ADMN 598 Master's Project

An Analysis of International Traceability Approaches and Implications for Canada

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EXECUTIVE SUMMARY

Globalization has led to an increasing “flat” world (Friedman, 2005), where consumer products are manufactured, assembled, and sold across a number of different countries and markets. Access to international markets is a critical avenue for economic growth and productivity. As international trade has expanded, countries have begun to reduce traditional trade barriers (e.g., tariffs) and introduced traceability provisions in legislation and regulation. Traceability, which is seen by some as a non-tariff barrier to trade, requires companies to identify the materials, processes, and production methods of a product.

The client for this Master’s project is the Mission of Canada to the European Union (EU), which is responsible for monitoring developments, related to Canada-EU trade. The Mission is interested in a high level overview of current traceability policies, primarily in the EU and what efforts have been made by the government and industry to meet them. They are also interested in any potential recommendations that could be considered by the government with regard to traceability policies. While primarily focused on the EU, the paper also provides an example of traceability in the US. Canada enjoys a vibrant trading relationship with both the EU and the US, however, Canadian business faces an evolving regulatory environment, notably with respect to traceability policies. Understanding how traceability policies affect Canadian business and how Canadian business respond to these policies can help Canadian officials in their role of supporting continued market access in the EU, the US and other jurisdictions with traceability policies. The US and EU were also selected for this project because of the sophistication of their regulatory environment and consumer choice legislation and regulations.

The trade relationship between Canada and the US has been supported, since 1988, by the Canada-US Free Trade Agreement, which was eventually superseded by the North American Free Trade Agreement between Canada, the US and Mexico. In the last few years, Canada and US trade has remained relatively stable which is why the Canadian government has looked to diversify its trade relationships. The importance of Canada’s trade relationship with the EU is evident in efforts to negotiate the Comprehensive Economic and Trade Agreement (CETA). This is an ambitious negotiation with both parties seeking to conclude an agreement by 2012.

As traceability is a relatively recent concept in international trade policy theory, the literature does not contain a single common definition. Definitions of traceability can vary with geographic coverage, time period, business activities, industry structure, consumer perceptions and the legal framework regulating consumer and producer rights. A critical theme from the literature review conducted for this project is that there are different types of traceability. One form of traceability consists of tracing “what” materials compose a product (e.g., is there Genetically Modified Organisms (GMOs) soya in those noodles?); another consists of “where” some stage of production took place (e.g., is this product produced in the US Europe, Canada, or maybe some
developing country such as Myanmar?); and thirdly there is a type of traceability that is concerned with “how” the product was made (e.g., is the fish caught in dolphin safe nets? Was the wood harvested legally? Were the clothes not produced by children?).

Not all traceability systems are interchangeable and they vary depending on the objectives being pursued. A useful way to describing how objectives can affect traceability relates to the depth, breadth, and precision of a traceability system. Breadth relates to how much information the system would record; depth refers to how far back or forward the system tracks; and precision refers to the degree of assurance the tracing system can pinpoint a product’s movement or characteristics. Each of these objectives influences the type of traceability system that are put in place.

While the literature reviewed contains many definitions of traceability, there is more consensus on the costs and benefits of traceability systems from a private sector perspective. Benefits of a traceability system include improved supply management; assistance in identifying potential sources of food safety and quality; and the ability to differentiate and market foods with subtle or undetectable quality attributes. Costs relate to establishing recordkeeping and product differentiation systems. The importance of these costs and benefits is that there are private sector incentives for adopting traceability systems beyond government regulation. The interplay of objectives, costs, and benefits has spurred different rates of business investment in the breadth, depth, and precision of traceability systems. These factors vary across industries and time, which is a reflection of market dynamics and consumer preferences. It is clear that traceability systems are rapidly developing as the benefits to be derived from such systems increase in value and as the technology drives down the cost of creating and managing information.

While there are private sector incentives for introducing traceability systems, traceability has a role to play in ensuring consumer safety, hence the need for government legislation and regulation. Market failures can arise based on the depth of information that is provided by a traceability system, meaning there may not be enough information on all of the processing stages to ensure consumers know exactly what was in a product and/or the source of ingredients it contains. It is the government’s role to ensure the appropriate level of information is provided by a traceability system.

In some jurisdictions, governments have developed a comprehensive system of regulations to ensure certain information is provided by a traceability system, otherwise, the product will not be allowed in the market. This would apply to cases where the private sector incentives highlighted above are not providing what is considered to be the appropriate level of information. It is important to note that these regulations are not just concerned with consumer safety. Traceability can also be introduced for other policy purposes, which will be demonstrated in the summary of case studies.

The paper provides examples of international cooperation in both government and non-government organizations to establish traceability provisions and align standards. The
Kimberley process and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are noted as examples of international government organizations, cooperating to implement traceability systems to achieve social and environmental policy objectives. The Kimberley process has traceability provisions designed to prevent the trade of conflict minerals, whereas the CITES is attempting to restrict the trade of endangered species. While both have been relatively successful, the Kimberley process has been criticized for its lack of enforcement mechanisms to ensure its goals are being met. These criticisms point to the importance of independent auditors to verify that shipments are meeting traceability provisions. The International Organization for Standardization (ISO) and GS1 (which is dedicated to the design of global standards) are highlighted as examples of non-governmental organizations, which are standardizing traceability practices across industries to ensure provisions are being met. They are important initiatives because they are examples of industries taking the lead to align processes at the international level.

After reviewing these forms of international cooperation, this paper highlights EU and US policies that require traceability. Both the EU and US have been leading jurisdictions in their use of traceability as a mechanism for achieving international trade objectives. Illegal logging policies in both jurisdictions as well as the EU’s GMO and biofuel policies contain extensive rules, whereby companies must establish licence/certification systems to ensure their products are meeting regulatory requirements. As highlighted in the literature, traceability is concerned with the “what”, “where” and “how”. Looking at these case studies provides examples of initiatives related to these three types of traceability. The EU GMO and biofuel policy are focused on the “what” and “how”. Illegal logging legislation in the EU and the US is focused on the “where” and “how”.

A critical conclusion of this paper is that while traceability is an important mechanism for ensuring consumer safety, governments use traceability for other policy purposes. Furthermore, the government’s mode of action does not always rely on consumers information and choice. Governments may force traceability, and tax more heavily “bad” products (e.g., carbon-intensive goods) or simply prohibit them (e.g., illegally harvested wood or unsafely processed meats), therefore, although traceability goes beyond a restriction in the strict sense, the use of traceability to impose restrictions should not be overlooked. The international case studies, as well as EU and US policies demonstrate that traceability can be used to impose restrictions for social and environmental objectives.

Going forward, the paper offers the following recommendations for the Department of Foreign Affairs and International Trade regarding traceability:

- Ensure a common understanding of the definition of traceability and how both private and public sector objectives can affect its implementation.
- Wherever possible and desirable, use independent auditors to verify traceability standards.
Look for opportunities with both the US and the EU to share best practices and collaborate on the development of traceability standards and licences.

Continue to work with the private sector to understand the administrative barriers that traceability provisions place on trade

Maintain an open dialogue about policy objectives and how the implementing traceability provisions will affect market access

To move forward with these recommendations, several options could be considered by the Department of Foreign Affairs and Trade:

1. The Department could consider setting up a working group among government and non-government representatives, including the private sector to consider some of the issues outlined in this report. This working group could be tasked with developing critical success factors/criteria for traceability policies.

2. The Department could formally establish a tri-level government committee of US and EU representatives to discuss traceability and trade policies and how the implementing provisions have affected market access. The committee could also develop recommendations for overcoming access issues.

3. The Department could identify best practices where it has worked with third party auditors to align traceability standards and disseminate this information internally. This would enable trade policy professionals across the organization to learn from each other’s experiences and solutions.

4. The Department could work with experts to sponsor the development of further research on traceability policies

The timelines for moving forward on these options vary from short to long-term. The priority should be investing time and resources into building knowledge networks on traceability. For example, the Mission could consider organizing a workshop before January 2013, which would involve key trade policy experts from government and non-government organizations. After the workshop, a larger conference could be organized involving a wider range of actors. Following this, the Mission could develop a discussion paper which outlines best practices in the implementation of traceability systems policies. These actions would enable the Mission to build a common understanding among both private and public sector actors about what traceability systems exist and how policies with traceability components affect market access.

In developing more research, the focus could be on the role of traceability in restricting market access. There is additional research that could be done looking at how products can be subject to different traceability systems as they move through the supply chain.

Traceability in international trade will only continue to grow in importance as traditional trade barriers are reduced. In the realm of trace policy, traceability is a relatively recent phenomenon hence the importance of looking at the literature and examples of policies that require traceability. The EU and US have been at the forefront of using traceability policies for specific trade objectives. Going forward, the Canadian government must
continue to monitor developments in relevant legislation and regulation concerning
traceability and ensure Canadian businesses are successfully meeting requirements for
market access.
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INTRODUCTION

Globalization and technological changes have led to an interconnected supply chain. International trade has resulted in a “flat” world (Friedman, 2005) where consumer and intermediate products contain materials from all over the world, which are then assembled and exported. This international system is a critical avenue for countries (both developed and developing) to promote and sustain economic growth and competitiveness. However, to ensure domestic products are successfully exported and sold in other countries, access to international markets is needed. This access can depend on meeting regulatory requirements in the export country that products are identified and tracked to their origin, composition or production process. This process is commonly referred to as traceability, which will be the focus of this paper.

Traceability is an important concept to understand because jurisdictions are introducing policies that require traceability for market access. As will be shown in this paper, traceability is about the “where”, “what” and “how” in producing a product. It is a relatively recent development but is growing in importance as countries reduce traditional trade barriers and introduce regulatory provisions that require licensing, labelling, certification or other information systems that often rely on traceability (Interview, DFAIT, February 2012). This paper focuses on understanding what traceability is and how it is being implemented. It examines the literature to understand the costs and benefits of traceability from a private sector perspective as well as the role of government in requiring traceability of materials. It looks at international organizations that use traceability to restrict trade and establish industry wide standards, as well as policies from the EU and the US. It will outline the impact of traceability policies on Canadian trade. When looking at the impacts of traceability policies, the paper examines the specific requirements of relevant regulations and how Canadian businesses and private sector associations work to meet them.

As will be shown, traceability can be used to meet a variety of policy objectives. It can be used to prevent certain products and materials within a product from being imported into a country. It can also be used to protect the environment and ensure sustainable manufacturing practices. Not much has been written on this topic therefore, there is an opportunity to bring about a better understanding of the various traceability policies that are currently in place and/or being introduced. Finally, the paper offers conclusions and recommendations for Canada moving forward. While the literature focuses heavily on the role of traceability in providing consumer information, traceability policies have been used for other purposes. Governments may use traceability to dis-incent the production of a certain material or product or prevent the importation of a product/material from a certain region or country. This paper demonstrates the importance of an independent body to work with businesses for verification purposes.
Background on the Client

The client for this Master's Project is the Mission of Canada to the European Union (EU). The Mission represents Canada on key issues related to Canada-EU relations and includes representatives from six federal departments and agencies. According to the Mission’s website (2012), “the Mission of Canada to the EU maintains and develops cooperation between Canada and the EU and monitors the development of EU policy and legislation and its impact on Canada.” The Mission works with EU institutions (e.g., the European Commission and the European Parliament) and the 27 member countries of the European Union, plus other missions (e.g. non-European missions) located in Brussels. Additionally, the Mission maintains relations with Brussels-based think tanks and non-governmental organizations to monitor economic developments in Europe and how they could impact Canada.

