

UNIVERSITY OF SALFORD

Strategies, Challenges and Outcomes  
in the Development and  
Implementation of Food Control  
Systems: An International  
Perspective from Policy Makers

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## Abstract

Foodborne disease is a significant and growing problem. The control of foodborne disease is the responsibility of food handlers, food business operators and agencies developing and implementing national food control systems. The purpose of this research is to identify strategies and analyse challenges and outcomes in the development and implementation of national food control systems across multiple countries. This is undertaken through a review of international guidance and academic research, a series of exploratory interviews and a questionnaire. Twenty findings are identified in this research including that governments around the world experience similar challenges in food control systems and development of implementation of national HACCP strategy, in particular in the areas of education, training, information provision and communication. It also found that governments are aware of many of the challenges that face industry and are willing to provide specialised support and guidance.

This research provides a unique analysis of food control systems from the perspective of those involved in development and implementation. It will be of value to those working in the food industry, industry bodies, international organisations and academics as well as to those working in government in the development and implementation of food control systems worldwide.

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## Dedication

I dedicate this work to my family, darlings Dan and Eliza,  
and without forgetting our eagerly awaited new arrival who  
gave me an extra sepcial deadline.

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## Abbreviations

BSE	Bovine Spongiform Encephalopathy
CCP	Critical Control Point
Codex	Codex Alimentarius Commission
EU	European Union
FAO	Food & Agriculture Organisation
FDA	Food & Drug Administration (USA)
GCC	Gulf Cooperation Council
GHP	Good Hygiene Practice
HACCP	Hazard Analysis Critical Control Point
NASA	National Aeronautics and Space Administration
PIC	Persons in Charge
SFBB	Safer Food Better Business
SLDBs	Small and/or Less Developed Businesses
UAE	United Arab Emirates
WHO	World Health Organisation
WTO	World Trade Organisation

## Author Profile

The author has a BA Honours Degree in Politics from the University of Leeds and a Graduate Diploma in Law from Leeds Metropolitan University. The author has a postgraduate Certificate in HACCP, and taught for six years on the MSc. HACCP at the University of Salford, UK.

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# Chapter 1: Introduction

## 1.1 Foodborne disease

*'Diarrhoeal disease caused by contaminated food and water kills more children than HIV Aids' (The Guardian, 2012).*

The message is slowly reaching the popular media that foodborne disease and food safety are important. Foodborne disease is a global health problem that affects the rich and the poor, adults, children and the elderly. Defined by the World Health Organisation (WHO) foodborne disease is 'disease...caused by agents that enter the body through the ingestion of food' (WHO, 2007). Symptoms vary widely from diarrhoea, vomiting and stomach cramps to associated sequelae triggered by foodborne disease such as cancers, organ failure and arthritis (Nierengarten, 2008). The WHO estimates that food and water borne diarrhoeal diseases kill 2.2 million people every year, most of those children (WHO, 2010a). The WHO label foodborne disease a public health priority (WHO, 2010a).

The WHO admits that for foodborne disease 'no precise and consistent global information exists.' (WHO, 2011) and it is thought that its incidence is under reported. Few countries have effective reporting systems, victims may be disparate making it difficult to identify outbreaks and individuals rarely report symptoms to health practitioners. This situation only increases the need to put effective controls in place to control effectively food safety risks and reduce the incidence of foodborne disease.

Foodborne disease is caused by microbiological, chemical or physical contaminants in food (Codex, 2009). Microbiological contaminants are reported

to cause the majority of disease and fatality (WHO, 2002). The WHO currently lists the current most virulent causes of foodborne disease as;

- Bovine Spongiform Encephalopathy (BSE)
- Campylobacter
- Escherichia coli infections
- Salmonella
- Shigella species

(WHO, 2010c)

The global costs or burden of foodborne disease are calculated by the WHO using the disability-adjusted life year (DALY) system. This is a time-based measure that combines years of life lost due to premature mortality and years of life lost due to time lived in states of less than full health (WHO, 2011a). Currently the global cost is unknown but is thought to be considerable and to impact development and trade and affect developing countries most acutely (WHO, 2011b).

The USA's Food & Drug Administration (FDA) describe foodborne disease as a significant public health burden and report that one in six of the population are victims to foodborne disease in any given year (FDA, 2011). In 2009 economic costs of foodborne disease in the USA, which include lost productivity and burden on health providers, was estimated to be as high as \$83 billion a year (FDA, 2009). Figures for mortality, disease and related costs have been estimated as being higher (Mead, 2009).

Scientific research and information gathering continues to inform our understanding of the causes and means of prevention of foodborne disease, it is described by the WHO as a growing risk (WHO, 2007). Continual and fast paced changes in farming and food production techniques and in consumer

behaviour make understanding the science behind foodborne disease an ongoing task (WHO, 2002). Factors contributing to change in foodborne disease include:

- New practices of food production or food consumption
- Improved science (e.g. discovery of new pathogens)
- Climate change
- Population movement
- Population growth
- Urbanisation
- Globalisation of the food trade

(Adapted from Mitchell, 2008)

## 1.2 Food Safety Management

Food safety management systems control hazards during production and prevent them entering the food chain at unsafe levels. Hazard Analysis Critical Control Point (HACCP) is a food safety management system that is internationally recognised as the most effective way to protect the public from foodborne disease (FAO/WHO, 2006). HACCP is used primarily but not exclusively in the food industry (Codex, 2009). It is a risk based system and requires an analysis of the production process and the implementation of process controls, monitoring and corrective actions at identified critical safety points in production specific to that product and operation (Codex, 2009).

HACCP originated in the NASA space programmes of the 1950's when scientists were looking for 100% assurance that food produced for astronauts in space would be safe (FAO, 1998). The HACCP system was used by contractors supplying NASA's space missions to assure food safety. Over the following 30 years it became a recognised food safety management system in the USA and internationally. Its adoption voluntarily by industry and as a legislative requirement was prompted by serious foodborne disease outbreaks

such as a serious outbreak in the US canned food sector and subsequent legislative requirement for HACCP in the US canned food sector (Taylor, 2006).

Since its initial development HACCP has emerged as an internationally recognised food safety management system. In 1996 it was adopted by Codex Alimentarius Commission (Codex) as an international reference for food safety and a definitive version of its methodology was put down on paper in a guidance document 'Food Hygiene – Basic Texts' (Codex, 1996). It is HACCP as outlined by Codex, referred to as Codex HACCP, which will be discussed throughout this work.

It is important to highlight the change in regulatory approach that HACCP brings. HACCP is a food safety management system that incorporates regulation (see Principles 6 & 7 in section below). HACCP can therefore be described as self-regulatory and regulations mandating HACCP implementation can be described as 'management-based' regulations (Coglianese, 2002). In brief, businesses are told to manage food safety risks using a particular system but this does not constitute direct instructions as to how to produce safe food i.e. specific limits or production methods. The regulator (government) then oversees a system assessing how well businesses are regulating food safety.

It can be argued that this style of regulation, although more appropriate for regulating very diverse industries such as the food industry, puts more responsibility and a greater burden on businesses and can constitute a major challenge (Coglianese, 2002). In addition the role of overseeing management based regulations such as those relating to HACCP, usually undertaken by government; make significant demands on food control departments (Suwanrangsi, 2000). The following sections describe the detail of HACCP methodology and identify the main challenges involved in the development and

implementation of HACCP systems. These sections highlight the nature of the challenges that businesses and auditors encounter in order to implement and oversee HACCP.

### 1.3 Hazard Analysis Critical Control Point

HACCP is based on seven principles:

1. Conduct a hazard analysis
2. Identify CCPs
3. Establish critical limits
4. Establish monitoring procedures
5. Establish corrective actions
6. Establish verification procedures
7. Establish a system of documentation and record keeping

(Codex, 2009)

To gain an understanding of HACCP it is necessary to look at each principle in detail.

#### 1.3.1. Conduct a hazard analysis

*'Hazard Analysis: the process of collecting and evaluating information on hazards and conditions leading to their presence to decide which are significant for food safety and therefore should be addressed in the HACCP plan.'*

(Codex, 2009)

Hazard analysis is a systematic analysis of the potential hazards that may affect one given product in order to identify the most significant hazard which should be tackled first. A hazard is any physical, chemical or microbiological



agent that poses a significant risk of causing harm to the consumer if not controlled during production (Taylor, 2006). HACCP theorists have identified as many as nine distinct steps within hazard analysis which involve grouping, prioritising and controlling hazards. The nine steps are;

1. Group the hazards (microbiological/chemical/physical)
2. Prioritise the hazard groups
3. Identify individual hazards
4. Prioritise individual hazards
5. Take each hazard one by one
6. Identify where in production the hazard may contaminate/multiply/survive/persist
7. Design out if possible (by adapting production processes)
8. Design control measures
9. Validate decisions made

(Taylor, 2006)

### 1.3.2. Identify CCPs

*‘Critical Control Points (CCP): A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.’*

(Codex, 2009)

The second principle involves the identification of steps in production, already identified during hazard analysis, where a given hazard is critical to the safety of food before it reaches the consumer. Criticality is established in the first instance at any step where the hazard will not be adequately controlled at a subsequent process step (Taylor, 2006).

In some instances there will be more than one CCP. There may be independent sources of contamination that require separate controls and CCPs, or a process step may be critical where its completion is necessary for the successful completion of a subsequent CCP (Taylor, 2006).

Steps identified as critical are called CCPs. While all production steps identified where a hazard may potentially contaminate, multiply, survive or persist are controlled (see hazard analysis above) steps identified as CCPs are monitored against specific criteria and detailed plans are made for if controls fail (see below).

### **1.3.3. Establish critical limits**

*‘Critical limit: A criterion which separates acceptability from unacceptability.’*

(Codex, 2009)

For every CCP identified a critical limit is established. A critical limit is an expression of the difference between safe and unsafe (Taylor, 2006). The critical limit may refer to any aspect of the product or production process that determines safety and which is measurable. This may be a time/temperature combination, a colour change or the successful completion of a given task (Taylor, 2006).

### **1.3.4. Establish monitoring procedures**

*‘Monitoring: The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control.’*

(Codex 2009)

The fourth HACCP principle relates to the monitoring of CCPs. Each critical control point is monitored in relation to the critical limit established. Monitoring of a CCP should be conducted for 100% of the product where possible and in 'real' time i.e. during production (Taylor, 2006). Monitoring procedures should take into account the range of accuracy in equipment used and include appropriate frequency of calibration of monitoring equipment to ensure that measurements are accurate (Taylor, 2006).

### 1.3.5. Establish corrective actions

*'Corrective action: Any action to be taken when the results of monitoring at the CCP indicate a loss of control.'*

*(Codex, 2009)*

The fifth HACCP principle is concerned with planning ahead for a loss of control at a CCP and putting plans in place for regaining control and continuing production without compromising safety. The corrective actions are designed to instruct operatives, those working in production rather than managers or supervisors. They are concerned with actions to have immediate effect rather than the adjustment of the HACCP plan in the longer term (Taylor, 2006).

### 13.6. Establish verification procedures

*'Verification: The application of methods, procedures, tests and other evaluations, in addition to monitoring to determine compliance with the HACCP plan.'*

*(Codex, 2009)*

The sixth HACCP step refers to validation and verification which can be considered separately. Validation involves establishing whether the decisions

made throughout steps one to five are technically valid, and will produce safe food (Taylor, 2006).

Validity can be demonstrated through documentation which show valid decision making and documentary evidence that provide scientific basis for those decisions. Validation is undertaken during the development of a HACCP system, at predetermined intervals over time and whenever a change has been made to the product, process or inputs that may affect the validity of previously made decisions (Taylor, 2006).

Verification involves establishing that the system's procedures are being complied with in practice (Taylor, 2006). Verification requires a system of monitoring of employees to establish compliance; this is often in the form of an audit. Verification is undertaken at regular intervals to ensure compliance over time.

#### **1.3.7. Establish a system of documentation and record keeping**

*'Establish documentation concerning all procedures and records appropriate to these principles and their application.'*

(Codex, 2009)

The final HACCP principle stipulates that a system of documentation and record keeping is in place. HACCP is a documented system and this requirement will be fulfilled as documents and records are generated at various points in the development, implementation and running of a HACCP system.

Documentation will include all paperwork generated in the development and maintenance of a HACCP system e.g. minutes of meetings, diagrams relating to

production processes, information relating to products, ingredients, supplier specifications, documented evidence of principles 1-6.

Key HACCP documents are the HACCP control charts which summarise information relating to steps 1-5 (see below).

Step	Hazard	Control measure	CCP	Critical limit	Monitoring procedures	Corrective actions

Figure 1: Typical HACCP control chart

The HACCP control chart is completed in detail for each individual hazard but will often reference more detailed documents and details of procedures (Taylor, 2006).

Records are generated by the day-to-day working of the HACCP system and may include monitoring data, corrective action records, documentation received with ingredients and audit records (Taylor, 2006). Records provide evidence the system is working effectively over time.

### 1.3.8 Codex' Twelve Steps to HACCP Implementation

Codex (2009) provides international guidance on implementation. Building on the seven HACCP principles a further five preliminary steps are included, see below;

Step One: Assembling a HACCP team

Step Two: Describing the product

Step Three: Describing the intended use

Step Four: Develop a flow diagram

- Step Five: Verify the flow diagram
- Step Six (principle 1): Conduct a hazard analysis
- Step Seven (principle 2): Identify critical control points
- Step Eight (principle 3): Establish critical limits
- Step Nine (principle 4): Establish monitoring procedures
- Step Ten (principle 5): Establish corrective actions
- Step Eleven (principle 6): Establish verification procedures
- Step Twelve (principle 7): Establish a system of documentation and record keeping

The six principles and twelve steps provide a format that may give the impression of a straightforward, logical, step-by-step guide to HACCP development providing a route to effective implementation. Further examination of the literature indicates that HACCP development is complex and technical and that there are potential challenges for food businesses at every step.

### 1.4 HACCP in practice

Table 1 summarises some of the challenges of HACCP implementation presented in the literature.

Principle	Task	Potential challenges/problems	Source/s
Codex step 4+ 5	Create and verify flow diagram	Not feasible for non-linear and bespoke food production used in catering and food service. Any errors not picked up at this stage may impact effectiveness of HACCP plan. Problems can be missed if operating staff are not involved.	(Taylor, 2007a)  (Taylor, 2007b)

Principle	Task	Potential challenges/problems	Source/s
		<p>Very time consuming, simple product processing may include 100+ steps.</p> <p>Easy to miss steps. May need multiple versions for variations in product/processing.</p> <p>Difference between on paper and in practice – involve production staff.</p> <p>Antiquated layout of factories</p>	(Panisello, 2001)
1	Conduct a hazard analysis	<p>Hazard analysis is usually poorly understood. Often an inability to distinguish relative risks between different foods.</p> <p>Process is often simplified to save time, leading to errors in analysis.</p> <p>Identification of hazards requires technical knowledge. Managers keen to keep simple for easier implementation.</p> <p>Required specific knowledge.</p> <p>Development of effective control measures.</p>	<p>(Taylor, 2007a)</p> <p>(Eves, 2005)</p>
2	Identify critical control points	Lack of technical expertise, failure to focus, misunderstandings of ‘critical’, over reliance on decision simulation tools (decision-tree).	(Taylor, 2007a)
3	Establish critical limits	Businesses may have to collect technical evidence themselves. In some cases businesses may require external technical support.	(Taylor, 2007a)
4	Establish monitoring procedures	<p>Frequency of monitoring usually ad-hoc and based on custom and practice.</p> <p>Time and staffing issues during busy periods.</p>	<p>(Taylor, 2007a)</p> <p>(Eves, 2005)</p>

Principle	Task	Potential challenges/problems	Source/s
5	Establish corrective actions	Time consuming in development stage as all possible scenarios are planned for. Often not detailed enough and rely on 'reporting to management'.	(Taylor, 2007a)
6	Verification of plan	The least well tackled principle. Requires the application of scientific and technical knowledge.	(Taylor, 2007a) (Panisello, 2001), (Scott, 2005)
7	Establish documentation and record keeping	In practice documentation incorrectly used. Record keeping can be onerous and overwhelms small businesses. Difficult to manage.  Not kept up to date during busy periods.	(Taylor, 2007a)  (Taylor, 2007b) (Eves, 2005),  (Panisello, 2001)

Table 1: Potential challenges presented by each HACCP principle

This review of the steps involved in HACCP development demonstrates that at each step there are potential challenges for food businesses.

## 1.5 International food safety regulation and HACCP

Regulation of food safety largely takes place at national or local level, however the international context in which national authorities operate important. It is usual that food safety is considered at point of entry when food is traded across borders (FAO, 2005).

Buzby (2003) identifies six causes of conflict in trade relating to food safety;

- New or more stringent standards and rapidly changing food safety regulations



- Difficulty separating food safety and non-science issues in regulatory decision making
- Difficulties in assessing whether equivalent safety outcome has been achieved when process standards are used
- Strong differences in consumer risk perception and preferences
- Newly identified and unfamiliar hazards, and
- Increased trade volumes from new or less proven sources.

In order to reduce this conflict in the area of food safety HACCP has been adopted as the internationally recognised standard for food safety via the WTOs non tariff trade agreements and reference to the United Nation's reference body for food, Codex.

Non tariff barrier agreements dictate on what terms a country can refuse to trade with another and whether a country can access foreign markets easily. Countries can legitimately restrict trade for purpose of the protection of human, animal or plant life and health, or in certain circumstances for technical standards. The Sanitary and Phytosanitary (SPS) and the Technical Barriers to Trade (TBT) agreements are found in Article 20 of the 1994 Uruguay Round agreements (WTO, 2010).

The WTO principle of 'national treatment' provides that *'imports and locally produced goods should be treated equally'* (WTO, 2010). This means that conditions applied to imported goods and services should also be applied to equivalent goods and services supplied locally. The consequence of this in the case of HACCP is that all food businesses both exporting and producing for local consumption should apply HACCP principles; *'The [WTO] rules extend well beyond border measures and reach deep into domestic regulatory structures'* (Sampson, 2001).

The impact of the SPS and TBT agreements and the principle of national treatment are acknowledged in the literature as being potential unfair barriers to trade (Alavi, 2009), (Sampson, 2001). The WTO has been criticised for failure to set up effective reporting mechanisms measuring the uptake and impact international standards at national and international level (Roberts, 2010).

This research examines HACCP in the wider context of the development and implementation of food control systems and from the perspective of those involved in food control at national level. What follows is a literature review incorporating HACCP, and the wider context of food control.

## 1.6 HACCP uptake

A review of research undertaken to date specifically reporting on uptake provided eleven peer reviewed papers. These papers publish findings from 1999-2008 from a wide range of countries as indicated in figure 2 (Mauritius, Cyprus, Spain, Turkey, Canada, the Philippines, Poland, the UK and the US).

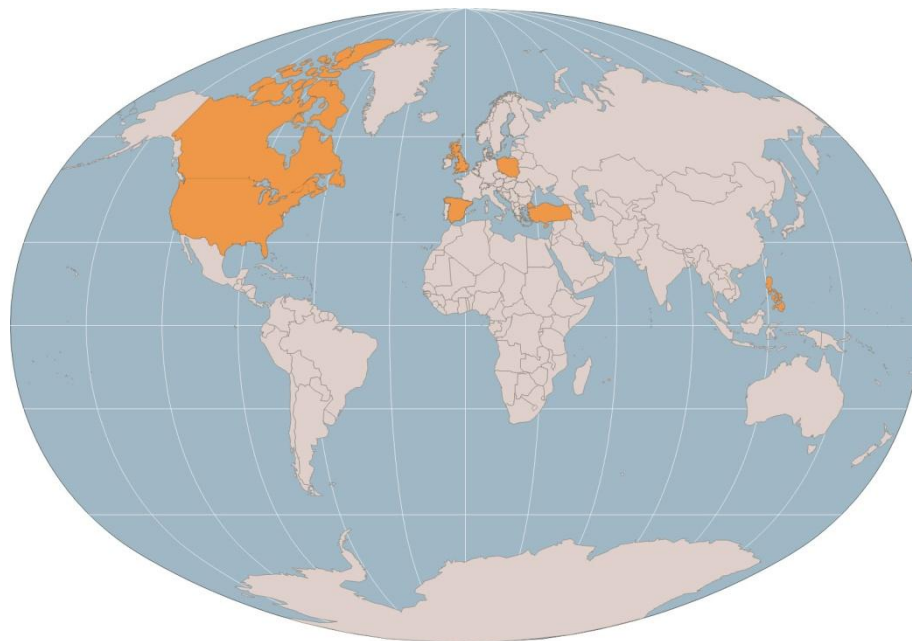


Figure 2: Countries included in published HACCP uptake research

The review includes almost exclusively research papers with one government report as an exception. These papers provide an insight into levels of uptake from the research undertaken to date.

The eleven papers are presented in table 2, a discussion of the methods, findings and limitations follows.

Author, date	Method/sample	Reported HACCP uptake	Incentives to implement HACCP	Limitations of research
Herath, D., et al (2010)  Canada	Questionnaire. 134 (of 1044) participants.	38% fully implemented HACCP. 19% currently implementing. 37% no plans to implement HACCP.	-	Republication of 2006 study data. Reliance on self reporting. 13% response rate. Majority of participants meat processors and only including primary producers.
Ramnauth, M. et al. (2008)  Mauritius	On-site questionnaire and 11 (of 26). Participants fish processors.	7 of 11 or 64% companies had HACCP (all exporters).	Importing country requirements, pressure from stakeholders.	Low sample number. 42% response rate.
Violaris, Y. et al. (2008)  Cyprus	Questionnaire and interview. Participants 300 food business managers. Response rate approaching 100%	17% uptake across all food businesses. 10% in small businesses, 32% in medium sized businesses 63% in large businesses.	-	Self reporting. Lack of information provided on recruitment.
Celaya, C. et al. (2007)	All food manufacturers	57% food businesses	-	Lack of methodological

Author, date	Method/sample	Reported HACCP uptake	Incentives to implement HACCP	Limitations of research
Spain	within Public health Area V of Madrid's autonomous community.	HACCP in place.		information difficult to establish rigour.
Bas, M. et al. (2007) Turkey	On-site questionnaire and interview. Participants 115 (response rate not included) food businesses.	18% of food businesses.	For FSMS – improved confidence in food safety, reduction in customer complaints.	Lack of information about sampling method, response rate and interview method.
Herath, D. et al. (2006) Canada	Postal questionnaire. 134 (of 1044) primary producers (meat, dairy, vegetable producers)	93% vegetable, 41% meat, 46% in dairy.	Ability to access new markets, ability to attain new customers, ability to retain existing customers.	13% response rate. Self reporting not verified by further research.
Azanza, M.P. et al. (2005) Philippines	Narrative interview/questionnaire 27 participants from four food businesses	40–50% had knowledge of HACCP.	–	Weakness in sampling – participants from previous research projects. Lack of detail and conflicting information about methodological approaches used.
Konecka-Matyek, E. et al. (2005)	Postal questionnaire. Participants 80 (of	34% implemented HACCP, 35% currently	Meeting customer demands, compliance with	20% response rate. Self reporting.

Author, date	Method/sample	Reported HACCP uptake	Incentives to implement HACCP	Limitations of research
Poland	400) food businesses.	implementing HACCP.	law and access to export markets.	
Walker, E. et al. (2003)  UK	On-site questionnaire and follow up telephone interview Participants 102 (of 159) food businesses.	42% managers had heard of HACCP. 26% of businesses had HACCP records	-	Self reporting. 64% response rate.
Food Standards Agency (2001)  UK	Postal questionnaire to local government authorities. Included 50% of all UK local authorities	20% food businesses have HACCP documentation (59% manufacturing, 19% food service).	Commercial marketing advantages better perceived by larger businesses.	Indicative only, based on perceptions of local authorities.
Youn, S. et al. (2000)  US	Postal questionnaire. Participants 414 (of 1169) school food service providers.	22% schools implemented.	-	35% response rate. Self reporting not verified by further research.
Panisello, P.J. et al. (1999)  UK	Postal questionnaire 175 (of 1000). Food companies.	72% HACCP in place, 15% in process of implementing.	Increase safety of food, comply with customer requirements, comply with legislation.	18% response rate. Self reporting not verified by further research.

Table 2: Summary of research into HACCP uptake

These papers report varying levels of HACCP uptake across the food sectors from 17% to 93%. The highest levels of uptake (more than 60%) were mostly reported amongst businesses exporting to overseas markets (Ramnauth, 2008), in large businesses (Violaris, 2008) or driven by customer demand for HACCP implementation (Herath, 2006). An exception to this is the study conducted by Panisello (1999) which finds uptake of 72% across the food industry.

The lowest levels of uptake (less than 40%) were reported amongst small and medium sized businesses (Violaris, 2008) and the food service sector (FSA, 2001) and (Youn, 1999). Konecka-Matyek (2005) and Bas (2007) find low uptake across sectors of 34% and 18% respectively. Studies presenting results that may indicate low uptake include Azanza (2005) reporting that only 40–50% of businesses had heard of HACCP and Walker (2002) reporting that only 42% of managers had heard of HACCP and only 26% had any HACCP documentation.

Several studies also reported on the incentives businesses identified for implementing HACCP. These included commercial advantages relating to increased access to overseas markets and meeting customer requirements (Ramnauth, 2008) (Herath, 2006), (Konecka-Matyek, 2005) (FSA, 2001) (Panisello, 1999) improved food safety (Bas, 2007) (Panisello, 1999) and compliance with legislation (Konecka-Matyek, 2005) (Panisello, 1999). It is likely that there is a strong relationship between the perceived incentives to implement HACCP and the rates of HACCP uptake.

It is not possible to gauge a reliable picture of HACCP uptake from the eleven studies for the following reasons; studies focus on different food industry sectors, studies measure uptake in different ways and finally all studies are

methodologically flawed to a greater or lesser extent. These issues are discussed below.

Some of the results presented in the eleven papers appear directly contradictory. Three studies measure HACCP uptake across the food industry in the UK between 1999 and 2003 (Walker, 2003), (FSA, 2001) and (Panisello, 1999) and report uptake of 26% (assuming no HACCP uptake where no HACCP documentation), 20%, and 72% respectively. Closer examination of the sample reveals important differences. A much higher proportion of the sample in FSA (2001) and Walker (2003) include businesses from the food service sector, although exact proportions are not available. In Panisello (1999) the food servicesector represented only 5.7% of the total sample and saw the lowest response rate amongst all businesses sectors. This highlights the need to view reported uptake figures in the context of the sample of participants.

The eleven publications adopted a range of methodological approaches; 6 postal questionnaires, 3 on-site questionnaires, 1 in-depth interview and 1 did not include detail of data collection. This demonstrates a predominance of methods relying on self-reporting (on-site questionnaires, questionnaires and in-depth interviews). Self-reporting i.e. reliance on what the participants say as opposed to examination of documentations and records is a weak method as it relies on the assumption that the participants will be honest and admit not to have a system in place that is linked to safety, best practice and in some cases legislative requirements.

The FSA (2001) study is the only paper not to gather data directly from food businesses. Data was gathered via a questionnaire and sent to local authorities in the UK. The local authorities were asked to estimate the level of uptake in their area. This technique while allowing for estimates which incorporate large numbers of businesses is problematic for at least three reasons. Firstly the

process of estimating and any guidance proved is not described and consequently it cannot be assumed that it was carried out in the same way by all of the local authorities. Secondly, there is the potential that local authorities may have an incentive to report higher/lower levels of compliance for strategic reasons e.g. to demonstrate effective enforcement, to secure higher levels of funding or in response to potential comparisons with other authorities.

A second methodological problem, related specifically to the use of questionnaires, is the response rates. Where all necessary information is available the response rates for the studies on HACCP uptake range from 13% - 63%. Violaris (2008) claims to have a response rate nearing 100%, unfortunately no data or information verify this estimate or explain this achievement.

Response rate is important as there may be common factors linking businesses that respond or do not respond. For example there may be a positive relationship between those businesses that respond to a questionnaire and those businesses that have heard of HACCP or have HACCP in place. It is difficult to assess the possible impact of non response as no data is available on non respondents in regard to HACCP uptake. However, it can be assumed that the lower the response rate the less reliable the results of the study. See table 2 for more information on response rate and limitations.

An additional problem relating to the studies included in this review is a lack of methodological detail in some papers. Violaris (2008), Celaya (2007) and Bas (2007) can all be identified as not including full detail of the methodological approach. This makes it impossible to interrogate the research design and weakens the reliability of the data presented. Where detail of the methodology is provided it can reveal further methodological weakness. Azanza (2005) cites use of the 'narrative interview technique' but describes use of questions with



‘multiple choices’ and quantitative analysis that are not used in the narrative method.

In summary although it is difficult to rely on the results of any one of the studies presented, and despite the need for research in this field to be more rigorous and rely less on self-reporting, a picture emerges that 1. HACCP uptake in several sectors of the food industry is likely to be low, 2. Uptake may be lower than estimated due to a reliance on self-reporting and 3. Low uptake is likely to be experienced in many countries.

### 1.7 Barriers to HACCP uptake

Another field of research in HACCP has been to explore the reasons for lack of HACCP uptake or ineffective HACCP implementation. This has led to a number of studies on what have come to be called ‘barriers’ to HACCP. A review of research undertaken to date exploring and identifying barriers provided nineteen peer reviewed papers and a PhD study. These twenty publications were published between 1995–2011 and are from a wide range of countries as indicated in figure 3 (Barbados, Canada, Cyprus, Dubai, Madagascar, Mauritius, Nigeria, Oman, Poland, Thailand, Turkey, the UK and the USA).

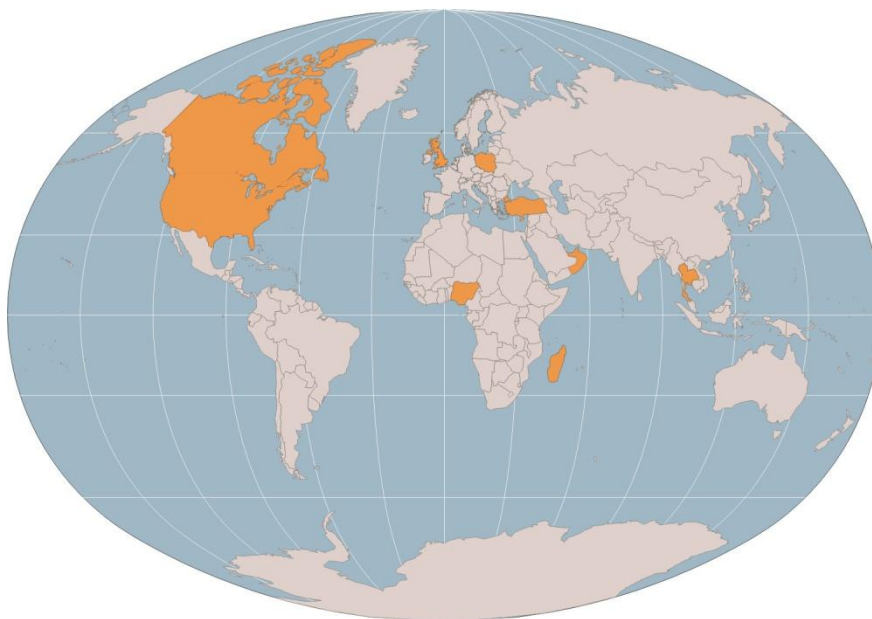


Figure 3: Countries included in published HACCP barriers research

The review includes almost exclusively research papers with the exception of one PhD thesis. These papers provide an insight into barriers to HACCP implementation. Several papers focus exclusively on HACCP barriers (Taylor, 2011), (Taylor, 2008), (Bas, 2007), (Taylor, 2007), (Yapp, 2006), (Azanza, 2005), (Taylor, 2004a), (Taylor, 2004b). The remaining twelve papers have wider objectives but barriers to HACCP implementation feature in the findings.

The twenty publications are presented in summary table 3, a discussion of the methods, findings and limitations follows.

Author, date	Method/sample	Findings/barriers to effective HACCP implementation	Limitations of research
Taylor, J. <i>et al.</i> (2011) UK, Barbados, Dubai, Nigeria & Oman	In-depth narrative interviews supported by documentary analysis in food service sector.	Supports the findings of parallel UK research. Barriers to food safety management are likely to have global relevance.	Low sample size.
Herath, D., <i>et al.</i> (2010)  Canada	Questionnaire. 134 participants. Quantitative analysis of impact of barriers in Taylor's 20 barrier model.	4 barrier groupings – questionable appropriateness, scale of change required, low priority of food safety and financial constraints.	Republication/analysis of author's 2006 data. 13% response rate. Majority of participants meat processors. Only including primary producers. Questionnaire incorporates 20 barriers explicitly – potential bias resulting.
Sarter, S. <i>et al.</i> (2010)	Interviews, documentary review and SWOT analysis.	Very small businesses in informal sector represent the highest proportion of businesses and need assistance. Very small	Methodology not provided and results not presented.

Author, date	Method/sample	Findings/barriers to effective HACCP implementation	Limitations of research
Madagascar		and medium sized businesses barriers are lack of clean water, poor food safety knowledge and belief that food safety precautions are of little value.	
Ramnauth, M. <i>et al.</i> (2008) Mauritius	On-site questionnaire and 11 (of 26). Participants fish processors.	Absence of legal requirement, lack of knowledge, lack of support, lack of training.	Low sample number. 42% response rate.
Taylor, J. (2008) UK	In-depth narrative interviews supported by documentary analysis. 22 food service businesses.	'21 barriers to success' model developed across knowledge, attitude and behaviour.	Limited to the UK food service sector.
Violaris, Y. <i>et al.</i> (2008) Cyprus	Questionnaire and interview. Participants 300 food business managers. Response rate approaching 100%	Knowledge of food safety, commitment of resources, access to expertise.	Self reporting. Full methodological detail not provided.
Bas, M. <i>et al.</i> (2007) Turkey	On-site questionnaire and interview. Participants 115 food businesses.	Lack of prerequisite programs, lack of knowledge about HACCP, cost, time.	Lack of information about sampling method, response rate and interview method.
Taylor, J. (2007c) UK	PhD Thesis. In-depth narrative interviews, documentary analysis with 22 food service businesses managers.	'21 barriers to success' model developed across knowledge, attitude and behaviour.	Limited to the UK food service sector.
Herath, D. <i>et al.</i> (2006)	Postal questionnaire. 134 (of 1044) primary producers (meat, dairy,	Budgetary constraints, perceived sufficiency of current system,	13% response rate. Self reporting not verified by further research.

Author, date	Method/sample	Findings/barriers to effective HACCP implementation	Limitations of research
Canada	vegetable producers)	preparation for HACCP implementation	
Azanza, M.P. <i>et al.</i> (2005)  Philippines	Narrative interview/questionnaire 27 participants from four food businesses	Low levels of HACCP knowledge were a barrier. Attitude and behaviour not measured as low levels of knowledge.	Weakness in sampling – participants from previous research projects. Lack of detail and conflicting information about methodological approaches used.
Konecka-Matyek, E. <i>et al.</i> (2005)  Poland	Questionnaire. Participants 80 (of 400) food businesses.	Cost, management challenges, upkeep of documentation.	20% response rate. Self reporting.
Yapp, C. <i>et al.</i> (2005)  UK	Analysis of local authority compliance data, semi-structured interviews, compliance assessments.	Several including; lack of money, lack of time, lack of experience.	Results not presented, only findings – not possible to ascertain rigour.
Taylor, E. & Taylor J.Z. (2004a)  UK	In depth narrative interview – one farmer.	Lack of credibility and oppression of officials and authorities, burden of paperwork and formalities.	Perspective of just one UK farmer.
Taylor, E. & Taylor J.Z. (2004b)	4 in-depth narrative interviews.	HACCP as difficult, burdensome and unnecessary, and hindered by staff and external problems. Barriers found to be operating on levels of knowledge, attitude and behaviour.	
Walker, E. <i>et al.</i>	On-site questionnaire and	Lack of time, lack of	Reliance on self

Author, date	Method/sample	Findings/barriers to effective HACCP implementation	Limitations of research
(2002) UK	follow up telephone interview Participants 102 (of 159) food businesses.	expertise.	reporting. 64% response rate.
Taylor, E. (2001) UK	Discussion paper.	Ability to change, expertise, costs, time, documentation and validation.	Proposed benefits of HACCP are not linked to evidence based research.
Food Standards Agency (2001) UK	Postal questionnaire to local government authorities. Included 50% of all UK local authorities	Perceived complexity and bureaucracy, lack of knowledge and adequate training, poor communication of information/guidance.	Indicative only, based on perceptions of local authorities.
Gilling, S. <i>et al.</i> (2001) UK	Narrative interview and 200 telephone interviews.	11 barriers identified and linked to knowledge attitude and behaviour.	
Jirathana, P. (1998) Thailand	Discussion paper.	Lack of effective education and training, language issues, confused messages in training manuals, scientific and technical requirements, not adhered to in practice.	Some observations may be outdated.
Ehiri, J.E. <i>et al.</i> (1995)	Discussion paper/literature review	Lack of knowledge, disputed relevance, lack of time, cost.	Outdated. No empirical research.

