
Animal identification for traceability and performance recording: FAO's multipurpose and integrated approach

Badi Besbes and Irene Hoffmann

Animal Production and Health Division, Food and Agriculture Organization of the United Nations (FAO), Viale delle Terme di Caracalla 1, 00100 Rome, Italy

Animal identification serves multiple purposes in a country's livestock sector. The unique identification of animals is the basis for prevention of animal rustling, subsidy payment and insurance schemes, artificial insemination schemes, pedigree certification, traceability and performance recording. The prominent use and growth in importance of animal identification in recent years can be attributed to the last two purposes. Animal traceability forms the basis of animal food safety and quality control, it helps disease prevention and control, and it is becoming an important requisite for export and certification. Performance recording also serves a variety of purposes. The data collected through performance recording help to build a knowledge base such as baseline animal performance, best production practices in different environments, best breeding strategies and monetary valuation of breeding stock. Therefore, animal identification, traceability and performance recording constitute a powerful tool for livestock development, particularly in developing countries, and for addressing global demands for food security and poverty alleviation. This multipurpose approach is described in the present paper, along with FAO's activities to support member countries in implementing animal identification and recording systems.

Why animal identification, traceability and performance recording? What are their potential benefits? Who are the potential beneficiaries? This section tries to address these questions focusing mainly on developing countries' context.

Animal identification is the marking of an animal, individually or collectively of its group, with a unique individual or group identifier. Historically, this mainly served to control ownership and to enable identification in pedigree breeding. Animal health authorities have, for decades, marked animals in order to distinguish animals vaccinated against contagious diseases such as brucellosis from those not vaccinated. Today, animal identification serves several other purposes including control of stock theft, subsidy payment and insurance schemes, artificial insemination schemes, pedigree certification, traceability and performance recording. The increasing importance of animal identification in recent years can be attributed to the last two purposes. Animal traceability and performance recording systems cannot function without a sound identification and registration and recording system in place. The latter refers to the process where the information on the animal

Summary

Purposes, benefits and beneficiaries of animal identification, traceability and performance recording

is collected, recorded, securely stored and made appropriately accessible to be used by the competent authorities for various purposes, including traceability and performance recording.

Traceability is broadly defined as the "*aptitude to find the history, the use or the localization of an entity by means of recorded identifications*" (ISO8402). In the context of animal production, traceability refers to the ability to access the history of an animal, or group of animals, through all stages of its life. The scope may extend to include tracing the history of an animal product along the product value chain. Traceability has become a vital component of livestock development programmes in many countries, where it is used to control the safety and quality of foods of animal origin. This role became prominent after the bovine spongiform encephalopathy (BSE) crisis in the United Kingdom and the outbreaks of *E. coli* infections in the USA. The perceived threat of food-borne diseases has stressed the need to trace farm products from "farm to fork". A second aspect of traceability is market access and certification. It helps to eliminate trade barriers by permitting countries wishing to export animals or animal products to give assurances on their health and safety. It can also ensure fair practices in the market place by providing information about animal products attributes such as origin, animal welfare and breed type. A third aspect is related to disease prevention and control. The success of such programme is highly dependent on the ability to trace an infected animal back to its origin. A sound traceability system provides information that enables animal health officials to trace the movement of diseased animals, and identify and contain other potentially exposed ones. It helps countries to put in place measures such as surveillance, early detection and notification of outbreaks, rapid response, and zoning or compartmentalization.

The range of benefits and beneficiaries of traceability depends on the scope, the depth and breadth of the traceability system, i.e. how much of the supply chain it covers and how much detail is recorded. Some traceability systems are regulatory while others are private sector initiatives. The former ones aim at facilitating animal disease prevention and control, and benefit mainly the government and the nation as a whole by protecting human and animal health and reducing public costs associated with disease outbreaks. The latter ones aim at reducing risk exposure and minimizing the costs and potential impact of crises related to food safety and quality, and benefit sub-sectors within the supply chain such as producers, processors and distributors. Depending on the information provided by a traceability system (e.g. through standards), the private sector may also enjoy some marketing and branding benefits. A producer or processor may utilize a traceability system to convey as well as prove its product attributes (e.g. organically produced, non-genetically modified, good animal welfare practices used, produced under environmentally-friendly conditions). Traceability, whether it is a public or private sector initiative, contributes to private and public goods as it confers certain benefits to the community as a whole (e.g. public health). Such benefits are tangible to certain specific sectors such as farmers, food distributors and processors, and consumers, but are also of national significance. By making local producers and processors more competitive globally and enhancing export trade, traceability not only helps to develop these business sectors but also offers new opportunities to small scale producers, and hence contributes to national economic growth and development.

