fishery handlers; advertising of fishery products; use of safe packaging material; freshness examination of fishery products; provision and adequacy of sanitation measures on board vessels or any transportation and in-service terminals?; measures to be implemented in the event of natural disasters such as floods, cyclones, earthquakes, etc.; irradiation processing; HACCP and ISO certification by an appropriate authority; quarantine measures; warranty measures; Penalties; etc?

What are the advantages of having appropriate national standards on fishery products safety and quality assurance compatible with modern fishery safety management system such as Codex Alimentarius and EU Legislation?

Lack of enforcement

Why the rate of juvenile fishing or catch is on the increase in the country?

Are regulators enforcing fishery act 1994, amended 2007?

How would you describe the level of enforcement of the existing fishery act 1994, amended 2007– adequate, inadequate or none?

Are regulators strengthened to effectively enforce fishery act 1994, amended 2007?

What will be the impact of effectively implementing and enforcing the fishery act 1994, amended 2007?

Lack of understanding

What are the abbreviations HACCP and PRP or GHP or GMP or SSOP stand for?

Are you familiar with the jargon and complexity of HACCP and PRP or GHP or GMP or SSOP stand for?

When last did you hear about the HACCP system?

Are you familiar with codex 12 steps and 7 principles of HACCP?

What are the benefits of understanding the HACCP system in fishery operations?

Lack human expertise and training

What categories of personnel are involved in fishery safety and fishery control?

What are their disciplines or specialties?

Are there personnel trained and qualified in HACCP and PRPs?

Are there personnel experienced in ISO certification system?

What are the advantages for the provisions for continuing education, training, and periodic assessments of national capacity building needs in fishery safety?

Lack access to information on hazards

Is there any legal notification system of cases of Foodborne diseases in the country compatible with RASFF, INFOSAN, and GLEWS?

Are there compiled statistics and computerised database of national foodborne diseases?



Is there any national food safety information system (FSIS) supported by worldwide web list server to facilitate capture, storage, retrieval and dissemination of information on foodborne diseases?

Are there legal requirements for food industries to establish FSIS compatible with national FSIS?

What are the advantages of national FSIS?

Lack of awareness

What is the general level of awareness and knowledge among stakeholders and public about fishery safety and quality assurance in the country?

What are the key concerns with respect to safety and quality assurance of fishery produced locally?

Are these concerns properly addressed by government and fishery businesses?

Are there national activities for ensuring that fishery products for local consumption conform to international HACCP regulations and standards?

What are the advantages of stakeholders and general public awareness in fishery safety and quality assurance?

Lack of self-efficacy

Is there a general perception in the country that people have the capability to organize and execute a course of action to resolve fishery safety problem and lift the export ban in short term?

Is there a general perception in the country that people have the capability to organize and execute a course of action to resolve fishery safety problem and lift the export ban in longer term?

Are fishery industries SMEs or larger enterprises?

Are SMEs discouraged from implementing HACCP due to the belief that it will be too difficult for them?

What are the advantages of self confident in national fishery safety management?

Lack of PRPs in fishery businesses

Are aware of the spoilages and wastages of fishery products in the fishery businesses in the country?

Are you aware of the fact that most of the fishery products expired or deteriorated in freshness on board vessels prior to landing or delivery to the fishery businesses?

Are there codes of hygienic practice in Sierra Leone for the production, processing, storage, and distribution of fishery products; and why the rate of spoilage and wastage of fishery products are high in fishery businesses in the country?

Do the codes specify cultivation of freshwater and saltwater species of fishery products; prohibit commercial harvesting of shellfish from contaminated or polluted waters; specific storage conditions, such as temperature or cold-chain-management in ports and stations for transportation by land, water or air of fishery products; specify traceability of fishery products; safe fishery products packaging material; and specify hygienic handling of fishery products by street vendors?.

What are the advantages of PRPs in fishery businesses?

Lack of consumer agency

Are consumers involved in food safety activities?

Are consumers involved in formation of consumer committees?

Is there a national system for complaints on food safety and economic fraud?

Do consumer protection groups have structures for monitoring the safety and quality of foods?

What is the advantage of having consumer pressure groups?

