



**CHALMERS**

# **Processes in management of food traceability**

A cross-case study between Spain and Sweden

Bachelor thesis for International Logistics Program

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**DEPARTMENT OF MECHANICS AND MARITIME SCIENCES**

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CHALMERS UNIVERSITY OF TECHNOLOGY  
Göteborg, Sweden, 2025



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## PREFACE

This bachelor's thesis was written during the spring semester of 2025 as part of the Bachelor Programme in International Logistics at Chalmers University of Technology. The project also serves as the final requirement to complete the Bachelor's Degree in Industrial Technologies Engineering at the Polytechnic University of Valencia (UPV). The thesis corresponds to 15 ECTS credits and focuses on the administrative and logistic processes used by public authorities to ensure food and fish traceability in Spain and Sweden.

The research was carried out independently and included interviews with representatives from relevant government agencies. The project was conducted during an academic exchange period in Sweden, offering a valuable opportunity to compare two different national systems and to learn from both academic and cultural perspectives.

I would like to sincerely thank my supervisor at Chalmers, Martin Larsson, for their continued support and guidance throughout the process. I am also grateful to the professionals who participated in the interviews and contributed with their insights and experience.

This thesis marks the completion of my undergraduate studies and has been a challenging but highly rewarding experience

*Pablo Mayo Castillo*  
*Chalmers University of Technology*  
*May 2025*

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### **SAMMANDRAG (in Swedish)**

I en värld där konsumenterna kräver större transparens och säkerhet när det gäller maten de äter har spårbarhet blivit en kritisk del av moderna livsmedelssystem. Förordningar inom EU har gjort spårbarhet av livsmedel och fisk till ett lagkrav, men hur dessa regler implementeras kan skilja sig avsevärt från ett land till ett annat. Den här avhandlingen undersöker hur offentliga myndigheter i Spanien och Sverige hanterar spårbarhet genom administrativa och logistiska processer, vilket ger ett praktiskt perspektiv på hur teori och lagstiftning omsätts i verklig handling.

Forskningen utgår från en kvalitativ fallstudiemetod, baserad på intervjuer med representanter från myndigheter som ansvarar för spårbarhetsarbetet i de båda länderna. Syftet är att förstå hur inspektioner, dokumentation, samordning och kontrollmekanismer används i praktiken, och hur dessa skiljer sig mellan en centraliserad modell som Sveriges och en decentraliserad struktur som Spaniens. Studien reflekterar också över den mänskliga sidan av spårbarhet; hur kommunikation, förtroende och professionella bedömningar spelar nyckelroller för att säkerställa att systemen fungerar som avsett.

Resultaten visar på både gemensamma utmaningar och kontrasterande tillvägagångssätt. Studien belyser att framgångsrik spårbarhet inte bara beror på starka regler och moderna verktyg, utan också på människorna och institutionerna bakom dem. Genom att erbjuda en jämförande och grundad syn bidrar denna forskning till en djupare förståelse för hur livsmedelssäkerhet hanteras i praktiken och hur framtida förbättringar kan styras av både struktur och erfarenhet.

**Nyckelord:** Spårbarhet, reglering, logistik, efterlevnad, myndigheter, inspektion, styrning, samordning, transparens, verkställighet

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## **ABSTRACT**

In a world where consumers demand greater transparency and safety in the food they eat, traceability has become a critical part of modern food systems. Regulations across the European Union have made food and fish traceability a legal requirement, but the way these rules are implemented can differ significantly from one country to another. This thesis explores how public authorities in Spain and Sweden manage traceability through administrative and logistic processes, providing a practical perspective on how theory and legislation are translated into real action.

The research adopts a qualitative case study approach, based on interviews with representatives from government agencies responsible for traceability enforcement in both countries. The aim is to understand how inspections, documentation, coordination, and control mechanisms are used in practice, and how these differ between a centralized model like Sweden's and a decentralized structure like Spain's. The study also reflects on the human side of traceability; how communication, trust, and professional judgment play key roles in ensuring that systems work as intended.

Findings reveal both common challenges and contrasting approaches. The study highlights that successful traceability depends not only on strong regulations and modern tools, but also on the people and institutions behind them. By offering a comparative and grounded view, this research contributes to a deeper understanding of how food safety is managed in practice, and how future improvements can be guided by both structure and experience.

**Keywords:** Traceability, Regulation, Logistics, Compliance, Authorities, Inspection, Governance, Coordination, Transparency, Enforcement

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## ACRONYMS AND TERMINOLOGY

EU	European Union
EC	European Commission
RFID	Radio-Frequency Identification
EFSA	European Food Safety Authority
HACCP	Hazard Analysis and Critical Control Points
DG SANTE	Directorate-General for Health and Food Safety
RASFF	Rapid Alert System for Food and Feed
EURLs	European Union Reference Laboratories
OLAF	European Anti-Fraud Office
AESAN	Agencia Española de Seguridad Alimentaria y Nutrición
MAPA	Ministerio de Agricultura, Pesca y Alimentación
SEPRONA	Sección de Protección de la Naturaleza
HaV	Havs- och vattenmyndigheten

# 1. INTRODUCTION

Following the EU's general food law No 178/2002 (European Commission, 2002), food traceability is the ability to track any food, feed, food-producing animal or substance that will be used for consumption, through all stages of production, processing and distribution. Food traceability plays a crucial role in ensuring food safety and sustainability, as products often travel long distances and pass through multiple handling stages. It ensures that every step in the supply chain, from fishing and food processing to distribution and retail, is documented and transparent. According to (Regattieri et al., 2007) traceability is important for food safety, as it allows quick action when contamination or health risks occur. If a product is unsafe, traceability helps authorities and companies recall it efficiently, protecting public health.

Traceability also builds consumer trust (Asante-Addo & Weible, 2020). People want to know where their food comes from and how it was handled. Additionally, food traceability supports sustainability. It ensures ethical sourcing, prevents food fraud, and reduces waste by improving inventory management (Tran et al., 2025).

Governments and international organizations have established regulations to improve traceability in the food industry. Many companies use modern technology to enhance tracking and verification (Tran et al., 2025). As global food trade expands, strong traceability systems become even more important. In a world where food safety and quality matter more than ever, traceability is a powerful tool that benefits consumers, businesses, and public health alike.

## 1.1 Background

Food traceability from its source to the consumer is a key part of food safety. It helps ensure that food is properly handled, meets quality standards, and follows regulations. Over time, the way food is tracked has improved, with more rules and better technology. However, keeping an effective traceability system is not just about technology it also depends on how authorities manage and organize the process.

To make food traceability work well, there needs to be good organization, strong management, and clear rules. Authorities play an important role in checking that businesses follow the law and keep the right records. In the fish industry, traceability is more complicated because fish travels long distances, changes hands many times, and goes through different processing steps before reaching the consumer. To help with this, electronic traceability systems have been introduced. These systems help authorities collect, store, and share important food safety data. However, fish traceability and general food traceability often use different systems, which can make things harder when managing information and ensuring everything follows the rules.

Many traceability systems use labels, barcodes, RFID technology, and digital records to track food. Some use modern digital solutions, while others still use paper records and manual processes. How governments and businesses use these systems is different, which affects how information is collected, stored, and shared.

