
How Animal Identification and Traceability systems (AIT) contributes to the prevention, control and eradication of animal diseases

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Livestock farmers or owners have been historically concerned with identification to find animals in the event of loss or theft, to make economic choices regarding production or to enhance the value of livestock (Blancou, 2011). Over the last 30 years, there has been an increased demand from buyers and retailers of animal products of known quality and safety to reassure consumers and demonstrate safety in order to gain access to markets at national and international levels for animals and animal-based products. One of the key requirements is to demonstrate their origin by having a system of traceability from their point of origin to their final destination.

In the aftermath of the crisis caused by bovine spongiform encephalopathy (BSE), which spread from the United Kingdom (UK) to most European Union (EU) countries and a number of countries in North America and Asia by the early 1990s, the identification of animals and traceability systems were reinforced. Due to the drastic consequences on the safety of food for human consumption, trade barriers were erected by countries to protect themselves against an introduction of BSE, such as the temporary ban on beef imports in the United States of America (USA). As a result, likewise, many countries that had a potential link with cattle imported from European countries affected by BSE took measures to introduce mechanisms to trace animals and animal products. The BSE sanitary and food safety crisis played a major role in the design and implementation of the EU Animal Identification and Traceability (AIT) systems currently in place¹. However, AIT systems were reinforced in other regions beyond EU to comply with international animal health standards and food safety standards related to animal products (e.g., dioxins or other food safety hazards).

International food safety standards such as that of Food and Agriculture Organisation (FAO) and World Health Organisation (WHO) Codex Alimentarius define traceability as the ability to follow the movement of a food product through the different stages of production, processing and distribution. The FAO/WHO Codex standards target the quality and origin of food products throughout the food chain. The World Organisation for Animal Health (OIE) provides standards for traceability from the primary producer at farm level until animals are slaughtered.

Introduction

¹Also as a consequence of foot-and-mouth disease [FMD] outbreaks.

AIT systems present other benefits than improving recognition and confidence in the animal health status of countries and assuring food safety; they can be used to increase livestock production and productivity, manage and conserve animal breeds and monitor genetic potential, when combined with performance recording, and to support public policies related to livestock production, ownership and compliance with taxation.

Applications of AIT in animal health related activities

Broadly speaking, AIT systems enable better control of sanitary events by registering the location of animals, assist in the control and management of animal transport, and facilitate record keeping to meet sanitary standards of export markets. From the animal health prospective, AIT systems play a major role in promoting disease management, supporting outbreak investigation, improving disease surveillance and monitoring animal movements. Disease outbreak investigations are facilitated when there are identification systems in place since animals can be traced back to determine potential source of infection. On the other hand, monitoring animal populations that can be exposed to animal disease threats is supported by knowing animal identification and traceability of animal movement. Animal disease surveillance can be targeted to animal populations at risk. Effective response to animal disease emergencies relies on adequate identification of animals to apply control measures including vaccination, culling and sampling. There are examples of programmes in USA such as the Market Cattle Identification (MCI) programme, first applied in the 1950s and based on the identification and registration of cattle, which allowed to trace back infections and gave positive results at slaughter (Caporale *et al.*, 2001). Another programme is the Israel Computerized Animal Health Monitoring System (ICHAMS), which provides relevant information on epidemic emergencies and facilitates epidemiological investigations to support disease control strategies.

One of the applications of AIT systems is in the area of epidemiological investigations when outbreaks of diseases occur. In these situations, veterinary services aim to quickly investigate the causes of an outbreak event. Those investigations need reliable key data on the history of animals (origin, movements, etc.), in-depth information related to their contacts (with other susceptible species), and places where they have travelled. These trace-back and trace-forward capabilities are key elements in any epidemiological disease investigation.

The use of traceability in animal health activities includes other areas, such as management of epidemic emergencies, including targeted vaccination and culling activities to eliminate a disease. In Latin America, for instance, AIT systems have been demonstrated to be very useful to monitor and assess, in countries like Uruguay and Colombia, the quality of vaccination programs against animal diseases, such as foot-and-mouth disease, brucellosis and tuberculosis. In addition to vaccination, recording and tracing of other health events - such as mortality and morbidity - AIT would also support the early warning and response to animal diseases threats affecting animals in their initial stage, thereby addressing rapid response and risk management. For instance, a good record of animal units or groups and their movements, facilitates the establishment of restrictions based on sanitary measures or the implementation of effective compensation to farmers based on the real number of livestock (i.e. brucellosis).

In addition, AIT systems can and are used to perform risk modeling of infectious diseases based on lists of individual or groups of animals and on records of animal movements in space and time. Risk Modeling using real data from AIT systems will support further validation of this analytical tools to improve disease management.

However, one of the main constraints of AIT systems is that they often require investment in human and technological inputs, at least initially. Experience indicates that most funding support to design and implement these systems comes from government resources, since they are portrayed as a public good: benefits derived are for animal health, public health and food safety. In parallel, the private sector should play, and often does play, a major role in the implementation and funding of these systems to ensure their sustainability. Private sector funding options can include direct payment for the service, and specific levies on animals and animal products and/or in the course of market chain transactions.

AIT is a process that generates benefits for animal disease control and food safety that need to be quantified. This process should 'fit-for-purpose'. The existence of an adequate AIT system covering animals and animal products is essential to perform risk assessment along the production chain (Caporale *et al.*, 2001). The objectives and use of AIT systems varies between countries or between the public and private sectors, which would require adaptation to the needs of specific groups (i.e. commercial enterprises, family farms, marketers, the type of animal production systems, or those responsible for time-bound animal disease control programs for which desired outcomes are expected [fit-for-purpose]).