This Master's Project assists the Trade Section of the Mission of Canada in understanding how jurisdictions use traceability to promote and further policy objectives. The paper is meant to highlights issues for Canadian diplomats working within the Trade Section of the Mission of Canada. Approximately 5 officials currently work in this section of the Mission. Looking at traceability policies in the EU and the US is a priority for the Canadian Department of Foreign Affairs and International Trade because it enables the department to have a better understanding of potential market access issues.
PROJECT OBJECTIVES AND METHODOLOGY

Project Objectives

The purpose of the paper is to overview traceability policies and describe their implementation across jurisdictions and sectors. The paper focuses on traceability policies within the US and the EU because of their strategic importance to Canada and because these countries have the most developed traceability policies and certification systems.

In terms of the analysis, there are a number of specific sectors, including the environment and agriculture, where it is critical to understand potential market access restrictions that could be faced by Canadian businesses. By understanding these issues, the Canadian government will be able to work with the private sector to develop common standards that ensure regulatory requirements are met. The paper focuses on specific case study examples in the US and Europe where traceability has been used to move forward on a policy objective. The paper also examines the types of international cooperation that currently exists. Countries have made policy choices and established international institutions with the goal of restricting the trade of conflict minerals and materials that could potentially contain products from endangered species.

As the information contained in the paper is based on publicly available sources, the paper is not confidential. Data sources are detailed below.

Methodology

This research project takes a comparative approach to achieving the project’s objectives. This means that various policies are examined and then assessed for their commonalities and differences. The analysis includes quantitative and qualitative data, however, most of the information available was qualitative in nature.

To complete the project, the following tasks were undertaken:

- A review of the academic literature written on the subject of international trade policy and traceability.
- A review of the professional literature written on the subject of international trade policy. This information was gathered from public, private, and not for profit organizations, as well as industry associations.
- A review of jurisdictional websites to determine their approach to traceability and how they use traceability to achieve policy objectives.
- Interviews were conducted with individuals with significant trade policy experience and expertise.
Interviews

In order to gain additional information on traceability policies and trends, semi-structured interviews were required (see Appendix A for the ethics approval form). These interviews used an open-ended format and allowed the interviewer to ask non-pre-set questions relevant to the topic, however, there were also pre-determined questions (see Appendix B). These were used to guide the conversation and ensure certain topics were discussed in the interview. Using open-ended questions ensured flexibility and the ability to have a deeper discussion of certain topics as they arose. Appendix C includes a list of organizations that were interviewed.

Data Sources

Data sources for the project consisted of publicly available information from various websites of the Canadian government, directorates of the European Union, the US government, and published and publicly available academic literature from reputable sources. The data also included information received from interviews with relevant stakeholders and key experts (e.g., employees of the trade section of the Mission of Canada to the EU).

Data and documents were also collected from the internet, public libraries and databases as well as the University of Victoria library.

Limitations and Delimitations

The literature on traceability in international trade relations is not large. This presented a challenge as most of the research relied on a review of jurisdictional websites and interviews with pertinent individuals to ascertain more specific and detailed information. Within the realm of international trade policy, a lot has been written on rules of origin which is specifically focused on the country where a product is manufactured. This project will focuses on traceability as will be defined and articulated in the paper.
INTERNATIONAL TRADE WITH THE EUROPEAN UNION (EU) AND UNITED STATES (US)

The Strategic Importance of the US and the EU

Research on traceability policies in the EU and the US is important because Canada enjoys a vibrant trading relationship with both jurisdictions. The biggest and most important trading partner for Canada is the US. Historically, Canada and the US have always had a vibrant trading relationship, which is furthered by their geographic proximity to each other. According to the Government of Canada (2012), more than eight million jobs depend on Canada-US trade and more than 400,000 people cross the Canada-US border daily. Canada is a top export destination for 36 states within the US.

Looking at import and export data from Industry Canada, total exports to the US were $330 billion (CDN) in 2011, $299 billion (CDN) in 2010, $270 billion (CDN) in 2009, $375 billion (CDN) in 2008, and $355 (CDN) billion in 2007 (see Table 1). Canada was 2nd in terms of good imported into the US totalling $276.5 billion (USD) in 2010, a 22.2% increase from 2009 and up 114.4% over the last 16 years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total $(CDN) billion</th>
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<tbody>
<tr>
<td>2011</td>
<td>330</td>
</tr>
<tr>
<td>2010</td>
<td>299</td>
</tr>
<tr>
<td>2009</td>
<td>270</td>
</tr>
<tr>
<td>2008</td>
<td>375</td>
</tr>
<tr>
<td>2007</td>
<td>276.5</td>
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This data shows that the US remains the most important trading market for Canadian goods and services. However, it also shows that over the last five years, trade has remained relatively stable with the US, hence there is a need to diversify trade opportunities with other countries. Canada and the US signed a free trade agreement in 1988, which was eventually superseded by the North American Free Trade Agreement (NAFTA) between Canada, the US and Mexico. NAFTA has been a critical agreement in the process of trade liberalization between Canada and the US. According to the Department of Foreign Affairs and International Trade (2012), “the Agreement has brought economic growth and rising standards of living for people in all three countries. In addition, NAFTA has established a strong foundation for future growth and has set a valuable example of the benefits of trade liberalization.”

The EU (originally called the European Economic Community) includes 27 member states and a total population of almost half a billion people (EUROPA, 2012). The main economic achievement of the EU is the creation of the single market for goods, services, investment and workers. The EU is also a unified trading block enjoying major global power. In 2010, total economic output was about €12.2 trillion, which accounted
for 20% of world exports and imports. Clearly, this is an important market for Canadian exports as Canada looks to diversify its trading relationships. Canadian goods and services exports to the EU totalled $49.2 billion (CDN), and imports from the EU amounted to $55.3 billion (CDN) in 2010 (European Commission, 2012). Canada is currently the EU’s 11th most important trading partner, accounting for 1.6% of the EU’s total external trade in 2010. In comparison, the US accounts for 14%, China 13.8%, and Russia 8.6% (European Commission, 2012). For Canada, the EU is the second most important trading partner behind the US accounting for 10.5% of total external trade followed by China (7.4%), Mexico (3.5%), and Japan (2.9%).

The importance of the Canada-EU economic relationship is evident in efforts to negotiate the Comprehensive Economic and Trade Agreement (CETA). The first round of CETA negotiations took place in October 2009. According to the Department of Foreign Affairs and International Trade (2012),

“Canada and the EU are committed to building on the success of negotiations thus far, where significant progress has been made across the board, including the areas of goods, services, investment, government procurement and many others. The negotiating text is now well-advanced, with many chapters closed or parked pending further development, and issues in the remaining chapters narrowed down to key differences where solutions are now being actively explored.”

The C.D. Howe Institute (2011) has argued that CETA is the most far-reaching trade talks commenced by Canada since the signing of the North American Free Trade Agreement in 1992. Given the size and sophistication of the EU market and the importance of services and investments in the Canada-EU relationship, C.D. Howe argues that a trade agreement would open new doors for Canada beyond its traditional resource and manufacturing base. Key issues include better mutual access to public procurement contracts, protection of intellectual property rights, enhanced mobility of skilled personnel, and non-discriminatory regulations, in addition to the more traditional trade issues such as agricultural and industrial tariffs.

Prior to negotiations of the CETA, Canada and the EU released a joint study on the costs and benefits of a potential trade agreement (Interview, DFAIT, April 2012). The study demonstrated important benefits for both countries in pursuing a trade agreement. In particular, the study pointed to several sectors of the Canada economy which would benefit, including aerospace, chemicals, plastics, aluminum, wood products, fish and seafood, automotive vehicles and parts, agricultural products, transportation, financial services, renewable energy, information and communication technologies, engineering and computer services, among others. The study also demonstrated potential for enhancing trade in areas such as investment, labour mobility, regulatory cooperation, environment, and science and technology. Currently, Canada and the EU are in the ninth round of negotiations with the intention of concluding an agreement by 2012 (Interview, DFAIT, November 2011).
To sum up, the US and the EU are critical export markets for Canadian products hence the focus on these particular jurisdictions when it comes to analyzing traceability policies. While these countries enjoy a good trading relationship with Canada, both have introduced legislation and regulations with traceability components, which have impacted Canadian business. The above data and information on trade relations between Canada and these jurisdictions quantifies the importance of these markets for Canadian goods and services. Before looking more specifically at policies and regulations within these two jurisdictions, this paper provides a review of the academic literature on the subject of international trade policy and traceability. The literature review focuses on definitions of traceability and sheds light on the commonalities between them. Traceability is more of a recent policy tool for governments as they move to further liberalize trade. Understanding how and why traceability is being used to implement regulations increases trade opportunities and prevents potential market access issues because of failed compliance with regulatory requirements.
LITERATURE REVIEW

This section of the report presents a literature review on the current state of knowledge of traceability. A lot of time was devoted to researching the various definitions of traceability, as well as the costs and benefits of traceability systems from a business and government perspective. This literature review provides the reader with a comprehensive overview of how traceability can be defined, as well as how business objectives can affect the implementation of a traceability system. It demonstrates costs and benefits of a traceability system for the private sector as well as the need and role for government regulation in requiring companies to track certain information on their products.

What is Traceability?

Trautman, Goddard and Nilsson (2008) note that market access increasingly requires traceability in order to satisfy regulatory provisions and trade restrictions. Frohberg et al (2006) further highlight that within the World Trade Organization, traditional trade barriers such as tariffs are steadily being reduced, while regulations related to traceability, product certification, environmental standards, and other regulations are increasing in scope and significance.

While traceability systems are noted as important in identifying the materials and processes used in manufacturing a product, the literature does not contain a single common definition. Generally, traceability refers to the ability to systematically identify a product unit of production, and track the location of any treatments or transformations at any stages of production, processing and distribution. Trautman, Goddard and Nilsson (2008) note that there is lack of a common definition of traceability as it varies across markets and sectors. Looking more specifically at the beef industry, they reviewed 135 articles and found 83 different definitions of traceability. They highlight (2008, p. 8) that “although there is extensive literature on traceability, each study uses its own definition of the term.” They note that definitions of traceability vary because of differences in geographic coverage, time period, business activities, industry structure, consumer perceptions and the legal framework regulating consumer and producer rights. Their study adopts the Canadian Food Inspection Agency’s (CFIA) definition of traceability, which is:

“The ability to trace and follow food, feed, food-producing animals or substances intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution. There are three recognized pillars to traceability: Animal or product identification; animal or product movement; and premises identification.”