This study focuses on how authorities handle food traceability through management and logistics. Understanding these processes is important to improve food safety, prevent food fraud and help different organizations work better together.

## **1.2 Aim of the study**

The purpose of this study is to analyze how authorities manage traceability through administrative and logistic processes. This research aims to understand the role of authorities in managing traceability-related reporting, data collection, and regulatory enforcement to ensure compliance with legal requirements.

This study will compare how different administrative and logistic processes affect food traceability management. It will examine how authorities verify compliance, coordinate inspections, and ensure the smooth flow of information between institutions, focusing in a comparative analysis between Spain and Sweden. The study also aims to identify challenges, and areas for improvement in the way governments handle food safety and traceability.

This research will provide insights into how authorities can improve efficiency, cooperation, and enforcement in fish traceability. The findings could help policymakers, businesses, and regulatory bodies develop better strategies for ensuring food safety and compliance.

## **1.3 Research questions**

This study aims to explore how food safety authorities manage traceability through administrative and logistic processes. To achieve this, the following research questions have been formulated:

1. What are the key administrative and logistic processes used by authorities to ensure fish traceability?
2. How do administrative and logistic approaches to fish traceability differ between Spain and Sweden?
3. How do governmental authorities cooperate to ensure traceability?
4. How do governmental authorities communicate across different administrative levels within the country and with the European Union?
5. What challenges do authorities face in managing traceability systems efficiently?

## **1.4 Delimitations**

This study focuses on food and fish traceability within the European Union, with a particular emphasis on Spain and Sweden. It will analyze the laws and mandatory regulations established by the European Union, the Spanish government, and the Swedish government. Additionally, research articles from the Scopus database will be used as relevant academic sources.

Furthermore, this study will incorporate official legal documents and decrees from the European Union, Spain, and Sweden, along with information from the official websites of the regulatory agencies in each country. These sources will provide a comprehensive understanding of the regulatory framework and its implementation.

The research will specifically examine the administrative aspects and logistical processes involved in traceability enforcement in the aforementioned countries.

## **2. THEORY**

### **2.1 INTRODUCTION TO FOOD TRACEABILITY**

Food traceability is the ability to track and follow food products throughout the supply chain, from production to consumption, ensuring transparency, safety, and regulatory compliance (Olsen & Borit, 2013). This system allows businesses and authorities to trace food backward to its source and forward to its final destination, helping to prevent fraud, ensure food authenticity, and improve risk management (Islam & Cullen, 2021).

The European Union's General Food Law (Regulation (EC) No. 178/2002) defines traceability as the ability to trace and follow food, feed, or any substance incorporated into food through all stages of production, processing, and distribution (EU, 2002). Similarly, ISO 22005 establishes international guidelines for traceability in the food and feed chain, emphasizing the importance of identification, data recording, and accessibility to maintain food integrity (ISO 22005:2007).

Food traceability can be categorized into two main types: internal traceability and external traceability (Qian et al., 2022). Internal traceability refers to the tracking of food products within a single company or organization. It ensures that all raw materials, ingredients, and processing steps are properly documented, allowing businesses to monitor their own production processes. On the other hand, external traceability involves tracking food products across different stages of the supply chain, from suppliers to distributors and retailers (Qian et al., 2022). This type of traceability facilitates data exchange between multiple stakeholders, ensuring that information flows seamlessly between producers, transporters, and regulators (Aung & Chang, 2014).

According to (Olsen & Borit, 2013), a well-functioning traceability system allows businesses and regulators to quickly respond to food safety incidents, conduct recalls efficiently, and enhance consumer trust. It also supports compliance with mandatory labeling, certification programs, and sustainability standards in global food markets.

### **2.2 LEGAL FRAMEWORK**

#### **2.2.1 Legal Framework in European Union**

Food traceability regulations in the European Union (EU) are designed to ensure food safety, prevent fraud, and protect public health by allowing authorities to track food products throughout the supply chain. These regulations establish clear responsibilities for food businesses, farmers, distributors, and retailers, requiring them to maintain records of their products' movements. The EU legal framework for food traceability is primarily governed by several key regulations (Jeuring, 2023).

### **2.2.1.1 Regulation (EC) No 178/2002 – General Food Law**

The General Food Law (Regulation (EC) No 178/2002) serves as the foundation for food traceability rules within the EU. Introduced after major food safety crises in the late 1990s, this regulation establishes the “one step back, one step forward” principle, which means that every food and feed business must be able to identify both the immediate supplier of their products and the next recipient in the supply chain (Qian et al., 2022). The main objective of this system is to ensure that, in the event of contamination or fraud, authorities can quickly identify and remove affected products from the market (European Commission, 2002).

In addition to setting traceability requirements, this regulation also led to the establishment of the European Food Safety Authority (EFSA). This agency is responsible for providing scientific risk assessments, supporting food safety policymaking, and assisting in crisis management within the EU. By ensuring a science-based approach to food safety, EFSA plays a key role in maintaining consumer confidence and enforcing food regulations (EFSA, 2021).

### **2.2.1.2 Regulation (EC) No 931/2011 – Traceability for Animal Products**

Given the higher safety risks associated with food of animal origin, the Regulation (EC) No 931/2011 introduces additional traceability requirements specifically for meat, dairy, fish, and eggs. Under this regulation, businesses handling animal-based food products must maintain detailed records, ensuring that key information is available at all times. These records must include the precise origin of the product, batch numbers, expiration dates, and complete details of suppliers and recipients (European Commission, 2011).

This regulation aims to strengthen the monitoring of foodborne pathogens and diseases, such as Bovine Spongiform Encephalopathy (BSE, also known as mad cow disease) and Salmonella outbreaks. By requiring more detailed documentation, authorities can identify contamination sources more quickly and prevent affected products from reaching consumers (European Commission, 2011).

### **2.2.1.3 Regulation (EC) No 852/2004 – Food Hygiene Regulations**

To complement traceability laws, the Regulation (EC) No 852/2004 establishes hygiene standards for all businesses involved in food production, processing, and distribution. This regulation mandates that all food businesses must implement hygiene procedures that align with Hazard Analysis and Critical Control Points (HACCP) principles. Additionally, businesses are required to keep comprehensive records of food handling activities, ensuring that food safety risks are minimized at every stage of the supply chain.

By enforcing hygiene and safety protocols, this regulation plays a crucial role in reducing foodborne illness risks and improving overall food quality. The focus on HACCP ensures that critical points in food production are continuously monitored, allowing businesses to detect and resolve potential issues before they escalate (European Commission, 2004).

#### **2.2.1.4 Regulation (EU) No 1169/2011 – Food Information to Consumers**

Regulation (EU) No 1169/2011 governs food labeling and consumer information within the EU. This regulation ensures that food labels contain clear, accurate, and traceable information regarding the composition, origin, and characteristics of food products. By enforcing transparency in labeling, this regulation strengthens traceability systems, allowing both authorities and consumers to make informed decisions about food products (European Commission, 2011).

