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## Beef traceability systems in Japan – how should New Zealand prepare?

T. OZAWA, N. LOPEZ-VILLALOBOS<sup>1</sup> AND H.T. BLAIR<sup>1</sup>

Department of Animal Science, Nippon Veterinary and Animal Science University, Tokyo, 180-8602 Japan

### ABSTRACT

Interviews were held with National Federation of Agricultural Cooperative Association (NFACA), Ministry of Agriculture, Forestry and Fisheries (MAFF) and New Zealand Meat Board staff to describe current beef traceability systems operating in Japan following the BSE incident there in 2001. Some suggested actions for the New Zealand beef industry to become more competitive against domestically produced beef are described from a traceability perspective. It is concluded that there is no sustainable, complete (from farm to consumer) beef traceability systems being operated in Japan, not only by domestic producers or retailers, but also by overseas companies. Domestic traceability systems are either facing financial problems (NFACA system) or functional problems (MAFF system). This means that if New Zealand adopts a farm to consumer traceability system in the Japanese market, it will be the pioneer and will be recognised, as “clean and green”, not only by nuance, but also in practice by the Japanese consumer. The main problem for New Zealand adopting such a traceability system in the Japanese market is balancing anticipated expenses versus expected financial return to the New Zealand beef producer.

**Keywords:** traceability system; Japan; New Zealand; beef.

### INTRODUCTION

Since the first case of mad-cow disease (bovine spongiform encephalopathy; BSE) occurred in Japan in September 2001, the beef-eating public have been very concerned about food safety. The reporting and confusion surrounding the defence of beef safety after the incident highlighted several flaws in the existing system, such as falsification of acknowledgement of food risk and lack of risk management. In Japan, the concept of improving food safety management lags far behind what is considered common sense in many countries. This situation occurs not only in public administration, but also for producers, in industry, for consumers, and even for academics (Takahashi, 2002).

The response to BSE outbreaks by the European Union (EU) was also questionable. They allowed the spread of BSE through exports of meat- and bone-meal from the UK to the world via continental countries in Europe. A detailed action scheme was established in 1997 by the EU, which was 10 years after the first BSE incident occurred in the UK. However, the EU made a substantial change in food safety policy through the BSE action scheme. Now, they have established a new food safety policy in the European Union, adopting several new concepts of quality assurance programmes based on the key phrase “from farm to table”. This required the establishment of traceability systems, and the introduction of comprehensive food laws based on the idea of “risk analysis” as suggested by the European Food Safety Authority (Niiyama, 2002).

Traceability has recently been brought to international attention as a risk management technique. Traceability is defined by ISO8402 as “the ability to trace the history, application or location of an entity by means of recorded identifications” (ISO 8402 3.16 Notes). HACCP (Hazard Analysis Critical Control Point) or the ISO 9000 series require that items can be traced only in the factory. However, what is required for food safety is a system that can trace raw materials from the farm level via

distribution channels to wholesale distributors or retailers and then to the consumer.

The year 2002 saw the introduction of a traceability system into animal husbandry in Japan. In April, the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF) introduced a traceability system which applied to all cattle from farm to slaughter house. The National Federation of Agricultural Cooperative Associations (NFACA) was the first organisation in Japan to establish a complete traceability system from farm to consumer between their associate partner beef-breeding farms in Kagoshima and Miyazaki prefectures and the AEON supermarket group. These actions were put in place due to the lessons learned from the BSE incident in 2001 (Ozawa, 2002).

This paper will describe what is possible for a practical traceability system versus what retailers might prefer, through a case study of MAFF and NFACA. In addition, we will also discuss how New Zealand beef export organisations (New Zealand Meat Board (NZMB) in Japan) might compete against domestically produced beef from the viewpoint of traceability.

### MATERIALS AND METHODS

Interviews were held with the supervisors of beef traceability of MAFF and NFACA in March 2002 and with a representative of the NZMB in January 2003 to study their traceability systems. Data published by the Japan Meat Information Centre (2001), with 2,000 respondents were used; exploring consumer needs to recover their confidence for the consumption of beef. The results and conclusions of this study are drawn directly from these interviews and the reviewed literature.

### RESULTS

Table 1 shows the measures that need addressing by those involved in the beef supply chain to convince Japanese consumers that beef is safe to eat. Some 80% of consumers stated that the screening of all cattle at the

<sup>1</sup> Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Palmerston North

**TABLE 1:** Reasons given by Japanese beef consumers indicating what kind of measures are needed to renew trust in beef safety (n=2,000).

	n	%
Carrying out thorough screening of all cattle so that only safe beef is distributed	1,590	79.5
Indicating production and distribution route at the point of meat sale	876	43.8
Indicating what kind of feed was given to the cattle	830	41.5
Message about beef safety from MAFF or related organisations	660	33.0
No news about BSE in any media	286	14.3
Everybody should buy beef at the supermarket	192	9.6
Others	170	8.5
No answer	36	1.8

Source: Japan Meat Information Centre (2001).