Performance recording also serves a variety of purposes. The data collected through performance recording help to establish a baseline animal performance level that is needed by decision makers for developing strategies and programmes to enhance national food security and increase livestock productivity; determine best production practices in different environments; characterize the productive capacity of target

breeds in their prevailing production system; monitor the animal's performance and use that information in the day-to-day herd management; establish best breeding strategy and monetary value of breeding stock.

The range of benefits and beneficiaries of performance recording primarily depends on the purpose for which the recording system is established, the scope of the recording scheme and the amount of data recorded. For example, a pedigree recording programme for pedigree certification, involving a few stud herds, will help to increase the market value of the animals in those herds but would be of limited benefit to the nation as a whole. On the other hand, a national recording scheme generates comprehensive multi-purpose information and benefits various stakeholders in the livestock sector. The government benefits from such information to formulate evidence based and sound livestock development strategies. The farmers and their service providers may utilize such information to improve herd management. If such improvements occur in a significant proportion of the livestock sector, they will contribute to improve the country's food supplies and competitiveness.

Performance recording, if combined with proper human capacity building, institutional development (i.e. farmers' associations), and marketing assistance, can help empower the poor rural and minority ethnic communities that are often involved in traditional agricultural or pastoral activities, to develop profitable animal production enterprises. Such programmes generate pride and recognition among the best producers, and encourage others to follow their example. Likewise, the social structures developed to underpin the development process provide a voice for participating farmers.

In summary, the benefits accruing from traceability and performance recording are vitally important and complementary components of a sound national livestock development programme.

As a response to the above drivers, animal identification, traceability and performance recording are addressed by various international agreements and standards, such as the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures and its Agreement on Technical Barriers to Trade, the World Organisation for Animal Health (OIE) Terrestrial animal health code and the Codex Alimentarius under the Joint FAO/WHO Food Standards Programme. Other organizations such as the International Committee for Animal Recording (ICAR) and the International Organization for Standardization (ISO) also play a role.

At national level, governments are responsible for incorporating these international agreements and standards into national legislation, while other competent authorities (e.g. ministries of agriculture and livestock, veterinary services, ministries of health and national bureaux of standards) ensure that legislation is applied and enforced. Audit and certification bodies should then certify compliance with legislation or standards. Finally, breeders' organisations and the livestock and food industry are also relevant players at national level.

While the role of national competent authorities is fully recognised, the multipurpose implications of animal identification, recording and traceability systems need to be considered and discussed with all relevant stakeholders, to increase their acceptance and the equitable distribution of the costs among them.

**The players in
animal
identification,
traceability and
performance
recording**

FAO's activities related to animal identification, traceability and performance recording

FAO supported the drafting of animal identification and recording legislation, and the design of national identification systems, in several countries including Chile, Lesotho, Malawi, Nepal, Uganda and Ukraine, and more recently in Georgia, Swaziland, India and Tanzania. Animal identification and traceability have been components of technical cooperation projects in the fields of veterinary public health and food safety and quality (e.g. prevention and control of BSE and other zoonoses).