#### **2.2.2 Legal Framework in Spain**

Spain follows the European Union's traceability framework, integrating Regulation (EC) No 178/2002, Regulation (EC) No 852/2004, and other EU food safety laws into its national legal system. The country has developed specific national regulations and institutions to ensure compliance with food traceability requirements (Ramón & Lull, 2019).

The main legislation governing food traceability in Spain is based on the EU's General Food Law. The country has implemented Royal Decree 1945/1983, which regulates food control, safety, and traceability within Spanish territory. This decree establishes penalties for non-compliance and sets out control mechanisms to ensure that all food products can be tracked throughout the supply chain. Additionally, Law 17/2011 on Food Safety and Nutrition reinforces food traceability by requiring businesses to maintain records of food origins, suppliers, and destinations (Ramón & Lull, 2019).

Spanish authorities also apply Royal Decree 640/2006, which regulates food product transportation, ensuring that traceability data accompany shipments. These national regulations complement EU laws by providing detailed guidelines for businesses operating in Spain (Ramón & Lull, 2019).

#### **2.2.3 Legal Framework in Sweden**

Sweden, as an EU member, follows the same general legal framework as other European countries. However, Sweden's food safety system is highly decentralized, relying on multiple authorities at both the national and municipal levels. The country is known for its strict food control policies, particularly in sustainability and animal welfare.

Swedish food traceability laws are mainly governed by the Food Act (Livsmedelslagen, 2006:804), which aligns with EU regulations. This law establishes traceability obligations for all food businesses, requiring them to document food movement across the supply chain. The Animal Welfare Act (Djurskyddslag 2018:1192) also plays a role in traceability for livestock and animal-derived products, ensuring compliance with strict welfare and safety measures.

### **2.3 REGULATORY AGENCIES**

The European Union (EU) has established a robust framework of institutions that work together to ensure that food safety and traceability laws are correctly implemented and enforced. These agencies are responsible for scientific risk assessments, policy development, regulatory compliance, and enforcement across all EU member states (Wang et al., 2014).

## **2.3.1 European Agencies**

### **2.3.1.1 European Food Safety Authority (EFSA)**

The European Food Safety Authority (EFSA) is the primary scientific agency responsible for assessing risks related to food safety, including traceability. Established in 2002 under Regulation (EC) No 178/2002, EFSA operates independently and provides scientific opinions, risk assessments, and policy recommendations to support food safety decision-making at the EU level (EFSA, 2023).

EFSA's role in food traceability includes:

- Evaluating food safety risks related to contaminants, food fraud, and mislabeling.
- Providing scientific data to support food traceability legislation.
- Coordinating with national food safety agencies to ensure compliance.

EFSA does not directly enforce laws but supports policymakers and national regulatory authorities with data-driven guidance and expert advice (Eissa et al., 2024).

### **2.3.1.2 European Commission's Directorate-General for Health and Food Safety**

The Directorate-General for Health and Food Safety (DG SANTE) is part of the European Commission and is responsible for developing, implementing, and enforcing EU food safety regulations. This agency ensures that traceability laws are applied consistently across all member states by working closely with national food safety authorities (European Commission, 2022).

DG SANTE's role includes (European Commission, 2022):

- Drafting and proposing EU food safety and traceability laws.
- Monitoring member states' enforcement of food safety regulations.
- Conducting audits and inspections in food businesses to ensure compliance.

Through official controls and compliance programs, DG SANTE helps ensure that EU-wide food traceability standards are followed consistently (European Commission, 2022).

### **2.3.1.2 Rapid Alert System For Food and Feed**

The Rapid Alert System for Food and Feed (RASFF) was established to facilitate real-time communication between EU countries when food safety risks or traceability violations are detected. This system allows member states, the European Commission, and food businesses to quickly share information about contaminated products, fraudulent food labeling, and supply chain disruptions (RASFF, 2023).

RASFF functions as an early warning mechanism, helping regulatory agencies prevent foodborne outbreaks and remove unsafe products from the market. Its online database is accessible to the public, allowing consumers to check food recalls and safety notifications (RASFF, 2023).

#### **2.3.1.4 European Union Reference Laboratories**

The European Union Reference Laboratories (EURLs) are specialized laboratories that support food safety enforcement and traceability verification. These labs conduct scientific testing to confirm that food products comply with EU regulations on contamination, labeling, and authenticity (EURLs, 2022).

Following (EURLs, 2022) the key roles of EURLs include:

- Testing food samples for contaminants and fraud.
- Developing new analytical methods for food traceability.
- Providing technical support and training for national food control laboratories.

By maintaining high scientific standards, EURLs help improve the accuracy and reliability of food traceability data across the EU (EURLs, 2022).

#### **2.3.1.5 European Anti-Fraud Office**

The European Anti-Fraud Office (OLAF) investigates fraudulent activities related to food traceability and safety. It works alongside DG SANTE and national enforcement agencies to detect and prevent fraudulent labeling, misrepresentation of food origins, and illegal food imports (OLAF, 2023).

OLAF has been instrumental in investigating high-profile food fraud cases, such as the 2013 Horse Meat Scandal, where undeclared horse meat was found in beef products across multiple EU countries. The agency works with member states to strengthen laws against food fraud and improve traceability measures (OLAF, 2023).

### **2.3.2 Spanish Agencies**

Spain has a multi-level regulatory system for food traceability, with responsibilities divided between national agencies, regional authorities, and enforcement bodies. These institutions work together to ensure that EU traceability laws are properly implemented and that food safety is maintained throughout the supply chain.

#### **2.3.2.1 Spanish Agency for Food Safety and Nutrition**

The Agencia Española de Seguridad Alimentaria y Nutrición (AESAN) is the primary body responsible for food safety, risk management, and traceability enforcement in Spain. It operates under the Ministry of Consumer Affairs and ensures that national and EU food traceability regulations are properly implemented (AESAN, 2023).

AESAN's main responsibilities include:

- Developing food safety policies in line with EU regulations.
- Coordinating food inspections and risk assessments.
- Managing food crisis situations by identifying and tracking contaminated products.

- Supervising food labeling and fraud prevention.

AESAN works closely with EFSA and DG SANTE, ensuring that Spain complies with EU-wide traceability requirements (AESAN, 2023).

### **2.3.2.2 Ministry of Agriculture, Fisheries and Food**

The Ministry of Agriculture, Fisheries and Food (Ministerio de Agricultura, Pesca y Alimentación, MAPA) is the central Spanish authority responsible for the development and coordination of national policies related to agriculture, food safety, and fisheries (Hernández et al., 2021). In the context of food and fish traceability, MAPA plays a leading role in legislating, planning, and supervising the implementation of EU regulations across the national territory (Pons-Hernandez, 2023).

As (Hernández et al., 2021) states, within the ministry, the Secretaría General de Pesca is the department specifically responsible for coordinating fisheries policy and traceability systems related to seafood products. This includes monitoring compliance with EU standards, managing data reporting from the sector, and coordinating inspections at the national level. MAPA also provides technical guidance and collaborates with both regional authorities and European institutions to ensure consistent enforcement of traceability requirements.

As a policy-making body, MAPA is also involved in developing strategic plans to modernize traceability systems, promoting digitalization, and supporting sustainable practices within the food and fisheries sectors (Hernández et al., 2021). Its central position allows it to act as a link between local implementation and international regulatory alignment, making it a key actor in the traceability framework of Spain (Jeuring, 2023).