They note that this definition conforms to the European Union’s definition of traceability, which states that “traceability means 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.” The CFIA definition also aligns with the US Food and Drug Administration (FDA, 2011) definition, which is “the ability to identify by means of paper or electronic records a food product and its producer, from where and when it came, and to where and when it was sent.”

While the above definitions are focused specifically on the food sector, there are other definitions in the literature, which are broader and more encompassing. Arisland and Kjærnsrød (2005) use the International Organization for Standardization (ISO) definition of traceability, which is “the ability to trace the history, application or location of an item or activity by means of recorded identification. When considering products, traceability can relate to the origin of materials, the processing history, and the distribution and location of the product after delivery.” Trautman, Goddard and Nilsson, (2008) note that Dessureault (2006) considers the ISO definition the most commonly used, as it is very broad and does not specify a standard measurement, a standard location size, a list of processes that must be identified, where information is recorded, or the bookkeeping technology. Trautman, Goddard, and Nilsson (2008) note that another fairly broad definition is developed by Golan et al. (2004, p. 5) where traceability is defined as “a record keeping system designed to track the flow of product or product attributes through all stages of production, processing and distribution.” This definition only describes one direction of traceability from the channel of distribution to the consumer.

Golan et al. (2004) specify that a traceability system is designed to track the flow of a product, but the need for a broad definition is due to the fact that traceability is a tool for achieving different objectives. This argument is echoed by Lupin (2006, p. 1) who notes that “traceability can be related to regulatory requirements, implemented on a voluntary basis or be commercial in nature. As a result, the word traceability is associated with an increasing number of purposes and objectives, with reference to different attributes (or information) to be traced, as well as to different standards to encode and recover information.” Box 1 provides some common themes from the literature.

### Box 1: Defining Traceability

- The ability to trace products or materials through all stages of production, processing, and distribution
- Relates to the origin of materials, the processing history, and distribution and location after delivery
- Concerned with the “what”, “where”, and “how”

Lupin (2006) argues that not all traceability systems are equivalent or interchangeable because the expectations of consumers and producers can trigger different systems and purposes. On this point, an interesting and useful way of describing how objectives can drive traceability systems is developed by Golan et al (2004) who argue that different objectives shape differences in the breadth, depth, and precision of a
traceability system. They note that breadth “describes the amount of information the traceability system records. The depth of a traceability system is “how far back or forward the system tracks.” Lastly, precision reflects “the degree of assurance with which the tracing system can pinpoint a particular product’s movement or characteristics.” Using Golan et al’s analysis, Box 2 provides a summary of how the breadth, depth and precision can affect a traceability system.

Box 2: Key Characteristics/Attributes of Traceability

**Breadth**
- Refers to how much information the traceability system would record.
- This could include the number of countries where materials came from, whether pesticides were used in a product, whether the product was grown on an huge corporate farm or small family run conventional farm, who harvested the products (e.g., machines or people), and how the product was stored.

**Depth**
- Refers to how far back or forward the system tracks.
- This could include whether the system refers back to the processing stage. A system designed for pathogen control may only need to extend to the last “kill” step – where the product was treated, cooked, or irradiated.

**Precision**
- Refers to the degree of assurance the tracing system can pinpoint a product’s movement or characteristics.
- This would be determined by the unit of analysis. Systems that have large tracking units, such as a grain silo, will have poorer precision compared to systems with smaller units, such as individual cows.

Source: Adapted from Golan et al, 2004

Similar to Golan et al, Lupin (2006) argues that traceability systems can include more than one objective. Furthermore, a product can be subjected to different traceability systems as it goes through the supply chain. Lupin draws a differentiation between external and internal traceability. External traceability refers to systems aimed to allow the traceability of a product and/or attribute(s) of that product through the successive stages of the distribution chain (e.g., boat/fish/farm to table). Internal traceability refers to the traceability of raw materials, intermediate and final products within a productive or commercial unit.

While the objectives of a traceability system can depend on each business’ goals, there are broad similarities between traceability systems. Regardless of the system that is being implemented, there are certain characteristics and required information identified
in the literature that make for an effective traceability system. Kuan (2008) highlights four critical aspects of information that are required in a traceability system:

1. product/lot identification;
2. handling of the information;
3. storage of the information; and
4. transformation of the information to the consumer.

Kuan (2008) further highlights important pre-requisites for establishing an effective traceability system, which are

1. management commitment and involvement at all levels internally and externally;
2. resource planning – time, tool, and manpower management;
3. objectives or project scope; and
4. data exchange and privacy issues, which include communicating and disclosing information.

OnTrace (2007) notes that all traceability approaches share a common perspective, which is “one step forward, one step back.” They note that all systems place an emphasis on knowing where inputs come from and where products go.

Regarding the review of the literature, a critical conclusion that can be drawn is that there are different types of traceability. One form of traceability consists of tracing “what” materials compose a product (e.g., is there GMO soya in those noodles?); another consists of “where” some stage of production took place (e.g., is this product produced in the US Europe, Canada, or maybe some developing country such as Myanmar); and thirdly there is a type of traceability that is concerned with “how” the product was made (e.g., is the fish caught in dolphin safe nets? Was the wood harvested legally? Were the clothes not produced by children?). Another key theme is that traceability is an important component of understanding the products, processes, and methods that were involved in manufacturing a product. Given this, there are a number of costs and benefits for firms that need to establish and maintain a traceability system. While the above section has attempted to shed light on the definition of traceability, it is also important to understand the private sector costs and benefits related to traceability systems. By understanding this, one can see the incentives for businesses to establish systems outside of any regulatory framework. In some cases, businesses will achieve greater efficiencies by introducing traceability systems because they have a positive impact on profits. On the other hand, there can be significant costs related to systems that are required to be introduced to capture specific product information that did not exist before.

**The Costs and Benefits of Traceability**

There seems to be more consensus on the costs and benefits of traceability systems from a business perspective. Golan et al (2004) note that firms have three primary objectives in developing and implementing a traceability system: 1) to improve supply management; 2) to assist in identifying potential sources of food safety and quality; and
3) to differentiate and market foods with subtle or undetectable quality attributes. Similarly, Kuan (2008) highlights that the objectives of a traceability system are to manage risks related to safety; improving product quality and processes; meet customer demands; and establish credibility by providing reliable information. From the perspective of business, the major benefit of implementing a traceability system is increased revenues. Firms achieve increased revenues with traceability systems because they contribute towards ensuring lower cost distribution systems and reduced expenses related to recalls if they are necessary.

There are also process efficiencies to be gained by firms through the implementation of a traceability system in regards to supply management. As noted by Golan et al (2004, p. 4) “a business’s traceability system is key to finding the most efficient ways to produce, assemble, warehouse, and distribute products.” Businesses across the world are now using electronic systems to track and manage inventory. A number of complex coding systems have been developed by the food industry to track the flow of raw inputs to products that end up on grocery store shelves. Traceability systems are critical in providing businesses with information about their product, which provides them with the right tools to ensure good supply management.

Another benefit for businesses is traceability systems help to ensure the safety and quality of a product. Traceability systems are a tool used by business to help minimize the production and distribution of unsafe or poor quality products. This ensures that the firms’ exposure to negative media attention can be minimized if they are faced with a potential safety or quality issue. On this point, one can think of a recent Canadian example from 2008, where Maple Leaf Foods, based in Toronto, had to recall nine varieties of cold cuts after some sample tests revealed that there were trace amounts of listeriosis in some shipments. This crisis was linked to 22 deaths in Canada and was characterized as one of the worst cases of food contamination in Canadian history. Golan et al (2004) argue a traceability system may help to establish the extent of a business’s liability in cases of product safety failure and then potentially shift liability to others in the food chain. Maple Leaf certainly relied on their traceability system to recall products and identify the source of the contamination, which was the factory in Toronto. By having a system in place, they were able to identify other shipments, which could potentially be infected and recall products as necessary to mitigate further harm to the public.

The last noted benefit for businesses highlighted in the literature relates to product differentiation. Health conscious consumers consider many different ingredients when choosing one product over another, therefore, traceability systems enable companies to ascribe certain characteristics to a product. Golan et al (2004) note that traceability systems are an indispensable part of any marketing effort to link and highlight certain product credence attributes – or content attributes that are difficult or costly to measure. They point to an example of tuna caught with dolphin safe nets. A bookkeeping system is needed to tie the dolphin safe tuna to an observer on a boat where the tuna was caught. A traceability system provides the value through evidence of the method in
which the fish was caught. This enables companies to market their product as dolphin safe tuna, which provides consumers with an ethical option when purchasing tuna from their grocery store shelves.

While the literature highlights several benefits for firms in introducing and implementing a traceability system, there are also a range of costs that are incurred by firms. In particular, these costs are found in establishing recordkeeping product differentiation systems. In terms of recordkeeping systems, there are costs incurred from maintaining information on products as they move through the supply chain. Depending on the policy or business objective, these systems may build on existing systems or may require new expensive additions. As noted by Golan et al (2004), the level of precision of the traceability system influences the recordkeeping costs. These costs rise in relation to the lot size, which is a measure of the batch or shipment size. Another factor affecting costs is the level of detail required of the bookkeeping system. If the system is required to be highly accurate and detailed, this could potentially lead to increased costs for the firm.

Product differentiation costs relate to costs incurred in keeping a product or set of product attributes separate from one another for tracking purposes. Similar to the recordkeeping costs, some firms are able to build on existing systems, which means the costs of implementing a traceability system is less expensive compared to those firms, which may require different or additional criteria for product differentiation. Golan et al (2004) note that the long run costs of separating products with different attributes depends on a number of factors, including underlying production technologies and the level of demand. A good example of product differentiation costs incurred by firms relates to the desire to distinguish genetically-modified products from conventional products. In this case, the firm may be required to incur major costs to establish a new system and to keep the two types of products separate. Another good example relates to the rise in consumer preferences for organic products. A number of companies have introduced organic lines of their product, which may require a separate system of tracking to distinguish organic materials from non-organic ones.

Both recordkeeping and differentiation expenses tend to rise with the complexity of the production and distribution systems. Golan et al (2004, p. 10) note that “products that undergo a large number of transformations on their way to market generate a lot of new information and are typically more difficult to track than products with little processing.” Furthermore, products that change firm’s hands several times generate higher bookkeeping and differentiation costs than those products, which largely remain with the same firm throughout their life cycle.

It is clear from the literature that the dynamic interplay of objectives, costs, and benefits has spurred different rates of business investment in the breadth, depth, and precision of traceability systems across sectors. These factors vary across industries and time, which is a reflection of market dynamics and consumer preferences. It is clear that traceability systems are rapidly developing as the benefits to be derived from such
systems increase in value and as the technology drives down the cost of creating and managing information. Therefore, there is an incentive for the private sector to voluntarily introduce and implement traceability systems. Traceability systems enable efficiencies in supply chain management and marketing, however, the extent of a firm's investment in traceability systems will only go so far as there is a private benefit to be gained. Box 3 provides a summary of the main costs and benefits.