Table 3: Summary of research into HACCP barriers

The twenty studies identify a wide range of potential barriers to effective HACCP implementation. Many of the same barriers are identified in many of

the studies and the barriers do not seem to have changed during the 16 years between publication of the first and last study. Barriers describing lack of knowledge, disputed relevance, lack of time and prohibitive costs are identified in both Ehiri (1995) and Taylor (2011) among others.

Other recurring barriers include; inability to change (Taylor, 2001), perceived complexity of HACCP systems (Jirathana, 1998), (FSA, 2001), (Gilling, 2001), (Taylor, 2002), (Taylor, 2007), (Taylor, 2008), (Taylor, 2011), inadequate training (Jirathana, 1998), (FSA 2001), poor guidance (Jirathana, 1998), (Gilling, 2001), burden of paperwork (FSA 2001), (Taylor, 2004a), (Taylor, 2004b), (Konecka-Matyek, 2005), inadequate prerequisites to HACCP (Herath, 2006), (Bas, 2006), lack of management commitment (Violaris, 2008), absence of legal compulsion (Ramnauth, 2008) and lack of government support (Ramnauth, 2008).

In 2001 a model providing a framework for HACCP barriers was developed and published (Gilling, 2001). This model was the result of project adopting an in-depth interview technique known as the 'narrative interview technique'. This research was underpinned by theories usually applied in social psychology research. The model categorises barriers under the subheadings of knowledge, attitude and behaviour.

Gilling's research saw the start of a more in-depth approach to HACCP research focusing on the experiences of food managers and food handlers. The in-depth approach to HACCP research has since been advanced by the co-authors of the Gilling's 2001 paper; (Taylor, 2004a), (Taylor, 2004b) (Azanza, 2005). The study of HACCP barriers through the prism of knowledge, attitude and behaviour has been used to increase understanding about barriers and develop effective solutions.

In 2007 research funded by the Food Standards Agency UK was published (Taylor, 2007). Twenty-two food service businesses participated in a longitudinal study in the Manchester, UK. In-depth interviews and documentary analysis were used to measure change in knowledge, attitude and behaviour pre and post implementation of a new system of HACCP for the food service sector (Safer Food Better Business). This study represents the largest and most in-depth research into barriers to date.

The research identified 21 barriers to successful HACCP implementation and categorised them under four headings; external behavioural barriers, internal behavioural barriers, attitude/psychological barriers and knowledge/expertise barriers (see figure 4). Taylor (2011) brings together research from Barbados, Dubai, Nigeria and Oman which adopt similar methodology and identify equivalent barriers. This research demonstrates that the '21 barriers model' has relevance beyond the UK hospitality sector.

The barriers model has also been adopted by researchers working with quantitative methods. Herath (2010) research has used Taylor's model and measured the respective impact of each barrier in US food processing industry. The study used a questionnaire to collect data and asked participants to indicate the importance of each of the barriers on a 5-point likert scale. The research found that the most important barriers were associated with lack of resources and adequacy of existing food safety controls.

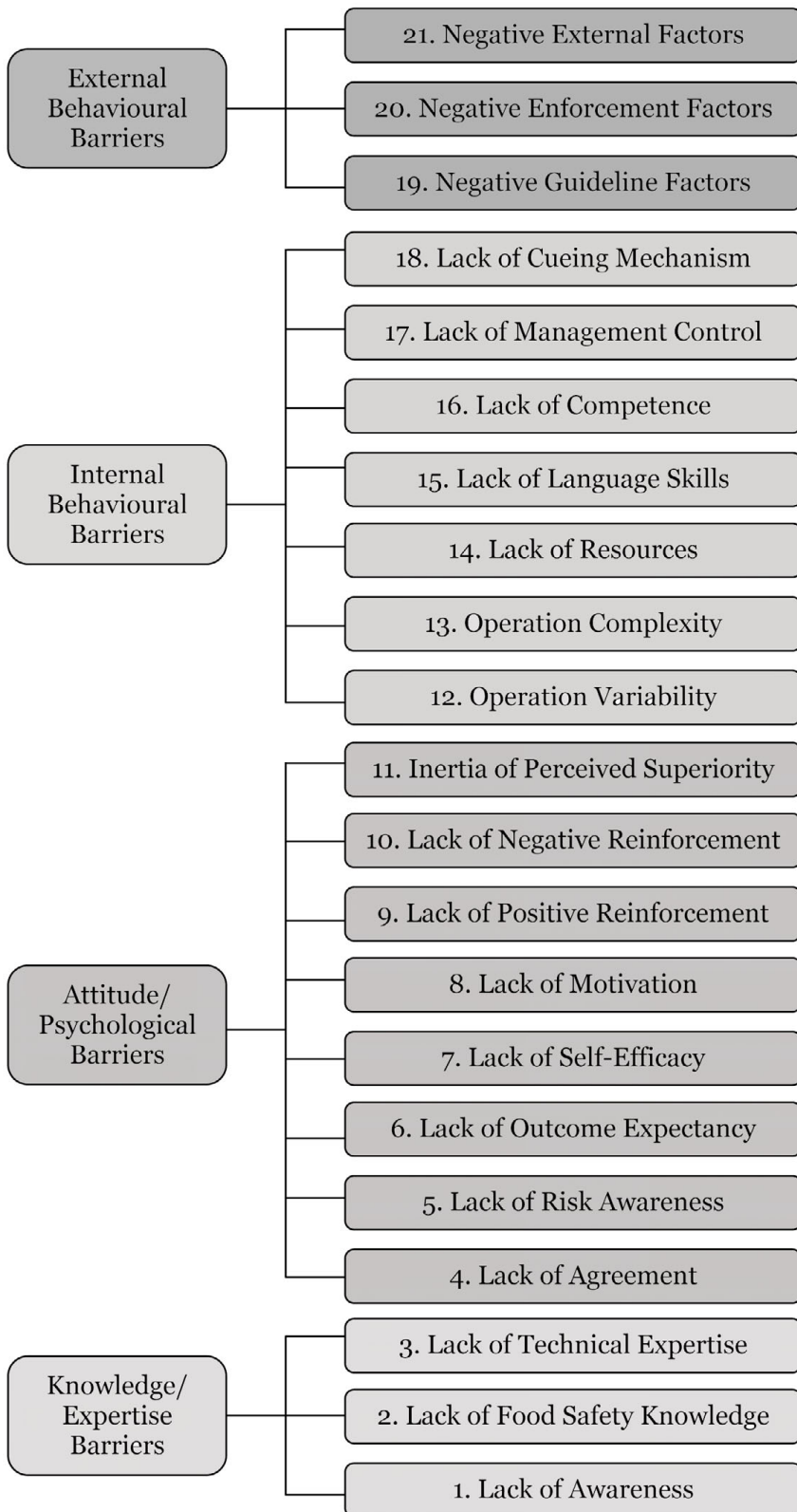


Figure 4: 21 barriers to HACCP and food safety management in hospitality (Taylor, 2007).

Across the twenty studies the findings coincide and are reinforced, it appears there are common barriers across industry sectors and countries. A significant



proportion of research into HACCP barriers adopts an in-depth methodological approach that puts food managers and food handlers at the centre of research and acknowledges the potential sensitivities of those with day to day involvement in and responsibility for producing safe food. It is therefore in this area of the literature that most can be learnt about HACCP and HACCP research.

## **1.8 National food control and HACCP**

At national level regulation of food safety, including legislation and enforcement of systems such as HACCP, falls under the umbrella of food control. Food control usually takes place at national or sub national level (FAO, 2005). The main objective of food control is to protect consumers and in addition to promote economic growth (FAO, 2010b).

The review of literature in this area will begin with the guidance available from the United Nations' agencies with responsibility for food safety; the Food & Agriculture Organisation (FAO) and the World Health Organisation (WHO). This will be followed by a review of academic articles published in this area and a discussion of key topics emerging in both the guidance and the articles.

Over the last two decades there have been significant changes in national and international regulation of food at national level. Codex has been adopted by the World Trade Organisation (WTO) as the source for international food safety standards (WTO, 2010). Codex was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts under the Joint FAO/WHO Food Standards Programme. The main purposes of Codex are protecting health of the consumers, ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations (Codex, 2011).

In addition global food-borne disease outbreaks, such as Mad Cows Disease, Avian Flu draw media attention and have led to an increasing interest in food control and regulation (FAO, 2005).

Food control is defined by the FAO as *'a mandatory regulatory activity of enforcement by national or local authorities to provide consumer protection and ensure that all foods during production, handling, storage, processing, and distribution are safe, wholesome and fit for human consumption; conform to safety and quality requirements; and are honestly and accurately labelled as prescribed by law'* (FAO, 2003).

The following activities form a typical food control system;

- Food control management
- Food legislation
- Food inspection
- Provision of official food control laboratories
- Information, education, communication and training

(FAO, 2010b) (FAO, 2003)

Underpinning food control activities guidance is a set of identifiable principles which appear throughout the literature. These are; a preventative approach, a farm to table approach, the establishment of emergency procedures, food control strategies that are science based, prioritising based on risk analysis, taking a holistic approach which targets risks and impacts economic wellbeing and promoting interaction between stakeholders (FAO, 2002).

United Nations agencies, the FAO and the WHO, provide support and guidance for countries on a wide range of issues. Improving food safety for the purpose of reducing foodborne disease is one aspect of these organisations' remit

(FAO, 2009) (WHO, 2002). The agencies' activities primarily support farmers and technicians however resources are also directed at supporting governments (FAO, 2010a). Policy makers can request to receive assistance in the establishment or improvement of food control systems in their country (FAO, 2006).

Resources are made publically available online the organisations' websites. These include; food standards, reports, training tools and statistics. In addition the FAO/WHO joint venture, Codex, provides a forum for countries to the negotiate content of international food safety texts (Codex, 2011).

### 1.8.1 International guidance

Key texts relevant to national food control systems and the development and implement of national HACCP strategy are presented below with a summary of content and target audience.

Title	Year	Author	Summary of content	Target audience
Codex Alimentarius Food Hygiene Basic Texts 4th edition	2009	Codex	Part of the internationally adopted food texts that make up the Codex Alimentarius. Promotes understanding of the development and application of rules and regulations in food hygiene.	Government authorities, food industries, food handlers, consumers and teachers and students of food hygiene.
Strengthening National Food Control Systems: Guidelines to Assess Capacity Building Needs	2006	FAO	A modular guide specifically for capacity assessment of food control systems. Structure based on the five core elements of food control; food control management, food legislation, food inspection, food control laboratories and food safety and quality and information,	National authorities, food industry and trade associations, consumer organisations, NGOs and academic institutions.

Title	Year	Author	Summary of content	Target audience
			and education and communication.	
Guidance to Governments on the Application of HACCP in Small and/or Less Developed Businesses	2006	FAO/ WHO	Guidance proposing the development of a national HACCP strategy for small and less developed businesses (SLDBs). Defines the sub-sector, identifies particular challenges they encounter and provides a framework for strategy development, a series of practical solutions and several national case studies in HACCP strategy development for SLDBs.	Of particular relevance to national authorities could also be of interest to food industry and trade associations, consumer organisations, NGOs and academic institutions.
Assuring Food Safety and Quality: Guidelines for Strengthening Food Control Systems	2003	FAO/ WHO	Provides guidelines for the strengthening of national food control systems under the following headings; important food issues, elements of a national food control system, strengthening national food control systems and the specific issues of developing countries.	National authorities, food industry and trade associations, consumer organisations, NGOs and academic institutions.
WHO Global Strategy for Food Safety: Safer Food for Better Health	2002	WHO	An explanation of food safety as a public health issue, identifies current major issues, defines the role of the WHO in food safety and sets out the WHO global strategy under seven sub-headings; strengthening surveillance systems, improving risk assessment, developing methods for assessments of safety of new products and technologies, enhancing role of WHO in Codex,	National authorities, food industry and trade associations, consumer organisations, NGOs and academic institutions.

Title	Year	Author	Summary of content	Target audience
			enhancing risk communication and improving international and national cooperation and strengthening capacity building in developing countries.	

Table 4: Summary of International Food Control Guidance

In summary ‘Assuring Food Safety and Quality’ (FAO/WHO, 2003) provides comprehensive guidance on national food control systems while ‘Guidance to Governments on the Application of HACCP in Small and/or Less Developed Businesses’ (FAO/WHO, 2006) and ‘Strengthening National Food Control Systems: Guidelines to Assess Capacity Building Needs’ (FAO, 2006A) focus on more specific areas within food control. All guidance is aimed at both reducing foodborne disease and improving conditions for economic growth.

### 1.8.2. Academic research and discussion

A comprehensive search of the academic literature between 2000 and the time of writing (Spring 2012) identified eleven articles with direct relevance to the development and implementation of effective national food control systems.

Articles represent discussion and/or research from a range of countries, see figure 5.

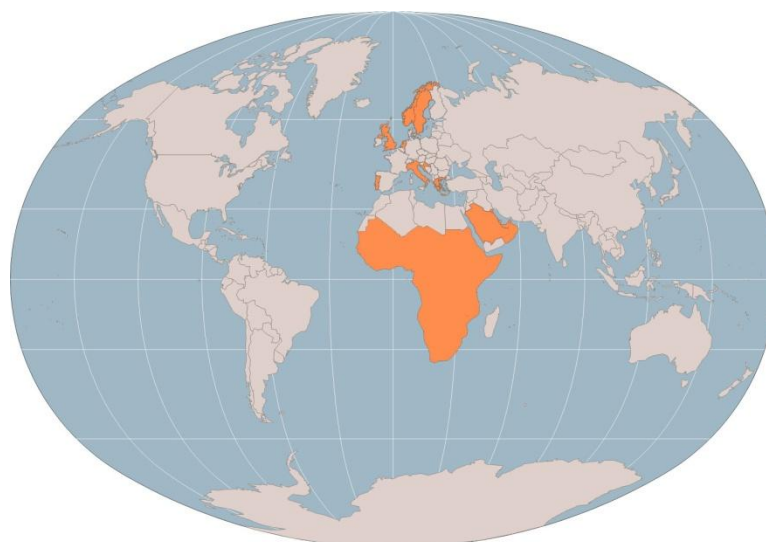


Figure 5: Countries included in published Food Control research

The eleven articles are presented in summarised form in table 5. This is followed by more in-depth discussion of the literatures content.

Source	Approach	Country/ Region	Findings	Limitations
Al-Awadhi, K.M.S., et al. (2011)	Technical	Dubai (UAE)	Many hospitality businesses are not managing food safety effectively, indicating a failure of basic hygiene training. Evolving methods of HACCP seen to improve food safety management. Food authority is focusing on training at supervisory/management levels.	Findings of fieldwork are presented but method not provided.
Al-Qassemi, R. et al. (2011)	Technical	Sharjah (UAE)	Describes the planning and implementation of a food safety program. Positive feedback from the program team and industry presented.	
Al-Yousuf, M.H.S., et al.	Technical	Abu-Dhabi (UAE)	Findings include: replacing written food hygiene exam with photo based alternative increases pass rate whilst retaining level of difficulty.	Provides limited depth on each initiative.

Source	Approach	Country/ Region	Findings	Limitations
(2011)			4/5* hotels typically have HACCP in place. Businesses with the lowest inspection grades were primarily independent food businesses. 40% of kitchen managers could not write or read in English or Arabic. Plan to develop a food safety management system based on pictures.	
Alomirah, H.F et al. (2010)	Discussion	Kuwait	Describes the food control system under headings; legislation, administrative structures, enforcement and education and training. Food sampling is still heavily relied upon for imports.	
Al-Kandari, D., et al. (2009)	Desk-based 'situational analysis'	Bahrain, Qatar, Kuwait, Oman, UAE, Saudi Arabia	Findings include; a multiple agency approach can be inefficient, efficiency improvements are reported in Bahrain and Saudi Arabia where a single agency has been created, the GCC is unifying food policies, regulations and standards, local inspection data could be utilised better to identify trends and inspectors training needs updating and finally that the hospitality sector is a focus for food control in the region.	An observation/opinion based discussion. Many statements are not referenced.
Antunovic, B., et al (2008)	Discussion	Croatia	Describes development of national food safety strategy. Describes support for industry through workshops, projects and conferences. Identifies the importance of cooperation with	Does not provide an in depth analysis of events, focuses on food safety strategy and does not draw

Source	Approach	Country/ Region	Findings	Limitations
			international nongovernmental organisations i.e. FAO and WHO. Found that the task was complex and multi-institutional, that progress relied on a high level of cooperation and coordination between relevant parts of government and other stakeholders.	comparison with any other country.
Elvbakken, K.T., et al. (2008)	Comparative analysis	Norway, Sweden, The Netherlands, Great Britain, Germany	Provides a history of food safety regulation for each country. Finds that central food legislation similar across five countries. All five countries established central food agencies although the responsibilities of each are quite different..	No insight into changes undertaken.
Domingues, M. (2006)	Discussion	Portugal	Launch of single agency project after BSE scare exposed failings in co-ordination between responsible ministries, clear policy and communication with industry and the public. Development of a single agency extremely problematic. Introduction of police force-like powers to inspectors.	From the perspective of consumer confidence. Restricted to a specific topic only. Observation/opinion based rather than methodical data collection/analysis.
Ferretti, M.P. et al. (2006)	interviews and documentary analysis.	Italy	BSE scare led to a response from the private sector but not the public sector. Strategy of local and traditional foods representing quality and implying safety. Co-	From the perspective of consumer confidence. Methodology not



Source	Approach	Country/ Region	Findings	Limitations
			ordination between agencies is weak.	provided and results not presented.
Varzakas, T.H., et al. (2006)	Discussion	Greece	Of particular relevance is the description of challenges. It is reported that one of the biggest challenges has been cooperation within government. Public opinion of the new authority has been measured and has been favourable.	Limitations include a lack of depth of the challenges encountered.
Nguz, K. (2005)	Discussion	Sub Saharan Africa	Findings include; that poor cooperation within government results in unnecessary bureaucracy and duplication of activities, the region does not have the necessary infrastructure for risk analysis, the region is not ready for mandatory HACCP requirements and that voluntary certification is more suitable.	No evidence for the identified 'key issues, does not draw comparison with any other region.

Table 5: Summary of research in the area of Food Control

The literature on national food control systems fall into three categories; 1. Description of regulatory changes (Elvbakken, 2008), 2. Situational analysis of food control in a country or region (Nguz, 2005) (Al-Kandari, 2009) and 3. Description of government activities (Antunovic, 2008) (Varzakas, 2006) (Al-Awadhi, 2011) (Al-Qassami, 2011) (Al-Yousuf, 2011) (Ferretti, 2006) (Domingues, 2006).

The following methodological approaches are taken in these articles; two desk based studies (Al-Kandari, 2009) (Elvbakken, 2008), seven discussion papers

i.e. presenting information without a methodological approach (Antunovic, 2008) (Nguz, 2005) (Varzakas, 2006) (Al-Awadhi, 2011) (Al-Qassami, 2011) (Domingues, 2006) (Alomirah, 2010), one quantitative study (Al-Yousuf, 2011) and one qualitative study using interviews and documentary analysis (Ferretti, 2006).

The majority of the articles are categorised as discussion. Of the research articles there are limitations; Ferretti (2006) only provides brief detail of the 25 interviews and documentary analysis of official documents and press coverage. Sampling, interviewing and analysis methods are not described. Al-Yousuf (2011) presents data from the piloting of a new basic hygiene examination, the content discussing national food control policy is descriptive.

The discussion articles have both strengths and weaknesses, five articles are written by those working in the food authority (Antunovic, 2008) (Varzakas, 2006) (Al-Awadhi, 2011) (Al-Qassami, 2011) (Al-Yousuf, 2011). This is a strength as those working within a national food control can offer a perspective informed by genuine experiences and insights. Other of the discussion papers have less robust legitimacy. Nguz (2005) presents 'key issues' for national food control in Sub-Saharan Africa but fails to demonstrate how these have been identified or explain why this viewpoint is legitimate. Similarly, Al-Kandari (2009) presents an analysis full of relevant facts but fails to provide references. In discussion papers the credentials of the Author is of key importance and should be outlined if not evident from the institution.

Several key topics emerge from the guidance and the academic literature on national food control policy and regulation, these are summarised below under the headings of the activities of a food control system as listed below;

- Food control management

- Food legislation
- Food inspection
- Provision of official food control laboratories
- Food safety and quality information
- Education, communication and training

In addition food control and change and international cooperation are discussed.

The purpose of analysing the content of the literature in this area in this way serves two purposes i) to present the different activities that make up a food control system and ii) to identify any patterns or themes in the discussion of food control and food control activities in order to identify common challenges.

### **1.8.3. Food Control Management**

The FAO guidance offers three options for food control management; 1) single agency system (responsibility for food safety and public health is within one agency), 2) multiple agency system (responsibility shared between government ministries) and 3) an integrated system (responsibility for policy, risk assessment and management, standards and regulation is within one national agency while inspection and enforcement, education and training are within local authorities) (FAO, 2003).

The key issue evident from the academic articles is the challenges encountered when food control is managed using a multiple agency system (Nguz, 2007) (Al-Kandari, 2009) (Ferretti, 2006) (Domingues, 2006) (Alomirah, 2010). In sub-Saharan Africa the split of responsibility varies between countries, the Codex coordination office may be in a Department for Standards, a Ministry for Commerce and Trade or in the Ministry for Health (Nguz, 2007). Similarly responsibility for import regulation may be split between Ministry of Health, Agriculture, Fisheries, Trade, Commerce & Industry amongst others

(Nguz, 2007). Nguz (2007) describes the multiple agency system as leading to 'many problems' including increased bureaucracy, lack of coordination and disputes over trade imports.

Alomirah (2010) describes the multiple agency system in Kuwait where responsibility is shared between several departments and identifies Kuwait Municipality as the primary authority. The Kuwait Municipality relies on cooperation and coordination with other agencies in order to undertake most of its tasks and as a result Kuwait Municipality is described as being under 'tremendous pressure' (Alomirah, 2010). The clear allocation of responsibilities between government institutions is described as being crucial for effective food safety management (Nguz, 2007) (Al-Kandari, 2009) (Alomirah, 2010).

Al-Kandari (2009) raises an additional issue with the multiple agency system, that there is the potential that food safety is a secondary concern of a department with other, larger responsibilities and therefore risk being allocated fewer resources. Al-Kandari (2009) describes moves to consolidate responsibility for food safety in UAE and Saudi Arabia and reports benefits such as improved cost efficiency, more effective use of resources, uniform application of protection measures and quicker response since a single agency was been formed in Bahrain.

Food control management is also identified as a key issue in Italy and Portugal (Ferretti, 2006) (Domingues, 2006). The Italian food control system is described as bureaucratic and a '*chaotic web of tasks and responsibilities...*'. Ferretti (2006) also links this 'chaos' with problems complying with international safety standards and a lack of consumer confidence.

The government responses to these problems are quite different, in Italy the pace of reform in government is slow and any response has been left to the

private sector (Ferretti, 2006). The government have bypassed the need to address food safety issues by promoting the notions of ‘quality’ and ‘localism’ as characteristics that are safe by their very nature. In Portugal reform of food control management and create a single agency has been challenging. The first attempt started in 2000 with a government decree, progress degenerated into *‘...as many fruitless discussions...’*, eighteen reforms of the original decree and successive policy changes under successive governments (Domingues, 2006).

Compounding the weaknesses of a multiple agency system is the nature of food control. Much of the literature agrees that effective food control management depends upon cooperation and coordination between all relevant institutions (Antunovic, 2008) (Nguz, 2007) (Varzakas, 2006). In Croatia, improved cooperation and coordination between responsible agencies was a precondition for the drafting of a national food safety strategy (Antunovic, 2008).

#### **1.8.4 Food law and regulation**

Food legislation should *‘...protect the rights of consumers and define the responsibilities of food producers, processors, manufacturers, traders and consumers, helping ensure food is safe, wholesome and fit for human consumption.’* (FAO, 2006a)

With the adoption of the Codex Alimentarius as the global reference point for food safety food legislation relating to safety is becoming increasingly harmonised. Harmonisation is the process of basing requirements and regulations on international standards (WTO, 2011). Harmonisation is a favourable option as importing countries are obliged to recognise safety standards where they meet with international standards (see further discussion below) and so increases access to markets.

At a regional level harmonisation is also relevant, the European Union (EU) and the Cooperation Council for the Arab Gulf (GCC) are just two examples of regional attempts to harmonise food regulation. In the GCC a unified trade policy was the first achievement, enabling trade between countries and eliminating the need for multiple customs checks at each border within the Union. Progress is being made toward the unification of food policies, regulations and standards (Al-Kandari, 2009). Harmonisation to Codex standards is described as a priority in Kuwait and the other GCC countries (Al-Kandari, 2009) (Alomirah, 2010).

In the literature there is recognition of the differences between the traditional punitive versus the more modern preventative approach to regulation (Alomirah, 2010). And a recognition that reform of legislation is a slow process (Alomirah, 2010)

Recent legislative reforms relating to food safety are reported in the Dubai Municipality. Firstly, food businesses are now required to have a dedicated employee for food safety, a Person in Charge (PIC). PICs must be trained and certified in food safety (Al-Wadhi, 2011). Secondly, all food businesses must ensure effective basic food hygiene practices are in place and those in manufacturing, hospitality and retail must implement a system based on Codex HACCP principles (Al-Wadhi, 2011). Reform of food legislation is identified as a priority in two papers (Alomirah, 2010) (Antunovic, 2008).

### **1.8.5 Food inspection**

According to the FAO, the administration and implementation of food law requires ‘...*a qualified, trained, efficient and honest food inspection service.*’ (2003). The food inspector is an important link between government and food businesses. The duties of the food inspector may include;

- Inspecting premises and processes
- Evaluating HACCP plans
- Sampling food at different points from farm to fork
- Identifying food unfit for human consumption and taking remedial action
- Identifying, collecting and transmitting evidence where law is breached
- Appearing in court to assist prosecution
- Encouraging voluntary compliance
- Carrying out inspection, sampling and certification for import/export purposes
- Conduct risk based audits

(Adapted from FAO, 2003)

In the literature concerns are expressed, in relation to inspection. Almost all discussion centres on the need for better education and training for inspectors (Al-Kandari, 2009) (Antunovic, 2008) (Alomirah, 2010) (Varzakas, 2006). Guidance from the FAO focuses largely on the training of food inspectors, identifying it as one of the biggest challenges in this area (FAO, 2003) (FAO, 2006A).

Domingues reports that shortfalls in the restructuring of the single agency for food in Portugal led to a policy reaction of increased powers for inspectors. Police like powers were granted to food inspectors... (Domingues, 2006). In Dubai the authorities are moving in the opposite direction. Recognising that inspection designed only to identify violations 'is not perfect' the Dubai inspectorate recognise that the only effective regulators, who are present as each portion of food is prepared, are food handlers and their managers thus making a police type role ineffective for ensuring safe food (Al-Awadhi, 2011). Similarly in Sharjah 'fear' of inspectors has been identified as a potential hindrance of uptake of new food safety management systems and inspection and enforcement based on 'support and discussion' rather than 'policing' is being implemented (Al-Qassemi, 2011).

Such comparisons between the different approaches being taken in relation to inspection and enforcement are problematic as reports are being made at different times and information is not available on recent changes in the case of Portugal. However the comparison serves to demonstrate the different policy options and the surrounding discussion.

### **1.8.6 Food Control Laboratories**

Provision of food control laboratories is described by the FAO as ‘...an essential part of a food control system.’ (FAO, 2003). The function of the laboratories is to make links with food contamination and foodborne disease, leading to evidence based policy decisions (FAO, 2003). The challenges include a need for substantial initial capital investment, sufficient expertise in the work force of epidemiologists, microbiologists and technicians (FAO, 2003).

In the literature food control laboratory provision in Kuwait is described in some detail (Alomirah, 2010). The current challenges identified include; small budget, fluctuating budget year on year, lack of capacity and an overwhelming demand on service. The overwhelming demand is described as a result of the absence of a risk based approach to sampling and use of the service for non-food sampling e.g. testing of sea water. Alomirah (2010) makes a link between these pressures and the potential problems in quality and accuracy in the service. Al-Kandari (2009) presents the situation across the GCC countries as improving, with recent initiatives to improve the provision of food control laboratories, expertise in the workforce is described a significant limiting factor.

Nguz (2007) identifies the provision of food control laboratories as a challenge for countries of sub-Saharan Africa. Challenges include; general lack of



laboratory facilities, potential weaknesses in accreditation of commercial laboratories and shortage of sufficient expertise in the workforce.

### **1.8.7 Information, education, communication and training**

Described by the FAO as ‘increasingly important’, activities under the heading ‘information, education, communication and training’ encompass the delivery of information, education and advice to stakeholders across the food chain (FAO, 2003). Strategies for training inspectors and laboratory staff are given high priority, discussion of training of inspectors has been provided above (FAO, 2003).

In the literature three papers describe government initiatives in three of the United Arab Emirates which fall under the headings of information, education, communication and training, these are summarised in the three paragraphs below;

Piloting of a photographic basic food hygiene examination in Abu Dhabi (Al-Yousuf, 2011) – 121 candidates sat a basic food hygiene examination which uses photographs instead of words. Efforts were made to assure the photographic examination was no easier than the traditional examination. Comparison with assessment scores from traditional examination show an increased pass rate of almost 20%.

A government initiative incorporating training, HACCP implementation and verification across food businesses in Sharjah (Al-Qassemi, 2011) – an initiative to implement a strategy for implementation of both GHP and HACCP across several industry sectors, including the provision of training by third party trainers, support systems and guidance and an fully vetted, third party accreditation system.

An evaluation of food handler training effectiveness in the hospitality sector led to new training initiative in Dubai (Al-Awadhi, 2011) – introduction of a requirement for a Person In Charge (PIC) and a management tools, to facilitate hazard control in smaller hospitality businesses.

These three papers provide an insight into government initiatives being undertaken currently and in the recent past. All three governments have identified weaknesses in current levels of food safety management in industry and all have used training as a focus for improving standards. It is not possible to say whether or not this is representative of other government's activities.

Al-Kandari (2009) reports that in GCC countries campaigns, workshops, conferences and websites have been used to inform, communicate key messages and educate food industry professionals and consumers. Collaboration with businesses in development of support materials and guidance for food safety management is described (Varzakas, 2006).

Certain themes are evident in the literature cutting across the activities of food control used as subheadings used above. Of particular relevance to our understanding of the context of food control and food safety are food control and change and international cooperation.

#### **1.8.8 Food control and change**

Change in national food control systems is most often linked to food outbreaks or 'scares'. In particular the BSE scare in the 1990s (Ferritti, 2006) (Domingues, 2006) (Elvbakken, 2008) (Al-Kandari, 2009) (Varzakas, 2006). Domingues (2006) reports that the BSE scare in Portugal shook consumer confidence in the governance of food safety and revealed serious failings ultimately leading to the launch of a project to create a single agency for food. Other incentives for change cited amongst these articles are consumer

demands (Nguz, 2005) (Domingues, 2006), increased risks exposure through increased trade (Nguz, 2005) (Al-Kandari, 2009) and other food scares such as Avian Flu and foot and mouth (Varzakas, 2006). Interestingly only one of the papers include access to world markets as an incentive to improve food control systems, further discussion of this issue below (Alomirah, 2010).

Elvbakken provides an in-depth analysis of regulatory and institutional change for food safety at national level. The study compares five European countries using what is described as a mixed comparative design methodology (2008). The findings of this study include the observation that the way food safety is regulated in a particular country is the result of a combination of internal nation, cultural characteristics and external international events and trends. A tension between protecting human health and protecting business interests is identified in all five countries (Elvbakken, 2008).

Other triggers for change in food control systems at national level reported in the literature include ascension to the European Union (Antunovic, 2008), a growing tourism industry (Al-Kandari, 2009) and growing consumer pressure (Domingues, 2006) (Ferretti, 2006) (Nguz, 2008) (Varzakas, 2006).

#### **1.8.9 International cooperation**

The perceived value in sharing experiences and solutions in food control is evident in the literature and guidance on food control. The international guidance for food control describes how *'...[countries can] draw lessons from the experiences of the more developed Member States...'* in order to *'...reduce duplications of effort and confusion...'* (WHO, 2002).

Of the eleven papers reviewed in this section the authors of five have direct links with the government or municipality being described. These papers offer practical information in the following ways:

- one presents the general structure of a new Food Authority, including inspection and training strategy
- two present the process of food safety strategy development and initial results and challenges
- one presents piloting of a photographic food hygiene examination
- one presents the introduction of new requirements for food businesses

The fact that these papers are published by those in government demonstrates that they see value in sharing experiences and knowledge, some reference this motivation directly, *'this paper...tries to draw lessons...and make suggestions to fill in the gaps'* (Nguz, 2005), *'this paper could serve to help other developing countries.'* (Antunovic, 2008) and *'it offers Governments and other stakeholders a practical 'template' that can accelerate HACCP implementation'* (Al-Qassemi, 2011).

In addition there is evidence from the detail provided in these papers that solutions are sought outside a nation's experience. The training initiative in Abu Dhabi was developed after an international benchmarking and review activity, the final solution used a format from Ireland, content from the UK and delivery from Toronto, Canada (Al-Yousuf, 2011). In Dubai businesses are government are using the internationally recognised Menu-Safe HACCP system to trial in businesses (Al-Awadhi, 2011). In Sharjah the government are employing a Dubai-based but international food safety specialist to assist in with the design of their initiative (Al-Qassemi, 2011).

Engaging with international organisations is also valued, many of the papers cite working with Codex, FAO or WHO as important (Antunovic, 2008) (Nguz, 2007) and at the very least are referencing use of their guidance documents (Antunovic, 2008) (Al-Qassemi, 2011) (Al-Awadhi, 2011) (Alomirah, 2010) (Al-Kandari, 2009).

### **1.8.10 Summary of food control literature**

The food control literature includes research and discussion from a range of countries. The majority of papers are discussion based and there is a paucity of research based papers with evidence of high quality methodological approaches. With regard to content a review of the papers reveals;

- problems with multi-agency food control systems
- insufficient budgets for infrastructure such as laboratories
- concern over training and education of food inspectors
- recognition that training and education are of key importance
- recognition that information and communication are of key importance, and
- recognition of the benefits of international cooperation.

These topics will be revisited in the discussion chapter.

## **1.9 HACCP for hospitality and food service**

An additional area of research has been undertaken that does not fit into the categories of uptake, barriers or food control. A significant amount of research has been undertaken in the area of HACCP for hospitality and food service. This research area is also linked with research into HACCP in small and/or less developed businesses (SLDBs). The term SLDBs is used in the FAO (2006) guidance document directed at developing HACCP strategy for SLDBs. SLDBs are businesses which are small and/or underdeveloped and have been identified as experiencing particular challenges in the development and implementation of systems such as HACCP (FAO, 2006).

In 2002 academics from the University of Salford were seconded to the UK government with the aim of developing a new method of HACCP for the hospitality and food service sector. A special edition of the International

Journal of Contemporary Hospitality Management includes eight articles focusing on this project (including two by the author).

The main output from this project was the Safer Food Better Business (SFBB) system which has since been implemented in more than half a million businesses across the UK. It's relevance to this research is that it is an example of a major government initiative. The project and the SFBB system provides a benchmark for worldwide developments in HACCP for SLDBs (FAO, 2006).

SFBB is a system based on and fully compliant with HACCP but suitable for use in very small food businesses (Taylor, 2007b). It comprises of a set of documented, validated safe methods and a record keeping diary (Taylor, 2008a). Key characteristics of the system include the absence of technical language and jargon (e.g. HACCP), pre-validated decision making and exception reporting to reduce paperwork (2008a).

### **1.10 Summary of introduction and literature review**

Foodborne disease is a large and growing problem affecting individuals in countries worldwide. The internationally accepted system for food safety management is HACCP. HACCP is being implemented by businesses worldwide on a voluntary basis or as a result of the legislative requirements of their country or region. Food businesses encounter a range of challenges in their attempts to achieve effective HACCP, as do governments in their attempts to support and oversee HACCP in through national food control systems.

A review of the literature in this area reveals that although food control and HACCP have been the topic of research from a wide variety of countries there has to date been no study, conducted with methodological rigour, bringing

together the opinions or experiences of those directly involved in food control systems from a range of countries.

In addition the following conclusions have been drawn;

- HACCP is challenging, implementation is often low and some industry sectors require simplified versions and specialist support
- Policy makers worldwide experience a range of challenges when updating national food control systems
- International standards – There are multiple incentives for governments to implement international standards, however achieving this is not easy
- The literature review confirms a lack of research in the area of food control and national HACCP strategy development and implementation.

### **1.11 Aims and Objectives**

The aims and objectives for this research address a gap in current published research and address real world problems identified in a review of current literature, see conclusions above.