Note: the respondents could give more than one answer.

slaughter plant was a necessary guarantee for them to consider beef as safe to consume. Forty-four percent of respondents indicated that the beef production and distribution processes were important, while 42% also required knowledge of the feed provided to the cattle at farm level. These figures indicate that a significant number of consumers require a beef traceability system for their confidence in the safety of beef to be regained. The following three traceability systems are currently operating in Japan.

#### **Livestock identification system implemented by MAFF (Japan)**

A livestock identification database was established in 2001 after the first BSE incident in Japan. This system was established through subsidies provided via MAFF to accumulate information on all cattle raised in Japan. The main purposes of this system are to:

- Enable individual cattle to be traced when communicable diseases occur.
- Consolidate the tracing information infrastructure, which provides distribution and consumption of livestock products.
- Simplify and ensure the identification of individual cattle at the farm level.

The fundamental concepts of this system are as follows:

- All cattle raised in Japan are included.
- Individual cattle are identified by ten-digit numbers which are non-duplicated and follow the animal for its lifetime.
- All cattle are required to have an eartag with a ten-digit number.
- It is the farmer's duty to put an eartag into each animal and to input information into the database.
- The cost of running the database system is subsidised by MAFF. However, farmer and local agricultural cooperatives have to absorb the costs of the eartag and the inputting of information on individual cattle into the database.

All the information accumulated in the database can be browsed through the internet. Information provided through the internet includes the identification number of the animal, breed, date of birth, place raised, sex, name and identification number of parents and date of death (slaughter). This system is only valid from farm to the slaughterhouse (including death at farm level) and cannot account for traceability at the retail or consumer levels.

#### **NFACA and AEON beef traceability system**

There are 433 AEON supermarkets spread throughout Japan. This group is an environmentally conscious company and they are interested in corporate philanthropic activities. The fundamental features of the beef traceability system used by NFACA with the AEON supermarket group system are as follows. Producers (beef fattening farms) have to fill out "the certificate of production record" (Figure 1) by handwriting. After shipping of finished cattle, local meat packers scan the document as a graphic image. Local meat packers send copies of the images to the web server at NFACA to provide a central store of all information. NFACA transfer the cut meat along with an image of the certificate of production record to AEON outlets. At the meat sales yard of AEON supermarkets, cut meat is dressed into beef commodities. Enquiry numbers are attached to each beef commodity according to the image provided with the cut meat, and information about the beef commodities is entered into information terminal machines. Customers intending to purchase the beef commodity can input the enquiry number sealed on the commodity label into the information terminal to access the certificate of production record relevant to the meat available for purchase.

Figure 1 shows the certificate of production record used to generate the information for this traceability system. A completed form is required to accompany all shipped fattening cattle entering into this traceability system. The person who completes the form must be the one who was responsible for shipping the cattle. A "BSE test certificate" must also be attached to the form. It costs 400yen (NZ\$6.70, 1NZ\$=59.7 yen) per animal to obtain the BSE certificate from the local animal health centre. The possibility of issuing free BSE test certificates by animal health centres is still under consideration.

The enquiry number sealed on the beef commodities consists of a ten-digit "unique" number established by NFACA, unfortunately this number is not related to the "Livestock identification system" used by MAFF.

#### **The NZMB beef traceability system**

The beef traceability system used by the NZMB in the Japanese market is based on New Zealand's Animal Products Act 1999 and the Biosecurity Act 1993, which requires filling out an Animal Status Declaration form. The NZMB explains this system to the Japanese consumer as follows via an internet web page in Japanese (NZMB, 2002a).

FIGURE 1: Certificate of production record to be completed by Japanese beef fattening farmers.

## The certificate of production record

### Prefectural Economic Federation of Agricultural Cooperatives

Ear tag No	Carcass No	Date of Slaughtering
Farm Name		Telephone
Farm location		
Characteristics of animal		
Breed:		Sex:
Date of birth:		Age in months when shipped:
Date of entry:		
Previous owner of the cattle:		
<input type="checkbox"/> <b>Description of the feed given to the cattle</b>		
Description of the feeding system		
Other feed provided		
<input type="checkbox"/> Was meat-and-bone meal contained in the feed given to this animal?		
Yes:		
No:		
Not clear:		
<input type="checkbox"/> <b>Did you comply with withholding requirements of any animal drugs?</b>		
Yes:	No:	Not clear:
<b>If your answer is "No" or "Not clear", please describe the details and reason</b>		

"All beef producers are required to present an Animal Status Declaration form to the government at the time of shipping. This declaration form tells us the environment of the farm where the cattle were raised and the health record of the cattle. Each meat packer in New Zealand uses the standard number and bar-code seal based on this declaration form".

The standard number and the bar-code seal are valid only at the cut meat level. Once imported cut meat is prepared for sale, the information cannot reach the customer, the information remains at the level of the wholesaler or restaurant chain.

### DISCUSSION

The livestock identification system used by MAFF is the only nationwide system of cattle traceability in Japan. It covers not only beef cattle, but also dairy cattle. The producer is obliged to use a yellow eartag with a ten-digit number and must keep rearing and health information about each individual animal. Registering incorrect information is a criminal act. Therefore, the information supplied into this system should be trustworthy. However, this system is only valid from the farm gate to the slaughterhouse and never reaches to the retail level. On the other hand, the system employed by NFACA is designed to disclose all information concerning every

single beef commodity at AEON supermarkets. The information presented via terminal machines is popular with customers and nurtures a feeling of beef safety.