Experience has shown that implementation of AIT needs to be gradual and follow established official animal disease control or food safety programs or strategies. Its scaling-up should take into account the capacity of veterinary services to comply with international standards of Codex and OIE (i.e. Sanitary and Phytosanitary Agreement by the World Trade Organization). The integration of all actors in livestock value chains in the process of design, implementation and evaluation is critical. Of particular concern are the smallholders, a sector which is the most vulnerable to the negative impacts of compliance to address animal disease control efforts and food safety threats along the livestock value chains. For instance, in Latin America, almost 80% of the livestock population is owned by smallholders and their commitment to these programmes needs to be quantified to demonstrate the benefits of their participation in the implementation of such systems.

As FAO's main focus is on nutrition, poverty reduction, food safety and food security, the Organization plays an important role to integrate the smallholder sector in existing AIT systems, since the quality of animal products and access to local markets can produce important socioeconomic benefits for the development of the sector and to combat hunger and poverty. For this challenge, AIT systems need to fulfill some requirements: they should be simple, not prescriptive, adapted to the size, and take into account the complexity of animal production systems.

In Latin America, veterinary services are often responsible for ensuring compliance programmes, including managing AIT, and their involvement has facilitated the monitoring of food safety of animal products either for local markets or for access to international markets with matured deboned beef, fish and other products.

During the '4th Extraordinary Meeting of South American Commission for the Control of Foot-and-Mouth Disease (COSALFA)' held in Rio de Janeiro, Brazil, on 29-30 November 2011, attended by representatives of several veterinary services from (15 countries, a survey was conducted to inquire about their views on the implementation of AIT systems in their own countries and the potential benefits that they bring for the implementation of disease control programs. The survey included nine questions addressing the existence of an AIT programme and its

Outcomes of a survey on AIT programmes in Latin America

scope (national, regional or sector level). All (13) respondents indicated that there is a national programme in existence. When queried, the objectives described for those programmes included:

- To assure food safety of animal products for national and export markets.
- To increase the efficacy and efficiency of Veterinary Services.
- To support the development of an information system to register animal transport, animal movements and compliance with regulations related to animal welfare and biosecurity.
- To maintain a system that facilitates the harmonization of sanitary control of animals and food products.
- To protect and promote the sanitary status through the registration of all type of events related to primary animal production and processing of animal products.
- To support epidemiological surveillance, border control and certification for exports.
- To improve competitiveness of livestock production.

In regard to the identification systems within these programmes, the respondents stated that individual identification was most often used in cattle and buffaloes and group/flock identification in poultry, swine, bees and small ruminants. In some countries, the animal identification system was compulsory while voluntary in others. The link between AIT programs with specific animal health activities was also explored in this questionnaire. The respondents indicated that some activities were to record vaccination events (i.e. official control programs against brucellosis, foot-and-mouth disease, tuberculosis or equine encephalitis).

Inter-operability of information platforms supporting AIT and established animal health information systems was mentioned by the respondents attending the workshop as a principal challenge. In some countries, the AIT information platform is to become the animal health platform; in other countries, there are two parallel systems that need to communicate with one another to be inter-operable. Some exceptions merit further examination in some countries, the AIT systems are already communicating information connected to specific databases on monitored vaccination programs, or the designed module that supports AIT is already part of the Animal Health Information and Management System, or there is a module for animal health information within AIT programme. Solutions can involve interoperability of AIT with existing animal disease information systems in countries by the selection of specific fields that can be used instrumentally for transferring key data between databases.

Funding of AIT systems is a key challenge for successful implementation. Considered as a public good, AIT systems investments have been made with support from funding partners and financial institutions (i.e. World Bank and Inter-American Development Bank) combined with support of public funds. One of the participants responded that maintenance of the program is financed by the private sector at a level of 70% with the difference provided by a bank loan which can guarantee some sustainability of the system. In other cases, governments are funding 100% of AIT systems. Some of the public resources are earmarked for the implementation of AIT programs in the smallholder sector, which cannot afford the investment for such programmes. This subsidiary support from governments is needed to have a comprehensive approach to livestock development in developing countries where smallholders raise the majority of livestock, as stated earlier. The large commercial private sector in some countries is bearing operational costs of identification in

livestock, with the public sector responsible for the design of AIT, the development of regulations and oversight, audit and compliance. Keeping farmers' data confidential was also seen as an important component to ensure participation.

Some important challenges expressed by the respondents² included:

- Maintenance and advocacy for long-term funding to assure sustainability of AIT systems [which should be shared between stakeholders who receive direct benefits from the implementation from such programs (i.e. transporters, processors, exporters, etc.)].
- Property rights and ownership of the data and information generated by AIT systems need to be discussed and agreed upon by the sector providing information (livestock ranchers and farmers) and the sector receiving and analyzing the information (official entities which might then share the information, with implications confidentiality vis-à-vis public data).
- Better dialogue between users and the entity responsible of the maintenance and management of AIT information systems and better interoperability between AIT and existing Animal Health Information Systems to help animal disease prevention and control programs.
- AIT systems development needs to comply with international standards and guidelines recommended by the OIE and Codex Alimentarius.
- The need for applied or operational research, cost/benefit analysis, and impact assessments of the AIT systems (and in particular, how these systems are adapted and benefit the conditions of the smallholder sector).
- AIT systems need to be simple, not prescriptive, and adapted to the size and complexity of animal production systems.
- Legal and institutional arrangements required to support the adequate implementation of AIT systems, with clear responsibilities delineated for veterinary services or other institutions.

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