Animal identification and traceability

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Summary: Animal identification and traceability have become issues of increasing interest and are closely related with disease control procedures as an epidemiological tool, with a heavy impact on matters such as public health and trade. A questionnaire was sent to OIE Member Countries to obtain information about the status of each of the countries in order to perform an international analysis of: competent authorities and regulations, registration systems, mandatory animal identification, purposes of animal identification, elements used in animal identification, documentation used for animal movements, harmonisation and standardisation procedures applied by the Member Countries, how animal identification and traceability relate to factors such as public health, animal health, trade, bioterrorism, economic aspects and the OIE’s role in this respect. Most of the Member Countries replied that they did think the OIE should propose the creation of international rules and guidelines.

1. INTRODUCTION

Traceability has been a subject of debate since 2001 at meetings of the Codex Alimentarius and of the OIE’s Terrestrial Animal Health Standards Commission and Regional Commissions. It is an issue that comes within the general sphere of collaboration between the Codex Alimentarius Commission and the World Organisation for Animal Health (OIE) (Appendix XXI of the World Trade Organization document reference G/SPS/GEN/259 of 3 July 2001).

Furthermore, the concept of traceability is mentioned in the following chapters of the Terrestrial Animal Health Code (Terrestrial Code):

- Bovine spongiform encephalopathy.
- Organisation and structure of the Veterinary Services (13, 16).
- Classical swine fever.

However, for the moment, apart from the very general definition provided by the ISO (International Organization for Standardization) on the concept of traceability, neither the Codex Alimentarius nor the OIE Terrestrial Code define this concept and so it can give rise to very different interpretations.

Traceability is not an end in itself but rather a tool/concept which, in some circumstances, is used to seek information, or even to guarantee the veracity of a piece of information where necessary, and to carry out measures of surveillance, isolation, or even destruction of products or animals in connection with public health (food safety) or animal health measures.
Various international studies have highlighted that the concept of traceability calls for a definition of:

- Firstly, the objectives to be considered for monitoring during the entire production phase, from start to finish, as well as the places, establishments, products and information to be managed.
- The element to be used as the information support right through all phases of traceability implementation, from start to finish, and the element on which one wishes to be able to find all the information collected.
- The tasks to be carried out to ensure that the information is collected and kept throughout the planned traceability phases.
- The rules for managing such traceability.
- The organisation established for the proper implementation and verification of such traceability.

For animals, traceability is based on animal identification.

Animal identification is a system that makes it possible to identify each individual animal or a group/herd of animals.

The system has at least four components:

- Identification of establishments or, in the case of open-air farms, of places situated in the territory of the country in which animals are kept, raised or handled.
- Elements used to identify animals.
- Documents on animal movements.
- Registration of establishments, animals and movements.

Certain components of the systems designed for animal production or animal-derived food and wild animals must be differentiated, such as:

- Establishments or farms or regions or areas or territories of a country where the animals are located.
- Animals.
- Animal owners.
- Vehicles used to transport animals.
- Establishments where animals are slaughtered.
- Establishments where animal products are processed, animal products.
- Components of animal products.
- Processes.

Traceability is the capacity to trace the movements, history, use, processes, documentation and location of an animal or animal product by means of registered identification documents (7).

The terminology and definitions used herein are for the sole purpose of this conference and must not be considered as official definitions.

Despite the fact that identification and traceability are basic components of health, trade, food safety and other mechanisms, the attention of the international community has been aroused in recent years, albeit with divergent interests, purposes and application requirements (15).

As a result of this international demand, a wide variety of companies and organisations have started to focus their activities on the different aspects of identification and traceability processes, including supplying identification elements, working on software, hardware and data transmission systems, or providing system organisation or certification services (9).
Identification and traceability requirements have been implemented by numerous countries or blocks of countries and private companies, as an additional prerequisite to engaging in trade. Furthermore, international trade on a massive scale has come into being, leading to the emergence of innumerable elements, methodologies and terminology for identifying and registering animals, recording their movements and tracing animal products, with different purposes and interests depending on the multiple identification and traceability applications (2, 3, 5, 6, 8, 14).

It has not yet been possible to harmonise at international level the various widely used components among countries involved in commercial transactions (1).