Aims: To analyse strategies, challenges and outcomes in the development and implementation of national food control systems across multiple countries.

Objectives:

1. To recruit key individuals from multiple countries involved in the development and implementation of food control at government level to take part in research phases
2. To analyse existing literature relevant to the development and implementation of national food control systems
3. To undertake in depth qualitative interviews generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries

4. To distribute a questionnaire generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries
5. To analyse data and identify findings regarding the challenges and outcomes in the development and implementation of national food control systems across multiple countries.



## Chapter 2: Methodology

*'In reality, questioning people is more like trying to capture a particularly elusive fish, by casting different kinds of bait at different lengths, without knowing what is going on beneath the surface!'* (Oppenheim, 1992).

### 2.1 The aims and objectives of this research were as follows:

Aims: To identify strategy and analyse challenges and outcomes in the development and implementation of national food control systems across multiple countries.

Objectives:

1. To recruit key individuals from multiple countries involved in the development and implementation of food control at government level to take part in research phases
2. To analyse existing literature relevant to the development and implementation of national food control systems
3. To undertake in depth qualitative interviews generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries
4. To distribute a questionnaire generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries
5. To analyse data and identify findings regarding the challenges and outcomes in the development and implementation of national food control systems across multiple countries.

The fieldwork carried out and presented for this thesis employed two methodological approaches; exploratory interviews and questionnaires. Eleven

in-depth interviews and twenty questionnaires were completed with those involved in national food control systems

The main success achieved by this research was the identification and involvement of participants, not from a general population, but chosen for their particular position knowledge and experience in relation to food control in twenty countries worldwide. This research presents a unique international perspective of government food control strategies, experiences and outcomes according to those actually involved in policy making.

This chapter provides detail of the research approach and the fieldwork undertaken. It has the following structure; 1. Outline of key problems with previous research in the field of Food Control at national level, 2. An overview of the research, 3. An overview of the researcher's skills and 4 and 5 present the two research phases detailing the research method used, describing the research process and evaluating the success of the fieldwork.

## **2.2 Research Overview**

This research can be divided in three distinct phases which employed three methodological approaches:

Phase One: Literature review, data mining and content analysis

Phase Two: A series of exploratory interviews

Phase Three: A questionnaire

These approaches were chosen for a combination of reasons; primarily the need to generate in-depth qualitative data and to include a specific type of participant from as wide a range of countries as possible. The use of exploratory interviews and questionnaires provided the means to achieve both

these goals; generating 5,000 words of qualitative data from participants in 20 countries worldwide.

The research design incorporated a flexible approach for the three phases of fieldwork to ensure they were complimentary to each other. The use of content analysis in Phase One was included in order to inform research design and direction in Phase Two. Data collection and analysis were undertaken for Phase Two which informed the question wording in Phase Three. The three phases of research were undertaken within a similar timeframe but not concurrently.

This approach to research design can be described as 'flexible design research' (Robson, 2002). Flexible design research as its name suggests allows a certain amount of flexibility in research design at the outset of the project *'anticipating that the design will emerge and develop during data collection.'* (Robson, 2002). A flexible approach allows the researcher to respond to the data as it is analysed and to practical aspects of data collection. Robson identifies an advantage of flexible design research is that it relies less on preplanning and therefore is likely to lessen the influence of preconceptions the researcher may have about the research, participants, and possible outcomes (Robson, 2002).

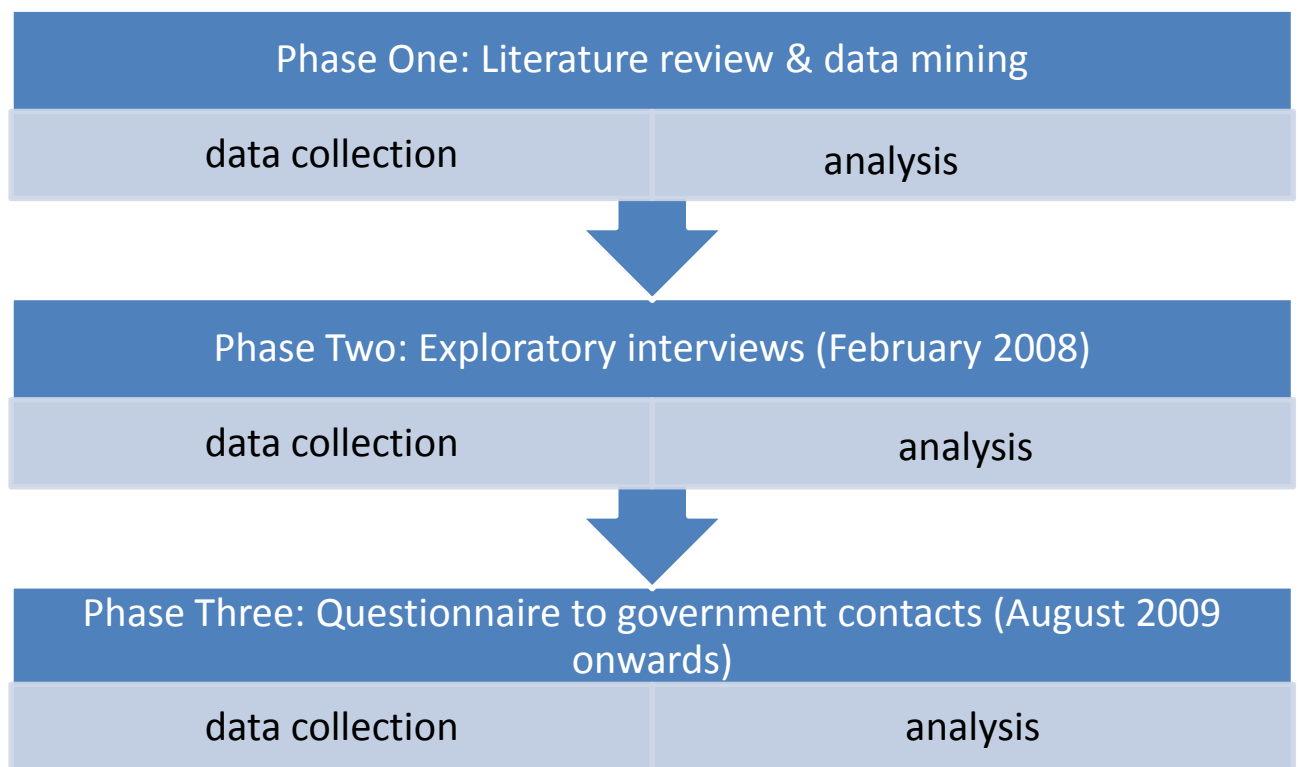


Figure 5: Research structure and chronology

The phases link directly to the research aims and objectives in the following ways;

Phase One (literature review and data mining) links directly with the second objective;

2. To analyse existing literature relevant to the development and implementation of national food control systems

Phase Two (Exploratory interviews) links directly to the following objectives;

1. To recruit key individuals from multiple countries involved in the development and implementation of food control at government level to take part in research phases.
3. To undertake in depth qualitative interviews generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries.

5. To analyse data and identify findings regarding the challenges and outcomes in the development and implementation of national food control systems across multiple countries.

Phase Three (Questionnaires) links directly to the following objectives;

1. To recruit key individuals from multiple countries involved in the development and implementation of food control at government level to take part in research phases
4. To distribute a questionnaire generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries
5. To analyse data and identify findings regarding the challenges and outcomes in the development and implementation of national food control systems across multiple countries.

### 2.3 Personal experience of the researcher

The author has been an active researcher for five years with publications in both questionnaire and interview based research;

- In 2007 the author undertook research exploring the experiences of online learners using a **questionnaire**; this research was presented at an international higher education conference (Clark, 2008).
- In 2008 the author **interviewed** businesses managers about the impact of a new food safety management system; this was published in a peer reviewed international journal (Clark, 2008a) (Clark 2008b).
- A selection of the data collected of Phase 1 of this research, interviews with individuals involved in the development and implementation of food control, is **published in a peer reviewed international journal** (Rostron, 2011).

In addition, the author attended a small group training program 'Use of narrative and in-depth interview techniques in post-graduate research' by Dr Joanne Taylor in June/July 2008. This training included theory and application of the narrative technique, practising interview technique, analysis and reflecting on personal progress.

For further detail see the Author's Profile at the beginning of this thesis.

## **2.4 Problems and precedents in the existing research**

The research undertaken to-date in the field of food control and national HACCP strategy is inadequate in three respects, 1) much of the research has methodological inadequacies, 2) several areas have not been researched in any depth and 3) there is a general paucity of research in this area. Below the methodological inadequacies are discussed.

The results of the literature review in chapter one revealed that in the area of national food control systems research between 2000 and up until the time of writing (Spring 2012) only eleven relevant articles had been published. Of these two are desk based studies (Al-Kandari, 2009) (Elvbakken, 2008), seven are discussion papers i.e. presenting information without a stated methodological approach (Antunovic, 2007) (Nguz, 2005) (Varzakas, 2006) (Al-Awadhi, 2011) (Al-Qassami, 2011) (Domingues, 2006) (Alomirah, 2010), one is a quantitative study (Al-Yousuf, 2011) and one is a qualitative study using interviews and documentary analysis (Ferretti, 2006).

Ferretti (2006) undertakes 25 exploratory interviews and documentary analysis of official documents and press coverage and has potential relevance to the design of this research. However, no information is provided in relation to sampling. It is not possible to determine who the participants were, their

roles or the method of recruitment. Similarly no detail about the interview approach, question design or analysis are included. It is not possible to establish strengths or weaknesses of the findings on the basis of rigour in data collection and analysis. In addition the results are presented in discussion form without inclusion of extracts from any of the 25 interviews, documentary analysis or press coverage. It is not possible to evaluate the meaning and significance directly from the results and the reader relies entirely on the interpretation of the author.

The omission of methodological detail detracts from the value of this research paper in the following ways; 1. findings cannot be considered in the context of a critical evaluation of methodology; 2. findings cannot be considered in the context of a critical evaluation of data presented and 3. It is not possible to learn and inform related research from the research.

The discussion articles have both strengths and weaknesses, five articles are written by those working in a food authority (Antunovic, 2007) (Varzakas, 2006) (Al-Awadhi, 2011) (Al-Qassami, 2011) (Al-Yousuf, 2011). This is a strength as those with working within a national food control can offer a perspective informed by genuine experiences and insights. Other of the discussion papers have less robust legitimacy. Nguz presents 'key issues' for national food control in Sub-Saharan Africa but fails to demonstrate how these have been identified (2005). Similarly, Al-Kandari presents an analysis full of facts but fails to provide references (2009). In discussion papers the credentials of the Author is of key importance and should be outlined if not evident from the institution.

Research in the field of HACCP implementation has been described previously as methodologically flawed, (Taylor, 2007), (Taylor, 2008) and was found to be so in the literature in chapter one. In the field of HACCP there has been little

research undertaken from the perspective of implementation strategies at government or equivalent level.

In the research to date in both food control and HACCP strategy there have been no attempts to bring together the experiences of policy makers from around the world. The FAO/WHO (2006) joint publication on HACCP for SLDBs does include useful overviews of HACCP initiatives for SLDBs from several countries but this does not represent a research project.

There are however examples of innovative research in the related and more specific field of HACCP and strategy at government level. Taylor (2008a), Taylor (2007) and Taylor (2005) each present research emanating a government project in the UK which led to a new method of HACCP for the hospitality industry. Action research methodology was used to facilitate the development of a new method of HACCP (Taylor, 2005) (Taylor, 2008a). Part of the evaluation of this new method is published using in-depth narrative interviews to identify barriers and measure behavioural change (Taylor, 2005) (Taylor, 2007) (Taylor, 2008b).

In the wider field of research into the impact of SPS standards there is paucity of research. Most analysis have been case studies looking at trade effects (Alavi, 2009) (Chowdary, 2008) and some econometric studies (Jongawich, 2009). There is no research to date, at least identified at the time of writing, exploring the effects of SPS standards using qualitative methods.

## **2.5 Phase One – Literature Review**

The purpose of Phase One was to review existing research and publications in order to provide a context for research. In addition the literature review



allowed the researcher to identify themes and inform the design and direction of the primary research conducted in Phases Two and Three.

The literature review has been included as a phase of the data collection to allow for methodological discussion of these activities. Literature reviews are often left out of the methodology section however as Finnegan (2006) advises there is often data collection involved in the construction of the literature review and the rigour with which this data is collected and interpreted will impact the research as a whole.

The results of Phase One of this research can be found in Chapter One – The Literature Review.

### **2.5.1 The Method of Data Collection**

The process of conducting the literature review involved searching for relevant literature in a variety of locations. The primary location for literature was the online databases of academic research. A variety of keywords were used to ensure the maximum number of relevant articles were found.

### **2.5.2 The Mode of Analysis**

A ‘conventional’ analysis was undertaken of the content of the documents in order to build a picture of knowledge to date and identify themes, geographical location, strengths, weaknesses and gaps.

The method of analysis of the documents could not be described as content analysis, ‘...*the quantitative analysis of what is in the document*’, or discourse analysis which prioritises language – ‘*how things are said*’ over content – ‘*what is said*’ (Robson, 2002). Although some data was compared and combined between documents analysed it is not a meta-analysis a process used to summarise the results of a number of different studies (Sutton, 2008).

Every document included in the study was considered critically. Limitations were identified and collated for documents presenting research in particular areas. This enabled the development of a critique of the body of literature as a whole as well as of individual documents. The context within which they were written (e.g. date of publication), the intended audience (e.g. the purpose of the document) as well as the substance of the documents (e.g. the methodology) was considered. As Finnegan (2006) advises, when collecting data from documentary sources it is essential to *'interpret rather than consult.'*

## 2.6 Phase Two – In-depth Interviews

There are several words used to describe qualitative interviews. Rapley (2004) provides a selection in his discussion of useful terminology in describing in-depth interviewing; *'active, biographical, collaborative, conversational, depth, dialogical, focused, guided, informal, non-directed, open ended, reflexive, semi structured...'* It is perhaps unsurprising that researching absorbed in extracting truths from words in their research would come up with so many to describe the activity they are undertaking. The label chosen in this research is *'exploratory interviews'*, it is borrowed from Oppenheim (1992) and most suits the context and style of the interviews conducted.

The purpose of Phase Two was to recruit key individuals from multiple countries involved in the development and implementation of food control at government level and to undertake in depth qualitative interviews generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries.

An exploratory interview technique was adopted for this phase of the research. An exploratory interview is in-depth and free flowing as distinct from a standardised interview with fixed questions and structure (Oppenheim, 1992). An exploratory interview was chosen because it allowed the interviewee to

influence the direction and content of the interview therefore allowing the interviewees' ideas and perspective to be communicated more accurately.

The interviews were semi-structured i.e. two interview questions were prepared in advance and asked to all interviewees and the other interview questions were asked in view of the interviewees response and also to their reaction to the questions e.g. body language. All interviewees were asked the following two questions (with several additional questions in between);

*What, in your opinion, are the key issues in Food Control in your country?*

*Can you tell me about the first time you heard about HACCP?*

### **2.6.1 Question design and wording**

The purpose of a question is to extract some information from an interviewee. However, the very act of asking a question inevitably causes distortion to a greater or lesser degree in the answer. This can be caused by the dynamics of the interviewee/interviewer, misinterpretation of the question, a wish to fulfil expectations, a wish to disguise the truth or simply inaccuracies in recalling facts. Oppenheim (1992) recognises this and fantasises *'Would there not be a way of looking into the minds of our respondents without having to ask any questions at all.'*

Conducting interviews which elicit truths rather than a response influenced and constructed for the interviewer requires careful design and wording, likened to catching an 'elusive fish' (Oppenheim, 1992). The questions used in the interviews in Phase One were designed with these pitfalls in mind and attempt to minimise bias and inaccuracies. The first question asked in each interview was:

*What, in your opinion, are the key issues in Food Control in your country?*

This question directed the interviewee to answer quite a specific question. The question was framed with the words ‘key issues’, ‘food control’, ‘your opinion’ and ‘your country’. Importantly, the question wording does not prompt the interviewee as to which issues might be ‘key’ e.g. by providing a list of food control issues or providing an example. In addition the language is neutral, use positive or negative language may prompt interviews to answer in a particular way e.g. providing a discussion of challenges, difficulties (as it happened all interviewees discussed key issues in terms of weak points in their current food control system but this is more likely to reflect the nature of working in Food Control than the influence of the question wording).

The purpose of this question identify priorities early in the interview and then use further questioning to ask appropriate questions. This question was also designed to provide a clear comparison between participants view of the ‘key issues’ in food control in their country.

The wording of this question included ‘*...in your opinion...*’ in order to emphasise to the interviewee that their individual opinions and experiences are sought and are valued. It was felt that because the interviewees were talking from the perspective of, or indeed as a representative of, government or equivalent they may need to be prompted not to provide the government official response. It was hoped that the inclusion of ‘*...in your opinion...*’ would elicit individual professional experience and opinion without this being overtly discussed before the start of the interview. Indeed from the responses it is clear that the interviewees are not providing a government official response, but their own individual professional experience and opinion.

The final question asked to the interviewees was;

*Can you tell me about the first time you heard about HACCP?*

This question borrows from the narrative interview technique. The narrative interview technique falls outside the framework of the traditional question-and-answer interview (Hollway, 2000). Hollway (2000) illustrates the need for better interview technique describing the distorting effect of questions and the dynamics of traditional interviewing.

The narrative interview technique fulfils Oppenheim's (1992) fantasy; an interview without questions, and instead elicits narrative or stories (Hollway 2000). An example of this would be instead of asking the question; 'On a scale of 1-5 how challenging is food control?' might be replaced by 'Tell me about a time when you felt negative about food control?' The narrative technique ensures the themes that emerge do so because they were of importance to the interviewee, rather than because they were suggested in the question.

Narrative interview technique has been pioneered in the area of Food Safety research by Dr. J.Z. Taylor (Taylor, 2007). The technique has been used in a variety of setting to explore the barriers to implementation of food safety management systems. This literature makes up part of the literature review in Chapter One. The success of the narrative interview technique in previous research in the area was a motivation for its use in this study.

Although the narrative interview technique was not adopted in its pure form, but alongside non-narrative questions, its principles and wisdom did influence the interviews undertaken. As well as the final question discussed above other narrative type questions were used in interview where it was appropriate e.g. Can you tell me about a time you felt particularly negative about food control?

*Or* Can you tell me about a time when you felt particularly positive about food control?

### **2.6.2 Interview technique**

Oppenheim (1994) describes the good interview technique as the most important skill for a researcher to acquire. Requiring excellent interpersonal skills and an ability to put the interviewee at ease, giving the impression of interestedness, making notes and recording without upsetting the conversational flow and giving support without biasing (Oppenheim, 1994).

Taylor provides a ten step guide to using the narrative technique which apply to design and delivery. This guidance was useful in the design and delivery of exploratory interviews undertaken in this study. The ten steps are presented in a shortened form below;

1. Use open ended questions
2. Encourage stories
3. Encourage personal stories of the subject's own choosing
4. Avoid 'why' questions
5. Follow up only using the narrator's own ordering and phrasing
6. Do not assume shared meanings
7. Allow the narrator sufficient time to think and develop their ideas
8. Create a non-threatening, non-judgemental, trusting environment
9. Encourage personal, emotional associations, not necessarily dependent on logic
10. Provide a suitable framework for the interview

(Taylor, 2007)

From the transcripts included as part of this thesis it is evident that the all of the above steps were incorporated in the interviews; Open ended questions

were used and more aggressive 'why' questions were avoided, stories and personal stories were elicited during the interviews, prompts from the interviewer were kept to a minimum and were language used in the response was used where appropriate in order to give the interviewee time to think before answering questions and limit the introduction of new language (which may influence direction of answer), a pre-prepared question schedule provided a framework for the interview while allowing for adaptation during the interview provided the necessary flexibility and responsiveness.

The application of Oppenheim's advice on rapport (1994) and Taylor's (2007) general guidance as well as specific advice on bias avoidance, along with lessons from the researchers own experience, the interviews were conducted in a reflective, self aware but outwardly relaxed atmosphere.

### **2.6.3 Additional methodological discussion**

The interviews technique adopted in Phase Two of this research can be compared to the 'focused interview' technique implemented by Merton and Lazerfield (Merton et al., 1946). The 'focused interview' is defined by the interviewees all having been involved in a particular event/situation. The researcher can develop an interview guide based on a hypothesis relating to the event/situation. The interviews can then test the hypothesis and uncover unanticipated responses (Merton et al., 1946).

This technique is relevant to the interviews undertaken in Phase Two as all interviewees had been involved in the development and implementation of Food Control policy at national level. The researcher was able to develop an interview guide based on knowledge of that situation. Differences are found in the specificity of the event/situation, the technique was originally used to identify effects of mass communication and interviewees may have seen the same film. In this study interviewees had been involved in varying degrees in

development and implementation of policy at government level in various countries.

The ‘focused interview’ technique allowed less skilled interviewees to gather qualitative data from large numbers of interviewees. The interview schedules were fixed with some room for flexibility (Merton et al., 1946). The interviewer conducting interviews in this research was skilled and trained and conducted interviews with small numbers of interviewees.

Merton’s work on ‘focused interviews’ does provide a guide good practice which coincides and supports the interviews conducted in this fieldwork which include a commitment to non-directional interviewing and allowing the interview to use his/her own words (described by Merton as specificity).

#### **2.6.4 Exploratory Interviews – research process**

Eleven semi-structured interviews were conducted. The location of the individual interviewees cannot be disclosed alongside their position in accordance with agreements made at the time of interview in order to encourage interviewees to speak openly.

The interviewees have been assigned an identification letter between A–K for the purposes of reference throughout this thesis. The interviews are listed below alongside the interviewee’s position at the time of writing and the date of the interview.

Fieldwork ID	Position (at time of interview)	Date of interview
A	Head of Food Control	26.02.08
B	Head of Department of Food Control	28.02.08



C	University Lecturer	26.02.08
D	Head of Inspection	26.02.08
E	University Professor	27.02.08
F	Regional Co-ordinator FAO	27.02.08
G	Food Safety Head of Inspection	27.02.08
H	Food Safety Officer	27.02.08
I	Nutrition Officer, Nutrition and Consumer Protection Division, FAO	30.07.09
J	Codex National Representative	30.07.09
K	Food Standards Agency Special Advisor (Retail)	12.10.09

Table 6: List of interviews with identification, positions and date of interview

Interviewees were based in six countries with an FAO regional coordinator and an FAO nutrition officer providing a regional and international perspective. They are made up of two heads of food control, four representatives of national food control authority (or equivalent) two university academics and a Codex national representative as well as the FAO regional coordinator and FAO hygiene officer.

Interviewees were selected on the basis of their experience in the development and implementation of food control systems. The legitimacy of each interviewee's experience was verified by the author either by their invitation to present and/or represent their country in a live regional debate at

an international conference or by virtue of their professional position e.g. Food Standards Agency Special Advisor.

### 2.6.5 Geographic location

Interviewees came from a range of countries, large and small, developed and developing in Asia, Australasia and the Middle-East, see figure 7. In addition interview with two FAO officers one based at headquarters and one based in a regional office provide an international and regional perspective. Figure 7 provides a view of the range of countries involved in the study rather than as a device to link to the individuals interviewed and the data collected.

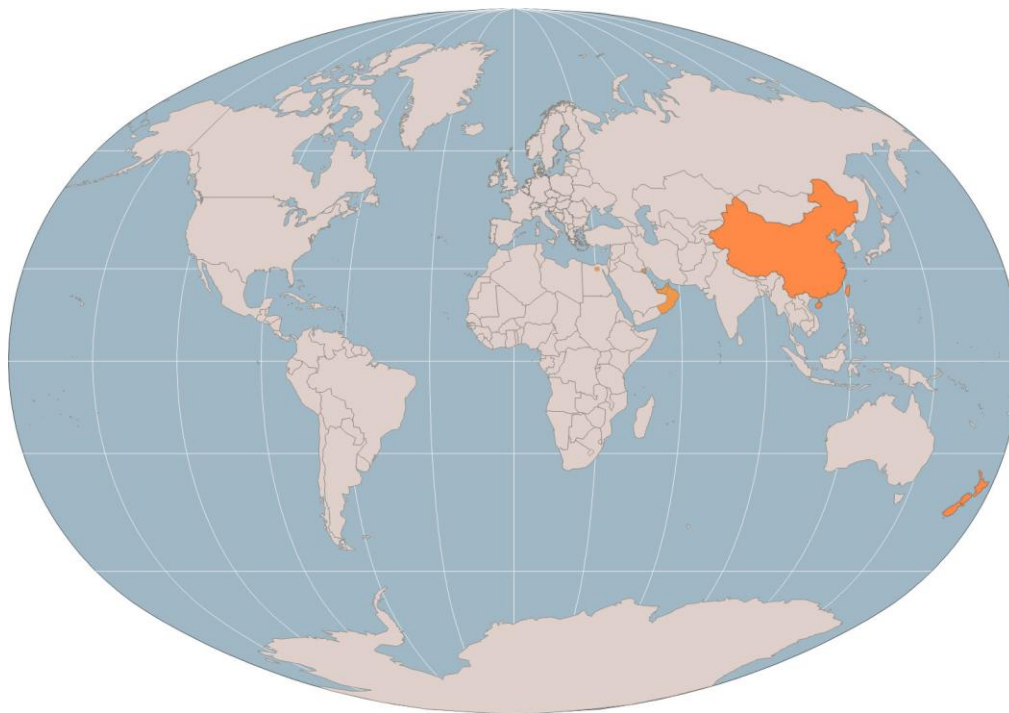


Figure 6: Participants in Phase one by country

### 2.6.6 Sampling and response rate

Interviewees A–H were approached at an international food safety conference. The interviewees were all presenting at the conference and were representing their country in a regional debate on the basis of their position and involvement with food control. Interviewees I, J and K were selected on the basis of their

being involved with the development and implementation of food control systems. Interviewees I and J were interviewed at the FAO headquarters in Rome and interviewee K was interviewed via telephone as it was not possible to arrange a face-to-face meeting. The method of sampling can be described as purposive sampling.

Purposive sampling employs a strategic approach in order to provide a sample including a range of relevant contexts and therefore is able to provide results on which to build well-founded findings and recommendations (Mason 2002). Although purposive sampling does not use a random sample of the wider population, which could be described as representative, neither is selection *ad hoc* or purely opportunistic. In Phase Two the participants were selected on the basis of gaining the widest international perspective from individuals with known experience in the field and who were available for interview.

A purposive approach to sampling produces findings that *may* occur in the wider population and provide an illustration or flavour of the wider context. The objective of the research adopting a purposive sample is not to make substantive claims or assess how adequately these findings represent the wider population (Mason 2002).

A purposive sampling approach was the most appropriate for the research in phase one as it would not be possible to undertake the research using a representative sample because of the very specific characteristics of the population i.e. those involved with the development and implementation of food control systems who were available for interview.

All those approached agreed to take part in the research providing a 100% positive response rate. This strengthens the legitimacy of the findings by removing any potential bias in results based on the underlying motivations of

non-respondents. The average response rate for research in this area (based on studies included in Chapter one of this research) is 32%.

Rapley (2004) recognises that the process of recruitment ‘... *routinely happens on an ad-hoc and chance basis...*’ and often starts with contacts from ‘...*friends and colleagues.*’ What he describes as essential, and what has been realised in this research, is that the recruitment process is documented and included in the final analysis of outcomes of the research (Rapley, 2004).

### **2.6.7 Interview process**

Interviewees A-H were approached at an international food safety conference and by the author and asked if they would agree to take part in an interview about issue in national food control. The interviewees were all presenting at the conference. All the individuals approached agreed to be interviewed.

The interviews A-H then took place at a convenient time and place to the interviewee. This was either immediately or at an agreed time during the conference (over three days). Interviews were carried out in a range of locations chosen for convenience and quiet. Cultural preferences dictated that interviews were conducted in a public place.

Interviewees I and J were approached by the author at the FAO Headquarters in Rome. The interviews took place in the interviewee’s offices at a convenient time. Interviewee K was interviewed by telephone after contact details were exchanged through a mutual contact.

All interviewees agreed to be recorded for the duration of the interview. All interviewees were assured that their names would be removed and their comments not directly linked to their home countries in any publication including extracts from the interview and that the recordings would be

destroyed once transcribed. All interviews appeared satisfied with this arrangement.

None of the interviewees were known to the author, except interviewee I who the author had worked with on a project with regular contact for three years. In this case it is not expected that the relationship with the interviewees would impact on the data collected in any meaningful way.

### **2.6.8 Interview transcription**

Interviews A–J were recorded with a small digital device which enabled full transcription of the interviews after the event. Interview K was conducted on the telephone. In this case brief notes were made during the interview and detailed notes made immediately afterwards in an attempt to record as much detail as possible.

Notes were made immediately after each interview to record any additional observations that may have affected the results e.g. a knock at the door, body language or looking at watch. These notes were added to the end of the transcript to add an additional level of detail which might be useful in subsequent stages of the research process.

Interviews A–J were fully transcribed and interview K was left in note form as it was not possible to accurately produce a transcription without a recording. The transcripts were produced by listening to the recording and typing up the interview and typically involved listening 5–6 times all the way through before it was felt an accurate transcript had been produced.

The transcripts include both the interviewee and interviewer. Pauses are indicated by commas, and longer pauses are indicated by ellipses (...). Other sounds such as laughter, coughing etc are indicated by description in

parentheses []. Fillers such as ‘er’ and ‘uhm’ were included in the text as were repetitions, grammatical and linguistic errors.

The process of transcription was time-consuming but was felt to be an important part of the methodological rigour applied throughout the research. The transcripts provide an accurate record of the interviews undertaken and were the sole artefact used in the analysis of the data. Therefore it was felt that significant time and attention should be spent on this activity.

A sample of the interview transcripts is available in Appendix 2.

#### **2.6.9 Interview analysis**

The analysis of the interview data involved careful examination of each interview transcript in order to identify recurrent themes. The analysis of interview data required a thorough approach in order to ensure themes were not missed or wrongly interpreted. It is possible that interviewees talk about the same issue in different ways, it is the researcher’s task to identify the similarities without imposing meaning that was not actually there.

For example in the interviews several interviewees discussed the division of responsibilities for food control amongst government or equivalent departments. During these discussions the description of the responsible department was described as ‘the management’, ‘the food safety system’, ‘supporting municipalities’ and ‘food control systems’. Responses can include language that is different, unexpected and sometimes in error and the researcher had to look at the context of the response to interpret what was meant. Simply searching for keywords in the text, as this example illustrates, would not be sufficient.

The aim was to draw on both the detail of individual extracts of the interviews to gain a better understanding of the interview as a whole and all the interviews undertaken. By identifying patterns, or themes, within the interviews it was possible to build a richer and better informed picture of the experiences, challenges and opinions the participants relate.

The transcripts were read two/three times each at the start of analysis. This helped familiarise the researcher with the content and the language. Then each transcript was read in relation to the five key activities of food control. This approach was taken to provide structure and to provide an opportunity to identify the incidence of these food control activities in the interviews. This enabled observations of the relative importance of each activity to interviewees without prompting consideration of each one.

Extracts of the interviews relating to these five activities were then grouped together (copied and pasted into tables) leaving the transcripts intact for further analysis.

The second stage of analysis involved the identification of additional themes, aside from the five key food control activities. Each transcript was read in turn and notes were made alongside the transcript each time a possible theme was identified. The transcripts were then read and analysed again to identify these and additional themes. This process continued until it was felt that all the content had been analysed and all emergent themes identified. Again fragments of the transcribed interviews were grouped under the headings of the emergent themes (copied and pasted into tables) leaving the transcripts intact for further reference. Although the process does not attempt to be objective, it is informed by the researchers' judgement and understanding of the interviewee and the wider context of the interview.

The table below demonstrates how the initial stage of analysis is undertaken. The text highlighted in blue indicates reference to any of the five food control activities. Here reference to an aspect of food control management in the discussion of the challenges of a multi-agency structure of food control. The references highlighted in purple indicate reference to other possible emergent themes. Here references to several possible themes were identified; the belief the other countries face similar challenges, communication issues, budget issues, crisis management and reluctance to take responsibility. Once all the transcripts were analysed in this way and themes were identified the extracts were taken directly from the transcript and grouped together.

Transcription	Initial analysis
<p>Er. First of all we came here to Dubai and er <b>the major issue facing my country and the GCC countries</b> in terms of food control systems is that <b>we don't have an agency by itself that look over food control processes from all the aspects</b>, from the food laws and legislation from the inspection services from the laboratory services <b>and most important is management</b>. So we don't have it and it, it <b>is scattered amongst the agencies with different responsibilities</b>, everyone is asking for budget. When it comes to crisis management everyone is saying it's not my responsibility and that's the problem.</p>	<p>Belief that other countries in the region are facing similar challenges.</p> <p>Food control management – Multi-agency system</p> <p>Food control management – considered primary issue.</p> <p>Lack of clarity results in Communication issues, Budget issues</p> <p>Crisis management issues</p> <p>Belief that no-one takes responsibility when there is a problem.</p>

Table 7: Example of initial analysis

This approach to analysis of qualitative data was based on the technique used in psychological analysis of interview transcripts in the narrative technique (Hollway, 2000) (Taylor, 2007). The systematic revisiting of each transcript



and the extraction and grouping of small parts of the transcript introduces high level of rigour to the process of analysis.

#### **2.6.10 Evaluating the success of the interviews**

Data collected in the in-depth interviews provided a unique insight into the development and implementation of national food control systems. The interviewees revealed concerns and frustrations about the current situation and their plans for the future openly. Analysis of the interview transcripts was rigorous and methodical. For these reasons the in-depth interviews undertaken in Phase One of this study can be described as a success.

The biggest achievement of this work is the ability to capture insights from within intergovernmental bodies and government that not every researcher would have access. This phase of the research included two interviews with FAO officers. This organisation is integral to the international food safety community and its employees are in the unique position of being able to comment on regional and international trends, issues and challenges.

The additional nine interviews included individuals who had each been involved in the development and implementation of Food Control policy at national level, two interviewees had the role of Head of Food Control or equivalent at the time of interview. Recruiting these participants made it possible to provide a unique insight into food control at national level.

During the design of this research a balance was maintained between the unique opportunities presented to the researcher to involve participants from high level government positions who otherwise would not be included and the need to maintain methodological rigour. It was felt that overwhelmingly the value of the data collected would override the methodological compromises made. For example interviews were conducted in a variety of locations and one

over the telephone rather than all in a contained and similar environment and interviews were held in most cases directly after requesting them rather than being at a scheduled time and for a scheduled time.

The risk of losing the opportunity to interview these participants outweighed the possible benefits consistency would have afforded. In addition, the value of qualitative data is its ability to capture individuals' experiences rather than attempt to undertake measurements and generalisations about wider populations. It was felt that this aspect of reliability, the ability to replicate and achieve the same results, was not applicable in the same way as it might be in other research.

Another major success of the research technique is evident in the data generated. The interview transcripts revealed personal experience, identification of weaknesses, reflection on challenges and hopes for the future. All indicating a willingness to talk openly, while being recorded about their experience in a professional capacity. In other words the interviews succeeded in eliciting in-depth qualitative data on revealing weaknesses the interviewees may wish to defend. It is this openness that provides the study with genuine value.

On reflection minor changes would be made to interview technique and question wording/order. However, it must be stressed that none of these critiques represents an attack on the validity of the research.

The opening question, 'what, in your opinion, are the key issues in Food Control in your country?' was on reflection misplaced. It required the interviewee to make a judgement about the fundamentals of food control in their country. All interviewees answered this question with extensive and informative answers; however the interviews may have been less fast paced

and less formidable with an alternative opening. This question was designed to ensure some data was comparable between the interviewees; however answers to such a question may have emerged through less direct questions anyway.

The use of the narrative interview question, 'Can you tell me about the first time you heard about HACCP?' was not entirely successful. Interviewees were pleased to answer this question, and responded with a smile and a long pause to recollect, perhaps because it asked something of them personally and was unexpected in this context. On reflection this question would have been better placed at the beginning of the interview, replacing the other fixed question on 'key issues'. Using the narrative question as the first question would have provided a more relaxed start to the interview, not asking so much of the interviewees. An even more individual response from the interviewees could have been achieved.

The interview schedule was semi structured, with two set questions and room to react to the responses as they were made. This required the interviewer to react and ask new questions within the timeframe of the interview. As discussed in the previous section the timeframe was not predetermined and a certain pressure was felt to react quickly in case the interview came to an unexpected end. In some cases the questions asked could be better direct to encourage good quality data. For example in interview D after the initial question's response about the challenges of multiple agencies the subsequent question asks about implementation issues, which is not directly related. Although the flexibility of semi-structured interviews offers some advantages it is also demanding and requires honed interview technique.