### **2.3.2.3 Regional Food Safety Authorities**

Spain's 17 autonomous communities have their own regional food safety agencies that conduct inspections, implement national food policies, and oversee traceability compliance at the local level. Each region is responsible for ensuring that food businesses maintain proper records and comply with traceability documentation requirements (Navarro et al., 2008).

Regional agencies work in direct cooperation with AESAN, particularly in cases of food recalls, fraud investigations, and traceability verification processes (Navarro et al., 2008).

### **2.3.2.4 Seprona**

The Sección de Protección de la Naturaleza (SEPRONA) is a specialized unit of the Guardia Civil responsible for preventing food fraud, illegal food trade, and environmental violations related to food production (Pons-Hernandez, 2023). Following (Pons-Hernandez, 2023) SEPRONA plays an essential role in:

- Investigating fraudulent food labeling and misrepresentation of food origins.

- Controlling illegal imports and ensuring traceability compliance in cross-border trade.
- Monitoring agricultural and livestock traceability to prevent illegal practices.

### **2.3.3 Swedish Agencies**

Sweden has a highly decentralized food safety system, where responsibilities are divided between national and municipal authorities. Swedish agencies focus on preventing foodborne diseases, ensuring traceability compliance, and maintaining high standards in food production and processing (Arias Schreiber & Gillette, 2023).

#### **2.3.3.1 Livsmedelsverket**

The Livsmedelsverket (Swedish National Food Agency) is Sweden's main authority for food safety and traceability enforcement. Following (Lundmark Hedman et al., 2021) it is responsible for:

- Monitoring and enforcing EU food traceability laws in Sweden.
- Providing food safety guidance to businesses and consumers.
- Coordinating inspections and laboratory testing for food authenticity.
- Managing Sweden's food recall system.

Livsmedelsverket works closely with EU institutions such as EFSA and DG SANTE to ensure Sweden meets European food traceability standards (Lundmark Hedman et al., 2021)

#### **2.3.3.2 Havs- och vattenmyndigheten**

The Swedish Agency for Marine and Water Management (Havs- och vattenmyndigheten, HaV) is a national authority responsible for the sustainable management of Sweden's marine and freshwater resources. It operates under the Ministry of Climate and Enterprise and plays a central role in implementing policies related to fishing, aquaculture, marine conservation, and water usage (Arias Schreiber & Gillette, 2023).

In the context of fish traceability, HaV is one of the key agencies responsible for enforcing both national and European Union regulations. The agency ensures that fish and seafood products are correctly registered, labeled, and traceable throughout the supply chain—from the moment they are caught or farmed, until they reach the market. This includes overseeing compliance with control systems for fishing quotas, landing declarations, and sales notes, which are essential for monitoring the origin and movement of fishery products (Hites et al., 2004).

HaV also manages the Swedish fisheries control system, which involves coordination with customs authorities, food safety bodies, and EU institutions. Its work supports the objectives of the EU Common Fisheries Policy (CFP), particularly regarding sustainability, transparency, and traceability (Hites et al., 2004).

In addition to regulation and enforcement, the agency contributes to the development of traceability strategies and national action plans, helping to improve the flow of information between actors in the seafood supply chain. HaV regularly collaborates with the Swedish Food Agency (Livsmedelsverket) to ensure that fish traceability aligns with broader food safety standards (Arias Schreiber & Gillette, 2023).

### **2.3.3.3 Jordbruksverket**

The Jordbruksverket (Swedish Board of Agriculture) regulates food traceability in agriculture, livestock, and animal-derived products (Lundmark Hedman et al., 2021). As (Lundmark Hedman et al., 2021) discuss, this agency ensures that:

- Farmers and food producers follow traceability documentation requirements.
- Imported and exported food products meet Sweden's traceability standards.
- Sustainability practices and animal welfare regulations are integrated into food traceability systems.

Jordbruksverket collaborates with municipal authorities and the Swedish Environmental Protection Agency to ensure sustainable food production and traceability compliance. (Lundmark Hedman et al., 2021)

### **2.3.3.4 Municipal Food Control Authorities**

In Sweden, local municipalities are responsible for conducting food inspections in restaurants, food processing facilities, and retail businesses (Granvik, 2012). Each municipality ensures that:

- Businesses keep proper traceability records.
- Food handling, storage, and labeling practices comply with national laws.
- Small food producers follow traceability requirements set by national agencies

## **3. METHODS**

### **3.1 METHOD SELECTION**

A case study approach was chosen for this research to explore how authorities in Spain and Sweden manage food and fish traceability through their administrative and logistical processes. As Yin (2009) points out, case studies are especially useful when studying complex systems in real-world settings, particularly when the boundaries between the issue being studied and its broader context are not clearly separated. This approach makes it possible to take a closer look at how things work in practice within the institutions that oversee traceability.

Yin (2009) also explains that case studies are well-suited for answering “how” and “why” questions, especially in situations where the researcher cannot influence what is happening. The purpose of this study is not just to describe the procedures authorities follow, but to understand why certain administrative and logistical strategies are chosen, and how these might vary between countries.

The research is designed as a comparative multiple-case study, focusing on two EU member states. Looking at both Spain and Sweden allows for a cross-case comparison, which is one of the main strengths of this kind of design Yin (2009). It helps highlight not only common approaches, but also country-specific differences in how traceability regulations are put into practice.

### **3.2 DATA COLLECTION**

This research relies primarily on qualitative data, collected through semi-structured interviews with individuals who are directly involved in traceability enforcement. These participants include professionals from governmental agencies, public health and inspection authorities, and institutions connected to food and fisheries regulation in both Spain and Sweden. The purpose of using interviews is to gather first-hand insights into how administrative and logistical processes are carried out, what challenges are faced, and how policies are interpreted and applied at different levels of the system.

As Yin (2009) notes, a strong case study should include multiple sources of evidence, not only to build a more complete understanding of the topic but also to increase the credibility of the findings. For this reason, in addition to interview data, this study draws on a wide range of secondary sources. These include official legal documents, regulatory frameworks, national and EU-level legislation, and detailed information published on the websites of relevant authorities, such as food safety agencies, ministries, and regional inspectorates.

Supporting this approach, Patton (2002) explains that qualitative data is typically gathered from three main types of sources: interviews, observations, and documents. In this research, the focus is primarily on interviews, as they allow participants to express their professional perspectives, day-to-day responsibilities, and opinions on how traceability systems function in practice. However, to provide context and support for these personal accounts, the study also incorporates a significant amount of document analysis, including EU regulations, national laws, policy guidelines, inspection protocols, and published reports from public agencies. These materials help to confirm, expand, or contrast the information shared during the interviews and contribute to a more grounded and balanced analysis.

### **3.3 SELECTION OF INTERVIEWED PARTICIPANTS**

The people interviewed for this study were selected based on their professional involvement in food and fish traceability. This included individuals working in national food safety agencies, regional inspection authorities, and other public institutions that play a direct role in the enforcement and coordination of traceability regulations. These professionals were actively involved in areas such as inspection planning, compliance monitoring, coordination between institutions, and administrative oversight, making them especially relevant for the goals of this research.