Negative guideline factors

Are stakeholders including fishery businesses familiar with all the codex 12 steps and 7 principles of HACCP in a simple straight forward, systematic and chronological manner?

Are the HACCP guidelines generic and makes it difficult to use the each of the 12 steps

Successfully?

Do you need appropriate interpretation of all the HACCP guidelines prior to their adaptation and implementation?

Are the guidelines adequate to provide an exact framework for the safety of fishery product?

To the best of your knowledge or experience, what do you think are the advantages of detailed framework for HACCP guidelines?

**Negative environmental factors**

Are there adequate environmental factors such as those relating to time, resources, and organizational structure to facilitate successful adherence to HACCP system and guidelines?

Are fishery industries having problems with insufficient time, money, and staff for the implementation of HACCP?

Is central government having problems with insufficient time, money, and staff for the enactment and enforcement of appropriate fishery safety policy and standard?

Are there national laboratories accredited to ISO17025, and with capacity to conduct chemical and microbiological analysis?

What are the advantages for institutional strengthening and capacity building?

Lack of competence

Do the fishery businesses have knowledge of GHP, GMP, HACCP, Quality assurance, certification and other fishery safety requirements?

Are stakeholders including fishery businesses conversant with the main fishery safety and quality assurance hazards and incidents in the fishery businesses?

Are stakeholders able to monitor and evaluate fishery safety and quality assurance problems associated with SMEs, including indigenous processors and street vendors?

Are there self-regulatory mechanisms in the fishery businesses?

What is competence, and what impact it may have on fishery safety control system?

Lack of private consultancy firm

Are there registered private consultancy firms to conduct third party auditing in food businesses?

Are the consultancy firms certified to issue HACCP and ISO certifications?

Do private consultancy firms authorized by law to provide extension and advisory services to the food businesses and markets?

Are training courses conducted for fishery industries by government regulators and/ or consultancy firms?

What are the advantages of the services of private consultancy firms in food safety and quality assurance?

Lack of cueing mechanism

What is meant by cueing mechanism?

Is cueing mechanism currently affecting the implementation of fishery safety programmes in fishery businesses?

Is cueing mechanism an obstacle in a fishery business that is successfully implementing HACCP?

Are staff members in SMEs currently carrying out many tasks simultaneously?

What are the advantages of cueing mechanisms, can it serve as a reminder for prompt appropriate action?

Lack of motivation

Are fishery industries motivated to adopt appropriate fishery safety and quality assurance system?

Is there a level playing field created by appropriate regulation of imported food products against locally produced food products?

Are certain imported food products sold at cheaper price against their locally produced counterparts?

Do you think that staff motivation is one of the key problems to immediately address in fishery businesses under the current fishery safety problem?

What are the advantages of staff motivation in fishery businesses?

Lack of outcome expectancy

What is outcome expectancy?

Are behaviours of stakeholders contributing to fishery safety problems?

Are their feelings among SMEs that HACCP cannot make differences?

Do the SMEs believe that they are doing it correctly for so many years now?

What are the advantages of positive change of behaviour in food safety practices?

**Lack of agreement**

Are there disagreements among stakeholders on HACCP principles?

If yes, why? or if no elaborate

What are the perceptions of fishery industries towards the credibility of regulatory authorities?

Are fishery industries and fishery inspectors disagreed over procedures of fishery safety?

What are the advantages of agreement in food safety activities?

Part VI**Pilot focus group workshop questions**

What are views and opinions about the introduction and the interview questions?

Are there difficulties for you to properly understand?

Are any of the questions too intimidating and have potential to compromise your personal safety and security? , If yes which ones?

Are there any questions you would like to change completely? , if yes which ones?

Are there additional suggestions or recommendations for group discussions?

To the best of your experience, are the questions exhaustive?

Part VII**Closing Questions**

I have come to the end of the questions I have for this focus group workshop, but before I you start is there any other business to discuss that could facilitate the data collection during this workshop?

I reiterated that everything we discuss in this workshop will remain strictly confidential and anonymous and would be used solely for this study. No names of participant will be connected to the information provided during this workshop.

Thank you very much for your assistance and stay richly blessed.