The animal health episodes that have occurred in recent years, such as those due to bovine spongiform encephalopathy, foot and mouth disease, dioxin food poisoning, the nipah virus epidemic, bioterrorism, avian influenza and equine influenza *inter alia*, have provoked crises serious enough to affect world trade (15), the economies of the countries involved and the movement of animals and people (4). Added to this is technological development, more demanding consumers wanting more sophisticated foodstuffs, with new components and raw materials from different origins (where, for example, the meat may come from one country but the additives or other components used from another country). This has highlighted the need for more effective methods of tracing live animals and animal products (11).

The purpose of this document is to examine the results of the questionnaire on identification and traceability which was sent to 165 Member Countries, as well as to describe the Member Countries’ views and suggestions regarding the role which the OIE should play in this regard. An attempt is made to analyse the replies from the Member Countries on this subject of identification and traceability, with suggestions on rules and guidelines, in view of the fact that 81% of the replies said that it is essential or very important for the OIE to draw up international rules or guidelines on such matters.

2. REPLY TO THE QUESTIONNAIRE

A questionnaire was drawn up containing the following five parts:

- Competent authorities and regulations on animal identification and traceability.
- Situation regarding animal identification and traceability in the OIE Member Countries.
- Animal identification and traceability as they relate to public health, animal health, bioterrorism and trade.
- Economic aspects of animal identification and traceability.
- Role that the OIE should play with regard to animal identification and traceability.

The questionnaire was sent to all 165 Member Countries, of which the following 93 countries replied: Albania, Algeria, Andorra, Argentina, Australia, Austria, Bangladesh, Belarus, Belgium, Belize, Benin, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, Congo, Costa Rica, Croatia, Cyprus, Czech Rep., Denmark, Djibouti, Ecuador, Egypt, Estonia, Finland, Former Yug. Rep. of Macedonia, France, Germany, Ghana, Greece, Guatemala, Guinea-Bissau, Guyana, Hungary, India, Indonesia, Ireland, Israel, Kuwait, Laos, Lithuania, Luxembourg, Malawi, Mali, Malta, Mauritius, Mexico, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Caledonia, New Zealand, Nicaragua, Nigeria, Norway, Paraguay, Peru, Poland, Portugal, Qatar, Rwanda, Saudi Arabia, Senegal, Serbia and Montenegro, Singapore, Slovakia, Slovenia, Spain, Sudan, Switzerland, Sweden, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States of America, Vanuatu, Vietnam, Zambia, Zimbabwe.

Fifty-six percent of the Member Countries replied to the questionnaire. This represents 53% of the African Member Countries, 52% of the Member Countries from the Americas, 46% of the Member Countries from Asia, the Pacific and Oceania, 71% of the European Member Countries and 38% of the Middle Eastern Member Countries.

After analysing the data provided and based on the information from the Member Countries in answer to the annual animal health questionnaire in 2002, the Member Countries replying to the animal identification and traceability questionnaire represent 71% of the world’s total number of cattle, 59% of the world’s total sheep, 50% of the world’s total goats, 67% of the world’s total equidae and 37% of the world’s total pigs.

The reference number for the percentages quoted in this document is the total number of replies to the questionnaire (93 replies).
3. COMPETENT AUTHORITIES AND REGULATIONS ON ANIMAL IDENTIFICATION AND TRACEABILITY

All aspects of a system are important, but none more so than regulations and competent authorities. This is why the questionnaire started with these basic questions to find out the status of the OIE Member Countries in this respect.

When asked whether the country has a specific department in the Veterinary Services responsible for animal identification and traceability issues:

- Of the 93 countries replying to the questionnaire:
  - Three countries failed to reply to the question on identification.
  - Nine countries failed to reply to the question on traceability.

Seventy-one percent replied that they had a specific department for animal identification issues and 69% replied that they had a specific department for traceability issues.

When we analyse the regional blocks, we see significant differences, as follows:

- With regard to identification, the range extends from 89% of European countries replying ‘yes’ to the questionnaire, to 75% of countries from Asia/Pacific, 65% from Africa, 60% from the Middle East and 40% from the Americas.
- With regard to traceability, the range extends from 89% of European countries, 75% of countries from Asia/Pacific, 58% from Africa, 60% from the Middle East and 40% from the Americas.