A final but unavoidable criticism is that all but two of the interviewees (interviews A-H and J) did not speak English as a first language all interviews

were conducted in English. All the interviewees were educated and spoke English comprehensibly, but with varying degrees of ease. This may have some effect on the responses although it is not possible to say to what extent. This weakness could not be designed out but questions the interviewer adjusted her speech to suit non-English listener. On balance it is thought this will have a minimal effect on the data quality as the discussion was not technical or requiring precise use of language, the most likely impact would be on the confidence of the interviewee and the length of answers.

As with all research criticism of some aspects of design or technique can be made. The purpose of such criticisms is to ensure a rigorous methodological approach to fieldwork, to incorporate recognition of limitations into analysis and recommendations and to acknowledge that even with careful planning research presents unforeseen challenges.

## **2.7 Phase Three – Questionnaires**

The purpose of Phase Two was to recruit key individuals from multiple countries involved in the development and implementation of food control and to distribute a questionnaire generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries.

Even if resources allowed travel to multiple locations to conduct further exploratory interviews the author did not have the necessary contacts to make this happen. For phase two a short questionnaire was used and sent by email to a selected sample of individuals.

A questionnaire refers to self-administered and postal questionnaires delivered in person, by post or by email as well as the interview schedules sometimes

used in standardised interviews (Oppenheim, 1994). Oppenheim outlines the main advantages and disadvantages of questionnaires as a research method.

Advantages:

- Low cost of data collection
- Low cost of processing
- Avoidance of researcher bias in response
- Ability to reach respondents who are dispersed widely

Disadvantages:

- Lower response rate and consequent bias
- Unsuitable for respondents with literacy difficulties
- No opportunity to correct misunderstandings, probe, or offer further guidance
- No control over order questions are completed
- No opportunities to make observations to feedback into design.

(adapted from Oppenheim, 1992)

Advantages a, b, c and d and disadvantages a, c and e are relevant to the questionnaire used in Phase Two. An additional disadvantage relating to disadvantage b, is the challenges for those being asked to write in a second language. The majority of the respondents in Phase Two are writing in their second language.

Low response rate is the biggest challenge for research conducted by questionnaire (Oppenheim, 1992) (and others). The way a participant is approached is crucial to gaining their cooperation and motivating them to take part. It was judged that simply emailing governments with questionnaires via email contacts on website would probably generate a low response rate. For this reason a more strategic and targeted approach was taken.

While working at the FAO headquarters in Rome on the development of a training package for National HACCP Strategy Development the researcher needed to contact individuals across a broad spectrum of countries in order to gather information on their experiences in this area. It was agreed that the questionnaire would be designed in to include questions for the purposes of research into food control, also of use to the FAO national HACCP strategy training project.

The FAO officer coordinating the project generated a list of contacts in countries worldwide. It was agreed that where possible two contacts would be used, in order to increase the response rate and the amount of data generated. The questionnaire was then incorporated into an email and sent to each individual by the FAO officer. Emails were addressed to the recipient in person and in some cases included a personal introduction. The emails were signed off by the FAO Officer, myself and a colleague.

For the purposes of this research all recipients were asked one question in three parts. The emails followed a set template but were not identical. All include the question for my study, but where the individual was known to have been involved in a particular initiative they had one specific additional question to answer (see appendix 3).

A total of 23 individuals in 20 countries were sent the questionnaire. Responses were received from 10 individuals in 9 countries. That provides a 43% response rate for individual responses and a 41% response rate for responses per country. This is significantly better than the average response rate for research in this field (based on studies reviewed in Chapter one of this research) which is 32%.

### **2.7.1 Questionnaire design**

The questionnaire was designed by the author and Dr. J.Z Taylor, also supervisor for this thesis and experienced researcher in the field. The objectives were to generate the most in-depth data from as many recipients as possible.

However it was still important to design the both the questions and the content of the email carefully in order to make it as appealing and as easy to respond to as possible and to minimise misinterpretations in what recipients were being asked to do. This thesis only includes analysis of questions that related directly to this research and not the additional question several recipients were asked.

Oppenheim identifies factors that may increase response rates, these include;

- Explanation of selection
- Confidentiality
- Anonymity
- Appearance
- Length
- The topic and degree of interest to the recipient
- Rapport

(Oppenheim, 1992)

These factors are discussed below in relation to the research undertaken.

#### **2.7.1.1 Explanation of selection**

The main body of the email included an explanation as to why they had been selected as a recipient;

*'...we would like to include information from a wide range of countries who have experience in the development of HACCP, and / or strategic approaches for HACCP at national or provincial level. In particular, we would like to demonstrate both the benefits and challenges of a range of initiatives and approaches, allowing countries to gain from both the successes and 'lessons learned' by others, and helping them to make informed choices.'*

#### **2.7.1.2 Confidentiality and anonymity**

Confidentiality and anonymity were not broached. After discussion between the author and the FAO Officer it was decided agreement regarding anonymity and confidentiality were not necessary. This is due to the unique relationship of support between the FAO and the national contacts and a willingness to share experiences and learn from one another.

#### **2.7.1.3 Appearance**

Consideration of the appearance in an emailed questionnaire includes the layout, type face and type size. The email sent was in a conventional style with an easy to read sans serif font and short focused paragraphs.

#### **2.7.1.4 Length**

It was decided to ask just two questions in order to make it as easy as possible to answer and increase the response rate. It was also decided to include the questions in the main body of the email again to make it as easy as possible to locate, and avoid any issues with attachments being screened or software compatibility, and so to increase response rate.

#### **2.7.1.5 The topic and degree of interest to the recipient**



The topic would be of some interest to all the recipients. The advantage of using the FAO contacts for the questionnaire was that the recipients were targeted specifically because of their position and professional experience.

#### **2.7.1.6 Rapport**

The questionnaire was sent by an official at the FAO, an internationally recognised and credible organisation. It is likely that many of the recipients had had previous contact with the individual at the FAO and this probably had a big impact on the response rate. In addition the content of the email aimed to establish a friendly rapport with the recipient.

#### **2.7.2 The questions**

The questions asked were;

*"In your opinion, what are the incentives for your country to increase HACCP implementation, and what are the main challenges?"*

*"Have you been involved in any initiatives or approaches to promote the adoption of HACCP?"*

*If yes, please summarise the initiative, the main outcomes and lessons learned.*

The following guidance was provided beneath the questions:

Where possible, we would like to hear about the practical issues that you have faced, and any advice you would give based on these. We would hope for a contribution of approximately 200–500 words on each question. In case, you wish to put us in contact with other experts working in this field in your country, please advise.

Recipients were not provided with any template in which to provide their response. Some returned by email and others in an attached file. Respondents were asked to send responses within two weeks. It was felt that this would provide ample time for recipients but not so long that the questionnaire is forgotten.

### **2.7.3 Sampling**

As described previously the sample of 23 individuals in 20 countries were selected on the basis of their position and professional experience from a list of contacts held at the Nutrition and Consumer Protection Division (AGNS) of the FAO. A purposive sampling approach was adopted again for phase two.

As described in the previous section purposive sampling employs a strategic approach in order to provide a sample including a range of relevant contexts and therefore is able to provide results on which to build well-founded findings and recommendations (Mason 2002). Again the sample cannot be described as representative, but neither is selection *ad hoc* or purely opportunistic. In phase two participants were selected on the basis of gaining the widest international perspective from individuals with known experience in the field.

Again the findings identified in the research *may* be identified in the wider population. Findings in this phase provide an illustration or flavour of the wider population but do not claim that this *is* the case or assess *how well* these findings represent the wider population (Mason 2002).

A purposive sampling approach was the most appropriate for the research in phase two as it would not be possible to undertake the research using a representative sample because of the very specific characteristics of the population i.e. those involved with the development and implementation of food control systems. On balance, as the alternative is to generate substantially

poorer quality data with a significantly lower response rate the use of a purposive sample was justified.

#### **2.7.4 The response rate**

Examination of the responders/non-responders did not reveal pattern or trend. Non respondents were from both developed and developing countries. It was advised by the FAO officer countersigning the questionnaire correspondence that recipients were most likely not to reply due to lack of free time and the high demands of their positions.

Responses were received from 42% of recipients. Although it is desirable to have as high a response rate as possible this level of response does not impinge on the value of the research in phase two as the nature of the responses accounts of experiences and initiatives are of individual value. Incidentally the response rate is significantly higher than the average response rate for research in this area which is 32% (based on research reviewed in chapter one of this research).

#### **2.7.5 The recipients**

The questionnaire was sent to individuals in 21 countries, see figure 7 (Argentina, Brazil, Bulgaria, Canada, Cameroon, Columbia, Fiji, India, Ireland, Japan, Jordan, Macedonia, Mexico, Netherlands, New Zealand, Peru, South Africa, Tanzania, Thailand, UK and Zambia). Responses were received from 10 individuals in 9 countries. The ten respondents represent a range of countries and all have been involved in the development and implementation of national HACCP strategy.

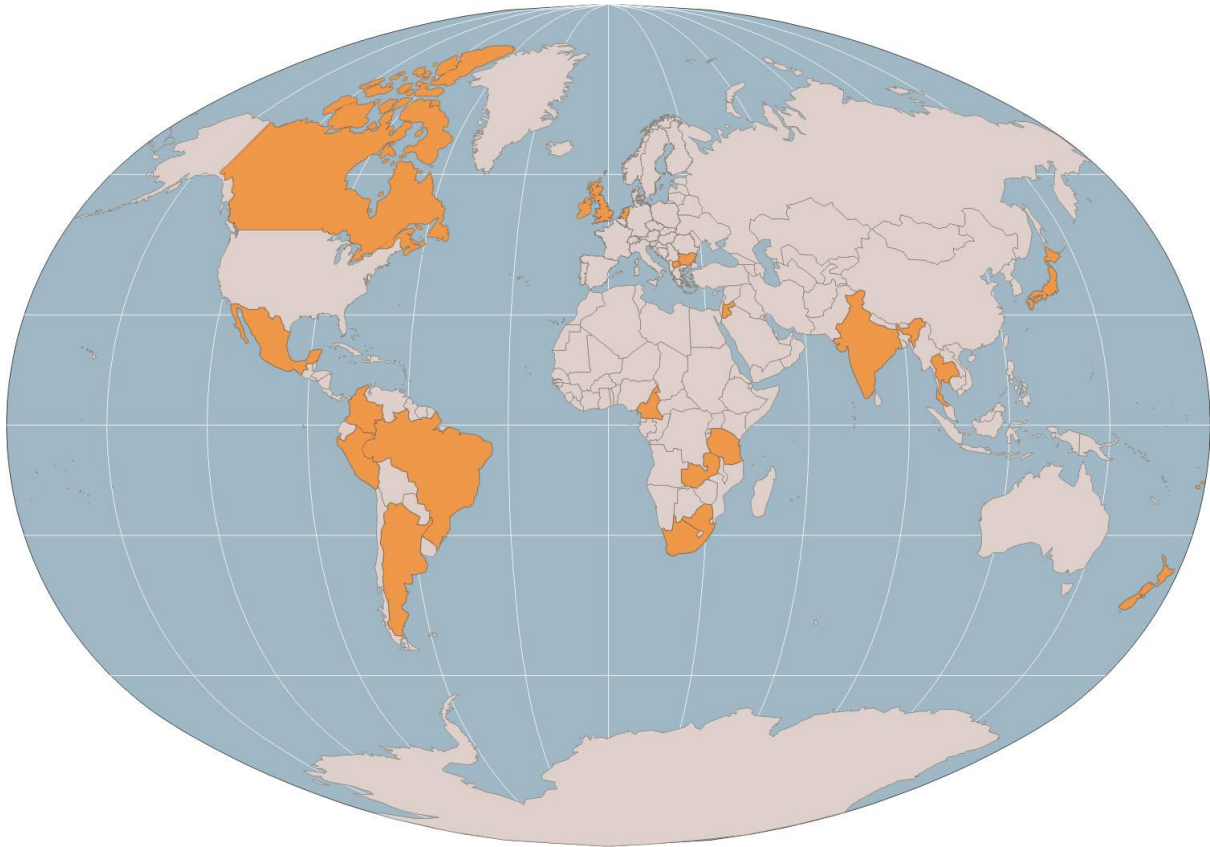


Figure 7: Participants in Phase two by country

### 2.7.6 Questionnaire data analysis

The analysis of the questionnaire data was undertaken using a similar approach as for the interviews in phase one adapted for questionnaires in phase two. Each questionnaire response was carefully examined order to identify recurrent themes. The analysis of questionnaire data required similarly thorough approach in order to ensure themes were not missed or wrongly interpreted. There are similarities between the type of data generated in the questionnaires and the interviews. For example it is evident from the responses (see appendix) that respondents use a variety of language, terminology to describe similar issues, interpret the same question in different ways and supply responses of varying lengths. However it is important to note that there are also important differences between the two set of data.

The following fundamental differences between questionnaires and interviews are of particular importance. These include;

- Questionnaire is completed at a distance from the researcher, minimal opportunity to develop rapport
- Questionnaires are completed in the respondents own time
- Researcher is not present to aid interpretation of the question
- Respondent physically writing/typing answers rather than speaking freely and being recorded

As a result it was observed that the data generated in a questionnaire is different from in an interview in a number of ways;

- Questionnaires generated more formal structured responses than interviews
- Less evidence of personal opinion
- In some cases more detail provided in the questionnaire responses
- In some cases questionnaire responses missed questions or focused heavily on one part of the questionnaire.
- Interpretation of the same question can vary amongst respondents
- The structure and presentation of the responses varied
- The length and detail of the responses varied

Again it was the researcher's task to identify the themes without imposing meaning that was not actually there.

The questionnaire responses were read two/three times each at the start of analysis. This helped familiarise the researcher with the content and the language. The responses were analysed against the questions asked. An additional heading was included as to suit the interpretation of one of the questions. Several responses included incentives for businesses to undertake HACCP as well as the incentives for governments. The approach provided

structure as well as the opportunity to compare the responses to the interview questions.

The second stage of analysis involved the identification of themes within the answers to the questions in the questionnaires. Each transcript was read in turn and notes were made alongside the transcript each time a possible theme was identified. The responses were then read and analysed again to identify these and additional themes. This process continued until it was felt that all the content had been analysed alongside all emergent themes. Sometimes comments relevant to a particular theme were made elsewhere in the response.

Fragments of the responses were grouped under the headings of the emergent themes (copied and pasted into tables) leaving the responses intact for further reference. The themes are presented as subheadings under the general heading provided by each question.

The final part of the questionnaire asked respondents to describe a government initiative they had been involved in and provide some lessons learnt. The data for this section did not require as thorough an analysis as it involved the supply of factual detail rather than personal experience and opinion. The section was included in the overall analysis as some of the detail included points relevant under other headings. The descriptions of the initiatives were presented in a table and a simple descriptive analysis of the type, targeting and impact of the initiatives was undertaken.

In summary the analysis in phase two was thorough and detailed. The systematic revisiting of each response and the extraction and grouping of small parts of the responses introduces a high level of rigour to the process of analysis.

### **2.7.7 Evaluating the success of the questionnaires**

On reflection Phase two of the research was a success. Ten individuals sent responses detailing the incentives, challenges and initiatives in their country. However, certain limitations can be identified although the researcher does not believe these fundamentally affect the integrity of the findings.

The limitations commonly associated with data gathered by questionnaire are evident in the data. The questionnaire was completed at a distance from the researcher and the researcher is not present to aid interpretation of the question. As a result in some cases questionnaire responses missed questions or focused heavily on one part of the questionnaire and the interpretation of the same question varied amongst respondents, the structure and presentation of the responses varied and the length and detail of the responses varied. Additionally, the respondents produced written responses and as a result formal structured responses were provided and there was less evidence of personal opinion than in the phase one interviews.

Using an FAO officer to send out a research questionnaire has both advantages and limitations, the advantages have been discussed above. These are the added credibility, increased focus of contacts and an instant rapport with the recipient.

The disadvantages were a lack of control of the questionnaire and the responses. All responses were sent to the FAO officer who sent on to the author by email. However, this indirect method of data collection could lead to lost data. In addition there was no opportunity to send reminders to participants, which could have increased the response rate further. In some cases recipients sent emails on receipt of the questionnaire agreeing to send

information on in the coming days, these were not received but were not followed up.



## Chapter 3: Results and Analysis

### 3.1 Study aims and objectives

Aims: To analyse challenges and outcomes in the development and implementation of national food control systems across multiple countries.

Objectives:

1. To recruit key individuals from multiple countries involved in the development and implementation of food control at government level to take part in research phases
2. To analyse existing literature relevant to the development and implementation of national food control systems
3. To undertake in depth qualitative interviews generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries
4. To distribute a questionnaire generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries
5. To analyse data and identify findings regarding the challenges and outcomes in the development and implementation of national food control systems across multiple countries.

These aims and objectives are addressed in three distinct research phases;

Phase One: A literature review

Phase Two: A series of exploratory interviews focusing on food control with individuals involved in the development and implementation of Food Control policy at national, regional and international level.

Phase Three: A short questionnaire focusing on HACCP addressing individuals involved in the development and implementation of Food Control policy at national level.

The research phases were undertaken in distinct timeframes. Data collection and analysis were undertaken for phase one this led to the design of Phases two and three. Data collection and analysis were undertaken for phase two, see figure 8. The phases were designed in response each other using a flexible design approach rather than being the result of an overall rigid design from the outset.

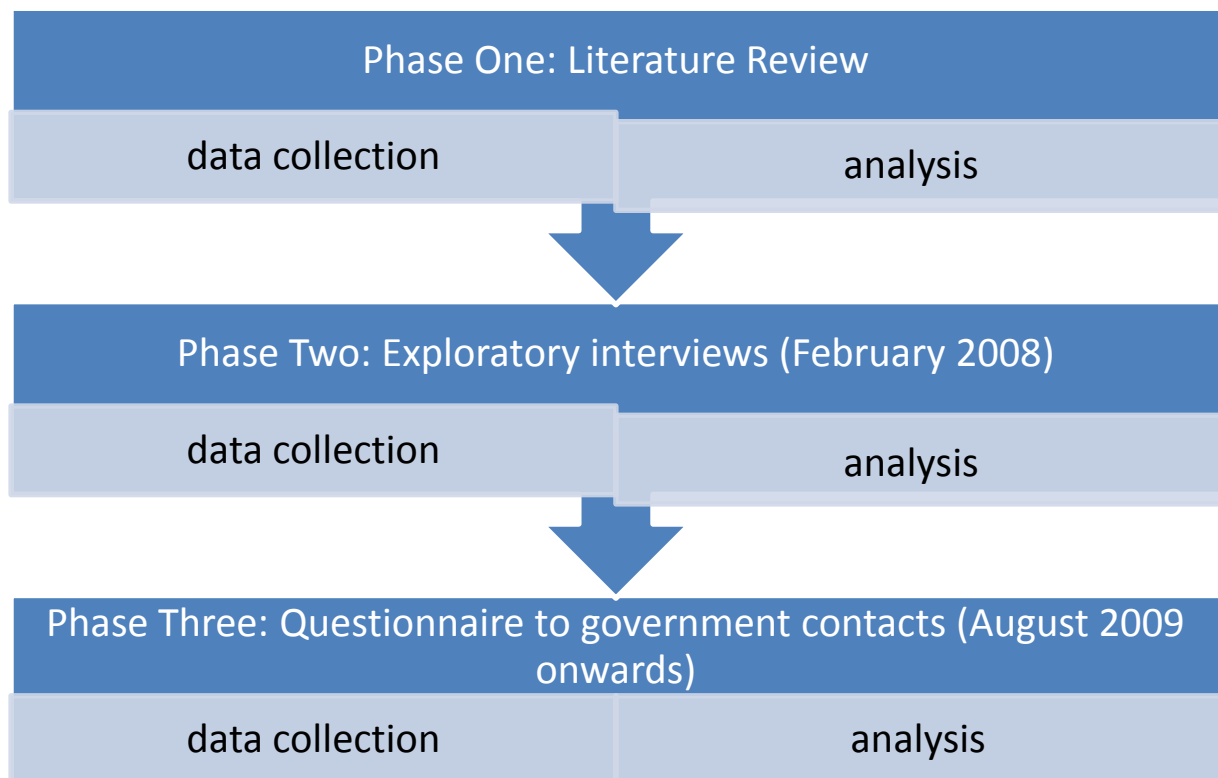


Figure 8: Research structure

In this chapter results for phases two and three of the research (results of phase one are presented in Chapter One). In addition a some of the findings from Phase One, the literature review, will be presented to provide baseline data. The chapter has the following structure; 1. Revisit the aims and

objectives, 2. Present baseline data found in the Literature review, 3. Present data for Phase Two, 4. Present the data for Phase Three. 5. Presents a summary of the findings of both Phases Two and Three.

### 3.2 Phase One

Baseline data is presented under the heading barriers to HACCP implementation. Data under this heading is most comparable to data from Phases Two and Three.

Recurrent barriers to HACCP and food safety management identified in Phase One are; Lack of knowledge (reported in 15 studies), disputed relevance (reported in 3 studies), time (reported in 7 studies), cost (reported in 10 studies), inability to change (reported in 6 studies), perceived complexity (reported in 7 studies), inadequate training (reported in 2 studies), poor guidance (reported in 2 studies), burden of paperwork (reported in 4 studies), lack of management commitment (reported in 1 study), absence of legal compulsion (reported in 1 study) and lack of government support (reported in 1 study). Table 3 in this thesis presents these findings across 20 publications.

The model presented by Taylor (2007) *21 Barriers to HACCP and food safety management in hospitality* is the biggest relevant research project in this area, has been replicated in several countries and sectors (see section 1.7 of this thesis) and its barriers encompass all those found in the literature review. For this reason the Taylor (2007) *21 Barriers to HACCP and food safety management in hospitality* model will provide a baseline for this research. Barriers found in the area of food control can be compared in a meaningful way with this model.

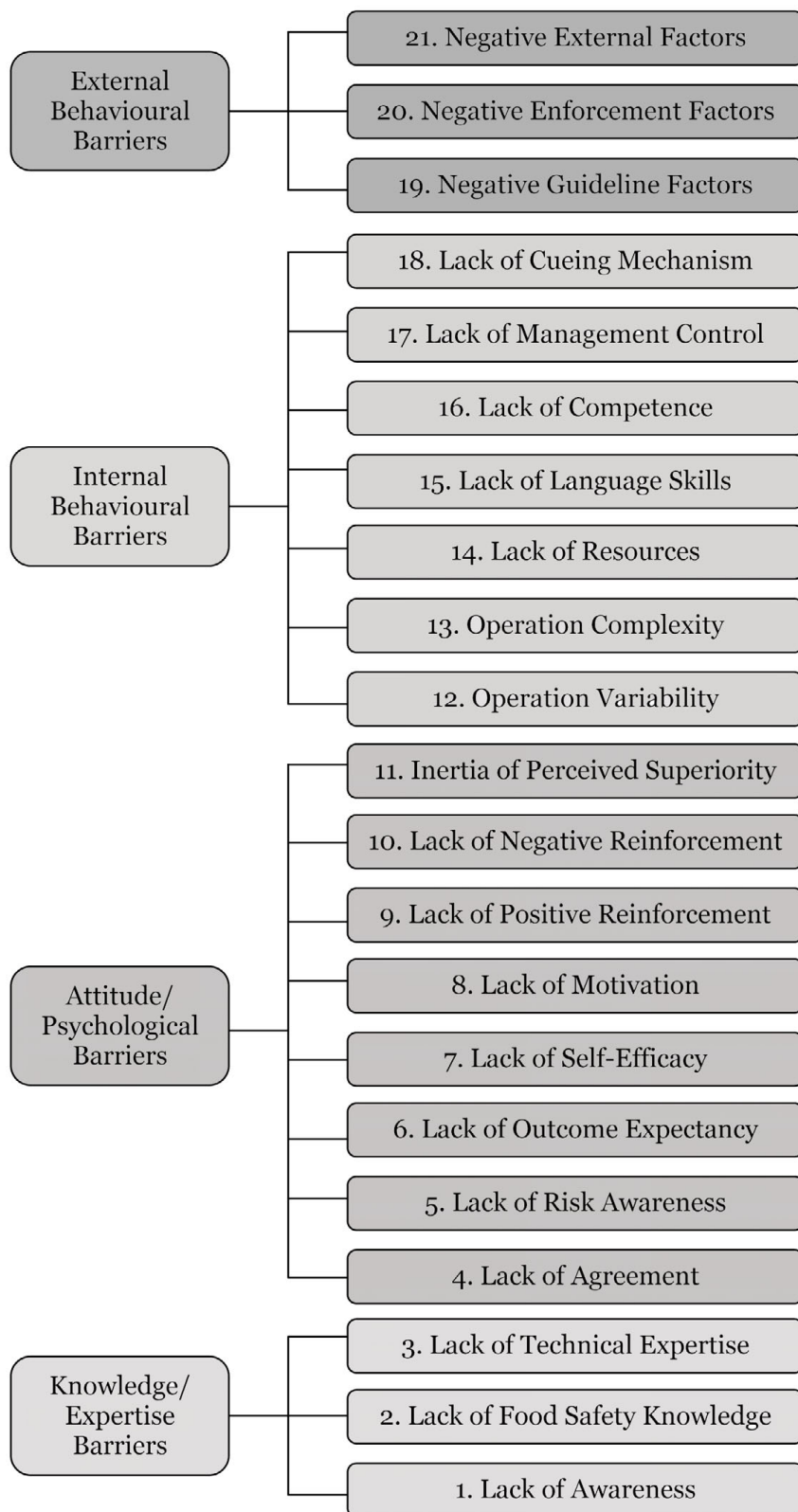


Figure 8a: 21 barriers to HACCP and food safety management in hospitality (Taylor, 2007).

### 3.3 Phase Two

#### 3.3.1 Research sample

The thirteen interviewees were selected by purposive sampling on the basis of their having knowledge and influence in development and implementation of national food control policy. All those approached agreed to take part in the study. The interviewees are from a range of countries and hold various professional positions linked to food control, see table 8.

Fieldwork ID	Position (at time of interview)	Date
A	Head of Food Control	26.02.08
B	Head of Department of Food Control	28.02.08
C	University Lecturer	26.02.08
D	Head of Inspection	26.02.08
E	Professor	27.02.08
F	Regional Co-ordinator FAO	27.02.08
G	Food Safety Head of Inspection	27.02.08
H	Principle Food Health Inspection Officer	27.02.08
I	Nutrition Officer, Nutrition and Consumer Protection Division, FAO	30.07.09
J	National representative at Codex	30.07.09
K	Food Standards Agency Special Advisor (Retail)	12.10.09

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Table 8: List of interviewees, their positions and date of interview

The interviewees come from a range of countries; China, Jordan, Kuwait, New Zealand, Oman, United Arab Emirates (Dubai) and also from the FAO a perspective from the Middle East Region and an international perspective from headquarters.

### 3.3.2 Results

The interviewees' responses are presented under the headings of the five key food control activities followed by other emerging topics;

- Food control management
- Food legislation
- Food inspection
- Provision of official food control laboratories
- Information, education, communication and training

#### 3.3.2.1 Food control management

Food control management is mentioned by all interviews and it is evident that this is perceived to be a priority in effective food control '*...most important is management*' (Interview A). Where responsibility for food was divided between two or more government authorities interviewees had encountered problems. Management and communication were described as '*...hugely complicated and difficult...*', '*...with responsibility scattered over different agencies*' (Interview B). One interviewee suggested that ideally they would create a single agency for food control.

One interviewee described confusion caused by a multiple agency system '*at national level some authority is responsible for develop the regional*

*certification system but for another government agency...we just use our own regulation.'* (Interview J). In addition where food control was part of a larger department this made allocation of resources problematic *'...how much of the budget, how much of the time and how much of those efforts are being paid to food control activities..?'* (Interview D).

These concerns are backed up by the regional FAO coordinator who identified the fragmentation of food control as *'... a major issue.'* Food control managed across multiple agencies in her experience lacks coordination and is inefficient. An example of this was given whereby more than one official visited a business, while another business received no visits, the problem being that *'grey areas lie between the mandates of different ministries'* (Interview F). The regional coordinator goes as far as to say there is *'...no communication, no coordination and this makes food control work in a really inefficient way...'* (Interview F).

An example of a country forming a single agency for food control was described with positivity. The move was linked to *'...a rising...more demanding [consumer], more knowing their rights...pushing the industry, pushing the policy makers...'* (Interview I).

### **3.3.2.2 Food legislation**

One interviewee described legislation as problematic in two ways that appear in conflict with one another. Firstly that legislation is based on scientific evidence from outside the country and describes a need for *'...legislation developed here...so it will meet our own environmental requirements not other environmental requirements.'* (Interview G). A second problem identified is the lack of national and regional harmonisation which can undermine control of food imports at port where rejected goods can enter by land where inter

country trade agreements are in place, *'...some shipments are rejected...enter from the other side'* (Interview G).

Another interview identified the process of updating food legislation as one of the food control biggest challenges, in particular moving away from prescriptive traditional legislation to a more risk-based approach (Interview K).

Food legislation did not emerge as a strong theme across the interviews. Interestingly although legislation was not discussed in any depth the FAO regional coordinator described the need to update and redraft law and regulations as *'...another of the key challenges...'* to effective food control for countries in the region (Interview F).

In several interviews it was discussed that while particular food safety legislation may be in place, e.g. a mandatory requirement for food safety management systems based on HACCP, such requirements were not currently enforced across all sectors (Interviews E, G, and K). This indicates that these countries are taking a longer term approach to implementation and are somewhere on route to achieving this.

### **3.3.2.3 Food inspection**

Food inspection is mentioned most commonly in relation to a perceived need for more effective training *'the most important issue we have to focus on is the qualification of inspectors'* (Interview C), this is reinforced by a interviewee who directly manages 40 inspectors, *'The biggest challenge for inspectors...they need to have more awareness and courses...actually...they have to learn HACCP first'* (Interview H). *'...we are doing intensive courses of hygiene and HACCP for our staff, our inspectors...'* (Interview F).



Ensuring consistency in inspection and competency among individual inspectors had been identified as a challenge for one interviewee. The strategy for improving this been directed at recruitment of inspectors, *‘...putting up higher standards.’* (Interview F).

At an organisational level one interviewee describes multiple systems of food safety inspection are described as a source of confusion *‘field inspection...for food on the shelf, Ministry of Agriculture and Ministry of Health...do...borders...and customs is the responsibility of the Royal Police.’* (Interview D). In addition, weakness at policy and strategy level is blamed for the failure to undertake a risk –based approach to inspections (Interview F).

### **3.3.2.4 Food Control Laboratories**

Provision of laboratory services is not mentioned by any of the interviewees.

### **3.3.2.5 Information, education, communication and training**

Information, education, communication and training are mentioned in the responses of all interviewees. The responsibility for responsible agencies to provide information and to communicate effectively is clearly accepted; *‘we have a strategy but we have to know that industry and consumers understand this strategy’* (Interview A).

Education and training are seen as both key to effective food control and as one of the key activities for food control authorities, *‘the key issue is to improve the knowledge of the people handling food’* (Interview A), *‘...the food handlers...need to increase their skills in how to handle food safely’* (Interview A). One interviewee describes education and training as the biggest challenge the government have identified, *‘...education and training for the food industry staff...it’s very basic but it’s very difficult...’* (Interview J). Among the challenges of effective education and training of food handlers were cultural

issues with the handlers who often *'...some from country...very rural...they think it's safe but it's not.'* (Interview J).

It is also recognised that education and training needs are not limited to food handlers but necessary at all levels *'to improve the knowledge of the people, the public, government, and food handlers...it's a very big challenge.'* (Interview A). Training and education activities within food control include those training and education of inspectors and other government employees, *'a major issue is that you don't have the trained people from government, you don't have the trained people to make the audits'* (Interview B). Content relating to education and training of inspectors was discussed in the previous subsection, Inspection.

Improving the knowledge and skills, described as 'capacity' of those involved in development and implementation of food control policy is highlighted as a key task by the FAO Nutrition Officer, *'...building the capacity of government groups and industry groups for them to be able to make changes in their own system...'* (Interview I). The FAO regional officer confirms that this is a common issue and describes training and retraining as important even for those working at the highest levels with the highest qualifications. HACCP and risk analysis emerge as areas where there is a particular shortcoming of expertise.

An example of the food authority's role in communicated and providing information is provided in a description of confusion over private and public food safety standards in India. Small and medium sized companies are described as *'...at a loss of what to do and where to go and what guideline to follow...I think the government should at least try to dialogue with industry...'* (Interview I).

*'...communication with all the stakeholders...'* (Interview C) in the development of national policy.

Communication with industry and the public is evidently made more difficult where the population is ethnically diverse *'...we are producing...literature in two languages only but we have more than 200 nationalities in \*\*\*...'* (Interview G). In addition low literacy levels can add to communication difficulties *'related to communication with the public...the majority of the public...there is a problem in language and in education.'* (Interview G).

### **3.3.2.6 Other topics**

In addition to the five key food control activities other issues emerged in the interviewees responses. Most interviewees were asked about the challenges of HACCP directly as so unsurprisingly this is one of the biggest topics outside the five key activities of food control framework. Within the discussion of HACCP and in addition to other emerging topics include additional support needed for Smaller and/or Less Developed Businesses (SLDBs), the hospitality and food service sector, a need for innovative approaches to HACCP, the commonality of challenges encountered by food control authorities and finally the extent of the challenge of effective food control.

### **3.3.2.7 HACCP**

Several interviewees had first heard about HACCP while studying for postgraduate qualifications (Interview A, B, C, D, F and H).

### **3.3.2.8 HACCP Implementation**

From the responses in the interviews it seems common for government initiatives for HACCP implementation to focus on export sectors, then manufacturing and to address the SLDBs last. The FAO officer describes HACCP strategy at national level as a 'continual evolution' (Interview I).

Examples of interviews describing the focus on key export industries and plans to support SLDBs in the future are listed below;

*'We have one of the best quality fish in the world and it's very important, we are exporters of fish to Japan, US and to Europe...its seems to be more easier to start with the fish industry...'* (Interview D).

*'...five start hotels completely have to implement [HACCP]... you know \*\*\* is a tourism country so they like people to come here and eat and to enjoy'* (Interview G).

*'India has a large, has a very important export commodity including white fish...and shrimp...that was a very defined project'* (Interview I).

*'in the future...we hope we shall start implementing HACCP for small and less developed premises.'* (Interview G).

The food service and hospitality sector includes business such as restaurants, hotels, cafes, canteens, take away shops and street food vendors. This is sometimes referred to in the interviews as the Retail sector. Several interviewees discussed the particular challenges involved in HACCP implementation in this sector.

*'The retail, you know, like restaurants...retail level is the most difficult place to implement it [HACCP]'* (Interview D) *'The big challenge now is to move from industry to retail.'* (Interview D). *'...restaurants and other retail businesses...I think will find it very difficult'* (Interview D).

HACCP implementation initiatives have proved challenging for several of the interviewees *'we tried to implement HACCP from 1997...[the] first trial was a failure because we are not prepared.'* (Interview G).

One interviewee described an attempt to implement a mandatory HACCP requirement as 'failing' after *'very very difficult, very hard discussion with industry...'* (Interview J). A second project in the same country involving HACCP implementation in a range of businesses *'...still failed.'* (Interview J). Some reasons that implementation may prove a challenge emerge from the literature. These include lack of basic food hygiene, lack of knowledge and expertise in industry and government, HACCP implemented as a paper exercise and the proliferation of private standards. These are discussed below.

One identified challenge is the lack of basic food hygiene as a starting point; *'...in many countries you don't yet have the good hygiene practice base yet or the good agricultural practices on farms ...before you can even start on the HACCP approach this is a major challenge...it's a two prong approach.'* (Interview I), *'in developing countries there are a lot of problems even in the raw materials for the foods...if you can very well control the milk plant...but there are problems on the farm...e are a very big country...we are an agricultural country...'* (Interview J).

Another challenge described by several interviewees is the lack of trained people industry, for implementation, training and inspection; *'...the major issue of implementing HACCP...you don't have the trained people who would make the audits...'* (Interview B), *'...the number of HACCP trainers is limited...additional training is needed and targeted training is needed'* (Interview F), *'my overall impression is there is still, you know, a lot of need for training on HACCP'* (Interview I).

A lack of expertise within government is also a challenge; *'...it is as simple as experts...maybe they know the textbooks but they don't know how to apply it...'* (Interview I). Discussion of training and education for inspectors, including in HACCP is discussed under the previous subheading, 'Inspection' and issues regarding training and education are included under the subheading 'Information, education, communication and training'.

A third challenge described by interviewees is that of businesses having HACCP on paper but implemented not in practice. *'...you see the very big record or something but it's just a cheat...it's false...'* (Interview J), *'It's a problem for HACCP...they just want to let people know "we have HACCP"...'* (Interview J), *'...yeah okay I'm HACCP certified but when you look at the license date its 2002...what happened?'* (Interview B)

It is recognised that to improve the uptake in industry the government have to be actively enforcing; *'they don't maintain it as part of a record of quality or safety...because government are not following up on this and that's the issue.'* (Interview B), *'government has to be supportive and verify...you don't have it like ten years ago and still claim for something that maybe doesn't exist anymore.'* (Interview B).