There are some problems of running the NFACA system, the first being its relationship with the national livestock identification system. The NFACA system was established as a joint commercial project with NFACA and the AEON group. Because of deregulation and cost reductions required in the Japanese public administration systems, MAFF does not have the resources to achieve an integration of the NFACA and national systems. Consequently, the fattening cattle in the NFACA system must wear two eartags (national and private) with ten-digit numbers in each tag. Having two traceability systems is cumbersome and complicated for producers. Secondly, there is a cost burden in running the NFACA system. Table 2 shows the costs of introducing the NFACA system to a breeding and fattening district. A system service charge was not imposed at the producer level, because of the subsidy by MAFF to establish their traceability system. Other materials such as bar-code labelling seals were also subsidised by NFACA, so that there were no direct costs to burden this system. However, direct expenses will be imposed on the district from the 2003 fiscal year. Currently, there is no financial incentive to the producer for joining this system. This means they are obliged to

**TABLE 2:** Necessary items to introduce NFACA traceability system at the breeding district in Japan.

Item	Approximate expense	Remarks
System service charge	\$0.84/head	Subsidised by MAFF in 2002
Internet line	\$84	Monthly communication charge
Personal computer	\$4,188	Substitutable by in-line product
Laser printer	\$4,188	Substitutable by in-line product
Image scanner	\$2,178	Subsidised by NFACA in 2002
Maintenance cost of scanner	\$503	Yearly maintenance cost
Bar-code labels	\$168/1,000 sheet	First payment was subsidised by NFACA

Source: Interview from National Federation of Agricultural Cooperative Associations.

Note: 1NZ\$=59.7 Yen.

accept a cost of about 84 cents per animal if they wish to continue as a member of this system. The final problem is guaranteeing the integrity of the record inscribed by the producer. The lifeline of the NFACA traceability system is the content of the certificate of production record inscribed by the producer. The accuracy of these records places an onus on every producer and there is no other impartial bystander who audits the inscription. The creation of this moral hazard among producers is one of the urgent problems to be solved in this system. This problem may be partially alleviated by using alternative identification means such as the DNA based easiTrace™ systems reported by Shackell *et al.* (2001) or the retinal scanning system being marketed by Optibrand™ (www.optibrand.com).

The traceability system presented by the NZMB seems to be poor compared to the NFACA system. The NZMB system is rather similar to the MAFF livestock identification system and should not be defined as a traceability system, because of the lack of information reaching the consumer. But the information included in the NZMB system is more useful than the Japanese system and the content is guaranteed by regulations. The Animal Products Act 1999 and the Biosecurity Act 1993 provide penalties for the non-supply of accurate information in the form of fines up to \$100,000 for individuals and \$200,000 for corporations. The NZMB (Japan) only promotes New Zealand beef using its nuance of “clean and green”, such as “bountiful grass-feeding system”, “minimum level of residual dioxin in advanced nations”, “no genetically modified feeds are used”, “no growth-promoting hormone preparations are used” and “BSE never occurred in New Zealand” (NZMB, 2002b). This is important information for the beef consumer, but it does not describe a traceability system. To improve the promotion of New Zealand beef in Japan, establishing a traceability system which brings all the on-farm management, processing, transportation and retail information to the Japanese consumers, is urgently needed.

The introduction of a traceability system by the NZMB would obviously incur additional expenses, and it must be considered as to whether such an investment would be worthwhile. Ozawa *et al.* (2002) showed that the expectations of Japanese beef consumers changed dramatically after the BSE incident 2001. Consumers are now more accepting of imported beef produced from grass-fed animals, offering an opportunity for New Zealand to reverse the loss in market share that it suffered between 1996 and 2000. During this period, the amount

of imported beef in Japan grew by 121%, but New Zealand's share of the Japanese beef market fell by 52% in the same period (Ozawa *et al.*, 2002). Given that the two major sources of imported beef (USA and Australia) have not yet introduced traceability systems, there is a window of opportunity for New Zealand to regain consumer confidence by being the first to introduce such a system.

There is no sustainable, complete, beef traceability system promoted effectively in Japan. In 2003, the beef producers using the NFACA system will incur charges to maintain the system, but it seems impossible for them to pass the charge on to consumers because of price competition at the retail level. Adopting a traceability system has not yet been proven to increase profits of the producer, and further subsidies to maintain the system are needed. Also, there is no traceability system being used by foreign countries exporting beef to Japan at this stage. This means that if New Zealand adopts a farm to consumer traceability system in the Japanese market, it will be the pioneer and be recognised, as “clean and green” not only in nuance, but also in practice, by Japanese consumers. The main problems for New Zealand adopting such a system in the Japanese market are the costs relative to the returns to the New Zealand beef industry. New Zealand beef producers must consider as to whether they wish to be competitive in the value-added spectrum of the Japanese beef market or whether they will remain in the low-value beef commodity market.

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