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## **Implementation of a Traceability System From Constraints to Opportunities for the Industry: A Case Study of Quebec, Canada**

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### **Abstract**

Increasing frequency of epidemiological crisis and their disastrous consequences are motivating nations, around the world, to introduce traceability systems. Traceability systems enable identification, prevention of propagation, and control of diseases and health problems in the shortest possible delay. However, while this effort is praise worthy and indeed necessary, the implementation of a traceability system is complicated primarily because it involves additional constraints and costs to the industry. This article describes the introduction and success of a compulsory traceability system in the Quebec province of Canada by presenting the approach and the strategies that were adopted to minimize constraints and generate opportunities for the industry.

**Keywords:** traceability, strategy, strategic alliance between industry and government, epidemiological crisis, information technology.

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## **Introduction**

The laws and regulations governing traceability are not well adapted to the industry. With respect to sanitary control and food security, they are generally embedded in the Government's overall strategy. Accordingly, the implementation is often managed by government veterinarians and human health specialists. Hence, the needs and constraints of the industry, while accounted for, are often treated a posteriori in spite of the precedence of public protection objectives. This creates a situation where the introduction of a traceability system leads to large resistance on the part of the industry that takes the tangible and short-term constraints and costs more into consideration than the opportunities that can be generated.

The sustained follow-up and management of farm information relating the links of the agri-food chain offers, in reality, a lot of opportunity to the industry; whether this is to maintain access to international markets, to identify the origin of convenience goods for marketing, to improve livestock or field management practices, or else. However, the main problem is that most of the advantages stay intangible and somewhat hypothetical in the short-run, and become concrete only in the event of an epidemiological or food safety crisis or in the long-run when various opportunities will arise.

The implementation of a traceability system is challenging to the industry in terms of optimally reducing of the associated costs and constraints, and perceiving the potential benefits from the opportunities thereof. It is, therefore, essential that the decision-makers responsible for the setup of such a system be aware of this challenge. They should also pay attention to and account for the priorities of the industry.

This article presents the case of Quebec's traceability system where the cooperation between the industry and the Government has been the key factor used to facilitate the implementation process.

## **The Implementation of a Traceability System in Quebec**

### *1- Agricultural Production in Quebec*

In terms of value of agricultural production, Quebec is the third largest producer among Canadian provinces. The agricultural sector, in this province, mainly consists of small and medium sized family farms, and animal production. In 2008, the value of farm production was estimated to be \$7.5 billion Canadian. The share of animal production is around 70% of the total gross farm market receipts from the agricultural sector. Although, historically focussed on the domestic market, Quebec's agriculture has experienced growth over the last twenty years, on the occasion of NAFTA and WTO agreements, through its export-oriented sectors of

production (such as pork and horticulture). As a result, at the turn of the year 2000, Quebec's agri-food balance of trade turned into a surplus, for the first time in its history.

## *2- The Creation of a Partnership*

In light of the high frequency of epidemiological crisis around the world (such as Bovine Spongiform Encephalopathy (BSE), foot and mouth disease and avian flu), and their significant economic consequences (including destruction of products, loss of access to international markets and reputation among other), the Government of Quebec and UPA (the union representing the agricultural producers of the province) agreed by the end of the 1990s, to introduce a system of permanent identification and traceability of agricultural products from the point of production (the farm) to the point of consumption (the table).

To this effect, MAPAQ (Quebec' Ministry of Agriculture, Fisheries, and Food) and UPA jointly created the autonomous non-profit organisation, Agri-Traceability Quebec (ATQ), to start its mandatory program in 2001. ATQ is managed by a board of directors consisting of Government representatives, MAPAQ and FADQ (Quebec's organization that manage agriculture insurance programs) and UPA (representing the agricultural producers). Its chair position is held by a producer. The objective of the partnership was to efficiently integrate both the requirements of the laws and regulations, and the needs of the agricultural producers (such as the simplification of the system for stakeholders, minimisation of expenses, and optimisation of benefits). Hence, this inter-disciplinary pool of experts, working towards the same purpose, was formed to allow the simultaneous achievement of the two objectives. This is, in fact, clearly stated in the ATQ mission statement as follows: «...to contribute to the improvement of food safety and the competitive capacity of agricultural producers of Quebec...»