The proliferation of private standards in the food industry was also described as a complicating factor; *'...it's getting further muddled by the private standards discussion...it's still kind of grey...small and medium one [businesses] are at a loss as what to do...'* (Interview I). *'ISO 22000 is a new type of HACCP but this makes things very complicated.'* (Interview I).

### **3.3.2.9 Supporting industry in HACCP implementation**

In discussion of HACCP interviewees talked about the need to support industry; *'you have to prepare your industry for HACCP...you cannot arrive and*

say that the next day...if you cannot implement HACCP then you cannot operate, it's not fair.' (Interview B), *'...as much support as you can do for this in the different industry sectors'* (Interview B). Another interview describes a national database for scientific support for HACCP including hazards associated with different products and appropriate interventions (Interview K).

Three interviewees mentioned the need to plan communication activities where new HACCP regulations were planned; *'...to prepare industry...having conferences to highlight the importance HACCP'* (Interview B). Incentive schemes are suggested as an effective strategy for initiatives with industry, *'you should have many things to do for businesses not just say "you must do HACCP"...you should provide support, funding, grants, training'* (Interview B).

Reflecting on success in a HACCP implementation initiative an interviewee described the food control authority's incentives *'the government encouraged people and even sponsored people...paid part of the consultation fees and part of the license fees and this was the motivation...I'm not paying much so why not'* (Interviewee E). *'It was the atmosphere for HACCP...that was very important, so let's go for it, yeah.'* (Interview E).

### **3.3.2.10 Costs and benefits of HACCP**

The responses also indicate that for HACCP to be accepted in industry it needs to be perceived to bring value to business rather than being only a cost or a burden. This was talked about both in terms of purely economic costs and benefits and other costs and benefits; *'when it is expensive for him he will weigh it up'* (Interview B), *'it's about acceptability, acceptance of people...business men...'* (Interview D), *'you should have many things to do for him [business owner] not just say it's a must...you should provide the logistics, provide the funding, support and grants and that's really a challenge.'* (Interview B).

One aspect of the cost benefit debate centred on the need for more documentation; *'I think a lot of businesses are talking about the cost of it and a lot of paper and documentation, this is annoying them...'* (Interview C). Others saw documentation as a benefit *'many plants do not have enough documentation...so they were pleased to have it.'* (Interview E).

### **3.3.2.11 Communication and HACCP**

The importance of managing the perceptions of the cost and benefits of HACCP is seen in the following statements; *'People are thinking that the certificate would be beneficial for me from a commercial point of view. So I can buy or sell more, this was the beginning'* (Interview E). *'Some people were disappointed because it was not necessarily if you have HACCP...your business will be better.'* (Interview E).

One interviewee felt the communication of HACCP and its value to the public was important; *'very important point here is that to make people aware...then the consumer would be aware of my work...this is the responsibility of people who are engaged; governmental, producers, consumers.'* (Interview E).

However, other interviews expressed concern of this type of activity; *'...there are companies you have on their packaging material HACCP logo...I feel uneasy about that because this is not the idea it should not be used for marketing purposes...'* (Interview F).

### **3.3.2.12 Small and/or less developed businesses**

The challenges encountered by smaller and/or less developed businesses (SLDBs) are mentioned throughout interviews; *'when we come to the smaller scale businesses, here is the problem and still they are not doing quite well'*



(Interview C), *'...the majority are small mid-sized businesses, family businesses or even run by one person'* (Interview B).

Two interviewees see bigger businesses as less problematic, reason for this being that they have the resources to support implementation; *'the big guys will work it out'* (Interview I), *'for big companies as you know they don't have a problem, they have money and they can get consultants.'* (Interview B).

Several of the interviewees identify that to be effective HACCP needs to respond to each sectors' needs and that for SLDBs this may mean adapting systems such as HACCP. Primarily to make them easier to use and understand; *'we need simplicity, reword, restructure'* (Interview D), *'to simplify things to implement HACCP in a different way'* (Interview B) *'If we can find a way to teach them... how to make HACCP easy...how to make HACCP easier...'* (Interview J). *'If we just copy all the principles all the content from Codex or from US or from Europe...copy and just use in \*\*\*, I don't think it will work.'* (Interview J). *'It's the dilemma...we have to try to find another...don't change the name but maybe find another way to make it [HACCP] easier to make it practical.'* (Interview J).

There is evidence in the interviews that food authorities are starting to respond to this need; *'...they [food authority] are starting to implement in a different way...to simplify things, to implement HACCP in a different way...'* (Interview C). There is interest in the innovative approaches to HACCP in the marketplace which offer an evidence based and internationally recognised solution for industry *'a simple system like Menu-Safe would be very interesting, it's simple it doesn't take much effort and it's not costly which is very important...that will be the future, that's what we need'* (Interview D).

### 3.3.2.13 Common experiences and common solutions

In the responses many interviews described the particular characteristics of their country as part of an explanation for the challenges they encounter e.g. *'...it's a large, agricultural country...'* (Interview J), *'...because \*\*\* is booming and everything...is increasing every year.'* (Interview A), *'we are not research based countries.'* (Interview D), *'...for developing countries three are...'* (Interview J) and *'...a lot of diversity here in \*\*\*'* (Interview G).

However, despite the individual characteristics of each country in the responses there emerged a perception food authorities face common challenges; *'...we are like everybody else'* (Interview D), *'I think it's quite similar with other countries'* (Interview C), *'...I do not know about other situations...but most likely it would be the same.'* (Interview B), *'I am talking about most of the \*\*\* countries and most of the \*\*\* \*\*\*'* (Interview D).

There were two exceptions where interviewees evidently felt their country was different in a fundamental way; *'it [food control department] is very small, not like Dubai, Dubai is really different.'* (Interview B), *'Maybe in Europe its better and everybody maybe they graduate from some University as a Cooker or something but in \*\*\* it's not'* (Interview J).

There was evidence of a regional approach to food control and to countries learning from one another within a region; *'...if \*\*\* will take it [innovative methods of HACCP] probably the \*\*\* countries will follow...'* (Interview C), *'...the region should have one agency...responsible for food control'* (Interview B).

One interviewee described succinctly the value of identifying common problems and solutions. Explaining that because countries have common problems in food control it is important to share ideas to avoid solving

problems that have already been solved or ‘reinventing the wheel’ (Interview K). The interviewee goes on to describe that in his experience some strategies will not work anywhere and by talking to authorities with experience in a similar project you have the opportunity of learning about potential problems before they happen (Interview K).

Engaging with the international food safety community is a key way to learn from the experiences and adopt solutions from other countries and regions. Codex is described by one interviewee as having a key role in disseminating information and ideas and coordinating countries working on similar issues as well as providing a good opportunity to socialise and network (Interview K). In this case the interviewee described a strategic approach to networking so as to form a ‘nucleus’ of countries with similar problems (Interview K).

One interviewee describes how his country was the first to start to implement HACCP and explains how international links and work with academics in the country were involved *‘the Swiss government had a kind of grant to \*\*\* and this was the beginning.’* (Interview E).

#### **3.3.2.14 The size of the challenge**

Finally, despite an overall positivity in the interviewees responses there was a unanimous recognition that the pursuit of effective food control is a significant challenge; *‘...it will take a lot of money and effort and time’* (Interview D), *‘it’s a big challenge’* (Interview A), *‘it’s difficult and complicated’* (Interview B), *‘that’s a big challenge for our region’* (Interview F) *‘in my personal and official opinion I think it’s going to be really, really hard work’* (Interview D), *‘I hope that in the coming years things will improve a lot.’* (Interview H). *‘So it’s not so easy.’* (Interview J), *‘it’s very difficult...I think it’s a big challenge.’* (Interview J).

### 3.3.3 Summary of Findings in Phase Two

The interviewees' responses were presented under the headings of the five key food control activities followed by other emerging topics. The findings for Phase Two of the fieldwork are presented below;

- Food control management, information, education, communication & training, and HACCP are priorities for food control.
- Education and training needs identified in industry, amongst enforcers and policy makers.
- Multi-agency systems can reduce effective food control.
- Literacy levels and multiple language use identified as a challenge for effective communication.
- Governments prioritise export industries for HACCP implementation.
- SLDBs identified as needing support in HACCP implementation.
- Low levels of basic food hygiene identified as inhibiting effective HACCP.
- Perception that in businesses HACCP is often present on paper but not in place in practice.
- Government should support industry through a range of activities.
- Perceptions of HACCP are poor in industry.
- There is a need to simplify the method of applying HACCP for SLDBs.
- Governments recognise that they encounter common challenges and may find common solutions.
- Governments recognise the size of the challenge HACCP implementation presents.

From the findings in phase one it is evident that of the five activities of food control the two key activities discussed in the interviews were 'information, education, communication and training' and 'food control management'.

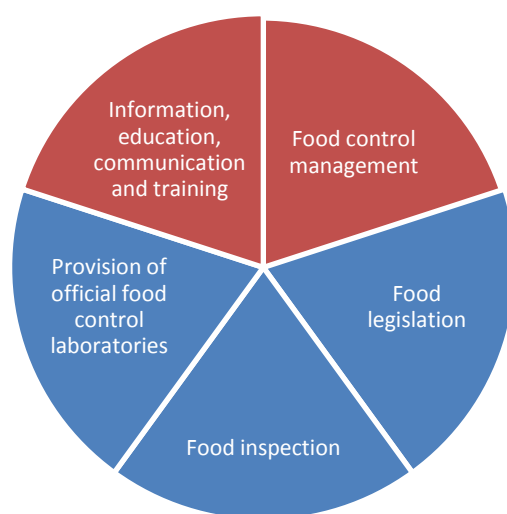


Figure 9: Areas of food control activity

### 3.4 Phase Three

#### 3.4.1 The research sample

In phase three 22 questionnaires were distributed to individuals in 20 countries worldwide. These individuals form a purposive sample selected on the basis of their position and professional experience from a list of contacts held at the AGNS department of the FAO. Responses were received from 9 individuals in 8 countries worldwide. The participants are listed using an ID L-U to ensure anonymity alongside their country and position where known.

The table below lists the country for which each questionnaire recipient represented and the ID or a 'no response' where appropriate. The position of the recipient has not been included to avoid identification of individuals.

Country		Country	
Argentina	Response	Macedonia	Response
Brazil	No response	Mexico	No response
Bulgaria	Response	Netherlands	No response
Canada	No response	New Zealand	No response

Country		Country	
Cameroon	No response	Peru*	Response
Columbia	Response		Response
Fiji	No response	South Africa	No response
India	Response	Tanzania	No response
Ireland	No response	Thailand	Response
Japan	No response	UK	Response
Jordan	No response	Zambia	Response

Table 9: Record of response/non response for questionnaire

### 3.4.2 The respondents

The questionnaire respondents provide data from countries in South America, Asia, Africa, Western Europe and Eastern Europe. The table below lists the questionnaire respondents along with the ID allocated to them for the purposes of the research. The position of the recipient has not been included to avoid identification of individuals.

Country	Job title/role of interviewee	Overview of HACCP requirements	ID
Argentina	University academic	Not a legal requirement for most businesses. Only in manufacture of infant formula	L
Bulgaria	Head of Health Control on Food Safety Sector, Public Health Directorate, Ministry of Health	HACCP required in food businesses under EU regulations.	M
Columbia	Director of Sanitary and Phytosanitary Policy	Currently no mandatory requirement for HACCP.	N
India	Director of Export Inspection Council (EIC)	HACCP a requirement for exporters via accreditation requirements.	O
Macedonia	Director of Food Directorate, Ministry of Health	Mandatory HACCP for all food businesses since 2009.	P

Peru*	University academic, Codex representative.	Currently no mandatory HACCP for fisheries industry.	Q
	Government representative		R
Thailand	Associate Professor University	Currently no mandatory requirement for HACCP.	S
UK	Leading expert and project lead on UK's food safety for caterers initiative.	HACCP required in food businesses under EU regulations.	T
Zambia	Zambeef Products Plc.	Currently no mandatory requirement for HACCP.	U

Table 10: Summary of participants in phase three

### 3.4.3 The questions

The participants were asked the following questions;

*In your opinion, what are the incentives for your country to increase HACCP implementation, and what are the main challenges?"*

*Have you been involved in any initiatives or approaches to promote adoption of HACCP?*

*and If yes, please summarise the initiative, the main outcomes and lessons learned.*

The questionnaire responses have been presented in a summarised form in the table below and in detail in the following section under six headings, these are;

Incentives to increase HACCP uptake

Challenges for governments increasing HACCP uptake

Challenges for businesses implementing HACCP

Government Initiatives

### 3.4.4 Results

This table presents a summary of the results from phase three; this is followed by an in depth analysis of the data.

Country	ID	Incentives for HACCP	Challenges to HACCP	Initiatives	Lessons learnt
Argentina	L	Access to markets and consumer demands.	Lack of knowledge, expertise, resources, qualified trainers with practical experience.	Individual HACCP training.	Short training courses not effective.
Bulgaria	M	Comply with EU ascension requirements for ascension to EU. Production of safe food.	-	Multiple HACCP training delivered and industry guidance documents.	HACCP not easy, most food operators not sufficiently educated to understand, food operators need to be motivated, stakeholder involvement necessary, trainers must be qualified.
Columbia	N	Access to markets. Improve safety of high risk foods.		Adoption of Implementation in small and medium sized businesses.	National strategy approach; identifying needs, assessing resources, and supporting



Country	ID	Incentives for HACCP	Challenges to HACCP	Initiatives	Lessons learnt
					change.
India	O	Access markets, comply with buyers' requirements, international recognition, improve/maintain reputation, identify weaknesses in food control.	Coordination, communication, infrastructure, primary production, management commitment and skills and knowledge of enforcers and consultants.	Establishment of a national accreditation programme for exports.	Involve retailers, provide effective training, provide more incentives and fewer penalties, improve basic hygiene and find a simplified approach..
Macedonia	P	Protection of human health, increased legal compliance, more efficient business and access to markets.	SLDBs, poor basic hygiene, infrastructure, negative perception in industry and lack of qualified consultants.	Develop national HACCP strategy, national guidelines, media campaign and forums with industry.	
Peru*	Q	To increase legal compliance. To increase exports from small businesses. To reduce complaints from importers.	Poor basic hygiene, lack of experience in HACCP in industry, high staff turnover, poor motivation in local/regional government, poor perception of benefits.	2008 – became compulsory for all businesses to implement HACCP.	Initial reluctance to implement, with support from government this is improving. Many workshops provided for SMEs.
	R	Access markets.	Infrastructure.	Promotion activities.	-

Country	ID	Incentives for HACCP	Challenges to HACCP	Initiatives	Lessons learnt
Thailand	S	Access markets.	Poor national HACCP strategy, poor industry guidance, lack of knowledge, lack of government support, poor basic hygiene, disagreement about HACCP methodology.	–	–
UK	T	Increase legal compliance, meet requirements of international standards and retailers. Large retailers provide significant incentive.	Lack of understanding of application in practice.	Development of a new method of applying HACCP principles. Implementation in food service sector. Development and delivery of educational activities.	Communicate in a practical and relevant format. Address any lack of qualified trainers at the outset. Educational opportunities for all stakeholders need to be made available, accelerate using e-learning.
Zambia	U	Market access, benefits of trade associated with economic growth, improved food safety, reduce foodborne disease.	Ineffective national strategy, poor communication of benefits, lack of government resources, corruption, weak	Government working with industry body (dairy) to assist processors in HACCP implementation in individual plants.	Small incentives such as training certificates are successful motivators. Industry should form industry bodies where

Country	ID	Incentives for HACCP	Challenges to HACCP	Initiatives	Lessons learnt
			consumer groups, logistical issues, lack of qualified trainers.	Similar initiative with small scale milk producers.	government strategy is weak.

Table 11: Summary of phase three results

### 3.4.4.1 Incentives to increase HACCP uptake

Participants were asked what the incentives are for their country to increase HACCP implementation. Participants' responses addressed both the incentives for governments and the nation to increase HACCP implementation and the incentives for individual food businesses to implement HACCP. Both are discussed under this heading.

Access to markets was the most common, and often the first response regarding the incentives for governments to increase HACCP implementation, (Responses L, N, O, P, Q, R, S, T, U). Some participants identified HACCP as a means to increase a countries competitiveness, *'To gain the possibility of export...and to have the competitive power as all the EU producers.'* (Response M), *'...to be able to enter some countries' market or increase the possibility to export.'* (Response P).

It was evident from the responses that the recognition of HACCP as an internationally accepted standard for food safety was an added incentive to increase uptake, making it *'...the system of choice.'* (Response O) and responding to the *'...demand for harmonization of standards among regional countries to facilitate trade...'* (Response U).

One respondent referenced the wider benefits increased access to markets would bring, *'Increased trade has a 'trickle down' effect of lifting people out of*

*poverty.*' (Response U). Another respondent described HACCP implementation as part of the requirements the country had needed to achieve in order to gain accession to the EU (Response M).

Access to markets was also the most cited incentive for food businesses to implement HACCP; *'the main motivation for HACCP adoption in medium and small companies has been the access to external markets...'* (Response L), *'...first driver for HACCP is to obtain or maintain access to specialised markets...'* (Response N), *'... driven by law and regulation of the importing countries (such as USA and EU) as well as the customer requirements (such as Japan where HACCP is still voluntary)'* (Response S).

It was reported that food businesses were motivated by the potential to increase competitiveness in the same way governments were; *'industry uses HACCP certification as a marketing advantage over industries that have not implemented such systems...'* (Response O), *'...to enhance their market potential and consumer demands.'* (Response L).

Some respondents described access to markets as the sole incentive for food businesses; *'For those who produce food for domestic consumption, there is no incentive for HACCP implementation...'* (Response S), *'The promotion of HACCP system at the moment only comes from the pressure from importing countries.'* (Response S).

Retailers were identified as responsible for increased HACCP implementation, *'...it was the overseas organized retailers such as Marks & Spencer's, Wal-Mart, etc who had made HACCP implementation a mandatory requirement for certain products...'* (Response O), *'The retail sector has had a significant impact on HACCP implementation over a 20 year period. All suppliers into the retail sector have had to implement HACCP as part of contractual requirements*

– *independently of any legislation*’ (Response T). *‘[HACCP implementation is]...customer driven and/or the requirements of their headquarters.’* (Response L), *‘...customers have a strong influence on HACCP implementation ...’* (Response S).

One respondent made a distinction between large and small businesses; *‘For larger companies the incentives have been either 1) to meet international best practice... 2) to meet the requirements of large retailers.’* (Response T). Whereas for small businesses the most significant incentives for HACCP implementation have been; *‘the introduction of legal requirements in tandem with availability of training and industry specific guidance/ best practice documents/ appropriate systems of HACCP...’* (Response T).

One respondent provided a detailed description of the particular benefits of implementing a national HACCP accreditation programme. The programme’s remit to increase and oversee HACCP uptake for exporters had a positive impact on trade mostly linked with increased government involvement in HACCP;

Increasing acceptance/acknowledgement of exporting country’s food control and food safety assurance systems, *‘The US authorities...recognize the ‘Certificate of Inspection’ of the Export Inspection Council’* (Response O).

Facilitation of formal bilateral agreements relating to acceptance of food control systems e.g. *‘...the recognition agreements between [country x] and Singapore in the areas of food products were facilitated due to already existing systems in place for egg products and marine products etc.’* (Response O).

Reduction in the duplication of inspection of accredited goods (as importing countries increasing accept/acknowledge national systems) e.g. *‘consignment*

*accompanies with such certificates [accreditation] are directly allowed a green channel entry with both exporters & importers having benefited.'* (Response O).

Reduction in costs associated with recall and rejection at port improve sector efficiency and profit, *'...leading to an overall financial benefit for both the country as well as trade.'* (Response O).

Improvement and maintenance of a good national image for food safety by improving standards and maintaining control of exports is also cited as a benefit of the national accreditation system. An example is provided where the government responded to an publicised problem with use of Sudan Red in chilli production by applying tighter export controls to *'unscrupulous exporters'*, *'a registration and approval programme for exporters was established under which all export of chillies was made mandatory.'* (Response O).

Identification of weaknesses within industry and government systems which can then be improved. Overall improvement of standards across industry e.g. *'...[in the] fishery sector...most processing units are implementing international norms whether for domestic production or exports.'* (Response O).

Facilitation of dispute settlement as industry and individual businesses are supported and government has an understanding of the issues e.g. *'after continuous discussions [between country x and the UK] over more than 6 months the UK authorities agreed to return such products.'* (Response O).

A further incentive identified by two respondents was relevant to countries where HACCP had been made mandatory for all or some sectors of the food industry was to increase legal compliance (Responses P & Q).

Improvement of management skills across the food industry was also identified as an incentive for increased HACCP implementation; *'effectiveness and efficiency'* were cited as areas of improvement. (Response P). See further discussion below under the heading 'Incentives for Businesses'.

One respondent mentions an incentive for businesses to implement HACCP that was not linked to the need to comply with importer, customer or legal requirements. The potential that *'...implementation of HACCP results in saving financial means...'* (Response P) was identified as a possible incentive for food businesses.

Three respondents cited HACCP's primary function of safe food as an incentive for governments to increase implementation; *'increased HACCP implementation at national level will have an immediate impact by raising national food safety standards...'* (Response U), *'...will improve the health of the nation...'* (Response U), *'...the main challenges were to provide safe food not only for Bulgarians but also for the European consumer...'* (Response M) and *'Providing protection of the human health...'* (Response P).

Similarly where respondents described the incentives for food businesses to implement HACCP few respondents mentioned improved food safety as a potential incentive; *'Improving the safety of high risk foods is a second incentive in some cases, but this is not as frequent as desirable.'* (Response N), *'the processor normally implements in case of pressure...not due to the fact that systems will lead to safe food'* (Response O). Note that the first respondent describes it as unfortunate that food safety is not a primary incentive for businesses.

In summary the main incentives for governments to increase HACCP implementation emerging from this phase of the fieldwork relate to trade;

access to markets, greater recognition of national systems by third parties, reduction in costs associated with exports, improvement of image by third parties. Increased legal compliance, harmonisation with international standards, ascension to the EU, improvement of management skills and improved food safety are also identified as incentives by one or more participants.

The main incentive identified by respondents for businesses to implement HACCP were also access to market via compliance with importer or customer requirements. A secondary incentive was to comply with legal requirements, and international best practice. However distinctions were made between possible incentives for large and small businesses. There was a strong recognition among respondents that incentives for food businesses to implement HACCP are external. The pressure to implement HACCP coming from customers, the requirements of potential importers and being enforced from top-down.

Other potential incentives for food businesses such as effective management of food safety risks, improved efficiency in production, improved systems of management such as documentation and record keeping systems and associated cost savings were not identified or were only identified by one respondent.

#### **3.4.4.2 Challenges for governments increasing HACCP uptake**

Respondents were asked to describe the main challenges the government experienced in increasing HACCP implementation. Responses also included many of the challenges businesses experience in implementing HACCP systems. The challenges governments experienced are presented in this section and challenges businesses experience are presented in the subsequent section under the heading 'Challenges for business implementing HACCP'.



#### 3.4.4.2.1 HACCP uptake

Levels of HACCP uptake in the food industry were discussed by some respondents. In all cases where respondents discussed uptake the comments focused on the low levels of uptake they estimated; *'...the level of uptake by catering and small food processing businesses was only 1% in contrast to the industrial sector that was 31%.'* (Response P). *'...the implementation rate is quite slow [among smaller businesses].'* (Response S), *'HACCP is widespread in large food companies but its use is more limited within small companies.'* (Response L), *'...a big part of the producers have been trained and HACCP has been implemented in big production establishments.'* (Response M), *'A great advance has been made in the last 10 years in the prerequisite programmes mainly at farm and industrial level (lower advance in caterers)...'* (Response L).

These comments indicate that in some cases data on uptake is being collected and that it is acknowledged that levels of uptake may be different in different sections of the food industry e.g. in large or small businesses or in different industry sectors.

#### 3.4.4.2.2 National HACCP Strategy

Respondents identified poor strategy in relation to HACCP and more generally food control management as an area of weakness; *'Lack of well defined and well targeted national food safety policy...'* (Response U). This weakness in strategy was linked directly to lack of uptake in industry; *'The government lacks solid policies and plans...therefore most food manufacturers remain uninterested in implementing the system'* (Response S). Where HACCP implementation is currently limited to export sectors government attitude is described by one respondent as a limiting factor; *'HACCP...only considered as a requirement for exporting or importing food stuffs.'* (Response U).

In relation to effective HACCP strategy one respondent's comments exposed a tension between a supportive approach to industry and the possibility of unsafe food being produced in the interim; *'...[it is important to] give enough time for the implementation...this should be by stages...but if this is a risky production or establishment then the implementation should be mandatory and introduced in a reasonable short time.'* (Response M). This comment provides an example of the many potential strategic dilemmas food control poses and demonstrates the incorporation of risk-based decision making into national HACCP strategy.

International cooperation featured in the responses both with countries and intergovernmental organisations. One respondent described the developed of national HACCP strategy with assistance from a more developed country; *'...in cooperation with the German Agency for Technical Cooperation...organised several open forums...'* (Response P). One respondent advises that when evaluating available resources sources of funding from international bodies were considered, *'...international cooperation projects...are excellent sources of funds.'* (Response N).

#### **3.4.4.2.3 Government commitment**

Government budget allocation is a challenge identified by several respondents; *'There is a lack of financial resources for the training, the development and the implementation of HACCP system, especially for the small and less developed FBO [food business operator].'* (Response M). *'Funding is not adequate.'* (Response U). *'Regional and local governments do not possess enough motivation to invest in food safety'* (Response Q).

Identification of economic resources available was identified as the first step in developing a national HACCP initiative (Response N) however budget size and spending strategies are a source of disagreement; *'lack of proper support [from within government]'* (Response S), *'There is a lack of financial resources*

*for the training...'* Response M). One respondent described how; *'although...government has provided a large amount of money...the main budget has been spent on providing consultation.'* (Response S).

The impact of this lack of funds has been linked to weaknesses in key food control activities, *'Due to poor funding, regulating and enforcing bodies of government are unable to carry out their work.'* (Response U). These weaknesses are linked by the respondent to potential corruption between the enforcers and the food business operators; *'...making it fertile ground for corruption.'* (Response U).

#### **3.4.4.2.4 Government structure**

A third challenge linking to food control management is the structure of government departments responsible for HACCP; *'...various government departments have a role in different parts of the supply chain. To ensure safe food, it is essential to establish proper coordination as well as flow of information between these...This was a major challenge.'* (Response O), *'...issues are handled by first line ministries...efforts are not well coordinated and often times duplicated.'* (Response O).

#### **3.4.4.2.5 Primary production**

The only sector of the food industry that emerged from the responses as an area of particular challenge to governments was primary production; *'primary production not well addressed – this was one of the biggest challenges and remains so even today.'* (Response O). This is described as being due to both problems with awareness of HACCP and food safety in rural areas, *'...a challenge to make them aware and implement...'* and the longer supply chains associated with small farmers *'...even more difficult to trace back products to farms as linkages between farms and producers is very weak due to the longer*

*supply chain...* (Response O). *...processors are spread far in terms of location... Led to logistical problems...* (Response U).

Small businesses are discussed from the start in relation to special requirements or challenges, this indicates an awareness of the challenges SLDBs face e.g. *'small businesses need specialist training...'* (Response L).

Reference to terms such as small and/or less developed businesses (SLDBs) appear in some responses (Response P). It is worth noting that respondents make a small error in translating the acronym SLDB using 'small and less developed businesses' as opposed to 'small and/or less developed businesses'. The significance of this is that the international guidance that first introduced and uses the term SLDB can apply to less developed businesses irrespective of size. The misinterpretation of this term and the corresponding guidance may see less support being directed to those larger but still underdeveloped businesses that may benefit from inclusion in any initiatives supporting HACCP implementation.

*'...the main challenge for Food Directorate is increasing the degree of compliance with legal requirements especially with small and less developed businesses.'* (Response P).

*'only 4% [of total food factories] are large and medium scale factories...while 96% are small scale plants.'* (Response S)

#### **3.4.4.2.6 Summary of challenges**

In summary the respondents identified an array of challenges for government including;

- National HACCP strategy

- Government commitment
- Government structure
- Primary production sector
- Small and/or less developed businesses

### 3.4.4.3 Challenges affecting food businesses implementing HACCP

Where respondents described the challenges businesses encountered when implementing HACCP they often also included information on or examples of best practice. These have been presented after the evidence of particular challenges.

#### 3.4.4.3.1 Lack of management commitment

Respondents identified that effective HACCP implementation is a challenge for many businesses. Lack of commitment from management is also identified as a challenge for industry, *'The FBO [food business operators] are not motivated to implement the system'* (Response M).

The reasons for this lack of commitment were linked to the factors leading to a decision to implement HACCP; *'the processor normally implements in case of pressure...not due to the fact that systems will lead to safe food. Due to this, once implemented, the processor tends to neglect the system...'* (Response O). This comment resonates with the overall message about the incentives for businesses to implement HACCP being largely limited to access to markets as discussed in the previous section.

In addition the perceptions of the cost-effectiveness of HACCP emerged from the respondents as a key challenge; *'...widespread perceptions among food business operators that HACCP is difficult and costly to implement.'* (Response P), *'...a perception that...there's no need for implementation...HACCP implementation will definitely increase production costs.'* (Response S), *'Lack*

*of knowledge about the benefits that the implementation of the system possesses'* (Response Q) and *'Management looks at the adoption of HACCP with the costs in mind and not the benefits.'* (Response U).

#### **3.4.4.3.1 Best practice in management commitment**

Better communication of the potential benefits of HACCP implementation was identified by two respondents as part of the challenge for government; *'...the benefits and incentives of implementing HACCP...are not properly communicated...'* (Response U), *'the challenge at the moment is to introduce HACCP to the food sector associations by way of packaging it and conveying it in a much more discernable way.'* (Response U), *'...if HACCP can be communicated to businesses in a language they can understand and in a format that is practical and relevant to them – they can and will use it!'* (Response T).

*'The municipalities could help the food business with financial project or some tax concession and thus give support and increase the motivation...'* (Response M).

#### **3.4.4.3.2 HACCP knowledge and skills**

The biggest challenge that emerged from the respondents was the ability of businesses to implement HACCP. Common mistakes described include; identification of CCPs, poor personal hygiene, poor record keeping, problems with cross contamination control, infrequent calibration of equipment, inadequate temperature control, lack of qualified personnel, ineffective validation, inappropriate sampling and lack of audit (Response O).

One reason for this was reported to be the complexity of the HACCP implementation *'Understanding food hazards is not easy...'* (Response S), *'The material and subject are not so easy to be understood.'* (Response M), *'...for*

*designing a HACCP plan, hazard identification and risk characterisation require a good knowledge on microbiology, chemistry, statistic, etc.'* (Response L).

One response points to how food production has become increasingly sophisticated and so the need for expertise increased, *'this has been especially important with the increasing knowledge of manpower in industry.'* (Response O). Another warns that *'...[most food business operators] do not have appropriate education and for the first time hear of HACCP.'* (Response M).

Although enforcement and inspection did not emerge as particular challenge for government or business some comments were made relevant to knowledge and skills. It was acknowledged that audit of HACCP systems demands a high level of expertise from those with an enforcement role, *'...requires personnel to have a scientific and risk-based understanding, knowledge and approach.'* (Response O).

An additional reason preventing businesses effectively implementing HACCP was reported to be a lack of appropriate skills in industry; *'Most small industries lack understanding of HACCP.'* (Response S), *'Main barriers to put HACCP in practice are a lack of...people resources.'* (Response L), *'Main barriers to put HACCP in practice are a lack of understanding and limited technical background and experience.'* (Response L), *'...even where staff are trained and understand the system...they don't realize the impact of deviation.'* (Response S), *'...the small industries lack qualified personnel for HACCP implementation.'* (Response S), *'but above all, lack of staff experience for the implementation of the system'* (Response Q). In one case shortages of HACCP knowledge and experience within businesses were linked with observations that *'HACCP staff frequently changed...qualified personnel did not stay working for the company for a long period of time'* (Response Q).

Problems associated with lack of sufficient knowledge and skills were not limited to small or medium sized businesses. One respondent maintains that even where HACCP is in place, even in the large companies there are challenges (Response S). A more specific problem that emerges is the lack of experienced personnel with knowledge of how to implement in practice; *'Many factories have employees with education in food science and technology...but they still lack the experience and information regarding food safety.'* (Response S), *'A lack of...persons in HACCP training and especially those with factory/manufacturing experience and tertiary education.'* (Response U).

A lack of available effective training and qualified trainers was identified as a challenge *'...quality of training is still a limiting factor given the lack of suitably qualified and experienced trainers at all levels...'* (Response T), *'Most HACCP trainers in general have no this [hazard identification and risk characterisation] expertise...'* (Response L), *'...current training short courses alone are not very effective for HACCP development in the small business.'* (Response L). Training and education were identified as one of the key aspects of national HACCP strategy; *'Any strategy to accelerate HACCP uptake must identify methods to address this skills gap at the outset.'* (Response T).

One respondent describes the benefits of training initiatives interestingly these include improved knowledge of experts and consultants; *'Major outcomes are ...a group of [small/medium businesses] having implemented HACCP..and not less important having a group of junior -local- experts trained...and an interesting group of consultants and resources all across the country.'* (Response N).

#### 3.4.4.3.2.1 Best practice in HACCP knowledge and skills



A wealth of advice was provided in the responses in the area delivering and improving HACCP knowledge and skills. This advice focused on training and falls into three key categories; training provision, type, competency of trainers and content of the training.

The respondents identified that an increase in opportunities for training and education was necessary; *'For HACCP to be implemented successfully – educational opportunities for all stakeholders need to be made available.'* (Response T). *'...small businesses need specialist training...'* (Response L).

In relation to provision in education and training the following responses tackled the length and structure of training; *'...short courses alone are not very effective for HACCP development in the small business.'* (Response L). *'Training...should be...in two stages...to have time to remember the meaning of the matter and after that enlarge the knowledge with more difficult HACCP.'* (Response M). An additional expert provided a practical solution to increasing accessibility; *'This [increase in educational opportunities] can be accelerated significantly by using e-learning mechanisms.'* (Response T).

Advice also calls for *'qualified and trained lecturers'* (Response M). One respondent described the difficulty in finding trainers with both knowledge and experience; *'Most HACCP trainers in general do not have this expertise and, in the other hand, people from the academy have this expertise but do not have experience in HACCP implementation.'* (Response L).

Advice about the content of the training identified a need for theory and practice; *'Theoretical knowledge always has to be combined with a practical one.'* (Response U), and advised that *'trainees have to be motivated and receive information step by step.'* (Response P)

Despite the positive attitude most respondents had some comments reveal that simply improving training provision may not solve HACCP implementation problems *‘...in my opinion training courses...are not enough to solve small company problems.’* (Response L).

Finally evidence of good practice is demonstrated by the sharing of educational materials from one institution to another; *‘...the curriculum/course content has been shared with numerous Universities including many from developing countries.’* (Response T).

#### **3.4.4.3.3 Provision of information and guidance**

Reference to clear information and guidance from government and the wider international food safety community was not always useful; *‘Various regulations and instructions available from within or outside...only specify what to do but are not very clear on how to do and the extent of execution.’* (Response S), *‘...a major hurdle to HACCP implementation is the lack of understanding of how the principles are applied in practice.’* (Response T), *‘Understanding food hazards is not easy...proper education, training materials, information on food hazards...should be provided...’* (Response S).

Government received criticism in this area; *‘Lack of information necessary in implementing HACCP system...this is due to poor data management and unavailability of research information from government agencies, universities and institutes.’* (Response S), *‘There is confusion on HACCP implementation because there are different opinions among the consultants, auditors and government officers.’* (Response S).

#### 3.4.4.3.3.1 Best practice in provision of information and guidance

Best practice advice was provided by one respondent in particular. Addressing issues related to consistency guidance had incorporated internationally accepted standard versions of HACCP; *'...the guides have to fulfil the principles of Codex Alimentarius guidelines for Food Hygiene and HACCP.'* (Response M). In addition engagement with the wider international food safety community is evident; *'...When developing the documents and booklets, the experience of some member state (Ireland, UK, Austria, Holland, Denmark)...'* (Response M).

Engagement with relevant stakeholders in the development of information and guidance was also described; *'Guides to Good Hygiene Practice are developed by branch organisations of the food industry in consultation with other interested parties such as consumer associations and competent authorities.'* (Response M), *'to involve the municipalities and other stakeholders (NGOs, association, consumers)...'* (Response M).