<table>
<thead>
<tr>
<th>Box 3: Summary of Costs and Benefits</th>
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<tbody>
<tr>
<td><strong>Benefits</strong></td>
</tr>
<tr>
<td>• Traceability ensures good supply chain management and leads to greater efficiencies</td>
</tr>
<tr>
<td>• Traceability ensures business can identify sources of food safety and quality, facilitating potential product recalls</td>
</tr>
<tr>
<td>• Assists business in demonstrating product attributes that may be important for consumers</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
</tr>
<tr>
<td>• Business may have to introduce new record keeping systems to ensure product information is adequately captured</td>
</tr>
<tr>
<td>• There are costs associated with differentiating one product over another.</td>
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So far, this paper has shed light on the definition of traceability and the key attributes of a traceability system. It has also shown that there are a number of incentives that exist for businesses to move forward with traceability systems without government intervention. The next section discusses cases where the private sector incentives may not be what are socially optimal. Depending on the sector, this could lead to a role for government to introduce legislation and regulations requiring traceability.

**Market Failures and the Role of Government**

What has emerged from this literature review is that there is variation in the adoption of traceability systems across sectors because the costs and benefits of traceability vary systemically. As highlighted previously, an important component of traceability is the role it has in providing information to consumers. Without a traceability system, consumers would not have a range of information available to help inform choices about products. However, traceability systems have a role to play in ensuring consumer safety, hence the need for government legislation and regulation. Market failures can
arise based on the depth of information that is provided by a traceability system, meaning there may not be enough information on all the processing stages to ensure consumers know exactly what was in a product and/or the source of ingredients it contains. It is the government’s role to ensure the appropriate level of information is being provided by a traceability system. Governments have introduced regulations, which require companies to track specific information for varying policy objectives. This would apply to cases where the private sector incentives highlighted above are not providing what is considered to be the appropriate level of information. While businesses can use traceability for marketing purposes, governments need to examine what policy objectives are being met by these systems.

Governments require components and materials within a product to be traced to provide consumers with information about a product. From a consumer point of view, one can use a range of indicators to identify a product with quality. Hobbs (2003) argues that many food safety and quality attributes are credence attributes, such as product origin, the animal welfare or environmental practices used on the farm or the presence of genetically modified organisms. The literature suggests that market failures can arise in relation to insufficient traceability systems that are missing information or missing public good aspects. Hobbs (2003) notes that consumers may incur information costs in determining whether an experience or credence attribute may be present and therefore market failures can arise as result of information asymmetry. Hobbs and Grossman (1981) point out that the seller of high quality products tends to have an incentive to disclose this to consumers. This argument is echoed by Golan et al (2004) who argue that firms have incentives to use traceability systems to help generate information on product attributes of value.

The opposite is that firms do not have incentives to generate information about products that are not of value or have a negative value. For example, if a traceability system is set-up which would increase the likelihood that a business would be identified as a source of public safety and exposed to negative media attention, then the business will have an incentive to remain anonymous. Golan et al (2004) note that in some cases, the amount of traceability supplied by businesses may be less than the social optimum because the public health benefits of traceability are larger than the firm’s benefits.

These market failures lead to the need for government regulation. In some jurisdictions, governments have developed a comprehensive system of regulations to ensure certain information is provided by a traceability system, otherwise, the product will not be allowed in the market. From the definitions highlighted and discussed in the literature, it is clear that traceability can go further than “restrictions” in the strict sense and should not be confused as a ban of a certain material or product. For example, in food safety or product safety, traceability can be imposed in order to facilitate eventual recalls of products. Another example is traceability policies that simply impose labelling, which is a softer type of restriction.
While governments have introduced policies and regulations requiring traceability, there are also examples of industry self-regulation, which was discussed previously. Golan et al (2004) note in response to consumer demands, industry has also made an effort to be responsive to consumers by using traceability systems to demonstrate certain product attributes. Third party safety/quality auditors are at the heart of these efforts. There are a growing number of buyers that are beginning to require that their suppliers establish safety/quality traceability systems to verify often through 3rd party certification, that such systems function as necessary. While industry efforts at self-regulation are being made, there are a number of policy instruments available for government to stimulate the supply of information. One of these is mandatory traceability to supply consumers with information on product attributes, including the country of origin and genetic composition. The problem with such an approach is that it can fail to differentiate between valuable quality attributes, those for which attributes is needed, and other less valuable attributes. Golan et al (2004) note that governments may have an incentive to require that producers of products, which are not genetically modified verify that these foods are in fact not genetically engineered, if that is an attribute that is of some value to consumers. A key theme from the literature is the need for flexible government-mandated systems that are efficient and less burdensome than ones that require that all firms revamp or introduce traceability systems to conform to a standard template.

As demonstrated in the previous section on the costs and benefits of traceability, traceability systems can help firms reduce liability and recalls costs. Traceability systems also have a range of social benefits, such as avoided costs from medical expenditures and productivity losses due to food borne illnesses. Social benefits also include the avoided costs of firms that produce safe products but lose sales because of safety problems in the industry. A firm’s traceability system not only helps minimize potential dangers for the individual firm, it also helps minimize dangers to the whole industry and to upstream and downstream industries as well.

To sum up, governments are interested in traceability because it provides information to consumers to help them make product choices, however traceability also has a role in consumer safety. In some cases, businesses have introduced traceability systems, which may not provide the socially optimal amount of information. In making policy choices, government may look to use traceability to assist in tracking and sourcing product information. This could be for strictly consumer safety purposes or as will be shown in the next section this paper for other policy objectives, such as preventing conflict and environmental sustainability.

**Summary**

The objective of this literature review was to provide a comprehensive summary of the various definitions of traceability. The main observation was that there is a lack of a common definition however generally traceability involves identifying the specific components, processes, and materials used to manufacture a product. Another critical
theme from this literature review is that there are a range of costs and benefits for firms to introduce or implement traceability systems, which are driven by the different range of objectives. The literature reviewed in this report highlighted the role that consumers play in shaping traceability systems however when these systems do not provide the social optimal amount of information, there is a role for government to require certain information to be tracked.

It is the role of government to ensure consumer safety, therefore, they have policies, legislation, or regulations, which require companies to disclose certain information related to the manufacturing and/or processing of a product. Traceability can be used as a mechanism for consumer safety as well as ensuring that they receive good information upon which to make product choices. In other words, traceability is a competitive process where government can increase, retain, or restrict access to specific markets depending on the production methods, the sources of the product materials or natural orientation of consumers towards a product. While companies have both incentives and disincentives to provide information to consumers on their products, it is the role of government to articulate through policy, legislation and regulation what information should be required to achieve specific policy objectives.

In a subsequent section, this paper will look at specific case studies of regulations that have been introduced in the EU and the US. Before these case studies, the paper provides examples of international cooperation using traceability to further specific policy goals beyond consumer safety. It also highlights two non-government organizations that are attempting to standardize practices across industries. It is to this that we now turn.
TRACEABILITY CASE STUDIES

International Traceability Initiatives:

As discussed previously, traceability systems can be concerned with the “where”, “what” and “how” in manufacturing a product. This section highlights examples of how traceability is being used by international organizations to restrict the trade of conflict minerals and endangered species. The Kimberley Process and the Convention on International Trade in Endangered Species of Wild Fauna and Flora are pertinent examples of international cooperation using traceability to restrict the movement of goods within specific countries or regions. The Kimberley Process illustrates an example of traceability being used to achieve a social policy objective, which is the prevention of armed conflict. The Convention on International Trade in Endangered Species of Wild Fauna and Flora provides an example of traceability being used to achieve an environmental policy objective, which is the prevention of trade of endangered species. The purpose of including these case studies is to demonstrate international examples of cooperation using traceability.

In parallel to government-led initiatives requiring traceability, there are also examples of non-government led organizations, which aim to ensure international standards are developed in a specific sector, often involving traceability components and provisions. The International Organization for Standardization and GS1 are highlighted as important cases of this type of cooperation. These organizations are highlighted because they are leaders in the development of standards related to traceability. Furthermore, they are examples where private sector efforts are being made to align standards related to traceability outside of government. They facilitate the international exchange of information related to standards, which are often developed in relation to traceability provisions.

1) Kimberley Process – Trade in Conflict Diamonds

One of the more high-profile traceability initiatives has been the Kimberley process, designed to certify the origin of rough diamonds from sources, which are free of conflict funded by diamond production (Interview, DFAIT, February 2012). As noted by the Kimberley Process (2011), in December 2000, the United Nations General Assembly adopted a landmark resolution supporting the creation of an international certification scheme for rough diamonds. By November 2002, negotiations between governments, the international diamond industry and civil society organizations resulted in the creation of the Kimberley Process Certification Scheme (KPCS).

Diamond production is a profitable industry for many jurisdictions across the world. The Kimberley Process publishes annual reports on the production, importation, and exportation of diamonds. According to its figures, Canada’s diamond production value was $2.3 billion in 2010 (the actual value of Canadian diamond exports was $2.4 billion
thanks to the value of the American dollar). Other countries that have high diamond production include Russia, Botswana, South Africa, Angola, Zimbabwe and Australia.

The KPCS sets out the requirements for controlling rough diamond production and trade, hence there is more of a focus on diamond production in developing countries. It entered into force in 2003, when participating countries started to implement its rules. According the Kimberley Process (2011),

“the Kimberley Process Certification Scheme imposes extensive requirements on its members to enable them to certify shipments of rough diamonds as ‘conflict-free’. As of December 2009, the Kimberley Process had 49 members, representing 75 countries, with the European Union and its member states counting as an individual participant.”

According to the preamble of the KPCS, participants recognize that “trade in conflict diamonds is a matter of serious international concern, which can be directly linked to the fuelling of armed conflict, the activities of rebel movements aimed at undermining or overthrowing legitimate governments, and the illicit traffic in, and proliferation of armaments, especially small arms and light weapons.” The KPCS recognizes the role that rough diamonds play in perpetuating conflict, therefore, by introducing a traceability and certification system, member countries are attempting to reduce these types of diamonds from international trade. Through certification standards, the Kimberley Process requires that each participant ensure each shipment of diamonds is conflict-free. The Kimberley Process calls for each participant to establish internal controls as each country may have differences in production methods and trading practices. On this note, the KPCS relies on a voluntary system of industry self-regulation.