This similarity in the replies to the questions on identification and traceability might indicate that the Member Countries make no real distinction between traceability and identification, or else that they consider it important for the Veterinary Services to be involved in both identification and traceability.

When asked whether there are regulations on animal identification, which is the competent authority and to which species the regulations apply:

- One of the 93 countries replying to the questionnaire failed to answer the question.
- Seventy-eight percent of the countries have regulations on animal identification (one country is in the process of introducing regulations).
- Six countries said that their country has no regulations on animal identification but that they have a specific department in the Veterinary Services for animal identification issues.

Animal identification regulations mainly concern cattle, sheep and pigs and, to a lesser extent, equidae, poultry, companion animals and wild animals:

Some countries have national regulations (Presidential or Prime Ministerial level, Ministerial or national level):

- 33 countries for cattle.
- 16 countries for equidae.
- 20 countries for pigs.
- 22 countries for sheep.
- 11 countries for poultry.
- 6 countries for bees.
- 9 countries for companion animals.
- 5 countries for wild animals.

Some countries have a national competent authority (Presidential or Prime Ministerial level, Ministerial or national level).
Others said that their country has a competent authority at several levels. This applies to:

- 16 countries for cattle.
- 5 countries for equidae.
- 9 countries for pigs.
- 10 countries for sheep.
- 4 countries for poultry.
- 1 country for bees.
- 4 countries for companion animals.
- 1 country for wild animals.

When asked whether their country has regulations on animal traceability, which is the competent authority and to which species the regulations apply:

Three of the 93 countries replying to the questionnaire failed to reply to the question.

In analysing the replies, we see that 69% of the countries have regulations on traceability (two countries are in the process of introducing regulations).

Eight countries say that their country has no regulations on animal traceability but that they have a specific department for traceability issues.

Some countries have national regulations (Presidential or Prime Ministerial level, Ministerial or national level):

- 30 countries for cattle.
- 14 countries for equidae.
- 18 countries for pigs.
- 19 countries for sheep.
- 13 countries for poultry.
- 8 countries for bees.
- 8 countries for companion animals.
- 5 countries for wild animals.

Some countries have a national competent authority (Presidential or Prime Ministerial level, Ministerial or national level).

These regulations mainly concern cattle, sheep and pigs and, to a lesser extent, equidae, poultry, companion animals and wild animals.

Others said that their country has a competent authority at several levels. This applies to:

- 15 countries for cattle.
- 4 countries for equidae.
- 7 countries for pigs.
- 7 countries for sheep.
- 4 countries for poultry.
- 3 countries for bees.
- 4 countries for companion animals.
- 2 countries for wild animals.

Most countries replied that the Veterinary Services is the competent authority for cattle, then pigs and sheep and, to a lesser extent, for poultry, bees, companion animals and wild animals. In the second place, the competent authority is at the Ministerial Level, where most countries have close links with the Veterinary Services, since they are the leading hierarchical structure (Graph 1).
4. SITUATION REGARDING ANIMAL IDENTIFICATION AND TRACEABILITY IN THE OIE MEMBER COUNTRIES

The countries were asked whether they have a system of individual registration for animal owners, production plants and processing plants.

Four of the 93 countries replying to the questionnaire failed to reply to this part of the questionnaire.

Eighty-two percent of the countries replied that they did have some form of individual registration. In answer to the question on the animal species concerned, 82% of the countries said that they have some form of registration for cattle, 58% for pigs, 57% for sheep, 56% for birds, 49% for equidae and 38% for bees (Graph 2).