Although enforcement and inspection did not emerge as a challenge for government or businesses in the responses it is worth noting one comment made that links to information and guidance. This describes a move away from the traditional inspection to a more facilitative role perhaps providing information and guidance, *'...working with a more positive approach so that processors upgrade rather than focusing on closure of units and penalties.'* (Response O).

#### 3.4.4.3.4 Consultants and HACCP

Businesses that choose to invest in external assistance in HACCP implementation may also experience challenges; *'...there are a limited number of qualified consultants.'* (Response S), *'consultants are not generally aware of*

*the specific industry...leading to a HACCP that is ineffective for safe food.'* (Response O). There are examples of consultants with inappropriate backgrounds and qualifications attempting to give advice to businesses, *'...there are instances of Civil or Mechanical engineers assisting industry to implement such systems who have limited knowledge on micro-organisms...'* (Response O).

Lack of regulation of consultants is considered contributor to this problem by one respondent; *'...inconvenient services by the consultant agencies that implementing HACCP...the main reason for this situation is that...authorization and accreditation of consultant agencies does not exist.'* (Response P).

#### **3.4.4.4 Additional challenges**

Unsatisfactory levels of basic food hygiene were also identified as limiting factor in the implementation of HACCP; *'The most important issue is a lack of basic hygiene conditions...to support the implementation of HACCP, before it could be put in place'* (Response P), *'...lack of pre-requisite programs.'* (Response S), *'Limited adherence of the prerequisites'* (Response Q). However some respondents found levels were satisfactory *'...most companies have passed independent audit to check whether GMP and GHP are fully implemented an strictly followed at each step.'* (Response L).

Finally a practical challenge identified by respondents was a weakness in infrastructure; *'...such as cold chain, laboratories with the required capabilities...was a major challenge.'* (Response O), *'...not adequate water supply exist as well as sewage disposal...especially in small and less developed businesses'* (Response P), *'...lack of technology resources.'* (Response Q), *'...not sufficient space and proper design of food facilities...'* (Response P).

#### 3.4.4.4 Summary of challenges

In summary the respondents identified many challenges for business implement HACCP including;

- lack of management commitment relating to a
- perception of high costs of HACCP implementation
- lack of understanding of potential benefits
- inability to implement HACCP relating to a
- lack of technical knowledge
- lack of experience in HACCP in practice
- lack of effective training/qualified trainers
- lack of appropriate information and guidance
- lack of qualified consultants
- additional challenges
- poor basic hygiene
- poor infrastructure

Best practice advice was provided for; improving management commitment, improving perceptions of HACCP's costs and benefits, improving education and training provision and improving information and guidance provision.

#### 3.4.4.3 Initiatives to increase HACCP implementation

The respondents were asked to describe any government funded HACCP initiatives they had been involved in. All except one respondent described one or more initiative.

The initiatives are summarised in the table below;

Country	ID	Initiatives type	Sector/business type	Number of businesses targeted
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Country	ID	Initiatives type	Sector/business type	Number of businesses targeted
Argentina	L	Delivery of HACCP training (3 day) in individual businesses.	Dairy	Not specified
Bulgaria	M	Delivery of multiple HACCP training	Not specified	Not specified
		Development of guidance documents	Not specified	Across sector
Columbia	N	HACCP Implementation assistance in individual businesses	SLDBs	Not specified
India	O	Establishment of a national accreditation programme for exports	Not specified	N/A
Macedonia	P	Development of national HACCP strategy	All	N/A
		Development of guidance documents	SLDBs	N/A
		Media campaign	Not specified	Not specified
		Forums with industry	Manufacturing, catering, exporters.	
Peru*	Q	Frequent HACCP workshops	SMEs	Not specified
	R	Awareness raising activities	Not specified	Not specified
Thailand	S	-	-	-
UK	T	Development of new method of applying HACCP (SFBB).	Food service sector.	Not specified
		Implementation of SFBB	Food service sector.	300,000 businesses
		Development and delivery of educational	Manufacturing, food service sector,	300 students from 30 countries.

Country	ID	Initiatives type	Sector/business type	Number of businesses targeted
		activities (Master programme).	agronomy, meat, SLDBs.	
Zambia	U	HACCP implementation assistance in individual businesses.	Dairy	Not specified
		HACCP implementation assistance.	SLDBs/dairy	Not specified

Table 12: Government initiatives for HACCP implementation

The level of detail provided in the response varied considerably between respondents. Some respondents provided detailed accounts and others an overview of several initiatives in less than a paragraph.

The variety in the type of initiative described varied widely and included; HACCP implementation assistance in individual businesses x 4, training and education x 4, development of guidance documents x 2, forums and awareness activities x 2, development of a national HACCP strategy x 1, a media campaign x 1 and the development of a new method of HACCP x 1.

The responses incorporated initiatives with both local and national impact. Small scale targeted activities such as working with individual businesses in HACCP development and implementation were described, in contrast initiatives with national and/or sector wide relevance were described e.g. development of national HACCP strategy, development of guidance documents, development of national accreditation system.

A wide range of food industry sectors were targeted by the initiatives described, these were; SLDBs and SMEs x 5, food service sector x 3, dairy x 3, manufacturing x 2, exporters x 2, meat x 1 and agronomy x 1. This

demonstrates that government funded initiatives have taken a focused approach directed support to address individual sector needs.

Only one respondent indicated the number of businesses targeted by the initiative/s described. This made it difficult to assess the size of the initiatives being undertaken. The roll out of a new method of applying HACCP methods in the food service sector in the UK involved 300,000 businesses, but there is no evidence that this is typical of a government funded HACCP initiative elsewhere.

In summary a range of government funded HACCP initiatives were described. They included both local and national activities and demonstrated a focused approach to a range of food industry sectors. This diversity demonstrates the variety of options governments have when choosing how to improving HACCP implementation but also the many different types of initiatives they may plan and oversee.

### **3.4.5 Summary of Findings in Phase Three**

The results for Phase Three of the fieldwork were presented under the following headings;

- Incentives to increase HACCP uptake
- Challenges for governments increasing HACCP uptake
- Challenges for businesses implementing HACCP
- Government Initiatives

A summary of the findings for Phase Three is presented below;

Incentives to increase HACCP uptake;



- The strongest incentives for governments and businesses to increase HACCP implementation relate to trade
- Additional incentives include; increased legal compliance, harmonisation with international standards, ascension to the EU, improvement of management skills and improved food safety
- Incentives for business to implement HACCP may depend on the size of the business
- Incentives for food businesses to implement HACCP are largely external to the business.

#### Challenges for governments increasing HACCP uptake;

- Development of effective national HACCP strategy
- Gaining government commitment
- Inadequate government structure
- The primary production sector and
- SLDBs

#### Challenges for businesses implementing HACCP;

- Lack of management commitment
- Perception of high costs of HACCP implementation
- Lack of understanding of potential benefits of HACCP
- Lack of knowledge and skills to implement HACCP
- Lack of effective training/qualified trainers
- Lack of appropriate information and guidance
- Lack of qualified consultants
- Poor basic hygiene
- Poor infrastructure

Best practice advice was provided for; improving management commitment, improving perceptions of HACCP's costs and benefits, improving education and training provision and improving information and guidance provision.

In addition it was found that governments are funding a wide range of HACCP related initiatives. Initiatives can be designed to have localised and national impact. Initiatives demonstrate a targeted approach to supporting the food industry.

### **3.5 Summary of Findings in Phase Two and Three**

Bringing together the results from phases two and three of the research the following observations can be made.

Across the two phases of research findings emerged which have been grouped under four headings.

Findings relating to strategy;

1. Governments encounter common challenges
2. Both governments and businesses implement HACCP primarily to increase trade
3. HACCP is a significant challenge for both governments and businesses
4. Governments recommend engagement with a range of stakeholders
5. Government recommend targeted support for SLDBs
6. Governments recommend simplified methods of HACCP for SLDBs

Findings relating to challenges in government;

7. Poor government structure for food control
8. A lack of effective national HACCP strategy
9. A lack of management commitment at government level
10. A lack of knowledge, expertise and experience in government

Findings relating to challenges in industry;

11. A shortage of HACCP knowledge, expertise and experience in industry
12. A shortage of appropriate and accurate advice and guidance for businesses
13. Poor levels of basic food hygiene in some businesses
14. Inaccurate perceptions of the costs and benefits of HACCP
15. A lack of management commitment in business
16. A proportion of businesses have HACCP on paper but not implemented in practice
17. Low levels of literacy and use of multiple languages amongst those working in the food industry
18. Poor infrastructure
19. Governments recognise a high proportion of the challenges experienced by businesses

Findings relating to outcomes;

20. Governments undertake a range of activities to prepare for and improve HACCP implementation nationally.

## Chapter 4: Discussion

In this chapter the findings are discussed in the context of the existing literature and research. This chapter is organised using four headings;

- Findings relating to strategy
- Findings relating to challenges in government
- Findings relating to challenges in industry, and finally
- Findings relating to outcomes.

### 4.1 Findings Relating to Strategy

In the research findings emerged that relate to strategy, these are discussed below.

#### 4.1.1 Finding One: Common challenges and solutions

In phases two and three of the research it emerged that governments encounter common challenges. It was also evident that governments acknowledge the potential benefits of identifying common problems and solutions and engaging with the international community in order to learn more about activity in this area.

In the literature this finding is supported. The perceived value in sharing experiences and solutions in food control is evident in international guidance for national food control systems (WHO, 2002). Some literature refers directly to the value of sharing experience and knowledge internationally (Nguz, 2005) (Antunovic, 2008), describe implementation of solutions found outside their own country (Al-Yousef, 2011) (Al-Awadhi, 2011) (Al-Qassemi, 2011) or cite the importance of working with international organisations (Antunovic, 2006) (Nguz, 2007) or reference guidance documents (Antunovic, 2008) (Al-Qassemi, 2011) (Al-Awadhi, 2011) (Alomirah, 2010) (Al-Kandari, 2009).

In addition several are written by individuals working or with direct links with the government or municipality being described demonstrating the value seen in sharing experiences through publication (Varzakas, 2006) (Al-Awadhi, 2011) (Al-Qassimi, 2011) (Al-Yousef, 2011) (Antunivoc, 2007).

It is possible that this research overemphasises the extent that governments appreciate and engage in sharing common challenges and solutions. The research identifies the views of those who have either a) engaged in publishing in the international press or b) those willing to participate in this research. Further, those selected to participate were from a group already engaging in international activities related to food control. However, this finding did emerge as a theme independently in the data and was not prompted by questions asked during phase one or two.

#### **4.1.2 Finding Two: Trade is main incentive to implement change**

In phases two and three of this research it emerged strongly that the main incentive for both governments and businesses to implement HACCP was increased opportunity to trade. In the literature possible incentives to implement HACCP are discussed in several studies exploring HACCP uptake. Increased opportunity to trade appears as one of the key incentives in three of these studies (Herath, 2006) (Konecka-Mayek, 2005) (Ramnauth, 2008).

Ramnauth (2008) and Konecka-Mayek (2005) categorically identify trade as the strongest incentive to implement HACCP. Herath (2006) links food safety and the implementation of HACCP in particular with competitive strategy. His research found that respondents attached a *'very high level of priority'* to food safety as part of a wider competitive strategy. However, in a quantitative analysis of motivations to implement HACCP impact on food safety does score slightly higher than meeting customer requirements (Herath, 2006).

The finding is of significance as demonstrates that government may have an accurate view of the motivation of business in regard to HACCP implementation. It may also lead to better understanding of any lack of motivation in businesses not involved directly with trade e.g. food service sector and the importance of the communication of the full range of potential benefits of HACCP and systems based on HACCP principles.

#### **4.1.3 Finding Three: HACCP presents a significant challenge to both governments and businesses**

In the research it emerged that governments saw development and implementation of national HACCP strategy as a significant challenge. This was expressed in terms of the investment of resources needed, the complexity of the tasks involved and simply as it being *hard work*. In the literature there is little direct reference to the size of the challenge presented by developing national strategy in food control or in HACCP. This theme emerged during the personal accounts by individuals involved in this research and is unlikely to be reported in more formal communications.

However, this finding is supported indirectly by the nature of the research undertaken in food control and HACCP i.e. HACCP uptake, barriers and food control. All three areas of research identify the challenges faced by industry and government in the development and implementation of national food control and HACCP strategy.

#### **4.1.4 Finding Four: Governments should engage with a range of stakeholders**

The research found that governments recommend as best practice engagement with a range of stakeholders in the development and implementation of national HACCP strategy. Recognition that food control is a shared responsibility is one the principles of food control as stated by FAO (2006). It is recommended that

effective food control requires positive interaction between all stakeholders (FAO, 2006). The literature provides several examples of positive interaction between government and stakeholders in the development and implementation of new initiatives (Al-Awadhi, 2011) (Al-Qassemi, 2011) (Al-Yousef, 2011). Antunovic (2008) specifically describes that progress was reliant on effective consultation and communication with stakeholders.

#### **4.1.5 Finding Five: SLDBs require targeted support**

In the research it emerged that SLDBs require targeted support from governments. In the literature this is supported by guidance from the Food and Agriculture Organisation (2006) which provides strategies for supporting SLDBs in HACCP implementation and in the HACCP barrier literature (Taylor, 2011) (Sarter, 2010) (Taylor, 2007c) (Taylor, 2001).

It is reported that the majority of food businesses fall into the SLDB category and that they may represent a significant proportion of a national economy (FAO, 2006). The FAO guidance for governments recommends SLDBs are recognised as needing additional and targeted support. Recommended support includes;

- Provision of financial support
- Provision of guidance and information
- Implementation of HACCP through voluntary programs
- An advisory role for inspectors
- HACCP certification systems
- Provision of expertise by consultants.

The guidance also acknowledges use of evolving HACCP methodologies including SFBB (FAO, 2006).

#### **4.1.6 Finding Six: SLDBs requires simplified methods of HACCP**

The research in phases two and three indicated that SLDBs require simplified methods of HACCP. This is supported in the literature identifying the technical challenges HACCP presents (Taylor, 2007a) (Taylor, 2007b), the several studies in the barriers literature which focus on SLDBs (Taylor, 2011) (Sarter, 2010) (Taylor, 2008) (Taylor, 2007c) (Taylor, 2004b) (Taylor 2001) and most significantly the substantial work by Taylor (2007c) which presents Menu-Safe, a new method of HACCP for the Hospitality sector. This research was undertaken in the UK and has been applied in a growing number of countries worldwide. This finding demonstrates that new systems such as SFBB and Menu-Safe may provide solutions in a wider range of countries.

The FAO guidance for governments developing national HACCP strategy for SLDBs acknowledges evolving methods of HACCP and describes them as a *'way forward for those SLDBs which find traditional method of HACCP too difficult, time-consuming or costly to implement'* (FAO, 2006).

## **4.2 Findings Relating to Challenges at Government Level**

Several findings relate to challenges at government level, these are discussed below.

### **4.2.1 Finding Seven: Poor government structure for food control**

In both phases two and three of the research it emerged strongly that the allocation of responsibility for food control across government or equivalent was potentially problematic. In a multiple agency system, where responsibility for food was divided between two or more authorities, coordination and communication were impaired.



This finding is strongly supported by the literature and emerged as one of the major limiting factors for effective food control (Nguz, 2007) (Al-Kandari, 2009) (Ferretti, 2006) (Domingues, 2006) (Alomirah, 2010). Problems with coordination and cooperation between agencies/departments are reported where a multiple agency system is in place (Antunovic, 2007) (Nguz, 2005) (Ferretti 2006) with coordination described as the biggest challenges in some accounts (Varzakas, 2006). Al-Kandari (2009) and Dominguez (2006) report substantial improvements in efficiency through better coordination on the establishment of a single agency system. The guidance from the FAO recognises that multiple agency systems '*...suffer from serious drawbacks*' including the lack of coordination identified in the results of this study and that single agency systems '*...has considerable merit.*' (FAO, 2005).

This finding is of significance as it identifies government structure as a barrier to effective food control across several governments where previous evidence had been anecdotal.

#### **4.2.2 Finding Eight: Lack of an effective national HACCP strategy**

A lack of effective national HACCP strategy was identified in phase two of the research and linked directly to low levels of HACCP uptake. It was also identified that the strategy must be effectively communicated to industry and other stakeholders. In the literature two articles report on the process of developing a national HACCP strategy (Antunovic, 2008) and a national food safety programme (Al-Qassemi, 2011). These articles demonstrate that national strategy development has been identified as necessary in Sharjah and Croatia. There are no examples of lack of strategy being identified as a problem however many of the problems identified by businesses and government in previous research such as, poor coordination (FSA, 2001), lack of support (Ramnauth, 2008) as well as the failures in multi-agency systems

discussed above, may be partly due to a poor or non-existent national HACCP strategy.

#### **4.2.3 Finding Nine: A lack of management commitment**

A lack of management commitment at government level was identified in phases two and three of the research. Budget size and spending strategies emerge as a typical source of disagreement. Lack of adequate funds was linked to weaknesses in food control activities, particularly enforcement.

A lack of management commitment at government level does not feature in the findings or discussion in the literature. This may be because it is not an issue of importance in those countries or this problem may exist but be hidden for two possible reasons. Firstly the majority of publications present data collected from individuals in industry. These individuals are not likely to be aware of such issues. Secondly where publications include content at national level authors may be reluctant to critique budgetary issues where this is contentious. This possibility highlights the value of research of the kind undertaken in this study where personal insights and experiences are sought and presented with the assurance of anonymity.

#### **4.2.4 Finding Ten: A shortage of HACCP knowledge, expertise and experience**

In phase two of this research it emerged that a lack of knowledge, expertise and experience in government can hinder effective development and implementation of national HACCP strategy. Knowledge, expertise and experience in HACCP are in great shortage across industry but according to this research also amongst those working in government in policy development and in inspection and enforcement roles.

Assessing the skills of those involved in development and implementation of food control policy is highlighted as a key task in FAO (2006a) guidance but is

not addressed in the published research. In FAO guidance the emphasis is on skills rather than specific knowledge, expertise or experience in areas such as HACCP.

In the research a perceived need for more effective training, a qualification and more effective training of inspectors emerged. In the literature the credibility of inspectors was identified as a barrier to effective HACCP implementation (Taylor, 2004a) and is one of the barriers in the '21 Barriers Model'. 'Negative enforcement factors' is categorised as an 'External Behavioural Barrier' and incorporates a range of identified behaviours all associated with lack of knowledge, expertise or experience (Taylor, 2007c).

#### **4.2.5 Challenges at government level and the barriers model**

Comparing those challenges in government identified in this study with the barriers acting upon businesses identified in the literature reveal distinct similarities and differences. Taylor (2007c) identifies 21 barriers to effective HACCP implementation operating in businesses. These are grouped under the following headings;

- External behavioural barriers
- Internal behavioural barriers
- Attitude/psychological barriers
- Knowledge/expertise barriers

The research undertaken in this study identified four challenges operating at government or equivalent level which reduce the effectiveness of food control activities and in particular the development and implementation of national HACCP strategy. Three of these can be described internal behavioural barriers;

- Inadequate structuring at government level

- Lack of an effective national HACCP strategy
- A lack of management commitment to food control

The remaining challenge is a knowledge and expertise barrier;

- A shortage of HACCP knowledge, expertise and experience

Interestingly no challenges were identified that compare with barriers under the ‘attitude and psychological barriers’ subheading at government level. In fact the results reveal that in several cases governments demonstrate opposite attitudes to the businesses. Those in government did not demonstrate perceived superiority (Barrier 11); in fact the study found the size of the challenge was recognised. Governments did not demonstrate a lack of motivation (Barrier 8); in fact governments appeared motivated to increase HACCP implementation. Governments did not appear to have a lack of agreement with the policy of increasing HACCP implementation (Barrier 5); in fact governments appeared to be in agreement.

One interpretation of this comparison is that attitudes in government to food control and HACCP are more positive than attitudes in businesses. Alternatively the research may not have identified negative attitudes that did exist.

Taylor identifies three external behavioural barriers to HACCP in businesses; negative external barriers (including customers and suppliers), negative enforcement factors and negative guideline factors. In view of the findings in this section an additional barrier ‘negative government factors’ could be added to Taylor’s barriers model.

This research takes the opportunity to develop the model further with the addition of ‘negative government factors’, see below.

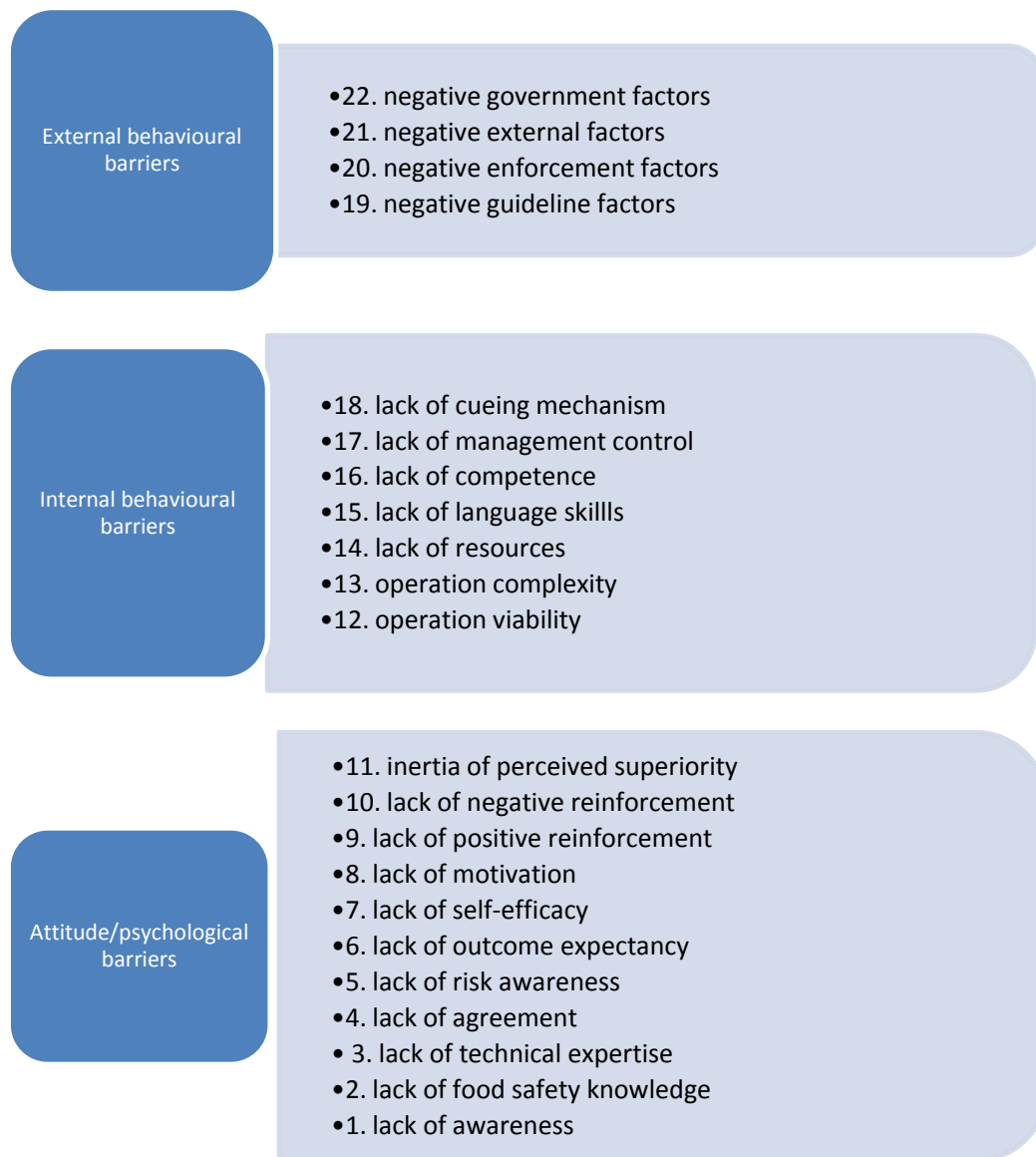


Figure 9a: Adaptation of Taylor (2007)

The final subheading in Taylor’s research is External Behavioural Barriers. For governments external barriers might include all those identified operating at industry level. These are discussed in the following sections.

### 4.3 Findings relating to challenges in Industry

The research identified several challenges operating at industry level that were identified as impacting the development and implementation of food control systems and effective national HACCP strategy, these are discussed below.

#### 4.3.1 Finding Eleven: A shortage of HACCP knowledge

In phases two and three a shortage of HACCP knowledge, expertise and experience emerged as a strong theme. All interviews in phase one and half of those responding to questionnaires in phase three described a lack of knowledge, expertise and experience. This shortage was identified to be amongst those working in industry in both large and small businesses, as well as amongst inspectors, trainers, consultants and those working in government or equivalent.

In the literature exploring the practical requirements of the HACCP system the need for specialist knowledge, expertise and experience is identified as essential (Taylor, 2007a) (Eves, 2005) (Scott, 2005) (Panisello, 2001) see table 1. In the literature exploring barriers to effective HACCP implementation a lack of knowledge, expertise and experience is identified in thirteen studies dating back to 1995 (Taylor, 2011) (Ramnauth, 2008) (Taylor, 2008) (Bas, 2007) (Taylor, 2007c) (Azanza, 2005) (Yapp, 2005), (Taylor, 2004b) (Walker, 2002) (FSA, 2001) (Gilling, 2001) (Jirathana, 1998) (Ehiri, 1995). A more general lack of food safety knowledge is also identified as a barrier to successful HACCP implementation in the literature (Sarter, 2010), (Violaris, 2008).

In this research HACCP training and education initiatives were reported in Argentina, Bulgaria and the UK. Examples of best practice in HACCP education and training were offered. These are summarised below;

- More opportunities for education and training necessary especially for SLDBs
- Short training programmes may not be adequate
- E-learning should be promoted to improve accessibility
- Trainers/educators should be qualified
- Theory should be accompanied by examples of practical application
- Training/educational materials should be shared between institutions

In the literature three examples of government initiatives focusing on education and training are described 1. The piloting of a photographic basic food hygiene examination in Abu Dhabi (Al-Yousuf, 2011), 2. HACCP training, implementation and verification across food businesses in Sharjah (Al-Qassemi, 2011) and 3. an evaluation of food handler training effectiveness in the hospitality sector leading to a new training initiative in Dubai (Al-Awadhi, 2011). These examples provide further evidence that governments are aware of the need to increase knowledge, expertise and experience in HACCP in industry.

It is evident from the literature and the research undertaken that those involved in the development and implementation of national HACCP strategy are aware of low levels of knowledge, expertise and experience in industry. This awareness is reflected in the initiatives being carried out with the support of government worldwide.

However, there are no examples in the literature or in the research undertaken of initiatives focused on improving knowledge, expertise and experience in HACCP for trainers, consultants, enforcers and policy makers. For this barrier to be tackled effectively governments will need to address the knowledge, expertise and experience shortage across all these stakeholders including in their own teams.

#### **4.3.2 Finding Twelve: A paucity of good advice and guidance**

The research in phases two and three identified a perceived paucity in the provision of appropriate and accurate advice and guidance for businesses. Guidance documents were felt to be too basic and not to address practical issues. In addition a lack of agreement between auditors, enforcers and consultants was identified as a source of confusion. This finding is linked to the

previous discussion of a lack of knowledge generally, including amongst auditors, enforcements, consultants and those in government or equivalent.

The literature review identified the provision of international guidance for food control and HACCP is aimed at government or equivalent responsible agencies rather than at businesses. Research into the barriers of HACCP implementation has identified similar findings. Jirathana (1999) reported that businesses experienced contradictory advice in HACCP guidance documents in Thailand and the FSA (2001) identified poor communication of information and guidance in the UK. The 21 Barriers Model for HACCP includes ‘negative guideline factors’ in the category of ‘external behaviour barriers’ reporting that effective guidance should be well presented, practical and emphasise its own purpose.

Research in phases two and three also found that governments recommend the provision of clear and consistent information and guidance as best practice. This is supported by international guidance recommending that governments should encourage industry to adopt good practices including HACCP through the development of mechanisms to promote communication between government and stakeholders and the development of targeted information materials (FAO, 2006a).

#### **4.3.3 Finding Thirteen: Low levels of basic food hygiene**

In phase three it emerged that low levels of basic hygiene in some businesses can present a challenge to effective implementation of national HACCP strategy. In the literature levels of basic hygiene are not addressed directly. Al-Awadhi’s (2011) technical paper presents HACCP initiatives in Dubai and does acknowledge that many hospitality businesses are not managing basic food hygiene effectively.



Basic food hygiene is a prerequisite for HACCP making it a potential barrier for effective HACCP implementation. If those involved in the development and implementation of national HACCP strategy are aware of low levels basic hygiene in industry they can develop national HACCP strategy that addresses this.

#### **4.3.4 Finding Fourteen: Inaccurate perceptions of the costs/benefits of HACCP**

In both phases two and three of the research the perception of the costs and benefits of HACCP emerged as a barrier to HACCP implementation. It emerged that governments identify that businesses believe HACCP is costly, difficult to implement and not actually necessary. It was recognised that effort must be made to make HACCP acceptable to businesses by better communicating the advantages HACCP implementation may bring.

The response to questions about incentives for HACCP implementation revealed an overwhelming focus on increased overseas trade. This factor only provides motivation to the small proportion of businesses involved in trade. Other incentives emerging strongly were all a result of external pressure such as customer or legal requirements.

The potential benefits for food businesses such as effective management of food safety risks, improved efficiency in production, improved systems of management such as documentation and record keeping systems and associated cost savings did not emerge strongly. Kane (2011), reviews research into HACCP's cost and benefits and finds that incentives need to go beyond legal compliance. Businesses need either to be motivated by international HACCP certification for trade purposes or be convinced of additional benefits such as increased efficiency, higher productivity etc. This appears to coincide with the need for governments to better communicate and better appreciate the additional benefits HACCP systems may provide.

This corresponds with findings in the barriers literature where cost and time are consistently identified as barriers to HACCP implementation (Taylor, 2011) (Taylor, 2008) (Taylor, 2007c) (Konecka–Matytek, 2005) (Yapp, 2005) (Taylor, 2004b) (Walker, 2002) (Gilling, 2001) (Ehiri, 1995). Were the potential benefits of HACCP to be fully recognised these cost/time barriers may not emerge so strongly.

In the ‘21 barrier model’ this finding link most closely with the attitude barrier ‘lack of outcome expectancy’, where businesses do not expect positive change to come about as a result of a proposed change (Taylor, 2007c).

It appears that those involved in the development and implementation of national HACCP strategy are aware of poor perceptions of the costs and benefits of HACCP industry. This is a positive finding as such awareness can inform national HACCP strategy. However an additional insight is that governments themselves may also have an inaccurate perception of costs and benefits of HACCP. Focusing on the benefits of increased overseas trade and less on benefits that may impact businesses across industry.

#### **4.3.5 Finding Fifteen: A lack of management commitment to HACCP**

In both phases two and three a lack of management commitment in business was identified as a barrier to successful HACCP implementation. The reasons for this lack of commitment were linked to the factors leading to a decision to implement HACCP being largely external, a lack of agreement about the need for certain recommended practices. This resonates with the overall message about the incentives for businesses to implement HACCP being largely limited to access to markets as discussed in the previous section. There is a clear link with finding 4 and a need to improve the perceptions of costs and benefits of HACCP in order for commitment to improve.

In the literature lack of management commitment is also identified as a limiting factor in effective HACCP implementation (Violaris, 2008) (Konecka-Matyek, 2005) (Taylor, 2007c). The 21 barrier model does not identify 'lack of management commitment' as a barrier but several of the barriers are relevant to this finding and link with the results of this study. These largely fall into the category of attitude barriers including; 'lack of risk awareness' where there is not acceptance that any major risk is present, 'lack of agreement' particularly with government or equivalent requirements, 'lack of positive and negative reinforcement' where there is no reward or punishment for adopting change and 'lack of outcome expectancy' where businesses do not expect positive change to come about as a result of a proposed change (Taylor, 2007c).

It is evident that a lack of management commitment can be the result of several interrelated factors including knowledge of food safety risks, the costs and benefits of HACCP systems and the system of enforcement. All the factors identified can be improved by the activities of the responsible authority through responsive enforcement, communication and education strategies. Al-Awadhi (2011) reports that Dubai's strategy to improve food safety management involves an increased focus on training at supervisory/management levels.

#### **4.3.6 Finding Sixteen: HACCP on paper but not in practice**

In phase two it emerged that governments believe businesses often have HACCP on paper but not implemented in practice. There was reference to completion of documentation and records to create the pretence of a HACCP system when in reality HACCP was not used in practice. The phenomenon of businesses having HACCP on paper but not implementing it in practice was linked to lack of regular and effective enforcement.

In the literature reviewed there was no direct reference to businesses employing this 'strategy'. Studies measuring HACCP uptake largely relied on self-reporting and did not follow up with documentary analysis to confirm HACCP was or was not in place (Herath, 2010), Violaris, 2008), (Herath, 2006), (Konecka-Matyek, 2005), (Walker, 2003), (FSA, 2001), (Youn, 2000), (Panisello, 1999). This finding provides another doubt as to the reliability of such data collection methods in the field of HACCP.

Although the finding is not directly supported in the literature the low levels of uptake reported in some studies and the numerous barriers to HACCP implementation identified in the literature point to its feasibility. Several authors identify various technical challenges posed by HACCP (Taylor, 2007a) (Taylor, 2007b) (Panisello, 2001) (Eves, 2005) (Scott, 2005). A growing body of literature highlights barriers linked to knowledge, attitude and behaviour of those directly involved in food safety management (Taylor, 2011) (Herath, 2010) (Sarter, 2010) (Ramnauth, 2008) (Taylor, 2008) (Violaris, 2008) (Bas, M. 2007) (Taylor, 2007) (Herath, 2006) (Azanza, 2005) (Konecka-Matyek, 2005) (Yapp, 2005) (Taylor, 2004a) (Taylor, 2004b) (Walker, 2002) (Taylor, 2001) (FSA, 2001) (Gilling, 2001) (Jirathana, 1998) (Ehiri, 1995).

The premise that the phenomena of HACCP on paper but not in practice is in part a result of poor enforcement is supported by the most in-depth study on barriers to HACCP implementation (Taylor, 2007c). The twenty one barriers to HACCP implementation include lack of positive reinforcement and lack of negative reinforcement. These barriers emerged from interviews where businesses talked about low frequency of inspection or inspections that only reviewed paperwork. These barriers have since been supported in a range of settings (Taylor, 2011), (Herath, 2010).

#### **4.3.7 Finding Seventeen: Poor levels of literacy in food industry**

Research in phases two and three found that poor levels of literacy and use of multiple languages amongst those working in the food industry presented a challenge for effective communication. From the data it appears that low levels of literacy can be a problem in many countries whereas multiple language use is described where a country relies to a greater or lesser degree on migrant labour.

The literature review revealed similar findings; Jirathana (1998) identified language issues amongst the barriers to effective HACCP implementation in Thailand and Taylor's (2007c) 21 Barriers Model include 'lack of language skills' as a 'internal behavioural barrier'. Taylor's study looks at this issue in the most depth identifying reasons why this may be a particular problem for the food service sector which is craft based, where employees may be unfamiliar with paperwork and as a sector attracting a multicultural workforce (Taylor, 2007c). This study was limited to the UK's catering sector but findings using similar research methods have been found (Taylor 2011).

The findings of this research indicate that governments as well as researchers have identified poor literacy and use of multiple languages as an issue of significance for effective communication in food control activities. In the literature Al-Yousuf (2011) presents an example of the food authority in Abu-Dhabi responding to this challenge with an innovative approach to training and examinations. Here written food hygiene exams have been replaced with entirely photo based alternatives with a resultant higher pass rate whilst retaining level of difficulty (Al-Yousuf 2011).

#### **4.3.8 Finding Eighteen: Poor infrastructure**

In phase three of the research poor infrastructure was identified as a barrier to effective HACCP implementation. This included the very basics such as water

supply and sewage systems, more sophisticated requirements such as laboratories and general requirements such as the quality of business premises available in the region/country. The challenges encountered are individual to each country but appear to be a common concern among in developing countries. In the literature infrastructure is not particularly focused on in any research and does not emerge strongly as a barrier to HACCP. That studies in the literature collect data from businesses rather than those involved at government level could explain that the wider context of a countries infrastructure has not been identified in previous research.

#### **4.3.9 Finding Nineteen: Government recognise a high proportion of the challenges business experience**

The challenges for businesses identified in the research coincide with the following barriers from Taylor's 21 barriers model (2007c);

- A shortage of knowledge, expertise and experience coincides with Barriers 1, 2, 3, 7, 16 and 20.
- A shortage of good advice and guidance coincides with Barrier 3 and 19. Low levels of basic food hygiene are a practical barrier to HACCP implementation and may coincide with 1, 2, 3, 5, 8, 16 and 18.
- Inaccurate perceptions of the costs and benefits of HACCP coincide with the Barriers 1 and 2.
- A lack of management commitment to HACCP may be the result of one or more factors in the results it was linked with lack of outcome expectancy, Barrier 6.
- Businesses having HACCP on paper but not implementing it in practice may be the result of one or more factors, in the results it

was linked with lack of negative and positive reinforcement, Barriers 9 and 10.