This system of self-regulation has led some to question whether the Kimberley process has been effective (Interview, DFAIT, February 2012). According to Global Witness (2011), the Kimberley process has made some notable achievements, including helping some of the countries worst hit by diamond fuelled wars increase their conflict free diamond revenue, however, it has repeatedly failed with problem cases such as Zimbabwe, Côte d’Ivoire and Venezuela. They note that despite the Kimberley Process, there are still many human rights abuses and violence fuelled by diamonds. Recently, Global Witness withdrew from the Kimberley Process over these concerns. In announcing their withdrawal, Global Witness said that “despite intensive efforts over many years by a coalition of non-governmental organizations, the scheme’s main flaws and loopholes have not been fixed and most of the governments that run the scheme continue to show no interest in reform.” They pointed to the authorization of two exports from a diamond mine in Zimbabwe at a site where the army had seized control killing 200 miners. After the seizure, several companies linked to Robert Mugabe’s Zanu PF party were granted questionable concessions. Global Witness also pointed to two other questionable actions in both Cote d’Ivore and Venezuela.
Global Witness has recommended that the Kimberley Process could be improved by clarifying and strengthening its commitment to human rights, establishing an independent and technical body to support progress on administrative matters, monitoring, statistical and legal analysis, and replace its decision making procedures with a more effective system.

This case shows that in some cases traceability can be used to specifically restrict the movement of goods from a country or region. In terms of the “what”, and “where” and “how” the Kimberley process is concentrated on the “what” and “where”. Regardless of whether or not the Kimberley process has been successful, this case demonstrates how traceability can be used to achieve a social objective. Another good case to examine is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

2) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) entered into force on July 1, 1975 and is currently one the largest multilateral environmental agreements in existence. Currently, there are 175 member countries and 33,000 types of species and animals that are covered by the Convention. According to United Nations Environmental Programme (UNEP) Executive Director Achim Steiner (2008, p. 1):

“the countries that established CITES were pioneers in realizing that a mechanism to regulate the international trade in wildlife was needed to conserve biodiversity and to contribute to the sustainable management of the world’s natural resources.”

CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival (CITES, 2011). CITES sets controls on the movement of animal and plant species that are, or may be, threatened due to excessive commercial exploitation (Environment Canada, 2011). CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. An average of 850,000 transactions are conducted annually under CITES provisions, which lay down standard requirements, conditions, and procedures for international trade in the interest of conservation.

An animal or specimen which is identified as a CITES species may be imported and/or exported if the member state to the convention has the appropriate documentation at the port of entry or exit (CITES 2011). This certification system is one of the major incentives that CITES has to promote conservation. According the 2008-09 CITES annual report (2010, p. 18) “when someone buys a CITES animal, plant or product that has been imported in compliance with the Convention, that person is also getting the
assurance that the specimen was harvested in a sustainable manner and was acquired and traded legally.” The annual report summarizes the successes of CITES in limiting international trade of elephant ivory in Africa. In both 2002 and 2007, CITES was successful in authorizing sales of elephant ivory from Botswana, Namibia, and South Africa. These three countries were authorized through CITES to sell government stockpiled elephant ivory (mostly from elephants that died of natural causes) to Japan. After the trade, CITES officials audited and verified the quantities of ivory sold to ensure it met CITES requirements.

3) **International Organization for Standardization (ISO)**

The International Organization for Standardization (ISO) is a non-governmental organization, which contains 163 national standards bodies, including the Standards Council of Canada. ISO standards are recognized by the World Trade Organization (Interview, Ontario Ministry of Economic Development and Trade, November 2011). In respect of the food sector, according to OnTrace (2007), the ISO provides principles and sets out requirements for the design and implementation of a traceability system for any type of food business. According to the ISO website (2011), ISO standards make the development, manufacturing, and supply of products and services more efficient, safer, and cleaner; facilitate trade between countries; and provide governments with a technical base for health, safety, and environmental legislation. One of the challenges with the ISO is that its standards are not available free of charge so smaller businesses may have trouble following these standards. While this is one criticism that has been levelled against the ISO, it has nonetheless been successful in attempting to ensure international food retailers are following the same standards and processes, which facilitates traceability that may be required under regulation. While some companies are required to join the International Organization for Standardization, others may also become members because of the requirement to meet standards under relevant legislation and regulations, which require traceability of a product and its materials.

4) **GS1**

Another non-governmental example of an international standard organization focused on traceability is the GS1, which is dedicated to the design of global standards and solutions. GS1 has 104 member countries, which are primarily retailers and food processors. According to OnTrace (2007), GS1 has been a leader in developing generic traceability standards and guidelines for beef, fresh produce, fish, bananas, and wine. The GS1 system has been widely adopted by food retailers and it incorporates other global standards, such as global trade item numbers (GTIN), global location numbers (GLN) serial shipping container codes (SSCC) and bar coding systems (OnTrace, 2007). According to GS1 (2011), “standards are agreements that structure any activity or any industry. They may be rules or guidelines that everyone applies. They may be a way of measuring, or describing, or classifying products or services.” A key trademark of GS1 is the GS1 barcodes, which enable companies to manage shipment, storage, ordering, and sales. These standard bar codes developed by GS1 help businesses to
find efficiencies in the global supply chain and manage product information. GS1 standards also play a role in combating counterfeiting, ensuring food safety, and creating electronic records of business documents – all critical components of an effective traceability system highlighted in the literature review.

**Summary**

In summary this section of the report highlighted some important international initiatives (both government and non-government led) which illustrate the use of traceability systems to achieve very different goals. These international initiatives demonstrate that governments do not necessarily impose traceability for consumer protection objectives. It may be for social or environmental objectives that have very little to do with the protection of the consumer of a product.

While the Kimberley Process has been criticized for its inability to limit the trade of rough diamonds, CITES has been praised for its ability to bring about conservation efforts. CITES works with international crime enforcement agencies such as INTERPOL, the World Customs Organization, the United Nations office of Drugs and Crime, the World Bank, and the ASEAN Wildlife Enforcement Network to ensure that the laws governing trade in CITES are enforced (CITES, 2010).

Both the Kimberley Process and CITES provides examples of international cooperation using traceability to try and achieve a specific policy objective – in these cases, traceability is being used to limit the trade of rough diamonds and ensure animal and plant products are being traded in a sustainable manner to promote conservation and prevent extinction. These are both examples of government-led initiatives.

Beyond the role of government, important private sector initiatives have been undertaken at the international level, which attempt to standardize the traceability of a product within one sector. The literature review highlighted the benefits of traceability systems for the private sector in terms of supply chain management, identifying unsafe products, and ascribing certain product attributes. Both the International Organization for Standardization and the GS1 provide good examples of non-governmental organizations that aim to improve business processes around traceability and ensure that companies are standardizing their labels as well as shipping information. Private sector companies are cooperating to establish standards, which are in some cases required by regulation but which are sometimes undertaken on a voluntary basis.

Going forward, this report now looks at selected case studies of traceability policies in the EU and the US in the agricultural and environmental sectors. These case studies provide concrete examples of how traceability has been used for achieving policy objectives related to food safety, climate change, and sustainable development. The case studies also provide examples of the different types of traceability highlighted in the literature review. They are examples of government led initiatives, where industry
has had to react and adjust their processing and recording system to ensure compliance.
SELECTED TRACEABILITY POLICIES IN THE EU

This section of the report provides an overview of current traceability policies in the EU. It is critical to understand how these policies are being implemented and the potential implications they have on Canadian exporters. For case study examples, this report will look at the EU’s GMO policy, as well as how the EU uses traceability to restrict biofuels and illegal logging. These case study examples are being highlighted because they are in sectors of strategic importance to Canadian trade and also because they are the most developed policies that require traceability. In other words, they represent some of the more innovative approaches that have been taken to use traceability to achieve a policy objective.

1) GMO Policy

The EU has been a very difficult market for products that contain Genetically Modified Organisms (GMOs), notably because of potential concerns over their impact on human health (Interview, DFAIT, February 2012). The EU applies a rigorous approval process for GMOs. Regulation 1829/2003 provides the legal framework for the regulation of GMOs. According to the Health and Consumer Protection Directorate General (DG SANCO) of the European Commission (2012), the legal framework “pursues the global objective of ensuring a high level of protection of human life and health and welfare, environment and consumer interests, whilst ensuring that the internal market works effectively.” The framework applies to both feed intended for animals as well as food, which is destined for human consumption.

The approval process is succinctly summarized by GMO Compass on their website (www.gmocompass.org). The first phase of the regulation approval process requires an application to be submitted to authorities in a member state. This application must contain information on studies which demonstrate that the GM food product is not dangerous or hazardous to health as well as suggestions for labelling and testing methods for detecting GM content. The application is submitted to the European Food Safety Agency (EFSA), which conducts a safety assessment. EFSA has six months to provide an opinion and the basis of this opinion is related to a scientific evaluation of whether the GMO is harmful to human and animal health and the environment. Along with an official opinion, EFSA includes suggestions for product labelling, possible conditions related to laboratory results and an environmental monitoring plan. EFSA submits its opinion to the European Commission and to the member states.

After this, the Commission has three months in which to produce a draft of a decision. This decision is submitted to the Standing Committee on the Food Chain and Animal Health – a committee with representatives from member states – which may approve or reject the Commission’s decision with a qualified majority. If the Committee rejects the Commission’s draft, or if a decision with a qualified majority cannot be reached, then the Commission must take its position to the European Council of Ministers and the European Parliament. The Council has 90 days to approve or reject the Commission’s
If the Council approves the draft or if a qualified majority cannot be reached, then the Commission draft for a decision comes into effect. This lengthy and complex approval process may be one of the causes of the relatively smaller number of GMOs approved in the EU compared to international partners such as the United States and Canada.

The “asynchronous” approval of GMOs in the EU and its trading partners such as the US and Canada has a direct impact on EU traceability policies. An interesting example of how the EU’s GMO policy has impacted Canadian exports relates to shipments of Canadian flaxseed (Interview, DFAIT, February 2012). In July 2009, a laboratory in Europe detected low level trace amounts of a genetically modified organism in a shipment of Canadian flaxseed to the EU. The GMO that was identified was FP967 (CDC Triffid), which received Canadian food safety authorization in 1998. No varieties of GM flaxseed have received regulatory approvals in the EU and their regulations allow zero tolerance of non-approved GMOs (Canadian Grain Commission, 2010). Following this incident, the Canadian Government and EU developed a sampling and testing protocol for Canadian flaxseed exports to the EU (see Appendix C). This protocol was developed in March 2010 and contains traceability provisions to ensure Canadian flaxseed can continue to be successfully exported to the EU, without the presence of GMOs.

The protocol requires that samples be taken (under the guidance of the Canadian Grain Commission) by grain handling company personnel for each product delivery into the commercial handling system. The protocol also requires all Canadian grain handling companies to be ISO certified and the sampling of railcars, which transport Canadian flaxseed to port positions. The protocol requires extensive testing and identification of railcars, sealing silos, as well as loading vessels. In all cases, the Canadian Grain Commission must ensure the appropriate identification of all modes, which have tested negative for GMOs. Lastly, appropriate documentation must been provided by the Canadian Grain Commission to the relevant EU authorities in the form of a letter of analysis, which verifies that all shipments of flaxseed were tested and sealed according the protocol and tested negative for the presence of FP967 (CDC Triffid).