From funding perspective, the Government of Quebec, that is also responsible for the laws and regulations on traceability, has granted ATQ a total of \$21.5 million over a period of four years. This budget is for the development and the implementation of a traceability system in the province. In turn, the agricultural producers are responsible for the purchase and the placement of identifiers.

*«In the absence of the partnership between the Government and the industry, it would have been practically impossible to implement traceability in Quebec. Traceability is a tool primarily used by government authorities due to their responsibility human and animal health protection. Had the Government tried to do it on its own, it would have faced resistance from producers and other stakeholders in the industry. Hence, the partnership helped unite the interests of all groups concerned... By working together throughout the development of the traceability system, each interest group had to understand the realities and*

*constraints of the others. This way, they were able to find viable mechanisms for the implementation of the traceability system. They were also able to look into the possible alternatives for cost sharing during the introduction of the system...»*

**Personal communications: Mrs Linda Marchand, General Manager of ATQ**

### *3 - Priority of the Livestock Sector and the Farm to the Table Information Management*

ATQ was given the responsibility to put in place systems of traceability for all of the agricultural producers in Quebec. However, given the magnitude of the task and of the analysis of risks, it has been agreed to start the implementation with the ruminants sector, and to mainly concentrate on the transfer of information from the farm to the slaughterhouse. This was conceived with the belief that the collection of information at the farm of origin is often at the core of any system of traceability.

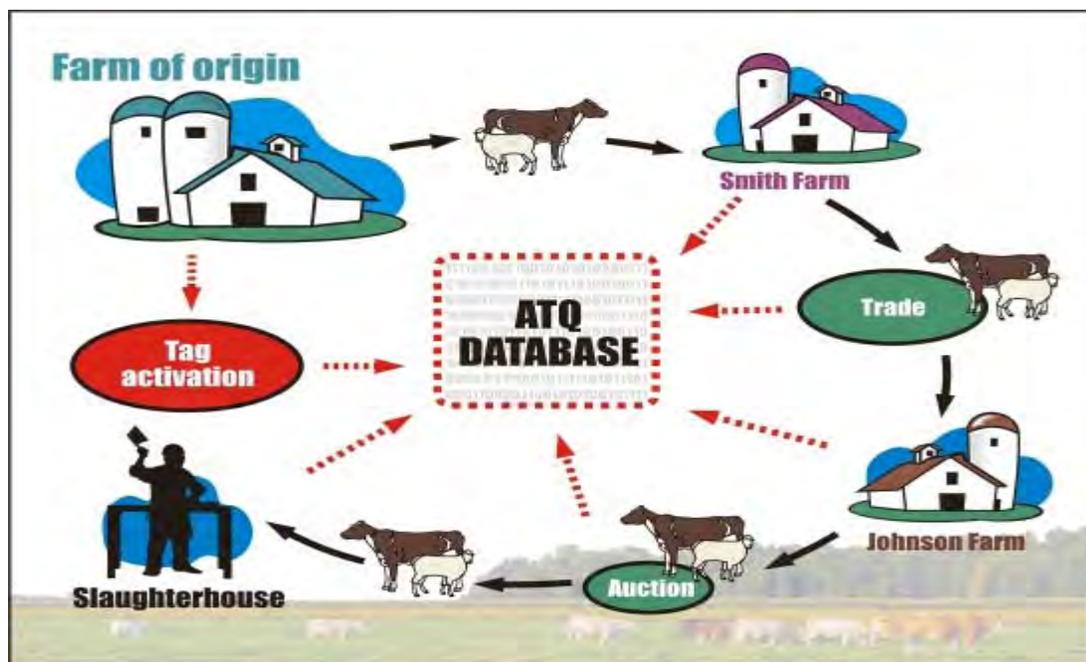
ATQ operates, at present, compulsory systems of traceability in the sectors of production of cattle (milk, calves and steers), sheep, and cervidae. The development of a system in the pork and poultry production sectors has also started. ATQ mandates will also expand to include fresh produce, goats and equine sectors by 2010. It also received, recently, the mandate to implement traceability in the hog sector across Canada. Additionally, a pilot project to incorporate and complete the chain of information from farm to the table is underway.