A purposive sampling strategy was used, meaning participants were intentionally selected because of their experience and expertise in the subject area. Rather than aiming for randomness, the focus was on speaking to people who could provide meaningful, detailed, and practical insights into how traceability systems function at an administrative and logistical level. This approach is particularly appropriate for case study research, where the depth and relevance of information are more important than the number of respondents (Yin, 2009).

There was no fixed number of interviews decided in advance. The goal was to continue gathering data until there was a sufficient range of perspectives to fully address the research questions. Following Yin (2009), the emphasis was on collecting rich and focused information rather than reaching a large sample size. To ensure diversity in the data, the study included participants from different agencies in both Spain and Sweden, allowing for a broader and more comparative understanding of how each country organizes and manages its traceability efforts.

### **3.4 INTERVIEW DESIGN AND IMPLEMENTATION**

To explore the research questions in depth and gain a better understanding of how traceability is managed from both administrative and logistical perspectives, a set of semi-structured interviews was developed and carried out. This type of interview was chosen because it provides a balance between structure and flexibility: while the researcher follows a prepared list of questions, participants are encouraged to speak openly and share insights based on their own experiences. This approach is particularly valuable in case study research, as Yin (2009) highlights, since it allows researchers to access the perspectives of individuals directly involved in real-life processes within their organizational and national contexts.

A total of 15 open-ended questions were designed to guide the interviews. These questions were grouped into four main areas that reflect the structure of the theoretical framework developed earlier in the study. The first part focused on administrative management, aiming to understand how compliance with traceability laws is monitored and enforced by public agencies. The second part addressed logistical processes, exploring how traceability is handled in practice, particularly in terms of inspections, movement of goods, and documentation. The third section examined coordination and communication between agencies, both at the national level and in collaboration with European Union institutions. Finally, the last part of the interview dealt with challenges and potential improvements, giving participants the opportunity to reflect critically on what works well and what could be changed to improve traceability systems.

All of these areas are closely connected to the three core components of the theoretical chapter: the role and responsibilities of regulatory agencies, the legal frameworks that shape traceability

policy, and the administrative and logistical mechanisms used to apply and enforce those policies.

The interviews were carried out online, as participants were located in different regions of Spain and Sweden. Online interviews allowed flexibility in scheduling and made it easier to include participants from various agencies. Before each interview began, participants received a brief explanation of the research objectives and were asked for informed consent to record the conversation. All participants agreed, and the interviews were fully recorded and supported by written notes taken during the meetings.

Each interview followed the same general structure, but the flexible format made it possible to ask follow-up questions when interesting or unexpected topics emerged. This often led to valuable additional insights that would not have been captured through a more rigid format. The interviews generally lasted between 45 minutes and one hour, giving participants enough time to reflect on their work and share their perspectives in detail.

After the interviews were completed, all recordings were transcribed and reviewed carefully. The answers were then analyzed and grouped by topic, first within each country, and then compared across the two national cases. This allowed the study to identify recurring patterns, differences in practice, and how national context may shape the way traceability systems are understood and implemented.

**Table 1**

*Information on interviews with Swedish agencies*

<b>Agency</b>	<b>Job title</b>	<b>Interview lenguaje</b>	<b>Interview duration</b>
Swedish Agency for Marine and Water Management	Responsible IT architect	English	42 minutes
Swedish Agency for Marine and Water Management	Senior advisor	English	31 minutes

**Table 2**

*Information on interviews with Spanish agencies*

<b>Agency</b>	<b>Job title</b>	<b>Interview lenguaje</b>	<b>Interview duration</b>
Secretaría General de Pesca, Ministerio de Agricultura y Pesca, Alimentación	Area manager	Spanish	56 minutes

Conselleria d'Agricultura, GVA	General Director of Fisheries	Spanish	31 minutes
Ministerio de Agricultura y Pesca, Alimentación	Assistant manager	Spanish	43 minutes

## 4. RESULTS

### 4.1 ADMINISTRATIVE MANAGEMENT

The interviews with agency representatives from both Spain and Sweden provided detailed insights into how administrative procedures are implemented to ensure fish and food traceability. Although both countries follow the general regulatory framework established by the European Union, their administrative practices reflect different institutional structures and operational approaches.

One of the main topics addressed in the interviews was how each agency ensures that businesses comply with traceability regulations. In Spain, this responsibility is shared between national institutions like the Secretaría General de Pesca and regional governments such as the Conselleria d'Agricultura. According to Spanish respondents, the process relies heavily on regular inspections and document checks, especially during the landing, transport, and sale of fish products. Businesses are required to maintain complete and up-to-date records, including landing declarations, transportation documents, and sales notes. Inspectors from both national and regional levels carry out these controls, often cross-checking information from various documents to verify consistency. Although some steps have been digitalized, one regional director noted that the systems used can differ between regions, which sometimes causes inefficiencies.

In Sweden, responsibility is more centralized, with the Swedish Agency for Marine and Water Management (HaV) taking the lead in both policy and oversight. Interviewees from the agency described a system that places a strong emphasis on digital recordkeeping and consistency across the country. Traceability data is entered electronically and stored in centralized databases, which can be accessed by inspectors and used to track products throughout the supply chain. According to the IT architect at HaV, this digitalization allows for faster and more accurate checks. Audits typically involve reviewing a digital trail of records and comparing them to physical operations when needed.

When asked about the kinds of documents reviewed during inspections, participants from both countries highlighted the importance of traceability logs, product origin declarations, and transport documentation. In Spain, these are often managed at a regional level, requiring coordination between local agencies and national authorities. In contrast, Sweden benefits from a unified data system that streamlines the process.

Both countries also explained how they respond in the case of a food safety incident or product recall. In Spain, the response involves coordination between the Ministry of Agriculture and regional authorities, depending on where the issue originates. There are standard protocols in place, but the involvement of multiple administrative levels can slow down the process. In Sweden, HaV leads the response effort in coordination with other national bodies and, if needed, EU institutions. Due to the centralized structure and the availability of digital records, the Swedish process tends to be quicker and more direct.

Another key aspect that emerged in the interviews was the level of collaboration between national, regional, and local authorities. In Spain, this collaboration is essential due to the decentralized nature of the government. However, it also means that traceability systems must be adapted to local conditions, leading to variations in implementation. In Sweden, the

centralized model reduces the need for cross-level coordination, making administrative processes more uniform.

## **4.2 LOGISTIC PROCESSES**

Logistical processes play a crucial role in ensuring that traceability systems function effectively across the supply chain. Through the interviews, representatives from both Spanish and Swedish agencies described how traceability is maintained as products move through different stages—from landing or harvesting to transportation, processing, and distribution.

In both countries, tracking the movement of fish and food products relies heavily on the continuous documentation and monitoring of each step. Participants explained that traceability starts as soon as the product is landed or harvested, with initial records being created at the point of origin. In Sweden, these records are immediately entered into a centralized digital system managed by HaV. This system allows different authorities to follow the movement of the product in real time and supports trace-back in case of incidents. In Spain, while digital systems are also in place, the process tends to be more fragmented, with regional authorities often managing their own platforms. This occasionally requires coordination between regional databases and national authorities to maintain a complete traceability chain.