Once a GMO is approved in the EU, its use in products remains regulated in several ways. For example, the EU has adopted regulations with the goal of ensuring consumers have information to make informed product choices and one of the areas where the EU has used traceability is to ensure products are clearly labelled that contain GMOs in food. Regulation 1830/2003 contains principles and rules on the placing of GMOs into the EU market, including rules for the appropriate labelling of GMOs in food products. The regulation notes that it is necessary to ensure that consumers are fully and reliably informed about GMOs and the products, foods, feed produced with GMOs to enable them to make an informed choice of about a product (European Commission, 2003). The objective of the regulation is to “facilitate accurate labelling, monitoring the effects on the environment and where appropriate on health,
and the implementation of the appropriate risk management measures, including, if necessary, withdrawal of products.”

The regulation requires that producers of food with GMOs label both pre-packaged products consisting of GMOs and non pre-packaged products offered to the final consumer contain labelling identifying the products as having GMOs. Products must have either of the following labels:

1) This product contains genetically modified organisms; or
2) This product contains genetically modified [name of organism(s)].

Additionally, the regulation requires that when producers place products produced from GMOs on the market, the following information must be transmitted in writing to the operator receiving the product:

1. An indication of each of the food ingredients which is produced from GMOs;
2. An indication of each of the feed materials or additives which is produced from GMOs; and
3. In the case of products for which no list of ingredients exists, an indication that the product is produced from GMOs.

The regulation notes that “the transmission and holding of information that products contain or consist of GMOs, and the unique codes for those GMOs at each stage of their placing on the market provides for the basis of appropriate traceability and labelling for GMOs.” Exemptions to the regulation would include when small trace amounts of GMOs are found in a product or a shipping container. The European Commission has established thresholds for what is an acceptable trace amount of GMO.

This case study provides a great example of how traceability can be used to try to minimize the trade impacts of rigorous regulatory requirements (the alternative to a traceability system could have been the prohibition of Canadian flax into the EU market). It also provides an example of where the government – in this case the Canadian Grain Commission – has had to work with industry associations to ensure standards and systems are in place to satisfy traceability requirements. In this case, the development of a traceability system is driven by government regulation as opposed to the industry undertaking such a system on its own. This development is because of different policies between Canada and the EU concerning the use and identification of GMOs.

2) EU Directive on Biofuels

The EU has recognized the increasing dependence on imported fossil fuels within the transport sector. The European Commission notes (2012) that this sector is expected to grow more rapidly than any other going forward to 2020. This increased dependence and consumption could lead to greater greenhouse gas emissions (GHGs), which contribute to global warming and the potential consequences that it could bring. The European Commission has noted (2006) that transport is responsible for an estimated
21% of all greenhouse gas emissions that are contributing to global warming, and the percentage is rising. Given this challenge, the EU has recognized the importance of expanding biofuel production. According to the Commission (2006) “the EU is supporting biofuels with the objectives of reducing greenhouse gas emissions, boosting the decarbonisation of transport fuels, diversifying fuel supply sources and developing long-term replacements for fossil oil.”

In May 2003, the European Commission released Directive 2003/30/EC, which established the goal of reaching a 5.75% share of renewable energy in the transport sector by 2010. This directive was revised in April 2009 with the release of Directive 2009/28/EC, which raised the share of renewable energy to a minimum of 10% in all member states by 2020. According to the European Commission (2012), the Directive also “aims to ensure that as Europe expands the use of biofuels, they use only sustainable biofuels, which generate a clear and net GHG saving and have no negative impact on biodiversity and land use.” This Directive represents a clear policy goal of reducing GHGs and reducing the potential devastating impacts associated with global warming, which include rising sea levels, increased abnormal temperatures, and an increase in the frequency of severe weather events.

This directive has led to the growth of the EU biofuel market. According to the European Commission, in 2008, biofuels represented a share of 3.5% for renewable energy sources. About 72% of biofuels were biodiesel, 19% were bioethanol, and about 9% were other biofuels. The percentage of biodiesel has been growing (from 64% in 2007) and five member states (Germany, France, Spain, Italy, and the UK) represent more than 70% of the European biofuels market. In 2008, about 78% of all EU biofuels consumed in the EU was produced in the EU. The other 22% was imported from other countries – primarily from the US.

The EU's biofuel regulations have a potentially significant impact on Canadian trade interests. Canadian canola oil is used as a feedstock in biodiesel to contribute to reduced greenhouse gas emissions. According to the Canola Council of Canada (2012), canola is a significant oilseed crop in Canada with over 16 million harvested acres and 11.8 million tonnes produced in 2010. For Canadian canola producers, the EU represents a critical market opportunity as Europe has the world's largest biodiesel industry (Canola Council of Canada, 2011). However, to gain access to the EU market, all feedstock used to produce biodiesel must meet minimum sustainability criteria and be certified as sustainable according to the EU's biofuel regulation. For Canadian canola oil producers, this means that all canola exported to the EU must have a certificate of sustainability attached and must be certified as a canola oil grower for the EU market. The canola industry in Canada has chosen to use the International Sustainability and Carbon Certification (ISCC) system to certify Canadian canola oil for the EU market.

The ISCC is a non-profit organization based in Germany and is one of the largest certification schemes in the world. According to the ISCC (2010), "in the context of a
sustainable development the use of biomass is only justifiable, if a sustainable, environmentally and socially sound production of the biomass is ensured.” The ISCC standard for sustainable production includes six principles (see Appendix D) with respective criteria, which are aimed at the prevention of “ecological shortcomings” as well as the safekeeping of adequate working conditions and the protection of employees health on farms. These six principles and respective criteria are organized into “major musts” and “minor musts”. All “major musts” and at least 60% of “minor musts” must be fulfilled for the ISCC to consider a grower to have a successful audit.

According to the Canola Council of Canada (2011), to meet certification requirements, the entire supply chain must be certified and this happens through an audit process. Independent auditors who are trained and approved by the ISCC conduct regular audits of the supply chain, including growers, crushing facilities, primary elevators, and export terminals. All growers must be “audit ready” however, only a random sample of growers will actually be audited. If a grower is audited and fails to pass, they have 40 days to rectify the deficiencies; otherwise, they will not be allowed to export canola to the EU market.

Under the ISCC, there are a range of traceability requirements, which must be met in the audit process or the grower will not qualify as a supplier for the EU market. The Canola Council of Canada provides a checklist of requirements for canola oil producers to help ensure they meet the requirements and would be considered audit ready. A key traceability requirement to ensure biofuel feedstock can be exported to the EU is that no land used to produce biofuel feedstock was cleared after January 1, 2008. Any grower who has cleared land larger than an acre would not qualify as a grower for the EU market. Growers are required to provide a “land clearance declaration” that attest to this stipulation. Additionally, the on-site audit requires a comprehensive list of documentation that must be provided including records of fertilizer and pesticide application, a list of crops and acres grown on each parcel of land for the current year, as well as the previous two years. The audit also includes information on employees who work for the company, payroll information, as well as information on farming practices related to tillage, soil, water, fuel storage, fertilizer and pesticides.

Here again, there is an example of a policy choice by the EU has resulted in traceability requirements. In the literature review, it was highlighted that there is an incentive for the private sector to introduce traceability systems without government regulation. However, when the government determines that industry is not providing the necessary information on their manufacturing processes, regulations can be introduced with specific traceability provisions. Similar to the EU’s GMO policy, Canadian industry has had to adjust their business processes to ensure regulatory requirements related to biofuels are met, which includes traceability. They have worked with a technical body to put systems in place that meet traceability requirements as outlined in the EU’s biofuel directive. The GMO and biofuel policy provides examples of emerging EU policies that have impacted Canadian businesses. They are also traceability initiatives concerned
with the “what” and “how”. An example of an EU policy requiring traceability concerned with the “where” is illegal logging.

3) Illegal Logging in the EU

Another interesting case study involving traceability that is important to highlight is the EU’s effort to ban illegal logging. The European Commission (2005) defines illegal logging as the harvesting of timber in contravention of the laws and regulations of the country of harvest. Illegal logging is a problem across many developing and developed countries across the world and is associated with deforestation, climate change, and a loss of biodiversity. It has also been noted as a source of social problems, particularly in developing countries, such as there has been conflict and the displacement of local indigenous communities.

The EU’s illegal logging policy is defined in two pieces of legislation: 1) FLEGT Regulation; and 2) The EU Timber Regulation. The FLEGT Regulation was adopted in 2005 and establishes a licensing scheme for imports of timber into the European Community. Under the FLEGT regulation adopted in 2005, exports from partner countries are prohibited unless the shipment is covered by a FLEGT licence. A key element of the FLEGT is a voluntary scheme, whereby the EU enters into bilateral agreements with other countries that include commitments to halt illegal timber. The licensing scheme verifies that the timber is not harvested illegally. An agreement has been concluded with Ghana. The Republic of Congo and Cameroon are in the ratification process and negotiations are ongoing with Liberia, Gabon, Democratic Republic of Congo, Central African Republic, Malaysia, Indonesia, and Vietnam. The challenge with the FLEGT process is the voluntary nature of the verification process. Similar to the Kimberley process, these bilateral agreements have been seen as not effective in preventing illegal timber from entering the EU market because of the lack of an independent verification body. Given these concerns, the EU has moved to introduce regulations which have stronger traceability provisions.

The EU Timber Regulation of 2008 lays out the specific implementing provisions of the EU’s illegal logging policy. Its application will not come into place until March 3, 2013, however, it is important to highlight because it is a comprehensive example of a traceability policy and companies will need to work towards meeting its requirements. It applies to both domestically produced and imported timber and timber products. This regulation prohibits the placing of illegally harvested timber and products derived from such timber on the EU market and requires EU traders who place timber products on the EU market for the first time to exercise ‘due diligence’ (European Commission, 2008). Due diligence is referred to as a risk assessment exercise with the goal of minimizing the potential for illegal harvested timber to enter the European market. On the Commission’s website, it is noted that due diligence encompasses three key elements:
1. Information: The operator must have access to information describing the timber and timber products, country of harvest, species, quantity, details of the supplier and information on compliance with national legislation.

2. Risk assessment: The operator should assess the risk of illegal timber in his supply chain, based on the information identified above and taking into account criteria set out in the regulation.

3. Risk mitigation: When the assessment shows that there is a risk of illegal timber in the supply chain that risk can be mitigated by requiring additional information and verification from the supplier.

The Commission has noted that it will adopt more specific rules related to the due diligence system by 2013. According the European Commission (2012), once on the market, the timber and/or timber products may be sold and/or transformed, however to facilitate traceability of such transformation, businesses in this part of the supply chain must keep a record of their suppliers and customers. The EU Timber Regulation outlines a role for monitoring organizations who will be responsible for operationalizing the due diligence systems. Operators will be able to develop their own traceability system or use one from the responsible monitoring organizations. Currently, the Commission is in the consultation stage with stakeholders on how best to move forward with options for these monitoring organizations as well as the best options for risk assessment procedures.