### *4 - Choices Made and the Establishment of the System*

In order to be in a position to develop a reliable, tight but simple system, it has been agreed to base the system on the following four major characteristics:

- Centralization of the information in one database, and this, for all types of production. Since agricultural producers have, in most cases, more than one type of production in their enterprise, it becomes simpler and more efficient to centralize the set of information in the same database. Additionally, this helps ensure better reliability of the collected data.
- Identification of the animals from the first days after birth. It is easier to identify the animals at birth and thereby ensure the tightness of the system.
- Recording of the births and movements of the animals in the database. This aspect is imperative to ensure the reliability of the information related to the movement of animals. However, it raises an important challenge in terms of simplicity of data recording. This issue is discussed farther in the present study.

- Identification of all of the sites where each animal spends time. A site is defined as any location where an animal is susceptible of spending time (barn, truck, fair, gathering park, animal market, auction, pasture, slaughterhouse etc). The aim is to ensure tracking of all of the places where the animals stayed. This, again, is another important challenge from the point of view of data recording. The way the traceability system functions in Quebec is illustrated in Figure 1.



**Figure 1.** The Traceability System of Quebec

Source: ATQ Website: [www.agri-tracabilite.qc.ca/en/traceability-quebec.html](http://www.agri-tracabilite.qc.ca/en/traceability-quebec.html)

### *5 - The Challenge of Simplification and Reliability of the Collected Information*

The chain of movements of the animals presents a major challenge with respect to the simplicity of data collection and the reliability of the information. Such an operation risks exasperating producers and stakeholders through repetitive obligations to provide new data. The automation of data recording has, thus, been selected. To this end, ATQ has undertaken many installation pilot projects at farms to test new information technologies aimed at simplifying the process of data entry and transfer. With respect to this, many strategic alliances have been formed with suppliers in order to have them participate in the search for solutions to the problems that arose during the pilot projects.

## 6 - Pilot Projects and Innovation

In order to simplify the collection of data, ensure the reliability of the information, and automate data recording, ATQ undertook pilot projects jointly with the producers and the different stakeholders, and those at the different site during the movements of the animals between the farm and the slaughterhouse (for instance, transporters, animal market responsible, etc).

The questions to which ATQ desired to respond using the pilot projects were the following:

- What are the data that should be collected?
- What type of identifiers should be chosen?
- How should the different chain of activities be linked?
- What kinds of partnership should be established?
- How should maximum automation of information transfer be introduced?

The results of the pilot projects have led to the following decisions to be made:

- Double identifiers on ruminants; a visual panel with a number and barcode, and an electronic ring;
- Emphasis on technological innovation (IP technology, Bluetooth, etc.) in order to be able to develop tools for entry and electronic transfer of information (software, electronic scanners/readers, etc) for the different links in the chain of movements from the farm to the slaughterhouse.
- Possibility to producers to either manually or electronically enter, and transfer the information to ATQ
- Harmonisation of the identification numbers, and the fulfillment of the information exchange agreements with other partners of the industry who register animals (such as expert centers and association of races) so that the producer does not have to register the same animal at more than one location.

*«In order to facilitate the electronic meshing, ATQ, first, chose a pilot project approach. This allowed understanding the particularities, and detecting the needs of the sector in which it planned to implement traceability. Then, it proceeded to technological intelligence to find the appropriate software, disk drive, and information transfer tools among those which already exist on the market... The selected technologies were tested on site with the stakeholders. It is well known that the choice of technology is quite challenging. The technologies that were initially proposed were unique and could be installed everywhere. However, it was, soon, discovered that each site had very specific needs and that they could not be adapted to every situation. Hence, it was necessary to find technological solutions that satisfy the immediate needs of every user, that are easy, user friendly and long lasting... Suppliers were*

*involved in the pilot projects so that they master the nature of the needs and adapt the tools they propose to these needs.»*

**Personal communications: Mrs. Linda Marchand, General Manager of ATQ**

### *7 - The Sharing of Know-How*

After a tremendous amount of experience, ATQ decided to create a new division Agri-Traceability International (ATI) in order to share its acquired know-how.