When asked about inspections during transport or at border control points, Swedish authorities described a routine where traceability documents are checked electronically, allowing inspectors to quickly confirm product origin and handling history. The use of digital platforms reduces manual checks and speeds up the process. In contrast, Spanish participants noted that while border checks are also based on document verification, these can involve more paper-based procedures depending on the region or type of product. They also highlighted the importance of physical inspections when inconsistencies are detected or when documentation is missing or unclear.

Regarding the planning and execution of inspections, both countries adopt a risk-based approach, although they also conduct random checks. Authorities in Sweden use historical data, operator compliance history, and product type to prioritize inspections. This data-driven method allows them to allocate resources more efficiently. Spanish agencies also consider risk factors, particularly in regions with high fishing activity or known non-compliance issues. However, the existence of multiple administrative layers can influence how inspections are scheduled and executed, often requiring coordination between regional and national teams.

The inspection process itself tends to be similar in both contexts. Inspectors visit processing facilities, distributors, or markets and review traceability documents, cross-checking data entries with physical stock. They may also take samples or request additional documentation if something appears inconsistent. In Sweden, much of this process is facilitated through digital records, while in Spain, some regions still rely on mixed systems that combine digital and paper-based methods.

A common logistical challenge mentioned by interviewees in both countries involves imported and exported products. Because these products move across borders, authorities must verify that traceability data from foreign systems aligns with domestic and EU regulations. Swedish officials noted that coordination with customs and the use of EU-wide databases like TRACES make this process more manageable. In Spain, ensuring full traceability of imported goods

sometimes requires additional administrative steps, especially when dealing with third-country suppliers that follow different documentation standards.

### **4.3 COORDINATION AND COMMUNICATION**

The importance of coordination and communication among authorities emerged as a central theme during the interviews. While both Spain and Sweden operate under the same EU-wide regulatory framework, the way in which agencies communicate and collaborate—both within each country and with European institutions—differs in practice, reflecting the structure and culture of each national administration.

When asked about how traceability information is shared among departments and agencies, participants from Sweden described a relatively streamlined system. The Swedish Agency for Marine and Water Management (HaV) uses internal digital platforms that allow for efficient communication between inspection teams, policy units, and enforcement divisions. These systems make it easier to keep track of compliance records and ensure that all stakeholders are informed when irregularities are detected. There is also a strong emphasis on consistency and transparency, which, according to the senior advisor interviewed, helps maintain trust between departments and reduces misunderstandings.

In Spain, the communication system is more layered due to the involvement of both national and regional authorities. The area manager from the Ministry of Agriculture explained that while national systems exist, much of the coordination depends on direct communication between regional offices and the central government. Regional authorities often use their own databases and tools to monitor traceability, which sometimes creates gaps or delays when trying to share information across regions. However, officials also noted that this structure allows for more flexibility and adaptation to local realities. One regional director emphasized that close, long-standing working relationships between teams often compensate for technological limitations. In many cases, communication still relies on direct phone calls and emails between officials, especially when quick decisions are needed.

Regarding collaboration with EU institutions, both countries acknowledged the importance of this relationship, particularly in the areas of trade, imports, and crisis response. Swedish representatives described regular communication with the European Commission and participation in joint projects and data-sharing platforms. They mentioned the use of EU-wide systems like TRACES, which helps track movements of goods across borders and aligns national practices with European standards. Spain also makes use of these systems but faces challenges in integrating regional data into EU platforms, due to differences in how data is collected and managed locally. Nonetheless, there is ongoing effort to harmonize systems and improve the speed and clarity of information exchange with EU bodies.

A particularly interesting discussion emerged when interviewees were asked whether fish and seafood require a different traceability approach than other food products. Most agreed that they do. Fish products often come from international waters, involve multiple stages of processing, and are traded across borders before reaching the final consumer. This makes the traceability chain more complex and more vulnerable to gaps. For example, one Spanish respondent pointed out that a fish may be caught in international waters, landed in Spain, processed in another EU country, and then re-exported; requiring coordination between several national and international systems. Swedish officials echoed this concern, stating that fish

traceability often needs quicker reporting and stricter controls due to the perishable nature of the product and the complexity of the supply chain.

#### **4.4 CHALLENGES AND IMPROVEMENTS**

During the interviews, participants from both Spain and Sweden shared honest reflections about the difficulties they encounter in their day-to-day work related to traceability enforcement. Despite differences in how each country organizes its system, the responses revealed several overlapping challenges that affect the effectiveness and consistency of traceability management.

One of the most frequently mentioned challenges was the complexity of the supply chain, particularly in the fish and seafood sector. Interviewees noted that the international nature of fisheries trade, combined with multiple stages of handling and transformation, makes it difficult to maintain a clear and uninterrupted record of a product's journey. Swedish participants highlighted the difficulties of tracking imported products, which often arrive with incomplete or inconsistent documentation from third countries. Spanish officials pointed out that internal complexity—especially in coordinating between national and regional levels—can also create administrative bottlenecks, especially when responding to time-sensitive issues such as recalls or food safety alerts.

Another shared concern was related to data management and system integration. While digital tools are widely used in both countries, participants agreed that different platforms do not always communicate well with each other. In Spain, this issue is amplified by the existence of multiple regional systems, which sometimes operate independently from national databases. In Sweden, although the system is more centralized, there are still technical and procedural gaps when exchanging data with EU-level platforms or customs authorities. Interviewees from both countries emphasized that more investment is needed to improve interoperability between systems and to make digital workflows more user-friendly and efficient.

On a more operational level, several participants mentioned the shortage of personnel and training as a key obstacle. In Spain, some regions struggle with limited staff capacity, especially during peak periods like fishing seasons. This affects the frequency and depth of inspections. In Sweden, while staffing levels were described as stable, there were concerns about the increasing workload and the need for specialized knowledge to handle complex cases involving international traceability or mixed-origin products.

When asked about potential improvements, interviewees in both countries offered thoughtful suggestions. Many pointed to the need for better coordination between institutions, not only within each country but also with EU agencies and neighboring member states. Spanish respondents called for greater standardization across regions to avoid duplication of effort and reduce delays. In Sweden, participants emphasized the importance of continuing to invest in digital tools while also improving communication and collaboration with importers and international partners.

There was also a shared belief that raising awareness among businesses is essential. Both Spanish and Swedish authorities mentioned that many traceability issues arise from lack of understanding or inconsistent practices at the operator level. Improved training, clearer guidelines, and more accessible communication channels were suggested as ways to close that gap and support better compliance.

## 4.5 PERCEPTIONS OF EFFECTIVENESS AND COMPLIANCE

In addition to discussing technical processes and structural challenges, interviewees were also asked to share their general impressions of how well traceability systems are working in practice. Their responses provided a more personal and reflective perspective on the everyday functioning of these systems, particularly in terms of how effectively rules are applied and how consistently businesses comply.