The specific impact of EU timber regulations on Canadian businesses and timber manufacturers is unknown, as the EU continues to work on implementing provisions (Interview, DFAIT, March 2012). Depending on the level of information that is required from Canadian manufacturers, it may be hard for them to verify the contents of their timber products. This is because in some cases, Canadian timber products may purchase timber materials on the open market – in which case, it is nearly impossible to identify the country of harvest and species (Interview, DFAIT, March 2012). As noted in the literature review, the more processes a product goes through in the supply chain, the more difficult it is to track specific information about the product. In this case, the government is lobbying for the implementation of traceability provisions to be applied on the basis of risk. If successful, this would mean that the government would need to attest that Canadian shipments entering the EU do not contain illegal timber.

This case study is an example of an EU policy initiative requiring traceability that is concerned with the “where” and “how”. The illegal logging legislation and regulations are designed to prevent illegal timber or illegally harvested timber from entering the EU. As noted in the literature review, traceability can often be related to consumer safety. The EU’s timber regulation is an example of a policy that is not necessarily concerned with consumer safety – Similar to the Kimberley Process and CITES, it is a traceability initiative with a social and environmental policy objective. This initiative is similar to efforts that have been undertaken in the US regarding illegal logging, which will now be highlighted.
The EU timber regulation is still under development and Canadian officials are looking at the experiences of implementing the US illegal logging regulation because it was the first traceability policy concerned with tracking the specific origin and species of timber (Interview, DFAIT, March 2012). It is important to highlight the US illegal policy because it is one of the first traceability initiatives introduced focused on issues unrelated to consumer safety.
US TRACEABILITY INITIATIVES

1) Illegal Logging in the US

Similar to the EU’s policy approach to prohibit illegal logging, the United States has also introduced policies, which have traceability requirements to ensure products are not made from illegal timber. According the Congressional Research Service (CRS) (2008), the United States is one the world’s larger wood products consumers and one of the top importers of tropical woods. The CRS cites the demand for wood in the United States as a possible driver for illegal logging. The United States does not have one single piece of legislation to address illegal logging, instead; there are a number of pieces of legislation and regulation both at the national and state level, which seek to prohibit illegal logging.

The Endangered Species Act restricts illegal logging if there is a species listed under the Act that is trying to be imported in the United States. This Act also authorizes the United States to participate in the CITES, a convention described earlier that is aimed at protecting plants and animals from unregulated trade. According the CRS (2008), US imports of wood and wood products from tree species listed on CITES are regulated according to their status under the treaty. Currently, 15 tree species are listed as trade-restricted under CITES. The Tropical Forest Convention Act is another piece of legislation aimed at preventing illegal logging. It indirectly addresses the issue by authorizing debt for nature transactions with developing countries that provide funding for conserving tropical forests (CRS, 2008). The Foreign Assistance Act also allocates a portion of funding for countries who are undertaking activities to prevent illegal logging. The United States has also pursued a series of bilateral initiatives with countries known to have illegal logging activities, including provisions in free trade agreements, however, it has been noted that this agreement has deficient environmental rules, which may have negative implications for illegal logging (CRS, 2008).

In 2008, the United States passed ground breaking legislation by amending the Lacey Act to ban all commerce in illegally sourced plants and products, including wood and timber products. Essentially, the Lacey Act does three main things:

1. Prohibits all trade in plant products that are illegally sourced from a US State or foreign country;
2. Requires importers to declare the country of origin of harvest and species names of all plants contained in their products; and
3. Established penalties for violation of the Act, including forfeiture of goods, fines, and jail time.

The declaration of country of origin and species contained in the products represents a traceability component of the legislation. Importers must provide a basic declaration of the contents of their shipments to increase the transparency and accountability of their products. Specifically, the Lacey Act requires that they provide the scientific name of any species used; the country of harvest; the quantity and measure; and the value. The US Department of Agriculture’s Animal Plant Health Inspective Service has the lead role
in processing declarations and inspecting potential violations. They share this responsibility with the US Department of Interior’s Fish and Wildlife Service. The Department of Homeland Security also plays a role in monitoring shipments at the border to ensure they do not violate provisions under the Act.

Violation of the Lacey Act can result in severe penalties and even jail time. If an individual or company is found to knowingly participate in conduct prohibited under the Act, they could face a fine up to $500,000 and up to 5 years in jail. If a company or individual unknowingly violates the Act by not exercising due care, they could face fines up to $200,000 and one year in jail. Clearly, these enforcement mechanisms are designed to disincent illegal logging activity.

In terms of implications of this legislation on Canadian business, each shipment must be certified as not containing illegally harvested timber. This requirement poses an administrative burden on Canadian timber exports as numerous shipments are made each month (Interview, DFAIT, February 2012). The Canadian government has lobbied for a reduction in this administrative process given the negligible risk posed by Canadian timber manufacturers having illegally harvested timber. (Interview, DFAIT, February 2012). So far, no amendments or changes have been made to reduce this burden on Canadian timber exporters. This case study is important to highlight because it shows the potential implications the EU timber regulation could have on Canadian businesses. It is an example of a more rigid traceability policy that does not discriminate on the basis of the likelihood that a country would export illegal timber products.
This report has provided selected case study examples of policies in both the EU and US that require traceability to verify specific information about a product. Both the EU and US have been leading jurisdictions in their use of traceability as a mechanism for achieving international trade objectives. Illegal logging policies in both jurisdictions as well as the EU’s GMO and biofuel policies all contain extensive requirements, where companies must establish standards and licences to ensure their products are meeting regulatory requirements. As highlighted in the literature, traceability is concerned with the “what”, “where” and “how”. Looking at these case studies provides examples of initiatives related to these three types of traceability. The EU GMO and biofuel policy are focused on the “what” and “how”, whereas the illegal logging legislation in the EU is focused on the “where” and “how”. Similarly, the US has introduced comprehensive legislation requiring traceability aimed at “where” and “how”.

The EU’s GMO policy is an example of an initiative undertaken, at least partially, for consumer safety and consumer choice purposes, which were key themes highlighted in the literature review. It also provides a concrete example whereby Canadian businesses have been forced to adjust their processes to ensure compliance with requirements for EU market access. The Canadian Grain Commission had to work with flaxseed growers to implement the protocol provisions agreed to by the Canadian and EU governments.

The literature review also highlighted the importance of traceability beyond consumer safety objectives. Traceability can be a competitive process used by jurisdictions to restrict certain products for other reasons beyond consumer safety. The EU’s biofuel policy and illegal logging legislation undertaken in the EU and US are certainly examples of traceability initiatives concerned more with environmental and social policy objectives. In the case of the biofuel policy, Canadian businesses have again been forced to adjust their processes to ensure compliance with traceability requirements if they want to seize potential market opportunities. The illegal logging legislation in the US has created an administrative burden for Canadian timber exports, because of the extensive requirements that each shipment contain verification that there is no illegally harvested timber. While the direct impacts of the EU timber regulation are unknown, there is a possibility that Canadian manufacturers will be exposed to tracking comprehensive information on their timber products, which may require new investment in the technology to acquire and track this information. This was certainly the case with the US illegal logging policy, where manufacturers have faced administrative barriers related to certifying that each and every single shipment exported to the US is free of illegally harvested timber.
SUMMARY, RECOMMENDATIONS, OPTIONS AND CONCLUSIONS

The primary goal of this report was to provide a high level summary of existing traceability policies in the EU and US. The Canadian Mission to the EU was interested in a paper, which summarized key traceability policies in these jurisdictions, which have been leaders in implementing regulations with traceability provisions.

This report has focused on international trade policy and the role of traceability in both promoting and restricting market access. It was demonstrated that traceability is a recent policy tool for governments in the field of international trade. Traditional trade barriers are being reduced and are sometimes replaced by product licensing and certification systems that require traceability of the product origin, processes and materials. While the literature provides a range of definitions, there is a common theme across all, which is that traceability is about the “where”, “what”, and “how” of production. Traceability is about information. The extent and scope of this information may vary by policy but in all cases, traceability relates to providing specific information about a product.

There are a range of benefits for the private sector to establish a traceability system, which include improved supply chain management, trace back for food safety, as ascribing certain product attributes. Costs of establishing a traceability system relate to the introduction and maintenance of systems used to keep records and demonstrate product differentiation. When the private sector does not provide the social optimal information, there is a role for government to introduce legislation and regulations, which articulate the necessary level and quantity of information required for importation of a product. While traceability represents an important mechanism for ensuring consumer safety, governments may use traceability for other policy purposes. The government’s mode of action does not always rely on consumer’s information and choice. Governments may force traceability and tax more heavily “bad” products (e.g., carbon-intensive goods) or simply prohibit them (e.g., illegally harvested wood or unsafely processed meats), therefore, although traceability goes beyond a restriction in the strict sense, the use of traceability to impose restrictions should not be overlooked.

The case studies discussed provide examples of government cooperation at the multi-governance level. They demonstrated the importance of an independent body for verification purposes. In the case of the Kimberley process, countries relied on a system of self-regulation, which was called into question by Global Witness. This was also the case with the timber FLEGT agreements, whereby the EU attempted to conclude bilateral agreements with countries based on voluntary compliance. Industry self-regulation may not be the most effective for implementation. Independent bodies, such as that of the CITES need to be established to ensure an effective licensing and certification system. CITES has been quite successful in achieving its policy objectives. CITES also works with international enforcement agencies, strengthening its accountability and enforcement powers. The importance of independent bodies was
also demonstrated in the case of the EU’s biofuel policy, whereby the canola growers are working with an independent standards body to ensure compliance with regulation.

The case studies highlighted in this paper also provide examples of traceability policies focused on the “what”, “where” and “how”. The EU’s GMO food policy is example of a traceability policy focused on the “what”. The biofuel policy is an example of the “what and “how”. The illegal logging policies in both the EU and the US is concerned with the “where” and “how”. They demonstrate initiatives whereby Canadian business has had to adjust processes to meet certain traceability requirements established by regulation. While the report primarily focused on traceability policies in the EU, illegal logging policies in the US were highlighted because they are some of the first regulations containing traceability provision not specifically focused on consumer safety objectives.

**Recommendations**

Going forward, the following recommendations should be considered by the Department of Foreign Affairs and International Trade in regards to traceability:

- Ensure a common understanding of the definition of traceability and how both private and public sector objectives can affect its implementation.
- Wherever possible and desirable, use independent auditors to verify and align traceability standards
- Look for opportunities with both the US and the EU to share best practices and collaborate on the development of traceability standards and licences.
- Continue to work with the private sector to understand the administrative barriers that traceability provisions place on trade
- Maintain an open dialogue about policy objectives and how the implementing traceability provisions will affect market access

**Options**

To move forward with these recommendations, several options could be considered by the Department of Foreign Affairs and Trade:

5. The Department could consider setting up a working group among government and non-government representatives, including the private sector to consider some of the issues outlined in this report. This working group could be tasked with developing critical success factors/criteria for traceability policies.
6. The Department could formally establish a tri-level government committee of US and EU representatives to discuss traceability and trade policies and how the implementing provisions have affected market access. The committee could also develop recommendations for overcoming access issues.
7. The Department could identify best practices where it has worked with third party auditors to align traceability standards and disseminate this information internally.
This would enable trade policy professionals across the organization to learn from each other’s experiences and solutions.