- Poor levels of literacy and multiple languages coincide with Barrier 15.
- Poor infrastructure coincides with Barrier 21.

Governments have recognised 16/21 or 76% of the barriers identified in the barriers research to date. This demonstrates that governments have a high awareness of the barriers businesses may encounter when implementing HACCP systems. This comparison also serves to strengthen the findings made in research on barriers by providing confirmation of the barriers from another source.

#### **4.4 Findings Relating to Outcomes**

The research identified findings relating to outcomes, these are discussed below.

##### **4.4.1 Finding Twenty: Governments undertake a range of activities and initiatives**

The research found that governments undertake a range of activities to prepare for and improve HACCP implementation nationally. These include the development of national HACCP strategy, development of guidance for industry, development of training materials, development of new methods for HACCP implementation and development of new infrastructure such as accreditation programmes.

The research also found that governments engage with industry in a range of ways in order to promote HACCP implementation. These include awareness raising activities such as media campaigns and forums as well as training and

assistance with implementation. It emerged although initiatives are varied between governments they often focus on a particular business sector and/or size.

The level of detail provided in responses varied considerably between respondents. Some respondents provided detailed accounts and others an overview of several activities and initiatives in a single paragraph. The data collected cannot claim to be representative of government activities and initiatives as respondents supplied information about those they had personally been involved in rather than all those undertaken by government in a given timeframe. This approach was used to gain an insight into the experiences and challenges encountered by individuals able to inform best practice and real world challenges, rather than an overview of government activity. These outcomes are contributed to the findings above.

The literature supports these findings with accounts of similar activities and initiatives such as development of strategy (Antunovic, 2008) (Al-Qassemi, 2011), development of new training/examination systems (Al-Yousef, 2011) and implementation of new methods of HACCP in industry (Al-Awadhi, 2011).

The range of government activity and initiatives described in the research and the literature that governments are doing things differently; this may be due to their different needs and resources but could indicate differing levels of awareness of effective national HACCP strategy development and implementation.

It indicates that a multidimensional approach may be necessary to effectively plan for and implement national HACCP strategy incorporating different initiatives for different sectors of the food industry and different types of businesses. The significance being that governments have many options and a



growing basis of precedents for increasing HACCP implementation. Ranging from the development and implementation of new methods of HACCP for specific sectors to the training of individual businesses in HACCP methodology.

#### 4.5 Summary of Findings

The twenty findings can be brought together to provide a framework for better food control. This framework includes strategising, identifying challenges and solutions, engaging with stakeholders and supporting change;

HACCP strategy is a significant challenge for government and business	<b>Strategise</b> (findings 1-3)
Both governments and businesses implement HACCP primarily to increase trade	
Governments encounter common challenges	
A lack of effective national HACCP strategy	
Governments recommend simplified methods of HACCP for SLDBs	<b>Identify challenges and solutions</b> (findings 7-19)
A lack of management commitment at government level	
A lack of knowledge, expertise and experience in government	
Challenges operating at industry level.	
Governments recommend engagement with a range of stakeholders	<b>Engage</b> (finding 4)
Government recommend targeted support for SLDBs	<b>Support change</b> (findings 5, 6, 19, 20)

Table 13: Towards a model for effective development and implementation of national HACCP strategy

The findings also highlight key characteristics for effective food control; communication, coordination and commitment. Communication is highlighted as of key importance in the research; common challenges amongst governments (finding 1), a need to engage with stakeholders (finding 4), a need for better guidance and information (finding 12), inaccurate perceptions of costs/benefits (finding 14) and poor language skills in industry (finding 17). Coordination is highlighted as of key importance in the research; the need to coordinate activities across responsible authorities (finding 7). Commitment is highlighted as of key importance an identified need to improve commitment levels of knowledge and expertise at government or equivalent level (findings 9 &10).

The findings of this research can be brought together to present potential key activities and key characteristics for effective food control. See figure 9.



Figure 10: A model for effective development and implementation of national HACCP strategy

## Chapter 5: Conclusions

This chapter provides an account of the completion of the research objectives in order to achieve the research aim. In addition recommendations are made to government and for further research in this field.

### 5.1 Aims and objectives

The aim of this research was to *identify strategies, challenges and outcomes in the development and implementation of national food control systems across multiple countries*. This aim was met by the achievement of the five identified objectives which link directly with the design and implementation of an effective and appropriate research methodology. Research methods and tools were selected to ensure objectives identified, as a result of a review of the literature, were met.

The objectives were as follows;

1. To recruit key individuals from multiple countries involved in the development and implementation of food control at government level to take part in research phases
2. To analyse existing literature relevant to the development and implementation of national food control systems
3. To undertake in depth qualitative interviews generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries
4. To distribute a questionnaire generating data about the challenges and outcomes in development and implementation of national food control systems in a range of countries
5. To analyse data and identify findings regarding the challenges and outcomes in the development and implementation of national food control systems across multiple countries.

Below an account of completion of each objective is provided with reference to the work presented in previous chapters of this research thesis.

### **5.1.1 Objective one**

Participants involved in the development and implementation of food control in government or equivalent were recruited from multiple countries to take part in research. This provided unique insights into food control systems by bringing together the thoughts and experiences of key individuals from a wide range of countries. This perspective has not been provided previously by any other research in the field.

### **5.1.2 Objective two**

Chapter one of this thesis provided an extensive review of the literature in this field. This included peer reviewed research in the areas of HACCP, HACCP uptake, HACCP barriers and food control as well as a review of international guidance. The literature review led to the following conclusions;

- Food control and HACCP are challenging, HACCP implementation is often low and that some industry sectors require simplified versions and lots of support.
- Policy makers worldwide experience a range of challenges when updating national food control system.
- There is a lack of quality in-depth research in the area of food control and national HACCP strategy development and implementation, particularly bringing together experience from multiple countries.

### **5.1.3 Objective three**

In-depth qualitative interviews were undertaken in phase one of this research. These interviews were designed to generate data about the challenges and outcomes in development and implementation of national food control systems

in a range of countries. The details of the methodology for this phase of the research are presented in chapter 2.

#### **5.1.4 Objective four**

A questionnaire was distributed in phase two of this research. This questionnaire was designed to generate data about the challenges and outcomes in development and implementation of national food control systems in a range of countries. The details of the methodology for this phase of the research are presented in chapter 2.

#### **5.1.5 Objective five**

Chapter five presents an analysis of the data and identifies nineteen findings relating to strategies, challenges and outcomes in the development and implementation of national food control systems across multiple countries. These findings are;

Across the three phases of research findings emerged which have been grouped under four headings.

Findings relating to strategy;

1. Governments encounter common challenges
2. Both governments and businesses implement HACCP primarily to increase trade
3. HACCP is a significant challenge for governments and businesses
4. Governments recommend engagement with a range of stakeholders
5. Government recommend targeted support for SLDBs
6. Governments recommend simplified methods of HACCP for SLDBs

Findings relating to challenges in government;

7. Poor government structure for food control
8. A lack of effective national HACCP strategy

9. A lack of management commitment at government level
10. A lack of knowledge, expertise and experience in government

Findings relating to challenges in industry;

11. A shortage of HACCP knowledge, expertise and experience in industry
12. A shortage of appropriate and accurate advice and guidance for businesses
13. Poor levels of basic food hygiene in some businesses
14. Inaccurate perceptions of the costs and benefits of HACCP
15. A lack of management commitment in business
16. A proportion of businesses have HACCP on paper but not implemented in practice
17. Low levels of literacy and use of multiple languages amongst those working in the food industry
18. Poor infrastructure
19. Government recognise a high proportion of the challenges business experience

Findings relating to outcomes;

20. Governments undertake a range of activities to prepare for and improve HACCP implementation nationally.

## **5.2 Recommendations to government**

The findings of this research provide information of relevance to those involved in the food control activities. The findings will inform others as to strategies adopted by other governments, the challenges experienced and the outcomes of food control activities. The findings have been used to create a framework for more effective food control which includes key activities and key characteristics, see figure 10.

## **5.3 Recommendations for further research**

It is recommended that further research is undertaken in this field in order to continue to inform governments' and international organisations' understanding

of current challenges and needs of government's as they oversee food control systems. In particular research in the following areas is recommended;

- Design and piloting of online forum for intergovernmental communication on food control issues focusing identification of common solutions relevant to national food control systems.
- Case study projects on food control in single countries to gain a holistic view food control systems and the pressures and challenges operating at that level
- International benchmarking analysing various food control activities across multiple countries

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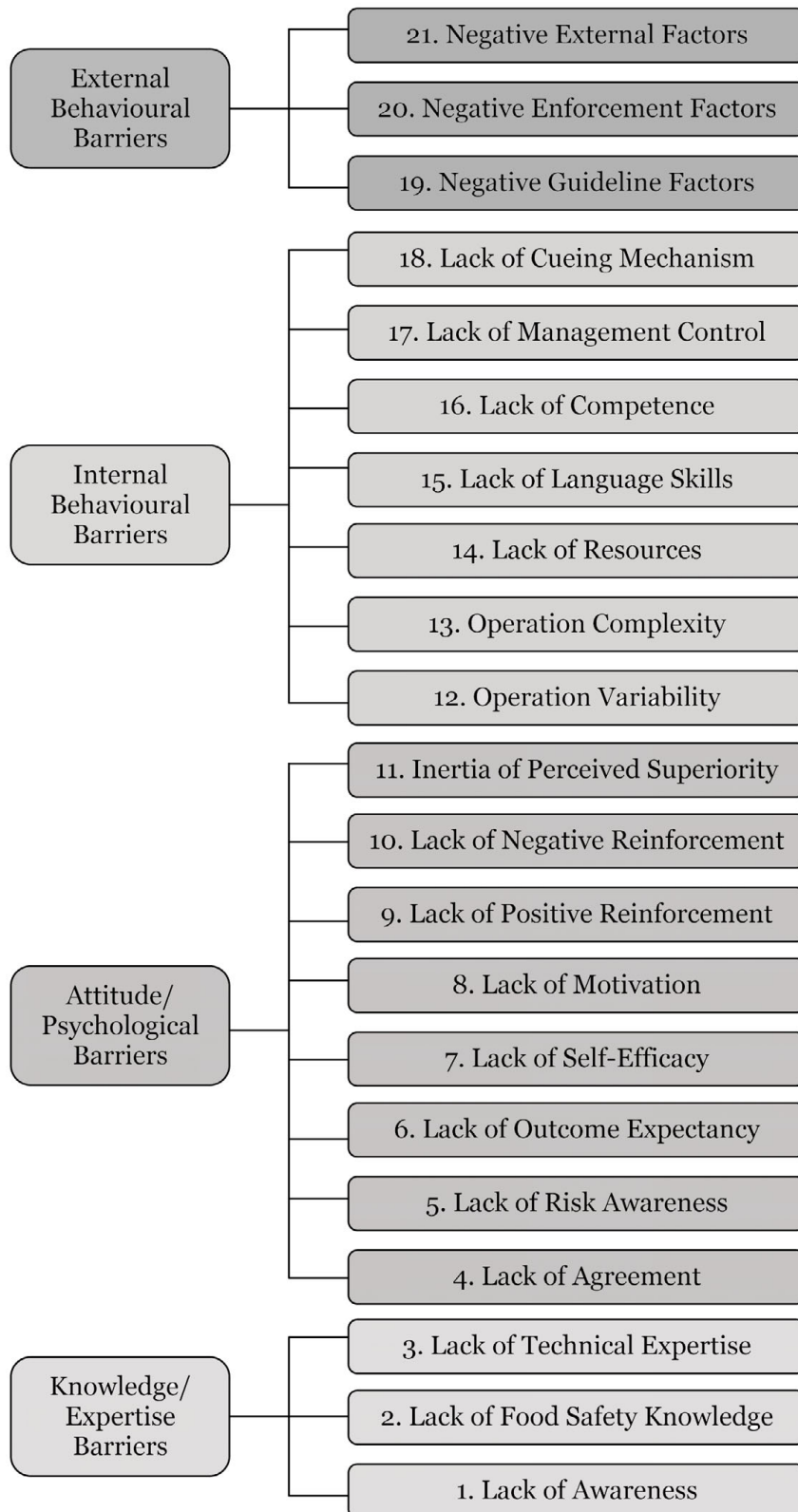
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# Appendices

## Appendix One – 21 Barriers to HACCP (Taylor, 2007c)



## Appendix Two – E-mail incorporating questionnaire sent in Phase two

Dear XXXX,

FAO, in collaboration with the University of Salford, is developing a new training package focusing on strengthening HACCP strategy development. This training package will be aimed at policy makers, technical staff and other stakeholders responsible for increasing levels of food safety through the application of HACCP. When completed, the training package will be used through FAO capacity building programmes with relevant partners. An overview of the curriculum is attached.

This training package will complement the FAO/WHO Guidance to governments on the application of HACCP in small and less developed food businesses, click here to access. <<ftp://ftp.fao.org/docrep/fao/009/a0799e/a0799e00.pdf>> The training highlights the incentives of increased HACCP uptake, explores flexible approaches to HACCP and aims to provide a detailed understanding of the practical challenges involved in HACCP implementation as well as the development of a national HACCP strategy. It will also review the basics of the seven HACCP principles and ensure a sound understanding. It is a given that any training and application of HACCP is based on a foundation of good hygiene practices set out in the Codex General Principles of Food Hygiene.

To provide rich and detailed course material, we would like to include information from a wide range of countries who have experience in the development of HACCP, and / or strategic approaches for HACCP at national or provincial level. In particular, we would like to demonstrate both the benefits and challenges of a range of initiatives and approaches, allowing countries to gain from both the successes and 'lessons learned' by others, and helping them to make informed choices. This may include initiatives purely driven by government or industry or a combination of public/private collaboration.

A contribution to the following questions would be greatly appreciated:

"In your opinion, what are the incentives for your country to increase HACCP implementation, and what are the main challenges?"

"Have you been involved in any initiatives or approaches to promote adoption of HACCP?"

If yes, please summarise the initiative, the main outcomes and lessons learned.

Where possible, we would like to hear about the practical issues that you have faced, and any advice you would give based on these. We would hope for a contribution of approximately 200-500 words on each question. In case, you wish to put us in contact with other experts working in this field in your country, please advise.

We thank you in advance for your contribution or input, and advise that you will be given an opportunity to review the section of the training package where your materials will be used before it is sent for peer review. Finally, FAO will organise a final peer review of the complete training package and should you be interested to join the team of peer reviewers in due course, please let us know.

All contributions to the final training material are much appreciated and will be fully referenced.

To ensure we can keep to our schedule for this project it would be helpful if could respond before 13th September 2009. Please reply to all on the list above - and please don't hesitate in case you need any further clarification.

Yours sincerely,

XXX XXXXX

Food Quality and Standards Service

FAO

Dr Joanne Taylor and Katherine Clark,  
University of Salford

## Appendix Three – A selection of interview transcripts from Phase One

### INTERVIEW B – Director of National Food Control

What do you think the key issue is at the moment for your country in regard to food control?

Er. First of all we came here to XXX and er the major issue facing my country and the XXX countries in terms of food control systems is that we don't have an agency by itself that look over all the food control processes from all the aspects from the food laws and legislation from the inspection services from the laboratory services and most important is the management. So we don't have and it, it is scattered amongst the agencies with different responsibilities, everyone is asking for budget. When it comes to crisis management everyone is saying it's not my responsibility and that's the problem.

Basically it's the food control authority or responsibility is scattered over different agencies with overlapping, with shortcoming, and not transparent communication between each agency. So you have the problem of..so personally I think the region should have an agency that is responsible for all the different pillars of the food control system and should be based on risk. As we have heard today it has to be established to be based on risk, the analysis should be based on risk and all the resources financial and human should be directed to the sources of major or where there is more concern high risk.

Ok thank you. You're talking about government agencies.

Yes, governmental agencies, of course.

With regard to HACCP implementation what do you think are the key challenges for government in achieving implementation across the food industry?

Ok. I would speak about XXX because I do not know about other situations in the XXX, but most likely it would be the same.

The major issue of implementing HACCP you don't have, from the governmental point of view, you don't have the trained people who would make the audits and before that you see you have to prepare the industry for HACCP. You cannot arrive and say that the next day or next



morning and say ok guys if you cannot implement HACCP then you cannot operate, it's not fair. So we have, as governmental agencies, to prepare the industry for this, by setting conferences in the importance of HACCP as government would like to help we have our experts but you know help and generate you or help you to start first preliminary action I think like that and you know as much support you can do for this in the different industry sectors and provide, if it's possible, their industry time, it's a great commodity I mean so for the bakery for the dairy for the meat. Because the requirement is not the same.

For the big companies as you know they don't have a problem, they have money and they can get consultants. But when I am speaking about the majority is a small or mid sized companies, is operated by family business or by himself only. When it comes implement HACCP it would be expensive for him so we when he weighs expenses or subsidise something for him. You should have many things to do for him not just to say it's a must to do the HACCP and that's it you should provide the expertise, provide the logistics, provide the funding, support and grants and that's really a challenge in our region.

Is there a particular sector of the food industry that would have most difficulty implementing HACCP?

As I said, maybe for the large scale producing companies maybe already they are HACCP certified, but the problem is not to get the certificate, you have to maintain it, that's the issue. You know most of our.., it's culture wise, that's why they speak today about culture. Yeah Ok I'm HACCP certified, but when you look at the license date its 2002 now we are 2008. what happened? I say OK, I got the HACCP, it was a challenge so what is it. They don't maintain it as part of a record of quality or safety. Ok it's a challenge I have it I have it on my logo. And that's it, because the government are not following up on this, that the issue.

So you think that government has a role to play in supporting..

It has to, government has to be supportive and verify. Ok you get the HACCP you are not allowed to display the logo on your website and things like this unless you really have a valid license. You don't have it like ten years ago and still claim the credit for something that does not maybe exist anymore, so er.

Can you remember the first time you heard about HACCP, you heard the word HACCP?

The first time I heard about HACCP was in 19..86..96 no no it was '93. The first time I was doing my masters in 92-93 and I heard about it and I was not aware of HACCP before then.

You did your masters..

I did my masters and PhD in food science. So the first course we were speaking about food control systems it starts to be HACCP, it was 92 I said 'what is this HACCP?', so it was not all that time but..

Can you remember a time when you felt about HACCP in a negative way?

Really no, I found HACCP is really working very well. If somebody have implement HACCP for the benefits of HACCP I think its very scientific based er now they have added the quality things with it to just make it as a standard but the science basis of HACCP is still valid and I think its er very nice work and er its very dynamic, change from industry to industry and er the moment you see a new hazard you can change your plan and treat this issue. It' s very dynamic, but the problem who HACCP and I think at university very good programme for implementing HACCP in industry...

Interrupted.

My final question.

As HACCP is part of the WTO as a trade requirement that' s obviously a trade very important for most countries. Do you feel that that' s..

It' s not fair. I think its not fair basically because er I think as I have mentioned HACCP is really a very important thing and very essential actually but to put it as a requirement for international trade.. because you do not know the.. how if other countries are ready or not, or what they need to be ready for that so I don' t think the levels of requirement and know how of European nations or American standard with African countries or Far East counties. Some are very well ready but some are not so. To set something like this as a major requirement is not..not to put HACCP as a prerequisite, slowly and gradually, but to put it as a condition itself I think it' s really not the right time really.

Ok that' s great, interview is over.

Can I just ask you what your role is exactly..

My role where?

Your job..

My job, I' m a food scientist, I' m working in a research institute we have many different sectors petroleum, environment and water, but I am working in a small group called food technology group. And we do anything because we are very few specialists. We do some studies in research studies, nutritional studies, contaminant level studies. Name it, anything related to food and nutrition with right or not right but this is what we are doing exactly. We do research to solve a problem, or to set a requirement to provide it to other countries, the other agencies in XXX to help with that. Sometimes we work with XXX municipality to help them with food control system but er it' s very small, not like Dubai. Dubai is really different.

## INTERVIEW ONE – Head of National Food Control

26.02.08

What do you think the key issues are for your country in terms of food control?

I think that the infrastructure, I would call it, need to be really reorganised, you know...like for example before talking about food handling we should have proper premises...premises...which we don't really have. And the reason behind it might be that it's rented places which are not designed for such, you know, activities. That's one thing, the other thing is that people keep moving, it's a business at the end of the day. You make money you stay and expand, you don't you move and go somewhere else. And that makes it very difficult for us to track and follow up.

And the other thing in our country if we are talking about XXX, being the head of food control and inspection in my country, is that the food safety system in the whole country. In the sense of, now I'm comparing between one authority with multiple authorities and in my country there are like almost five main, and I say main because there are some other authorities involved in this and I'll give you an example, the municipalities, supporting municipalities...they do the inspection, the field inspection basically for food on the shelf, whereas the ministry of agriculture and the ministry of health, they do the inspections on the borders and customs in my country will be the responsibility of the Royal Police. And this makes it hugely complicated and very difficult. Now if you look at it from different point of view you would find that the food safety issue in these five different authorities is just a part of their huge responsibilities which might lead to the attentions, the attention of that sector and the payments. And the budget for each sector will be blah blah blah million or billion in reals in XXX whatever the... but how much of that budget, how much of that time and how much of those efforts are being paid to this part of the ...and this makes it very difficult and very complicated.

In relation to HACCP in particular, what issues do you think the food industry in your country has with implementation?

In our country, it is not ...we are the ...like everybody else, but it will take a long time. But XXX practically...we have one of the best quality fish in the world and its very important, we are very important exporters of fish basically to Japan, US and to Europe and

some other countries. So the HACCP implementation seems to be more easier to start with the fish industry the fish factories, and that's where we started actually. But now we are in the process to start to, you know, expand to other activities and other sectors but I think it will take time because of the reason I just talked to you about. The system itself needs to be restructured, you know, to start being able to go ahead.

Do you envisage any particular food industry sector that will have problems with HACCP?

The retail. The retail, you know, like restaurants and other... I think will find it very difficult. It's really going to be a huge improvement if we can do something like that, I personally in my personal and official opinion think it's going to be a really hard work. There's going to be some huge and big things there. So you know I hope. Because it's always easier to implement it in factories, standardised you know, places and so on and so forth but the retail level is the most difficult place to implement it.

It's a very different environment.

Yeah and we actually, and I'm not talking about XXX in the case, I'm talking about the XXX countries and probably most of the XXX XXX, we are not research based countries and that makes it very difficult. We just get the knowledge through the search or the ... but then the implementation will require lots of other things. It's not just like you get the information and you go and implement it. It needs lots of preparation.

I've just got two more questions. Firstly, now that HACCP is a requirement for the WTO countries, do you see that as an achievable requirement for countries in your region?

Well in all cases I believe that HACCP will be a must one day, and there's no way to ignore it so we better start now. But I think it will take lots of effort, money and time.

And can you remember the first time you heard about HACCP, the first time you heard the word HACCP?

Yes, back in university in my second, third semester. And that was in '95, that was the first time I heard that. It was very interesting to me because the teacher, the professor started saying that this was invented first by NASA and it was basically designed for astronauts. It was very interesting to me and we kept on doing that and I then worked on a

place with food... not the sort of thing I do now. But I think it's not a difficult or complicated system but it needs lots of understanding and simplicity in the system by itself. I would consider it not an easy system but then...with time simplify things and restructuring, re-manipulating, if I'm using the right terminology here, then its possible to implement it. So that was the first time and I always hear about it now. But I think the big challenge now is to move from the industry to the retail and this is what I most liked about this conference. This was very interesting to me I was er I was very early not to miss the workshop and always attend the presentations about HACCP.

Can you imagine using a system similar ton Menu Safe as a solution to some of the issues you might face in your own country?

Yep. That will be the future, that's what we need. And when I was listening to the... menu safe it was the first time for me to know about it, but I think this is going to be a huge thing and that its probably going to replace the real system. And acceptability, you know, and acceptability, acceptance of people of consumers and you know business men, people who are in the business will be much more interesting too, because this sounds...when ever there is money involved, time involved we can not control it at an official level. I mean we can ask the people working in these places 'do this and that' but then we don't know how much does it cost; time and money, and then if they're fine with that they can do it because they have to comply with the rule anyway. If they don't have these then they just try to ignore it we just go back to the same point. So a simple system like menu safe would be very much interesting, it's simple, it doesn't take much effort, and it's not costly, which is very important.

And you saw from my presentation the business using it had actually improved their management skills.

Oh yeah, actually I already decided, to be very frank that I am going to do, because I am currently studying, I am doing my studies. So the first thing when I finish is to do two things, which I learnt from this conference. 1. immediately start with the safe menu, in which I'll need your help anyway in a year from now, and then one of the studies presented this morning was very interesting I mean its nothing related with this but its to do with the media in our countries, how do the media play a role in food safety issues? Like newspapers and etc. so these two things I am definitely going to do when I finish. The first thing to start with is the menu safe that's very interesting.

## INTERVIEW E – Professor

26.02.08

I was saying the following, we have supervised MSc student. This is joint supervision from Department of Agriculture and Economics and my department of Nutrition Food Technology and it has been done in XXX. The student, the graduate student, went to people who had applied HACCP and ISO 9001 and had prepared a questionnaire where there are certain questions, ‘how come that you know about ISO and HACCP?’ ‘why are you attracted to HACCP?’ ‘what are the advantages you expected from implementing HACCP and ISO?’ and then ‘after certification to ISO and HACCP, what did you find?’ ‘was your investment, has your investment paid for you?’ ‘What are the disadvantages, advantages?’

And we have published two papers from it, unfortunately these are in Arabic but we have in English summary.

What did he or she find?

He. He found that, you see the beginnings of HACCP and ISO this is maybe in many countries that people wanted ISO and HACCP some people are thinking that the certificate would be beneficial for me from a commercial point of view. So that I can buy more or sell more, this was the beginning. The government of ...in XXX encouraged people and even sponsored people to... it paid part of the consultation fees and part of the certification fees and this was the motivation, ‘I am not paying, much so why not’ , it was in the atmosphere that ISO and HACCP are very important, so let’ s go for it, yeah.

Some people felt that the advantage of documentation for example, because many plants do not have enough documentation so as you know ISO needs to have documentation so they were pleased to have something which is documented and things to be controlled in the right way. Some people were not pleased with er too much documentation, some...other people those who thought that the business would better were disappointed because it was not necessarily that if you have HACCP and ISO your business will be better.

What do you think the key issues are in food control in your country?

Key issues now is that, you see XXX is an open country. So we have competition if I am producing x product. I have competition from other countries from other Arabian countries, from Turkey for example. So in order to complete I have to have quality, safety is very important because everyone is asking about safety so this is why we have HACCP. Very important point here is that to make people aware of this because it would not be beneficial for me, this is what the producers are saying, to have ISO and HACCP and then consumer would not... would not appreciate it. Because it is the end receiver should be aware of my work and my... . so this is again the responsibility of the people who are engaged; governmental, producers and consumers.

So you mention that the government in your country have been supporting industry is that across the food industry or in exports sectors or...

Actually it is the XXX government and the European agencies also. Beginnings of HACCP, maybe, XXX may be the first country in the Arab world to begin with HACCP. It began, I think, before about fifteen years. The Swiss government has a kind of grant to XXX and say this grant should be used in improving food and food quality. So er I had had a sabbatical at this time and I approached people who...in XXX and I said for them why don' t we have a kind of programme in which we try to implement HACCP in five plants in XXX, and this was the beginning. That we have chosen one meat plant, tomato paste plant, chips plant and ... and... we had to begin from scratch because no-one is knowing about HACCP so we have to prepare training material we have to train people in GMP and then on HACCP and these were the first companies to be certified in XXX. And now it has continued.

And can you remember the first time you heard about HACCP?

The first time I heard? ...from an academic point of view it is part of my job. I was a member in IFT (Institute for Food Technology) they publish the magazine Food Technology and Journal of Food Protection, and they send me their monthly publication. So in this way I have been introduced, but by people who developed HACCP system. As you know HACCP was developed by Pillsbury, the American company, for NASA, this is the known story about HACCP. So this was the beginning because it has a good relation with microbiology and microbiologists and personally I find it very convincing because it is the logical approach to food safety and you cannot rely on sampling and testing especially if you want to test end products, so I find this is the logical approach to ensure food safety.



And what do you see as the biggest incentives to introduce national HACCP strategy?

Yes, here we have to differentiate between foods for the local market and foods for export. For exports mostly everybody is asking for HACCP, and everybody is asking for ISO 9001 and HACCP, so everybody want to export food must have these.

Er locally people are now becoming aware, when they see HACCP, slowly, but not many people, but they are becoming aware that if I have HACCP and it is written this food was produced applying HACCP system to ensure food safety so you are educating people.

Is it a requirement for businesses?

It is not yet obligatory, or a governmental requirement. But actually we have the standard principles of food hygiene based on the Codex standard and in the Codex standard it is annexed to the general principles of food hygiene. We have the same standard, translated, modified, tailored to XXX and we have HACCP system as annex in it. Theoretically all food plants have to implement this standard because it is a XXXian standard but so by default HACCP should be also in place, yes, but they are not activating this, the authorities are not activating this, until now.

So they are choosing not to enforce?

It is not enforced. It is not yet enforced.

The end.

INTERVIEW F – FAO Regional Coordinator

27.02.08

I am currently doing some research into HACCP and one of my focuses is the XXX XXX and Dubai, so obviously you have a really good perspective on this.

In your opinion what are the key issues for food control in the region?

Um. Well the lack of legislations, the fragmentation of food control systems, this is really one major issue. Co-ordination is lacking which means that um er there are instances when you can have more than one official visiting one food premise and instances where no-one would go to do anything. So these grey areas lie between the mandates of different ministries and it means that the system is not effective. So er there' s no communication, no coordination and this makes food control really work in an inefficient way, lets say.

And what are the challenges for the FAO working in this area?

First of all at the human.. lets say the capacity of the professionals in the region need to be updated and reinforced. Like professionals who have been working in their fields for many years have not been... do not do retraining and they do not do professional courses to become better and to stay abreast with the new technologies. Which means that the systems and people working in the systems are a little bit outdated. Um for example we face a major problem when it comes to risk analysis and to making people understand the importance of risk analysis and also to make people practice it. We...

Professionals because most of them are PhD holders believe that they know everything about everything. So when we tell them about risk analysis they think it is easy to do, but they have not been trained in risk analysis and no-one can do this if they not been trained. So this is a major obstacle because er inspection should be risk based standards should be risk based and er so what happens is they bring in expertise from abroad and then when these expertise go away the sustainability is not there because they are not working making the manpower and the professionals do the work themselves. So there is a need to invest in this area um.... .

We are also having a problem finding experts that can sit on technical committees, especially in Codex. So the representation from this region in technical committees is very poor. Er because there is also a problem with research and the output of academics, experts in peer reviewed journals for example and because these technical committees require people with high expertise and the experts are chosen on merit er we are finding it difficult. So the human factor here is very important, infrastructure can be dealt with because there are rich countries in the region they can buy any equipment, they can buy the expertise, but er this is not sustainable. So when the expert goes everything goes away with him or her, so this is a major problem.

I see and is that a similar problem with HACCP?

Yes, I do myself organise a lot of capacity building activities but I myself I organise the activities but I am not a HACCP trainer, you know that, so I look for HACCP trainers and I prefer to sometimes bring HACCP trainers from the region so that they can give examples related to issues related to foods that people eat, they can give them hands on information on issues related to the area. While it proves to be very difficult to bring in experts from the region in HACCP. The number of HACCP trainers is so limited and consequently the region depends on trainers from abroad. And if you noticed in the meeting this morning, I don' t know if it came across very clearly two ladies from UAE were complaining that they' re not given the chance to work even though they have been trained, however they are in fact not trained in the areas requested by the industry...additional training is needed and targeted training is needed, and in fields that are changing all the time. I mean I don' t think that there are many people around the world that claim that they do risk analysis and understand the concept very well. There are not so many, but in the region there are none.

I see.

Sorry to tell you this.

No, it' s very interesting. In terms of HACCP again what do you perceive as the benefits for a country in implementing HACCP across the food industry.

Well effective HACCP the benefits are many, we have er...there are two levels. The countries in the region, those who are export food stuffs need HACCP in order to gain access to markets. So this is a purely economic thing, **but** the consumers in the local markets do not

feel assured that the industry or the government is offering them or providing them with safe food. If HACCP becomes like a requisite to er...like the government requires industries to use HACCP and even if they start implementing HACCP in the priInterviewee production I think it would increase the confidence that consumers have in their governments in the food control systems. Nowadays this region and especially in Dubai food industries that are using HACCP are using it as a means of marketing their products. So I feel uneasy about that because this is not the idea, it should not be used for marketing purposes, it' s a system that ensures quality and this is what it should be. Er so I was told yesterday that there are companies here who have on their packaging material HACCP logo, as if it is a trademark, so I think that...er...the companies that are using HACCP and at the back of their minds they want to have more gains but from a consumer point of view and from an international organisation point of view that cares about the health of consumers and about fair trade what I think should be done is that this culture of ensuring food safety should be...shouldn' t be led by the private sector, should be.. I mean there' s nothing wrong with the... but it shouldn' t be led by having more economic interests.

From what you' ve said in your presentation and just now the implementation of HACCP in your region, in the most part, isn' t very well developed so with the WTO requirement for HACCP and for countries to start implementing HACCP. Are there any negatives that could potentially come from countries feeling the pressure?

I don' t think it' s from the countries, we are feeling it from the small businesses. Because there is costs implicated in applying HACCP and the small businesses cannot take it so er so we are feeling this pressure and this is why FAO and in collaboration with WHO have developed a manual for the small businesses, for implementing HACCP in small businesses. But er to tell you the truth application is different and er I think what the industry...the small industries tell us all the time is that they feel that with this new global environment where there is a push for standards and for sanitary and phytosanitary issues, they feel that it is one way of discriminating against them. Now is it a barrier or is it an enhancer to their businesses it' s a big question mark, I don' t have answers to that because I see the suffering from the side of the small businesses, I see what they can do and what they cannot do and on the other hand I believe that food safety is a right for everyone. So the consumer has the right to safe food, but who' s going to bear the cost of that is another issue and this is...we saw the generic models on traditional foods and its not easy to implement in small businesses. We are talking about many small businesses and family businesses, where you might have two/three people working at most, so er.. so I er

feel its difficult in traditional societies where....er a colleague of mine in WHO used to say that food poisoning is taken as a fact of life in this region so they do not question it so much er so how can we convince a small food producer to implement HACCP when there is a general acceptance that 'ok that happens, its not serious.' So I think there is a whole culture that needs to be addressed and er and consumer education and awareness are very important. Because now they see the food safety issue... most people see the food safety issue as a means by which the industries in large countries are fighting the less developed countries or developing countries to gain access to their markets and prevent access to their own. And in principle it shouldn' t be... it should be, in theory it should be beneficial to everyone. But this is not how it is felt or seen in this part of the world

and also I think on the part of the professionals there is a misunderstanding of HACCP. I saw it in two presentations that we embrace the seven principles. As if its work to achieve the stages to achieve a goal, it' s not a goal a whole system, you do not have documentation at the end of these steps its all through. So it struck me that two speakers said the same thing if its like stages, if you do this chunk you have progressed in achieving the HACCP it' s not like a continuous thing that you have to be doing all through. So er...i don' t know...one of the presenters said about documentation, that this stage is bad, as if documentation is a stage and this is something that I come across so often in the region people say, 'oh I' ve reached stage three of HACCP' , stage three of HACCP?. So it means that whoever is advising them has not got that grasp of the system and what the quality assurance system is all about. So as if you' re having a multistage diploma and this has also reflects that the professionals themselves who advise on HACCP need training in HACCP.

Do you remember the first time you heard about HACCP?

Yeah, first time I heard about HACCP was at the University of Reading 1988 or 89 and it was in the microbiology module. But that was still at the beginning but I didn' t know much about it I started to realise about its importance since I joined the FAO, Six years back or seven years back.

**INTERVIEW G - Head of Food Inspection**

26.02.08

Thank you agreeing to be interviewed. What do you think the key issues are for food control in Dubai?

The key issues for food control in Dubai...er... I cannot put it in one or two issues. We could categorise it into thirteen categories and then we could go to the issues. [interviewer: hmm]. You need to, lets say, talk about employee issues, then we could talk about legislation issues, we could talk about legislative issues, we could talk about communication issues, then we could talk about intergovernmental issues, relationship, we could talk also about the control of food at import, the expansion of Dubai, which is now gives us, let' s say, a very big headache, it' s a very fast expansion. So these categories if you want to talk about employees issues we have issues regarding the communication with languages with high turnover in Dubai and with trying to educate them you know so, it' s very very difficult for us. This is one issue, second issue they are coming from very poor life or hygienic standards from origin so how to go to from that community to transfer them from that community from another community with a different standard. Most of them are bringing their practices with them, so this is a very big issue we are facing here in Dubai. Third...as I talk to you because we are producing the lang...literature or legislation in two languages only but we have more than 200 nationalities in Dubai and each nationality has its own restaurants, its own food its own... a lot of diversity here in Dubai. [interviewer: hmmm] so this is for the employees issues. Also employee carry different diseases, you know that, and they are coming to us, this is also a panic to us.