Overall, most participants expressed a moderate level of confidence in the traceability systems currently in place. They recognized that the legal framework—both at the EU level and nationally—is solid and clearly defined. However, they also highlighted that implementation does not always match the intentions of the law. In both countries, participants noted that while large companies usually have the resources and procedures to comply fully, small and medium-sized enterprises (SMEs) sometimes struggle to meet requirements, especially when digital systems are involved.

Spanish respondents emphasized that the fragmented nature of administrative oversight sometimes leads to inconsistent application of the rules. Depending on the region and the authority involved, businesses may receive different instructions or face varying levels of inspection intensity. One participant noted that while the intention is to apply regulations uniformly, the reality is that "some areas are more rigorous than others," which can affect how seriously businesses take their responsibilities.

In Sweden, the system was generally described as more consistent, thanks to the centralized role of HaV and the widespread use of digital tools. Still, some officials pointed out that even in a well-structured system, there can be "blind spots," particularly when products pass through many hands or come from complex supply chains. The senior advisor at HaV mentioned that compliance is generally high but that "being compliant doesn't always mean being transparent," suggesting that some actors may meet the formal requirements without fully embracing the spirit of traceability.

Another theme that emerged was the importance of trust—both between authorities and businesses and between agencies themselves. Participants from both countries agreed that traceability systems work best when they are built on open communication and mutual understanding. When businesses feel supported rather than punished, they are more likely to engage meaningfully with the system. Likewise, effective cooperation between agencies creates a stronger and more consistent enforcement environment.

Finally, several interviewees reflected on how public perception influences their work. They felt that consumers are increasingly aware of where their food comes from, which adds pressure on both authorities and businesses to maintain high standards.

## 5. DISCUSSION

Throughout the theoretical chapter, it became clear that the European Union has developed a comprehensive and increasingly strict legal framework to ensure the traceability of food, particularly since various food crises in the late 20th century. However, as the interviews have shown, the existence of regulations is only part of the story. What really shapes traceability in practice is how these rules are interpreted and applied by public agencies at different levels and how individuals within those agencies manage daily challenges.

In both Spain and Sweden, food traceability systems are shaped not only by legislation but by the structure of public administration, institutional culture, and the degree of digital development. The human factor plays a central role. Traceability procedures are carried out by people working in real institutions, often under pressure, and navigating different levels of bureaucracy and responsibility. The findings from the interviews suggest that successful implementation depends not only on clear rules and modern tools, but on communication, trust, and coordination across departments and regions. This brings the abstract idea of traceability into a more grounded and realistic context, where flexibility, experience, and cooperation are as important as technology or legal frameworks.

The literature suggests that successful traceability systems rely on a combination of clear regulations, organizational capacity, and reliable information systems (Manning & Soon, 2014; Qian et al., 2022). The interviews confirmed this perspective but also added nuance to it. In both countries, administrative procedures revolve around documentation, inspections, and routine verification. However, the way these are carried out depends heavily on national structures and internal coordination.

What stood out during the interviews was how strongly the institutional design of each country influences its practical approach. Spain's decentralized model, mentioned in the theoretical section as a possible challenge, was clearly visible in the testimonies from officials who described having to align regional processes with national requirements. On the other hand, Sweden's more centralized system reflects exactly the kind of streamlined governance that researchers have linked to higher system efficiency.

Despite these differences, both systems rely heavily on risk-based inspections, a strategy encouraged by EU guidelines and supported by previous studies (Storøy et al., 2013). The results showed that Spain and Sweden both attempt to prioritize their resources based on previous non-compliance or the nature of the product being inspected. But while Sweden seems to apply this approach in a more consistent and digitalized way, Spain's implementation depends more on the capacity of each region.

The contrasting structures of Spain and Sweden, already highlighted in the theoretical framework, became even more evident through the interviews. The Spanish system, though rooted in EU legislation, is interpreted and applied through a multi-layered governance structure that includes regional administrations with varying capabilities. Interviewees from Spain shared examples of how this complexity can slow down processes, especially when quick responses are needed.

In contrast, Sweden's centralized system appears to align more easily with EU expectations. The agencies are fewer, the platforms are unified, and the chain of command is clearer. These features, discussed in literature as indicators of better traceability outcomes, were confirmed by the practical experiences shared during the interviews.

Still, both models have their strengths. Spanish officials emphasized the benefits of regional knowledge and relationships, which often help compensate for systemic gaps. In this sense, the findings echo previous research that points out the importance of local familiarity in enforcement (Salampasis et al., 2012). Sweden, for its part, demonstrates the advantages of strong digital integration and national coordination, but also acknowledges the challenge of maintaining human connection in a more system-driven environment.

Coordination and communication were often taken for granted in earlier theoretical models but emerged as critical factors during the interviews. The theory suggested that collaboration between agencies and with EU institutions is essential for building a reliable traceability chain—but the interviews revealed how difficult this can be in reality.

Spanish participants spoke about the daily effort needed to stay connected across departments and regions, often relying on personal relationships and informal communication to make up for structural fragmentation. This finding challenges the assumption that formal systems alone can guarantee effective coordination.

In Sweden, digital platforms allow for quicker and more transparent communication, but even there, gaps appear when working across borders or integrating EU-level tools. These insights suggest that while technology is important, it does not eliminate the need for trust, clarity, and flexibility between human actors in the system.

The interviewees also raised the idea that fish traceability is more demanding than other sectors, due to complex supply chains and fast product turnover. This was not emphasized in the theoretical literature reviewed but appears to be an important area for future academic attention.

The theoretical background touched on issues such as system integration, staffing, and resource limitations—but the interviews brought these abstract issues to life. In Spain, gaps in digital infrastructure were not just technical obstacles; they translated into longer inspection times, missed opportunities, and additional stress for both inspectors and businesses. In Sweden, even with strong systems, officials expressed concern about rising workloads and the growing need for specialized knowledge.

These challenges point to a broader truth that is sometimes missed in policy discussions: traceability is ultimately a human process. It depends on people being trained, motivated, and able to adapt to new tools and expectations. As one interviewee put it, "Having the law is not enough, you need people who know how to apply it."

This aligns with arguments in the literature about the importance of organizational culture and institutional learning (Silva et al., 2020). It also helps explain why even well-funded or technically advanced systems can struggle if they neglect the people responsible for making them work.

Combining the theoretical and empirical parts of this study leads to a clearer picture: regulations provide the skeleton of a traceability system, but everyday practice fills in the rest. The human, logistical, and institutional realities determine whether traceability is merely a formality or a meaningful safeguard for food safety.

The Spanish and Swedish cases show two valid but different ways of addressing the same goals. Spain highlights the importance of flexibility, regional insight, and adaptability, even if that comes with a price in consistency and speed. Sweden shows how centralization and digital tools can increase efficiency, but may require extra effort to maintain close collaboration and context-sensitive decision-making.

These insights suggest that improving traceability is not just about refining legal frameworks or adopting better technology, it also requires sustained investment in people, inter-agency cooperation, and an understanding of how public institutions actually function in practice. If food traceability is to truly protect public health and build consumer trust, it must be rooted in both good systems and good relationships.

## **5.1 METHOD DISCUSSION**

In line with qualitative case study methodology, it is important to reflect critically on the methods used in this research and to evaluate their trustworthiness. According to Yin (2009), the quality of a case study can be judged through four main criteria: construct validity, internal validity, external validity, and reliability. These criteria have been central to the design and execution of this study.