*«... ATI is the division of ATQ that plays the role of offering expertise to Quebec concerning matters related to traceability outside the province, such as Canada or elsewhere in the world. When I speak of expertise, I am not referring to the provision of a copy of the database, but rather strategic consultancy for the development, introduction, and implementation of a traceability system. This, for instance, means assistance in the search for solutions, evaluation of needs, and support in communication strategies, among other...»*

**Personal communications: Mrs Linda Marchand, General Manager of ATQ**

### *8 - The Creation of Value Added*

The perception of traceability is slowly transformed from one of constraints to one of opportunities gradually as the system became simpler and the benefits more tangible. In addition to the importance of such a system in terms of epidemiological control and public reputation, the principal direct benefits that the producer under this system obtains are the following:

- Maintain the borders opened for the ruminants sector. After the Mad Cow Disease (BSE) crisis hit Canada in 2003, the continued records of information in the ATQ system (such as age of the animal and movements among other) has facilitated the reopening of markets for animals less than thirty months.
- Use of the information in the database to obtain export certificates from the Canadian Food Inspection Agency (CFIA). Following the information exchange agreement concluded with ATQ, the veterinarians of CFIA now use the information from the database in order to issue their certificates.
- Link the automation of the recorded information to computer tools of herd management and control. Collaborations are made between ATQ and herd management program developers in order to integrate the information in their computer tools.

*«The most important advantage that the traceability system gave was the rapid reopening of borders after the BSE in Mai 2003. This is because the information contained in the system was well recorded for slaughterhouses and live animal exporters. ATQ had the facilities to confirm the real birth dates of the animals before they got exported either towards the U.S.A. or Japan.*

*Another advantage to the breeders is that the information contained in the system facilitates their day to day work... It is centralised at one location, and due to the protocol approved by the producer, other organisations also share this information... Furthermore, slaughterhouses outside Quebec that are provided with cattle from Quebec can guarantee to their Japanese buyers the age and the source of the animals using the ATQ database provided that the producer issues a written agreement.»*

**Personal communications: Mrs Linda Marchand, General Manager of ATQ**

*9 - The Importance of the Service to the Clientele*

Given the resistant state of the agricultural clientele to the introduction of the traceability system on the farms, the client approach takes on a crucial importance. ATQ has expended constant efforts to improve the services offered and the communication activities with its clients. These include:

- IP telephone system allowing, among other, audio expedition of messages to the target clientele;
- Information website that is constantly improved and equipped with transactional component allowing information exchange and online consultation of files;
- Multiple means of communication to reach the clientele through specialised journals, announcements, e-mails, telephone services, dissemination of the results from pilot projects, guides on traceability, among other; and
- Continued training of officers who give services to the clients so that they adequately respond to the needs of the clientele.

*10 - The Emphasis on the Quality of the Service and the Reliability of the System*

The reliability, tightness and the overall quality of a system of traceability are the most important variables that help confirm the performance of an enterprise such as ATQ, and indicate to its clientele that all precautions and measures are taken to guarantee the efficiency of the tool in time of crisis. In respect to this, ATQ has set in motion an international standardisation, ISO, measure for all of its business process in spring 2006 and it has obtained ISO-9001 certification in March 2009.

## Conclusions

It should be noted that the producers showed great resistance to the adoption of the traceability system at the beginning of the process of its introduction. However, the partnership industry-Government and the approach used to select the most appropriate method of implementation finally allowed to easily tackle this issue, and facilitated the adoption.

*«First of all, a traceability system is a system based on the collaboration industry Government. This collaboration should not be limited only to producers and Government but also those implicated at the different links, for instance, transportation, auction blocks, slaughterhouses, processing, distribution and retailing... Traceability should also be easily accessible and user friendly, and should offer a value added to users... It is primarily a collaborative effort. All stakeholders should feel implicated and concerned.»*

**Personal communications: Mrs Linda Marchand, General Manager of ATQ**