The second issue if you want to talk about the legislation the legislation is not harmonised very well here, so there is differences in legislation and the strength of legislation among the emirates first and the GCC countries. So we are open to other countries. And there is some shipments maybe that are rejected from certain countries to enter from other side, so this is an issue to us. And also our legislation is not uh let' s say well developed based on uh based on scientific research mainly ...it is dependent on other research done in other places in the world so uh we need to have our legislation here which is developed here internally so it will meet our own environment requirements not other environment requirements. This is another issue which we need to discuss.

The competency of inspectors, because of the diversity of inspection power so we have different inspectors from different places in the World maybe this could be a power tool and maybe this could be a weakness tool. We have inspectors from other places so we could communicate with other people but also as a management we need to harmonise the inspection you know and make the consistency of inspection this is also a difficulty for us. But mainly when recruiting inspectors we are putting up higher standards.

Also if we want to talk about the expansion of Dubai this brings to us actually a very er big troubles in terms of preparedness and we have to expand our er resources we are very very frequent we need to implement new strategies always very fast, so when you have a fast life fast growing you have to use short strategies very short you know making very fast strategies change in your procedures change in your procedures implementing new ideas this takes a lot of effort this is a big issue. Also it requires from us er that we need to be er creative here because the other solutions will not solve the problem. So this is also another issue.

If we talk about the diversity of the food here in Dubai, here all the world in Dubai so you need to deal with all types of food in the world. So, whatever you think any word you think about you can find it here in Dubai. So you need to know about Chinese methods of preparation the Mongolian methods of preparation, Pakistani, Indian, European, Arabic, Eastern, South East all the countries they have their own kitchens here in Dubai and their own preparations...so...when you are developing your strategies and monitoring procedures you have to consider that...also when you are developing your legislation you have to consider that...so when you talk about legislations, this legislation should consider the diversity of food preparations here in Dubai. So this is another issue which we have to consider.

Ah...also we have an issue related to communication with the public especially when the majority of the public are from Asian origin so there is a problem in language and in education.

Also because of the ah... ...there is a federal law here in the Emirates so we have a issue organising [interrupted by another speaker] [interviewer: okay] [pause] ...so when you talk about uh other emirates there is a difference in their capability in controlling of food into ports they don' t have the same capability as Dubai so you have to think about strategy of strengthening others capability. So its not only that you have to think of strengthen

your own capability you have to also in order to protect yourself you have to help others in order to develop their capabilities. So this is another issue to us here in Dubai. and the food coming to the emirates is not only the food that is coming here to Dubai ports, no, it is coming through all the emirates ports to come to Dubai [interviewer: yep].so in order to harmonise the the process it is very very difficult. [Interviewer: I see, that' s great]

Interviewer: Yousuf can you remember the first time you heard about HACCP, of the word HACCP?

Interviewee: I have it, it was 1996. I heard about HACCP.

Interviewer: and where were you?

Interviewee: once we was we had a colleague he was actually an English person, he graduated from England and he came with the idea he wanted to implement HACCP here in Dubai and also are uh our Mr Hamid Sharif he was uh graduated also from England so they came and they implemented HACCP in Dubai so from that time we start to train about HACCP we have training and we try to implement HACCP from 1997 in Dubai. But first trial was failure because we are not prepared very well. Then in 200 ur 3 we try again but we were prepared very well that time. [okay that' s great]

Interviewer: What do you think is the key challenge for industry to implement HACCP?

Interviewee: The key challenge here in the emirates is the legislation because we are enforcing HACCP here in Dubai it is not enforced in other emirates or other GCC countries so there are other producers of the same food they are not implementing and they could sell for a less price than us. So this is a challenge and I think uh we have to overcome this with harmonising of the legislation.

Is HACCP a requirement for all food businesses or...?

Interviewee: It is requirement by law but as I talk in my presentation the strategy is very long. So implementation takes phases.

Interviewer: So it' s not enforceable yet?



Interviewee: No, no it is not enforced yet. We enforce it now for food factories five star hotels completely have to implement and now for the retailers, big retailers, like chain restaurants, chain supermarkets, big supermarkets, they have to implement, this year and the year before..er...after. so it will take time when we reach the smallest but by law they have to implement.

Interviewer: what do you think the benefits are for Dubai for implementing HACCP across the food chain?

Interviewee: there are many benefits in terms of the image of Dubai first and the health of Dubai because you know Dubai' s a tourism country so they like the people to come here to eat and too enjoy and so if there are any problem it will affect the image of Dubai so we need to have to be careful. This is one issue we could benefit from.

Then for the premises themselves they are more able to export their food outside because of the image of Dubai. And the food that is produced here in Dubai they have confidence now. The people will be more confident about the food produced here in Dubai. So this is a benefit in the higher term but also the businesses can confident from it in many ways from as the training of their employees as uh, as uh, as uh, to reduce their problems in terms of fines and you know we have a system of fining on the spot if we find anything and this fine is doubled at each time so also they will benefit if they have a self-monitoring and self-control system. [okay that' s great]

Interviewee: I' ve got one more question: What do you see in the future for HACCP and the municipality?

Interviewee: I see the future, en sha la, we hope that we shall start implementing HACCP for small and less developed premises within two or three years ...coming two or three years [umm] And I think that will produce a lot of menu safe orders which is maybe very different from what was developed at Salford, but it will add to that project. This is what I think anyway it will be in the near future.

Interviewer: and currently what is the system for certification here?

Interviewee: the system for certification for HACCP classical HACCP any company that would like to implement HACCP first all they have to have is a consultant other are capable of

doing it in-house it's allowed for them but they need to be certified by other certification by a certification company there is one. The consultant company shall be from our side shall be approved and accredited from Dubai municipality. Also the programme it will be reviewed, that the HACCP programme will be reviewed and visited by the municipality officials.

Interviewer: So certification is from the municipality?

Interviewee: No. No, from outside but we have the role of monitoring, or monitor the HACCP implementation and we monitor the certification companies... both.

Interviewer: I see, I see, I see.

Interviewee: because we don't like the certification companies to give certificates just for money. So this is the issue, so we are conducting...we are reviewing the HACCP manual and we are visiting the premises to ensure that the HACCP is implemented very well. Also we have a joint inspection with the certification company. So we are not leaving them doing their work like what they want. [I see that's great]

Interviewer: Thank you very much Yusuf very helpful

**Interview I:** Nutrition Officer, Nutrition and Consumer Protection Division, FAO

30.07.09

Interviewer: What's your post here at FAO?

Interviewee: Uh oh okay. Laughs. Well we're called ... I work here in the Food Quality and Standards division of FAO but I am here specialising in we call it food control and consumer protection and because basically a major component of it is on strengthening or working with countries on official control government with support and how they support industry and agro processors to strengthen their food safety management systems as well as a component of it.

Interviewer: Right, great. And can you tell me about a project related to HACCP you've been involved in where you've biggest challenges?

Interviewee: Okay. Um I mean the main projects well specifically on HACCP was some time ago, it was a project in India where we were working with predominantly with the exporter inspection agency who is the competent authority in India for certifying assessing safety of all imported food from India. And India as you know has a large, has a very important export commodity including food white fish, fish like cod or whatever and those kind of and also shrimp they have an huge exporter of shrimp and that can be fresh, it can also be frozen but it can actually be fresh I think, they chill it somehow and send it off and what were some of the challenges... and more recently then we haven't had such...that was a very defined project to strengthen GHP and HACCP within the government working with the food industry. (Interviewer: Hmmm.)

whereas more recently we've had other projects whereby we've had a component on HACCP, training on HACCP but its been much more piecemeal if you want to say its been a smaller component. Um I guess the in the India project some of the challenges we had or and in general my overall impression is that there's still you know a lot of need for training on HACCP and just its not even training on HACCP because I think there's been a lot of training on HACCP but its really more getting building the capacity of government groups and industry groups to be able, for them to be able to implement programmes and implement make changes in their own system to ensure industries can uptake good hygiene practices and HACCP or HACCP based systems so I guess a bit of our approach here at FAO has been that we have seen that there has been a lot of training but is it really having an impact is anything changing? And I could say for example with the people in India they do a lot of things and they are moving ahead because it's a pressure from the importing countries as well but in

general the people we were training I guess they were then locked in their offices when they went back so you have to kind of train the technicians but we also have make a change to the policy level and and to the decision makers at a higher level...

Interviewer: Uh hmm.

Interviewee: Try and target them as well and make sure that they understand, not the detail of HACCP at all but that they know that the food industry needs to be able to comply with good hygiene practice and be able to document procedures and show to buyers or show to consumers also that they have safe procedures in place and that you know and that when its necessary they have a HACCP plan in place you know if that's a requirement of their importing market. Um another major challenge in the whole area of HACCP is basically in many countries you don't yet have the good hygiene practice base yet or the good agricultural practices on farms also at farm level so this before you even try to start on the HACCP approach this is a major challenge I'm not saying that you shouldn't roll out HACCP until you have all the hygiene in place but you know we need to keep in mind the two prong approach I guess.

Interviewer: Okay. That's great. So in India what might help the policy makers understand the need, the needs?

Interviewee: Well um, it's a continual uh well a country like India has changed a lot in ten years and I know in a broader way in terms of an overall food safety policy and the higher importance or priority to food safety in general so that will of course should have the effect that businesses are more aware that they should adopt hygiene or HACCP program and I'm sure government putting regulatory bodies to support those industries so I think it's a continual evolution I mean uh um India has its fair share of food scares as well uh some of them affect other countries some are within the national context. so this is always a good one to like our own countries for the government to understand the uh importance but now more recently they've formed a new food agency a single agency approach I mean they're doing many things in India to give importance and I think they have a rising more affluent, not affluent but a more demanding more knowing more their rights are slowly so I think for me you have to very much keep pushing the different parts, pushing the consumers, pushing the industry, pushing the policy makers pushing and just time things evolve and there's time time to make changes and move forward in a develop in a let's say a stronger way. That's what development is all about I suppose.

Interviewer: and with time is that a challenge in terms of the project and how much time there is to spend on that or?

Interviewee: For me you mean in my work?

Interviewer: with you yeah or generally.

Interviewee: The project approach from FAO is very much for anything including the HACCP projects is very much that its driven by country needs and country demand and so we respond to and identify need by a country now that would seem to indicate therefore that the partner whether it' s a country its usually a ministry for us the ministry of agriculture that would seem to indicate that you have a partner who ready to work with you and spend a lot of time to make things happen, it not... this is one lets say bottle neck that we have that the the the support and the commitment required from the government is not always there and it may not be because they are not interested it may be because of lack of capacity or lack of resources I mean not in a country like India but in many countries now we find that people are people working in food safety some of them are doing many things and they' re being continually invited to workshops and continually invited to training courses so they are exhausted doing all these things so they don' t have a minute to focus on maybe on doing less but maybe doing it better. I mean other challenges we have I mean we' re also working in a global context which is very challenging and because you know of cultural we have language barriers, we have different stages of development countries naturally have different capacity on how to move forwards on organising a training course or things like that things you know that you imagine could be done quite easily and smoothly but there are obstacles that you can' t even imagine that you have to work through erm and then on our side we have many many projects here at FAO we also face resource challenges as well uh err I don' t pretend that its only at the government level we have lots of people and we also so you know (laughs) could spend more time perhaps doing things in more detail or in a more timely manner also so...

Interviewer: sure

Interviewee: and you know a project support and administration and we end up working at a technical level cos that' s what our specialisation is but you also end up doing many many many other things, helping people get visas, making sure documents are finally edited are

ready to go out you know I mean project support and project management is there's an awful lot of administrative work as well and in our structure here the technical officer does all that as well so you know it's a lot of extra and our projects are quite small projects like normally the ones I'm thinking about would be \$100,000 or \$200,000 USD so they're quite small projects but they are they are quite unique to well FAO gives you a very good contact with the countries and a good understanding of what's going on but um I think you can always improve but.

Interviewer: just to clarify when you say capacity what exactly do you mean?

Interviewee: we mean. When we talk about capacity building or we talk about capacity development now I think we are really talking about... helping or putting in place or building the capacity of individuals and of institutions I mean its both if you just train the person or to make sure that that person has access to information but the office or the ministry or the policy framework in which they're working in doesn't allow them to use their knowledge then you don't get anywhere. (Interviewer: right) so that for us and I think we have another level of capacity in our in one of our books we talk about but definitely the individual the institutional framework and then I guess the policy framework and for us it really is about building the its not a question of us sending experts we work a lot with consultants and they go and assess situations and give advice, and guidelines or prepare draft legislation or whatever they do but we are also very keen and are trying through our project work to ensure that the people of the partners the countries you're working with that they have the capacity it not that the external consultant came and said do this and then nothing happens but its trying to build and change and (Interviewer: yeah) and through dialogue with the national experts understand from them what their situation and what do they think is needed to roll out a HACCP plan or should they target, which group of small food producers should they target and things like this so its that's what we mean by capacity development its really planting seeds so that other people, its not us, so that the people in the countries can really make the decisions (Interviewer: right) and have sustainable development ahead of them (Interviewer: OK) that's all we and that's what we call here in our group at FAO the food safety group we have two groups and one is the scientific risk assessment and the other group is we call it capacity building and that's the group I'm in now where we develop manuals we implement projects we can send experts from one country to another you know its err its anything to build capacity in this area of food safety and quality and obviously it can be people within the and institutions within the err err government sector but also in private as well but our main focus is government.

Interviewer: OK that's great. Just a final question just to clarify even further on capacity with regard to HACCP what kind of challenges with regard to capacity do you find in the projects you've been involved in or in a particular project?

Interviewee: Uh hmm. Yes.

Interviewer: so for example in the Indian project in regard to capacity?

Interviewee: some of it is as simple as experts still or technicians still... maybe they know the textbook but they don't know how to apply it that can be one thing. I think there's one thing out of confusion out there of you know 'which HACCP?' or is it and then this getting further muddied by the private standards discussion as well you know and you often have particularly in the international trade and food environment you have people coming and saying 'oh and you need global gap here' and you need ASEAN GAP here up in the Asian countries or EC saying no we want you to do it this way so I think in the whole area of HACCP too, well its not purely in HACCP what I've seen recently in Asia government officials what really should we be doing should we be certifying should we not how do we you know how do we go forward should we have you know BRC should we have SQS you know its all that kind of still a very grey I think area in some ways and we would argue that there is a role for government to working with industry to try to come up with some more cohesive way of dealing with this and not to and while their not doing that that's what's happening all these private and different initiatives and I have nothing wrong with the private initiatives per se but its just if there's too many of them and the industry doesn't know what to do and where to go and particluarly the big guys will work it out but the small and medium ones if they are at a loss of what to do and where to go and what guideline do we follow then I think the government should at least try to dialogue with industry and these private standard people or different groups that are coming or different consultants that are coming try to say and look what do we think the approach should be in our country and say that you know if businesses want to follow any private standard of course they can but you know we want the core of our businesses to try to the ones that need development to at least move up through GHP and start you know whatever but you know that it should be in a more lets say a more focussed way to avoid confusion cos I think there still is a lot of confusion and learning to learned still lets say in applying GHP and HACCP approaches in the developing and transition countries and the developed world as well are still lessons

learning lessons and still changing how they' re doing it as well but lets say they mainly have it sorted or they' re in a better state yeah for the developing countries definitely.

Interviewer: OK. Do you have time for one more question?

Interviewee: Yeah, yeah, yeah.

Interviewer: Um it' s the same question but um.. Do you have can you tell me about a project related to HACCP that you' ve been involved in where you' ve experienced success?

Interviewee: Oh God. Well... (laughs). Gosh that' s a bit difficult because we don' t always, we' re very naughty and you shouldn' t repeat this but we don' t always evaluate our... we' re very weak on following up and evaluating if there has been success and things like that...(Interviewer: but in your opinion?) yeah, um, no I mean I think in the uh I mean in the different trainings that we' ve done ah yeah we had a native country project in eastern Europe for example and we had a we had a series of training courses there in different countries and uh we had a practical trainer you know he worked with people and in some other countries they said no they hadn' t had such practical training on HACCP before and this has been helpful and things like this and I think we forget sometimes we still think even countries that are close to becoming the EU we think they' ve had all the training and but I think we need to not necessarily keep training as I said but training in a practical way or trying to build capacity and maybe to have follow up training as a core group so yeah so in that project people were very said it was very good and they would have liked more training in the project because they particularly like the approach of the trainer and said that he was the most practical one they had had after many different trainers in HACCP.

Interviewer: And that approach was...

Interviewee: He was, I don' t know what his materials were but he did visits he mixed it with visits to I don' t think he did anything necessarily so innovative but I think it was also he was a former he was from university actually but I think he also worked with industry or something but he mixed it with case studies and things like this and um yes so they found it practical. OK? OK?

Interviewer: Thanks so much that' s great.



Interview close.

Notes: Interviewee was busy and agreed to a 15 minute slot. Seemed to be some feeling that needed to perform. But once interview started - lots to say and few prompts needed.

To remember: Explain at start of interview, interviewee will be sent a copy of any work where interview included and will be given the opportunity to ask that part or all the content is omitted. Explain at the start of the interview that this is an informal interview, that would like to hear about interviewees opinions on current issues and experiences.

## Appendix Four – A selection of responses from Phase two

### Respondent S

"What are Thailand's main incentives for increasing HACCP implementation?"

The main incentives are

1. To have better sale and to be able to enter some countries' market or increase the possibility to export:

Thailand has more than fifty thousand food factories consisting of small, medium, and large-scale plants. These factories include both domestic and export food plants. Only 4% are large and medium scale factories (which produce foods both for export and domestic consumption) while 96% are small-scale plants (which produce foods for domestic consumption). Since Thailand is an agricultural country, Thailand produce vast varieties of food products both for export and domestic consumption. Thailand's exported food products include frozen & canned chicken, seafood (shrimp, squid, and fish) and fruits and vegetables.

For exporting food factories, most of HACCP implementations are driven by law and regulation of the importing countries (such as USA and EU) as well as the customer requirements (such as Japan where HACCP is still voluntary).

For those which produce food for domestic consumption, there is no incentive for HACCP implementation since the local people do not understand the importance of HACCP implementation even though they prefer safer foods. Although GMP regulation has implemented by Thai FDA since July 24, 2003, HACCP is still voluntary. Therefore, the majority of the domestic food industry, consisting mostly of small food plants, did not consider implementing HACCP system.

In conclusion : Law, regulation and customers have strong influence on HACCP implementation at all levels of food industries.

2. To comply to the regulation: If HACCP is mandatory, all food factories will implement HACCP system. However, the readiness of the small industries is still a question.

What are the main challenges that Thailand faces?"

#### 1. Government Policies and Regulations including implementation strategy

- The government lacks solid policies and plans on mandating HACCP system for all sectors and levels of food industries in Thailand even though GMP has already been made compulsory; therefore, most managers of food manufacturers remain uninterested in implementing the system.
- Although, at present, the government has assigned National Food Institute to promote HACCP implementation in small food industries, the implementation rate is quite slow since there are limited number of qualified consultants. In addition, the small industries lack of qualified personnel for HACCP implementation. The promotion of HACCP system at the moment only comes from the pressure from importing countries.

- Various regulations and instructions available from within or outside Thailand on HACCP implementation only specify what to do but are not very clear on how to do and the extent of the execution. Hence, there is a need for guidance which explain more on how to do and clearly indicate the impact of deviation.

## 2. Lack of understanding and knowledge

- Most of small food industries lack understanding of HACCP system and commitment due to the perception that:
  - If it's not necessary now, there's no need for implementation
  - HACCP implementation will definitely increase product cost

## 3. Lack of proper support

Although, Thai government has provided a large amount of money for promoting HACCP implementation through National Food Institute, the main budget has been used for providing consultation. Understanding food hazards is not easy, since they are invisible. Understanding food hazards is through proper education. Training materials, information of food hazards, conditions that lead to hazard formation( e.g. pathogens' growth, toxin formation) should be provided in proper manners.

## 4. Lack of proper pre-requisite programs

Even the large companies produce foods for export are facing with the post contamination of many pathogens such as *Listeria*, *E.coli* . The contamination is normally resulted from improper equipment design such as meat dicer which is very difficult to dissemble. The meat dicer which causes contamination is imported from a company in western country who claims that the equipment is sanitary design. It seems that there are still a lot of problems encountered the food safety even though HACCP is implemented. We need to think about raising the level of HACCP implementation and assess the risk of food hazards. The concept of risk assessment issued by Codex should be introduced to the implementation in industry level.

## 5. Lack of information necessary in implementing HACCP system, such as the critical limit of temperature and time needed to destroy the pathogens to an acceptable level. This is due to poor data management and unavailability of research information from government agencies, universities, and institutes

## 6. Many factories have employees with education in food science and technology, i.e. knowledgeable in the field of food processing, but they still lack the experience and information regarding food safety. This prevents them from effectively implement all 12 steps of HACCP on their own. In addition, the knowledge management is crucial for HACCP implementation. Many graduates have good knowledge, but when they have to put the knowledge into work, they cannot manage the knowledge they have to implement the proper HACCP system.

## 7. Conflicts among the consultants, auditors and government officers.

## 8. There is confusion on HACCP implementation because there are different opinions among the consultants, auditors and government officers. Thailand should appoint a board of committee to execute the arguments among the consultants, auditors and government officers so that the industries will be able to implement the HACCP in the right direction.

## 9. Unaware of the impact of HACCP system deviation.

Even though many staffs are trained and understand the system (GMP&HACCP), they don't realize the impact of the deviation. This is why contamination is frequently occurred and it is difficult to find the sources of contamination.

Therefore, I would like to suggest that the training course should emphasize on hazards analysis with full information and explanation the reasons of being a hazard of concern. Impacts of deviation should also be included in the course. Moreover, the course should be designed in a way that knowledge management is encountered.

There should be many levels of courses, such as courses for managers, supervisors and workers who are not well educated. Relevant courses such as knowledge management, risk assessment should also be created.

## Respondent O

### **Q 1 What are the main incentives for establishing & overseeing a National accreditation Programme and what were the challenges you faced?**

My experience in establishing and overseeing a National Accreditation Programme has been in relation to exports from India. This basically covers sectors including fishery, dairy, honey, poultry, black pepper, gelatine, basmati rice, processed foods, etc. Under the programmes, processors are assessed against requirements laid down which cover GMP/ GHP and HACCP and those having the capabilities are approved for the purpose of exports. The exporters once approved are allowed to export subject to their compliance with the norms for the systems requirements as well as the SPS measures in terms of specification requirements imposed by the country of import. Regular surveillance audits of processors are carried out ranging from monthly to once in three months to ensure their continued compliance to norms. During these compliance visits, samples of raw material, finished products and hygiene requirements are drawn and tested in governmental or government approved labs.

Such a programme for export is more significant for countries that are major exporters. Some of the main incentives in establishing and overseeing such programmes are highlighted below:

- (i) **Essential for trading** – Many importing countries require that for trade with their country, the exporting country should have implemented legislation and controls equivalent to theirs. The Competent Authority should oversee the implementation of food control by the industry as a form of guarantee or assurance. This is one of the major reasons for establishing a National accreditation programme for exports to cover GMP & HACCP. To meet the requirement of the European Union, fish & fishery products, dairy products, honey, gelatine, egg products and poultry products have been brought under such systems. To ensure residue controls, the CA also implements Residue Monitoring Programmes at farm as well as for the entire chain. For export of products like rice, sesame seeds, groundnut, etc to Russia the CA needs to certify the pesticide usage. India is approving and registering processors implementing Good Practices and after ensuring the pesticide residues in the consignments exported.
- (ii) **Minimize trade impediments** – Such accreditation programmes which are based on ensuring compliance to Good Practices &/ or HACCP minimize impediments to trade by reducing the time for inspection and testing at the importing end; minimize and even eliminate rejection or noncompliance at the point of import; avoids duplication of inspection, sampling and tests at two levels i.e. at the exporting and importing ends and lead to usage of collective resources more efficiently and effectively. An eg cited is the case of black pepper exports to US from India which requires each consignment to be detained for checks and only those passing as per USFDA are cleared. The US Authorities, however recognize the ‘Certificate of Inspection’ of Export Inspection Council, India, and consignments accompanied with such certificates are directly allowed a green channel entry with both exporters & importers having benefited. Such certificates of inspection are given only for consignments produced by approved processors under an Accreditation programme and based on their implementing food safety management systems in their processing.

- (iii) **Cost benefit** – A main incentive for implementation of such accreditation programmes is that processors are able to meet the importing governments as well as buyers requirement as a result cost of recall, cost of testing at importing end and cost of destruction of consignments is minimized leading to an overall financial benefit for both the country as well as trade.
- (iv) **Agreements/ MoUs/ MRAs** – Such accreditations facilitate negotiating and concluding Equivalence Agreements/Arrangements and MRAs/MoUs for recognition of food control systems and certification by the importing country. The exporting country through such programmes has already a basic system in place which can be slightly tweaked to cover requirements of the importing country. The recognition agreements between India and Singapore in the area of food products were facilitated due to already existing systems in place for egg products, marine products, etc.
- (v) **Country image** – Through such accreditation & controls, it is ensured that inferior quality products are not exported by unscrupulous one-time or fly-by-night operators thus maintaining a country image. An example can be cited in the case of red chillies export which had suffered a setback due to use Sudan Red by certain unscrupulous manufacturers. A registration & approval programme for exporters was established under which all export of chillies was made mandatory.
- (vi) **Capacity Building** - A National accreditation programme for exports helps in ‘Capacity Building’ in a country with respect to product as well as systems. With a mandatory control programme, the weaknesses are identified in both processing units and at country level and so that these can be strengthened. Example is the strengthening laboratories in the country to test for dioxin through GCHRMS, antibiotic residues such as chloramphenicol, nitrofurans and their metabolites through HPLC MS MS (high levels of sensitivity). At the processors level, through continuous monitoring by the National Authority under their accreditation programmes, the exporters understand the weaknesses in their system and strengthen the same. Examples are available in the fishery sector where most processing units are implementing international norms whether for domestic production or exports.
- (vii) **Solving Non- tariff issues** - Helps in sorting non-tariff issues with importing governments as the cause of exporters is taken up at governmental levels who being fully aware of the issues, as the same are under their controls, can negotiate these effectively rather than these being taken up by individual exporters. An eg can be cited in the case where consignments of fishery products containing nitrofurans metabolites in excess of EU requirements and exported to UK were being destroyed rather than being returned back to the country of origin (India). Negotiations were held for return of consignments on the grounds that each consignment contained a number of batches which would be checked batchwise and those not complying destroyed. After continuous discussions over more than 6 months the UK authorities agreed to return such products.

## Challenges

- (i) **Co-ordination between different departments** – In India, various government departments have a role in different parts of the supply chain. To ensure safe food, it is essential to establish proper coordination as well as flow of information between these. For eg in the case of dairy products, the Ministry of Agriculture (Department of Animal Husbandry) is responsible for implementation of disease surveillance as well as Good Animal Husbandry and Veterinary Practices, the Export Inspection Council has the responsibility of approval of processors for exports and the Ministry of Health is responsible for dairy products for domestic consumption. The linkages between these departments are essential to ensure that correct animal related practices are followed by Department of Animal Husbandry. Further in case of rejections for exports due to contaminants or residues higher than norms as detected by Export Inspection Council, it also becomes necessary to communicate to Ministry of Health so that such product is not released for domestic consumption. This was a major challenge
- (ii) **Infrastructural requirements/ capacity building** – Establishing infrastructural facilities such as cold chain, laboratories with the required capabilities in required numbers to cater to the entire country was a major challenge which required support of government as well as private sector.
- (iii) **PriInterviewee production not well addressed** – This was one of the biggest challenges and remains so even today. In a country like India with a large number of small size farms, it remains a challenge to make them aware and implement the Good Agricultural Practices and maintain the required records. It is even more difficult to trace back products to farms as linkage between farmers and processors is very weak due to the longer supply chain with production by small farmers, consolidation of produce by aggregators, auctioning of mixed material at market places and finally processing at the processors end.
- (iv) **Assessors competencies & capabilities** – The entire change from inspections to assessments has been equally challenging as it requires manpower to first unlearn their inspection approach & skills and then learn the art of assessment with a view to detection of non-conformities, differentiating between the critical and minor ones, working with a positive approach so that processors upgrade rather than focussing on closure of units and penalties. In addition to the above, it also requires personnel to have a scientific and risk-based understanding, knowledge and approach to be able to justify the reasons for their observations. This has been especially important with the increasing knowledge of manpower in industry.

**Q 2 What are your country's main incentives for increasing HACCP implementation and what are the main challenges you faced?**

#### **Incentives for Increasing HACCP Implementation**

- (viii) **Essential for trading** – HACCP implementation is a mandatory requirement by many importing governments for imports. Egs are mandatory HACCP requirements by European Union for fish & fishery products, dairy products, egg products and poultry products; Singapore for egg products, USA for fish & fishery products, low acid canned foods, poultry products, dairy products, etc

- (ix) **Competitive Advantage** – Industry uses HACCP certification as a marketing advantage over industries that have not implemented such systems and therefore the focus on implementation.
- (x) **Buyers' Requirements** – Earlier it was the overseas organized retailers such as Marks & Spencers, Walmart, etc who had made HACCP implementation a mandatory requirement for certain products for stocking these on their shelves. Gradually within the country also customers such as railways, defence, large processing units, organized retail in India have also realised the importance of HACCP for ensuring a safe food and are in a limited way making this as a requirement although it is still not an absolutely essential.
- (xi) **Agreements/ MoUs/ MRAs** – Implementation of HACCP facilitates negotiating and concluding Equivalence Agreements/Arrangements and MRAs/MoUs for recognition of food control systems and certification by the importing country. The exporting country through such programmes has already a basic system in place which can be slightly tweaked to cover requirements of the importing country. The recognition agreements between India and Singapore in the area of food products were facilitated due to already existing HACCP systems which were in place for egg products, marine products, etc.
- (xii) **International Standards Recognize HACCP** – An easy step-by –step approach recognized in Codex standards and therefore compatible with SPS Agreement has made the system widely acceptable in India. Further there is not much awareness about other risk –based systems referred to in the Codex GMP document so this is the system of choice.
- (xiii) **Promotion by Government** – Government is actively promoting HACCP systems through awareness programmes by various departments, in educational curricula in Food Science & Technology courses. Further, Ministry of Health is developing requirements in a phased way for implementation by industry on a voluntary basis. Codex HACCP has been adopted as a National Standard.

## Challenges

(i)**Consultants Role** – Industry lacks technical expertise to carry out hazard analysis and develop the HACCP Plan as a result they use consultants. Many consultant are generally not aware of the specific industry and therefore prepare an impractical or an unmanageable HACCP with either too many or incorrect CCPs leading to a HACCP Plan which is ineffective for a safe food. There are instances of Civil or Mechanical engineers assisting industry to implement such systems who have limited theoretical knowledge on micro-organisms and the conditions for their growth and survival.

(ii)**Effective HACCP implementation** –The adequacy and effectiveness of HACCP implementation is also a challenge. Issues or gaps noticed relate to **correct identification of CCPs**; adequacy of personal Hygiene; records not correctly filled at the time of occurrence of event; cross-contamination aspects; calibrations not done at appropriate frequency; change rooms maintenance, bare minimal testing which do not assure safety eg testing of water or raw materials; inadequate temperature controls, poor equipment maintenance; non-availability of required number of qualified personnel at processor end; no or improper validations to ensure effective HACCP Plan; sampling procedures



not correctly followed, etc. Low surveillance frequency (generally once in 6-months) also leads to inappropriate HACCP maintenance.

**(iii) Management commitment lacking** – The processor normally implements in case of pressure to comply either by government or demand from buyer or importing government and not due to the fact that the systems will lead to a safe product. Due to this, once implemented, the processor tends to neglect the system and the same is only a paper and record keeping exercise where the authenticity of records is uncertain. Most of the efforts by the government are also generally towards export and not much focus is on domestic sector.

Another reason for low management commitment is due to the fact that most of the hazards encountered and rejections are on residues which are introduced during production and even though all the steps are followed, the processor is not able to control these hazards. Examples include Cadmium in fishery products, Lead in milk, Nitrofurans & chloramphenicol in animal products.

Processors also do not fully believe that safety of the foods processed by them lies solely with them as in many cases foods develop hazards due to poor storage conditions. It is common to see frozen foods in a thawed condition in retail shops due to fluctuating power conditions or erratic power supply.

**(iv) Assessor competencies & capabilities** – Development of capable assessors in sufficient numbers with the scientific and risk-based understanding, knowledge and approach is a major challenge faced. This is especially important not only for them to be able to do a correct assessment but also to be able to justify the reasons for their observations.

#### **Practical Advice**

- i) In the initial stages the HACCP implementation should be government driven with assistance from larger buyers especially retail.
- ii) Training should be strengthened for both sets of persons ie assessors & consultants
- iii) Good Practices – Agriculture, Veterinary & Animal Husbandry should be implemented simultaneously along with the HACCP and should be driven by government.
- iv) Surveillance should be more frequent with hand holding of industry. Should be a phased implementation with more encouragement and less emphasis on penalties. Focus also to be on GMP/GHPs initially and a simplified HACCP with minimal CCPs.

Respondent T

**"In your opinion, what are the incentives for your country to increase HACCP implementation, and what are the main challenges?"**

*The incentives for small businesses to implement HACCP has been the introduction of legal requirements in tandem with the availability of appropriate training and industry specific guidance /best practice documents/ appropriate food safety management systems based on HACCP principles. The development of a new method of applying HACCP principles (developed by Salford University for the Food Standards Agency) has facilitated the up-take of HACCP in 300,000 small catering businesses.*

*For larger companies the incentives have been either (1) to meet international best practice as part of general quality initiatives or (2) to meet the requirements of large retailers. The retail sector in the UK has had a significant impact on HACCP implementation over a 20 year period. All suppliers into the retail sector have had to implement HACCP as part of contractual requirements- independently of any legislation. This includes businesses across the food chain.*

**> "Have you been involved in any initiatives or approaches to promote adoption of HACCP?"**

Yes.

(1)Development of a new method of applying HACCP principles.

(2)Development and delivery of HACCP educational opportunities.

**> If yes, please summarise the initiative, the main outcomes and lessons learned**

(1)

*I led the multi-disciplinary team that produced a new method of applying HACCP principles whilst on secondment to the Food Standards Agency 2001-2003. (As referenced in: FAO/WHO Guidance to governments on the application of HACCP in small and less developed food businesses). This output the cumulation of extensive research into how HACCP principles could be applied in commercial kitchens that I first began in 1989.*

The new method was disseminated extensively through the literature / conferences etc. The Food Standards Agency(FSA) minimized the content of the original version - but retained its name 'Safer Food Better Business' - to enable dissemination at no cost to 300,000 businesses.

The 'new method' has since been the subject of 5 years of further research and development to create a complete food safety management system (GHP and HACCP) that would meet the needs of catering and food service business worldwide - of any size or sector. This product is now available as 'Menu-Safe' ([www.menu-safe.com](http://www.menu-safe.com)) with versions in English, Spanish and Arabic. Currently being delivered by local partners in Europe, XXX XXX and Central America. Research identifies significant success in terms of improved food safety behavior.

The major lesson learned from this project is that if HACCP can be communicated to businesses in a language they can understand and in a format that is practical and relevant to them - they can and will use it! However, the quality of training is still a limiting factor given the lack of suitably qualified and experienced trainers at all levels (see below). Any strategy to accelerate HACCP uptake must identify methods to address this skills gap at the outset.

(2)

It my experience the major hurdle to HACCP implementation is the lack of understanding of how the principles are applied in practice. This conviction, led me to re-enter education in 1998 and open up opportunities for HACCP education that extended beyond the existing short courses (1-5 days). I created and delivered the worlds first HACCP Masters program. (Funded by a UK Government Research Council) This involved collaboration with experienced international HACCP experts, food industry practitioners from large multi-nationals and small businesses, Government scientists etc. The reality of HACCP practice (rather than 'theory') was documented and through real life case studies over 300 students from 30 countries have shared their experiences and studied on this program - which is delivered entirely by e-learning. There are now specialist modules for agronomy, the meat industry, catering and food service and manufacturing.

The material from this program has been disseminated through published books, conferences and academic papers. The curriculum/course content has been shared with numerous Universities - including many from developing countries. Many of the modules have been used to develop intensive training

*for practitioners, trainers, food inspectors, policy makers and other stakeholders.*

*The key lesson learnt from this project is that for HACCP to be implemented successfully - educational opportunities for all stakeholders need to be made available. This can be accelerated significantly by using e-learning mechanisms.*