Construct validity was strengthened by using multiple sources of evidence. In this case, the primary data source was semi-structured interviews with professionals directly involved in food and fish traceability, complemented by secondary data from official regulations, laws, agency reports, and public websites. Combining different sources of information was important to make the findings stronger and helped avoid biased interpretations.

The decision to use semi-structured interviews was based on the need to explore the administrative and logistical aspects of traceability from the perspective of those responsible for managing and enforcing these processes. Interviews allowed participants to share detailed, experience-based knowledge that would not have been easily captured through standardized surveys or purely document-based research. This method enabled the study to collect rich, contextual information about how traceability procedures are applied in real-world settings.

Participant selection was carried out through purposive sampling, focusing on individuals working within food safety agencies, inspection authorities, and relevant government institutions in Spain and Sweden. This choice was made to ensure that all participants had direct professional experience with the processes under investigation. No fixed number of interviews was predetermined; instead, interviews continued until enough depth and variation of perspectives were achieved to answer the research questions effectively. Including participants from different agencies and from two different national contexts also helped to enhance the overall construct validity of the study.

Internal validity was addressed by using pattern matching during the analysis phase. Data from different participants and sources were compared to identify consistent themes, as well as notable differences between Spain and Sweden. This approach helped strengthen the credibility of the explanations generated from the findings.

External validity, referring to the generalizability of results, is naturally limited in case study research. However, as Yin (2009) emphasizes, the goal is not to achieve statistical generalization but analytic generalization. By providing detailed descriptions of the regulatory frameworks, administrative structures, and traceability processes in two different EU countries, the study offers insights that may be transferable to other contexts with similar regulatory environments.

Reliability was promoted by maintaining a clear and consistent research protocol throughout the study. All interviews followed the same basic structure, and detailed records; including interview guides, audio recordings, and transcripts; were kept to ensure that the study could be replicated in the future if necessary.

As with any qualitative research, some limitations should be acknowledged. The reliance on interviews introduces some degree of subjectivity, both from the participants' self-reporting and from the researcher's interpretation during analysis. Additionally, while the sample included individuals from different agencies, the number of participants remains relatively small. However, the combination of careful participant selection, diverse sources of evidence, and systematic analysis procedures helped mitigate these limitations and ensured that the findings are both credible and meaningful for understanding the administrative and logistical dimensions of food and fish traceability.

## 6. CONCLUSION

The objective of this research was to better understand how food and fish traceability is managed by public authorities in Spain and Sweden, with a specific focus on administrative and logistical processes. By conducting interviews with agency representatives and comparing two national systems operating under the same European regulatory framework, this study aimed to go beyond formal legislation and explore how traceability works in practice.

From the beginning, it was clear that food traceability is a complex and multi-layered process. This project has shown that while legal requirements form the foundation, the actual implementation depends heavily on how authorities organize their work, communicate with one another, and adapt to changing conditions. Spain and Sweden both follow the same EU laws, but their strategies and institutional structures reflect different national realities. This research has not only identified those differences, but also pointed to shared challenges such as system integration, workload pressure, and the importance of training and coordination.

A key takeaway from the study is the role of the human element in making traceability systems function. Regulations and technology are essential tools, but without the work and judgment of the people behind them: inspectors, advisors, administrators; traceability would be just a theoretical concept. This was especially evident during interviews, where participants described their work not only as a responsibility, but also as a continuous process of problem-solving, learning, and collaboration. Their voices added depth and realism to the analysis, and served as a reminder that public systems are built and maintained by individuals.

Another important contribution of this study is that it helps to bridge the gap between academic theory and administrative practice. Much of the literature on traceability focuses on legal texts, technological frameworks, or ideal models. By focusing on real experiences, this project highlights how those models are shaped by everyday challenges, limited resources, and institutional diversity. The insights gathered here may be useful for improving existing systems, informing future regulations, or simply understanding how traceability is experienced by those working to guarantee it.

In conclusion, food and fish traceability is not only a technical or legal matter, it is a living process that involves cooperation, adaptation, and commitment. Whether centralized or decentralized, highly digitalized or still in transition, what matters most is the ability of institutions to work together, learn from their context, and ensure that safety and transparency are more than just policy goals. This study offers a small but meaningful contribution to that understanding.

## **7. RECOMMENDATIONS FOR FURTHER RESEARCH**

While this study has focused on how public authorities in Spain and Sweden manage traceability through administrative and logistical processes, there are several related areas that could be explored in future research to build a more complete understanding of how traceability functions across the food system.

One promising direction would be to study the perception of consumers regarding food and fish traceability. Public trust is a key goal of traceability systems, but there is limited knowledge about how well consumers understand these systems or how much they influence purchasing decisions. Research in this area could help determine whether current efforts by institutions are meeting public expectations and where more communication or education might be needed.

Another valuable perspective would be to examine the role of private actors, such as fishing companies, distributors, and retailers, in applying traceability regulations. While this study focused on public institutions, businesses are responsible for maintaining many of the records and systems that traceability depends on. Their experience, level of compliance, and use of digital tools could offer important insights.

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## **APPENDIX 1 – INTERVIEW QUESTIONS**

The following list includes the questions that were used during the interviews conducted for this study. The questions were designed to gather insights from professionals working in national and regional authorities responsible for food and fish traceability in Spain and Sweden. They are grouped into thematic sections to reflect the main focus areas of the research: administrative management, logistic processes, coordination and communication, and challenges and improvements. The purpose of these questions was to better understand how traceability regulations are applied in practice and how public agencies manage daily operations related to compliance and enforcement.

### **Administrative Management**

- How does your agency generally ensure that businesses are following the traceability regulations? What does that process look like from your side?
- When you carry out inspections or checks, what kinds of documents or records are usually the most important to review in terms of traceability?
- How are those records typically reviewed or audited? Is there a standard process, or does it depend on the type of product or business?
- In terms of coordination/ collaboration, how do the different government levels: national, regional, or local; work together when it comes to food or fish traceability?
- When there's a food safety incident or a recall, how does your agency get involved? What steps do you usually take in those cases?

### **Logistical Processes**

- How is the movement of food or fish tracked through the supply chain? What kind of systems or routines are used to manage that?
- Which specific procedures does your agency follow when checking traceability during transport or at border control points?
- How are inspections of food-related businesses usually planned and carried out? For example, what's the process when inspecting a distributor or a seafood processor?
- How do you schedule inspections, or are they more risk-based or random? How do you decide when and where to inspect?
- When it comes to imported or exported products, are there any particular logistical challenges in verifying their traceability?

### **Coordination and Communication**

- What kinds of tools or systems do you use to share traceability information between authorities or departments?
- How does collaboration with EU institutions work in practice? Is there regular communication or support in terms of enforcement?
- From your perspective, do fish and seafood require a different approach than other food products when it comes to traceability? If yes, can you describe why?

### **Challenges and Improvements**

- Looking at the day-to-day work, what would you say are the biggest challenges your agency faces when enforcing traceability rules?
- If you had the chance to make changes or improvements, what do you think could help strengthen the administrative or logistical side of traceability?



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