8. The Department could work with experts to sponsor the development of further research on traceability policies

The timelines for moving forward on these options vary from short to long-term. The priority should be investing time and resources into building knowledge networks on traceability. For example, the Mission could consider organizing a workshop before January 2013, which would involve key trade policy experts from government and non-government organizations. After the workshop, a larger conference could be organized involving a wider range of actors. Following this, the Mission could develop a discussion paper which outlines best practices in the implementation of traceability systems policies. These actions would enable the Mission to build a common understanding among both private and public sector actors about what traceability systems exist and how policies with traceability components affect market access.

In developing more research, the focus could be on the role of traceability in restricting market access. There is additional research that could be done looking at how products can be subject to different traceability systems as they move through the supply chain. As stated earlier, there is not much written on this topic in the literature therefore there is an opportunity to further understanding about it.

Conclusion

In conclusion, traceability in international trade will only continue to grow in importance as traditional trade barriers are reduced. In the realm of trace policy, traceability is a relatively recent phenomenon hence the importance of looking at the literature and examples of policies that require traceability. The EU and US have been at the forefront of using traceability policies for specific trade objectives. Going forward, the Canadian government must continue to monitor developments in relevant legislation and regulation concerning traceability and ensure Canadian businesses are successfully meeting requirements for market access.
REFERENCES


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APPENDIX B: KEY INTERVIEW QUESTIONS

- Please describe your roles and responsibilities with respect to international trade policy
- How would you define traceability?
- Do you think traceability policies are growing in importance (as opposed to more traditional trade barriers - e.g., tariffs)?
- What are the challenges faced by Canadian manufacturers as it relates to traceability policies in other jurisdictions (specifically the US and the EU)?
- What approaches have been taken in the US and the E.U regarding illegal logging? How have they impacted Canada?
- What are the challenges and opportunities presented by using traceability to promote trade and foreign policy objectives?
- What type(s) of international cooperation exists within your field? Are their similar or different approaches taken to using traceability?
APPENDIX C: LIST OF ORGANIZATIONS INTERVIEWED

- Department of Foreign Affairs and International Trade
- Mission of Canada to the European Union
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ontario Ministry of Economic Development and Trade
APPENDIX D: SAMPLING AND TESTING PROTOCOL FOR CANADIAN FLAXSEED EXPORTED TO THE EUROPEAN UNION

This appendix contain the wording of the protocol, which can be found at http://www.grainscanada.gc.ca/gmflax-lingm/stpf-peevl-eng.htm

1. Purpose

The purpose of this protocol is to describe the system of sampling, testing, and documentation pertaining to the presence of FP967 (CDC Triffid) in shipments of Canadian flaxseed to the European Union.

2. Background

In July 2009 a commercial laboratory in the European Union detected a low level presence of genetically modified material in a shipment of Canadian flaxseed to the European Union. In September 2009 the Canadian Grain Commission confirmed a trace amount of genetically modified material in some Canadian flaxseed shipments. There are currently no varieties of genetically modified flaxseed registered in Canada. FP967, a genetically modified flaxseed variety, received regulatory feed and environmental safety authorizations in 1996, and food safety authorizations in 1998, but was never released for commercial production. No varieties of genetically modified flaxseed have received regulatory approvals in the European Union. European Union regulations allow zero tolerance of non-approved genetically modified events.

3. Commercial handling system procedures

Producer delivery samples
A sample will be taken by grain handling company personnel from each producer delivery into the commercial handling system. Samples will be retained for a period of no less than six months from the date of delivery. The Canadian Grain Commission provides guidance on sampling methods to the Canadian grain industry in its official Sampling systems handbook and approval guide.

Composite railcar samples and testing
All flaxseed moves from primary elevators to port position by railcars. At time of loading, each railcar will be sampled, and composite samples representing not more than 5 railcars will be prepared. The Canadian Grain Commission provides guidance on sampling methods to the Canadian grain industry in its official Sampling Systems Handbook and Approval Guide. These composite samples will be tested for the presence of FP967 by a laboratory on the list of Laboratories approved for testing flaxseed shipments to the European Union using the method described in 6b. If a composite sample tests positive for the presence of FP967, all railcars testing positive represented by that sample will be diverted from the European Union flaxseed supply.
Individual grain handling companies will retain documentation pertaining to each rail shipment and test result.

**Commercial segregation and quality management**
All Canadian grain handling companies exporting bulk flaxseed to the European Union are either ISO or HACCP certified. Companies will employ internal quality management systems and practices to guard against cross contamination of positive flaxseed and negative flaxseed lots.

4. **Requirements for testing laboratories**

Laboratories undertaking testing for the commercial handling system may only be designated if they operate and have been assessed in accordance with the ISO 17025 standard on ‘General requirements for competence and testing and calibration laboratories’ and if the proposed test method falls within the scope of the above assessment.

The Canadian Grain Commission will maintain a list of Laboratories approved for testing flaxseed shipments to the European Union on its website. Laboratories designated on this list will handle and prepare samples in accordance with ISO 17025 accredited procedures. Laboratories will employ the construct-specific method verified by the European Community Reference Laboratory.

5. **Canadian Grain Commission procedures for exports: Sampling and sealing silos**

**Prior to railcar unloading**
- The Canadian Grain Commission will seal all silos in the elevator containing flaxseed not tested under this Protocol or that has tested positive using a uniquely numbered Canadian Grain Commission seal, and record the silo and seal numbers.
- The Canadian Grain Commission will obtain a list of silos in the elevator designated for negative flaxseed destined to the European Union and confirm those silos are empty prior to use.

**Unloading railcars, sealing silos, sampling and testing**
- The Canadian Grain Commission will obtain a list of railcars from grain companies that have tested negative.
- Canadian Grain Commission personnel will officially sample all railcars unloading flaxseed destined for export to the European Union with an approved automatic diverter-type sampler in accordance with the official Sampling systems handbook and approval guide.
- For lots of flaxseed exceeding 500 metric tons, a minimum sample size of 50 kilograms will be taken. For lots between 50 metric tons and 500 metric tons, a
sample equal to 0.01% of the lot size will be taken. For lots less than 50 metric tons, a minimum sample size of 5 kilograms will be taken. These sample sizes are in accordance with European Commission Recommendation 2004/787/EC (OJ L 348, 24/11/2004, p 0018-0026).

- The Canadian Grain Commission will monitor grain flow from each railcar unload to each designated silo. The Canadian Grain Commission will seal full silos with a uniquely numbered Canadian Grain Commission seal and record the silo and seal number.
- The Canadian Grain Commission will prepare two 2.5 kilogram composite samples for each silo. One sample will be forwarded to an ISO 17025 accredited laboratory on the list of Laboratories approved for testing flaxseed shipments to the European Union.
- ISO 17025 laboratories will test the official sample in accordance with the procedures outlined in section 6 of this Protocol, and notify the Canadian Grain Commission whether each silo tests positive or negative for the presence of FP967. The Canadian Grain Commission will notify terminal elevator operators of the testing results for each silo. Any silo for which the composite sample tests positive will be diverted from the European Union flaxseed supply.

Loading vessels
- The Canadian Grain Commission will obtain a list of silos to be loaded to European Union vessels and confirm that they tested negative and that the seals remain intact.
- The Canadian Grain Commission will break the seal on each negative silo, and monitor grain flow paths to ensure only flaxseed from designated silos is loaded to the vessel during the loading of the vessel.
- The Canadian Grain Commission will confirm that seals on positive or non-protocol flaxseed are intact prior, during, and after vessel loading.


Testing preparation
Samples for testing will be expedited to a laboratory on the list of Laboratories approved for testing flaxseed shipments to the European Union. Laboratory personnel will draw four 60 gram sub-samples from the single 2.5 kilogram laboratory sample. Each 60 gram sub-sample represents approximately 10,000 individual flax seeds, which is capable of achieving a level of detection of 0.01%.

Testing procedures
Laboratory personnel will test four 60 gram sub-samples taken from the single 2.5 kilogram laboratory sample. One DNA extraction will be made from each sub-sample using the Fast ID Genomic DNA Extraction Kit. Two PCR analyses will be carried out for each DNA extraction. The construct-specific method, verified by the European Union Community Reference Laboratory, will be used for the qualitative PCR assay.
Testing results
A lot shall be considered negative when all four 60 gram sub-samples test negative.

7. Canadian Grain Commission procedures for exports: Documentation

The Canadian Grain Commission will prepare an official Letter of Analysis on Canadian Grain Commission letterhead to accompany other Canadian Grain Commission quality certification which may include a Certificate Final or an Official Inspection Certificate. The Letter of Analysis will be presented to the Canadian flaxseed exporter, who will in turn provide it directly to the appropriate European Union authorities. The Letter of Analysis will include a statement as follows:

Prior to the loading of the vessel identified above, the Canadian Grain Commission (CGC) officially sampled the flaxseed (Linseed) destined to storage silos and then sealed each silo.

An official sample representative of each silo was prepared and sealed by CGC personnel and forwarded to [Insert Laboratory Name] for testing. [Insert Laboratory Name] operates and has been assessed in accordance with the ISO 17025 standard on ‘General requirements for competence and testing and calibration laboratories’, and the testing method employed falls within the scope of that assessment.

The official samples, as reported by [Insert Laboratory Name], tested negative for the presence of FP967 (CDC Triffid) based on the verified testing procedures outlined in section 6 of the Sampling and Testing Protocol for Canadian Flax Exported to the European Union. The lab report is attached.

The attached silo list has been prepared by the CGC and designates the silos that were utilized for the shipment identified above.

8. Canadian Grain Commission investigation into the presence of FP967

The Canadian Grain Commission is conducting an investigation into the presence of FP967 within the Canadian flaxseed supply. The Canadian Grain Commission will share results of this investigation with the European Commission at regular intervals.

9. Review date

This protocol may be reviewed and revised at any time. The Government of Canada will notify European Commission officials if revisions are sought.
APPENDIX D: INTERNATIONAL SUSTAINABILITY AND CARBON CERTIFICATION
PRINCIPLES

According to the International Sustainability and Carbon Certification System (2011), the following principles must be adhered to:

PRINCIPLE 1: Biomass shall not be produced on land with high biodiversity value or high carbon stock. HCV areas shall be protected.

PRINCIPLE 2: Biomass shall be produced in an environmentally responsible way. This includes the protection of soil, water and air and the application of Good Agricultural Practices

PRINCIPLE 3: Safe working conditions through training and education, use of protective clothing and proper and timely assistance in the event of accidents

PRINCIPLE 4: Biomass production shall not violate human rights labour rights or land rights. It shall promote responsible labour conditions and workers' health, safety and welfare and shall be based on responsible community relations

PRINCIPLE 5: Biomass production shall take place in compliance with all applicable regional and national laws and shall follow relevant international treaties

PRINCIPLE 6: Good management practices shall be implemented