FAO actively works in partnership with relevant players to strengthen the national capacities of its member countries and of a broad spectrum of actors. In this regard, FAO, in collaboration with ICAR, has organised several workshops on the development of animal identification, traceability and performance recording in developing countries, which have taken place in India (1997), Poland (1998), Slovenia (2000), Switzerland (2002), Tunisia (2004), Finland (2006), and the present one in Chile (2011). In 2007, the FAO Animal Production and Health Commission for Asia and the Pacific, jointly with OIE, organised a workshop in Sri Lanka on animal identification and traceability. In May 2008, FAO organised a regional workshop on development of animal identification and recording systems for veterinary surveillance and livestock development in countries of Central and Eastern Europe, in Budapest, Hungary. In March 2009, a workshop on Animal Identification, Traceability and Performance Recording in Countries of the Near East and North Africa, was organised in the Syrian Arab Republic, in collaboration with the International Center for Agricultural Research in the Dry Areas. In November 2009, a similar workshop was organised in Gaborone, Botswana, for the countries of the Southern African Development Community (SADC), in collaboration with SADC's Livestock Technical Committee. In April 2011, FAO collaborated with the Tunisian Office of Livestock and Pasture to organise a training workshop on Animal Identification, Traceability and Performance Recording in the North African Arab Countries.

In 1998, FAO developed the first guidelines on animal recording for medium-input production environments. Currently, it is preparing new guidelines on animal identification, traceability and performance recording in low and medium input production systems, with the contribution of the ICAR Working Group for Developing Countries (WG-DC) and several other international experts. These guidelines are based on existing standards and guidelines, and draw on lessons learned from current and past experiences and on the results of a recent survey conducted by the WG-DC.

Lessons learned

Lessons on implementing animal identification and recording (AI&R) programmes in developing countries and countries with economies in transition are drawn from past and present experiences. Failure to sustainably implement such programmes in these countries has mainly resulted from a combined lack of financial resources, lack of capacity in the implementing institutions and lack of participation by farmers, breeders and other stakeholders. The high costs of infrastructure for AI&R systems (e.g. computer hardware and software, equipment and transport) and operational costs (e.g. ear tags and field staff travel) have been insurmountable hurdles for many developing countries. Governments have generally failed to commit and sustain adequate resources to AI&R programmes because of a lack of awareness of their importance. A cost-benefit analysis is necessary to indicate where funding for certain components should come from. Often, government funds aim to cover the public goods related costs, e.g. related to animal and public health and food safety, whereas farmer associations or the breeding industry cover private goods aspects related to performance recording. Governments may also combine animal

identification with farmer identification or farm registries in order to better target interventions to improve food security, income generation and the gradual development of market access. Due to the combined benefits of AI&R, government financial support, particularly at the implementation stage, is vital to the success of such programmes.

In the case of voluntary AI&R programmes, poor adoption by farmers is one of the main reasons for failure. Many of these programmes collect data for purposes such as research and progeny testing, without providing any direct benefit to the farmers, such as milk recording data that can be used for ration formulation or reproduction management. It is therefore crucial that such programmes provide feedback and demonstrate direct benefit to farmers. Farmers may also feel that their privacy is being intruded upon and that the confidentiality of their information is not being respected, and may therefore not participate.

These lessons present a sound basis for identifying the requirements for sustainable AI&R systems. A major prerequisite for the success of AI&R programmes is long term commitment by the users and those providing financial and technical support, mainly government and farmer cooperatives. Failure to secure such commitment will inevitably result in poor sustainability of the system. Enabling policy and legislative frameworks are another prerequisite. An AI&R system should be matched to the available infrastructure, operate at a low cost and be no more complex than is necessary, e.g. by being modular. Its implementation should be phased, and implementing institutions should ensure that they have adequate capacity before they embark on the programme. Specialist skills in areas such as information technology, database management, animal identification, recording and technology transfer are vital to its success. It is important that the implementing institutions develop systems that provide feedback and demonstrate the direct benefits to farmers. This may be achieved by streamlining AI&R systems serving different purposes and incorporating them into a service package.

As described above, AI&R serves multiple purposes in a country's livestock sector. It is necessary for animal traceability, which plays an important role in protecting public and animal health. Traceability forms the basis for animal food safety and quality control and helps disease prevention and control. AI&R is also necessary for performance recording, which forms the basis for production improvement both through better farm management and breeding. In addition, AI&R can have a direct impact on the livelihood of small scale and poor livestock keepers by preventing animal rustling, delivering vaccination or health certificates that increase the value of their animals, and securing access to markets for higher-quality and geographically identifiable products. Therefore, AI&R is considered as a powerful tool for livestock development, particularly in developing countries, and for addressing global demands for food security and poverty alleviation. However, for this tool to deliver its expected benefits, there is a need for sound policies, strategies and legislations. This multipurpose approach is illustrated in Figure 1.

**Integrated
approach for
animal
identification,
traceability and
performance
recording**

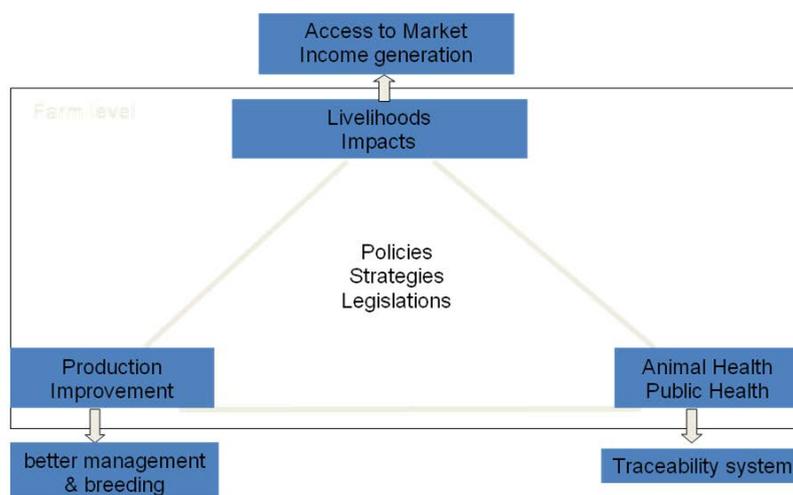


Figure 1. Integrated approach for Animal Identification, Traceability and Performance Recording.

This multipurpose and integrated approach for animal identification, traceability and performance recording depends on the inclusion of all relevant stakeholders and their acceptance of sharing such a system. This would require substantial efforts for awareness raising and capacity development of these stakeholders.

References

Food and Agriculture Organization of the United Nations (FAO) (1998). Secondary guidelines for development of national farm animal genetic resources management plans. Animal recording for medium input production environment. FAO, Rome.

FAO. Legal office, FAOLEX. Website: <http://faolex.fao.org/faolex> (accessed on 15 June 2009).

International Committee for Animal Recording (ICAR) (1997). International Workshop on Animal Recording for Smallholders in developing Countries, Anand, India, 20-23 October 1997, jointly organized with FAO and the India National Dairy Development Board, ICAR Technical Series No. 1.

ICAR (1998). Workshop on Cattle Identification and Milk Recording in Central and European countries, Warsaw, Poland, 23 August 1998 jointly organized with FAO, EAAP and the Polish Animal Breeding Service, ICAR Technical Series No. 2.

ICAR (2000). Animal Recording for Improved Breeding and Management Strategies for Buffaloes, Bled, Slovenia, 16-17 May 2000, jointly organized with FAO, ICAR Technical Series No 4

ICAR (2002). Development of Successful Animal Recording Systems for Transition and Developing Countries, Interlaken, Switzerland, 27 May 2002, jointly organized with FAO, ICAR Technical Series No. 8.

ICAR (2004). Development of animal identification and recording systems for developing countries, Proceedings of the ICAR/FAO Seminar held in Sousse, Tunisia, 29 May 2004, jointly organized with FAO, ICAR Technical Series No. 9.

ICAR (2004). Current status of genetic resources, recording and production systems in African, Asian and American Camelids. Proceedings of the ICAR/FAO Seminar held in Sousse, Tunisia, 30 May 2004, ICAR Technical Series No. 11.

ICAR (2006). Development of animal identification and recording systems for veterinary surveillance and livestock development in countries of Eastern Europe. Proceedings of the ICAR/FAO Seminar held in Kuopio, Finland, 6 June 2006, ICAR Technical Series No. 12.