With regard to the different types of registration, the countries sent the information shown in Table 1, showing that 73%, of the countries have registers for cattle, 63% have individual registers of animal owners and 66% have registers for production plants and processing plants. Fewer countries have systems of individual registration for the other animal species.
Table 1

System of individual registration
(percentage of ‘yes’ answers from countries)

<table>
<thead>
<tr>
<th></th>
<th>Cattle</th>
<th>Equidae</th>
<th>Pigs</th>
<th>Sheep</th>
<th>Poultry</th>
<th>Bees</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal owners</td>
<td>73</td>
<td>39</td>
<td>50</td>
<td>48</td>
<td>43</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>Production plants</td>
<td>63</td>
<td>26</td>
<td>45</td>
<td>44</td>
<td>52</td>
<td>33</td>
<td>8</td>
</tr>
<tr>
<td>Processing plants</td>
<td>66</td>
<td>32</td>
<td>52</td>
<td>45</td>
<td>59</td>
<td>28</td>
<td>8</td>
</tr>
</tbody>
</table>

By comparing the reply to this question with the reply to question no. 3 (to which species do the regulations on traceability apply?) we see that:

Some countries have no system of individual registration for primary production plants, although they state that they have national regulations on traceability:

- 8 countries out of 30 countries for cattle.
- 5 countries out of 14 countries for equidae.
- 2 countries out of 18 countries for pigs.
- 3 countries out of 19 countries for sheep.
- 1 country out of 13 countries for poultry.

Some countries have no system of individual registration for plants processing animal products, although they state that they have national regulations on traceability:

- 6 countries out of 30 countries for cattle.
- 3 countries out of 14 countries for equidae.
- 1 country out of 18 countries for pigs.
- 2 countries out of 19 countries for sheep.

How can traceability be guaranteed if there is no system of individual registration for primary production plants? The same question also applies where there is no system of individual registration for plants processing animal products.

By comparing the reply to this question with the reply to question no. 10 we see that:

Except for cattle, some countries have a system of individual registration for animal owners yet do not have an animal identification register:

- Five countries for equidae.
- Three countries for pigs.
- Two countries for sheep.

How can animal movements be traced if there is no animal identification register?

Some countries have no system of individual registration for animal owners yet have an animal identification register:

- 26 countries for cattle.
- 34 countries for equidae.
- 24 countries for pigs.
- 26 countries for sheep.

In the next section of this block the countries were asked whether a harmonised system exists for managing animal identification and traceability:

- One of the 93 countries replying to the questionnaire failed to reply to the question.
- One country replied yes to the question but failed to identify the animal species to which the system applies.
- Two countries are in the process of implementing a harmonised system.
Sixty-eight percent of the countries have a harmonised system, and in 68% of cases, animal identification and traceability harmonisation targets cattle, 50% pigs, 42% sheep, 29% equidae, 22% bees and companion animals, 14% poultry and 4% wild animals (Graph 3).

By comparing the reply to this question with the reply to question no. 2 we see that 10 countries say their country has regulations on animal identification yet that it has no harmonised system for managing animal identification (4 countries for cattle, 3 countries for equidae, 3 countries for pigs, one country for sheep and 4 countries for poultry).

By comparing the reply to this question with the reply to question no. 3 we see that 8 countries say that their country has regulations on traceability yet it has no harmonised system for managing animal identification. In order to improve the application of regulations and help to verify their application, it would seem preferable to have a harmonised national system. By comparing the reply to this question with the reply to question no. 2 we see that:

- For cattle, of the 33 countries that have national animal identification regulations, 29 countries have a harmonised national system.
- For equidae, of the 16 countries that have national animal identification regulations, 13 countries have a harmonised national system.
- For pigs, of the 20 countries that have national animal identification regulations, 17 countries have a harmonised national system.
- For sheep, of the 22 countries that have national animal identification regulations, 21 countries have a harmonised national system.
- For poultry, of the 11 countries that have national animal identification regulations, 7 countries have a harmonised national system.
- For bees, of the 6 countries that have national animal identification regulations, 5 countries have a harmonised national system.
- For companion animals, of the 9 countries that have national animal identification regulations, 4 countries have a harmonised national system.
- For wild animals, of the 5 countries that have national animal identification regulations, 2 countries have a harmonised national system.
The Member Countries were asked whether or not animal identification is mandatory and to which species it applies. Furthermore, the same question asked them to stipulate whether identification is on a herd or an individual for each animal species:

Seventy-two percent of the countries replied that animal identification is mandatory and an analysis of the answers for each species in the table in point 6 of the questionnaire shows that identification is mandatory for cattle in 75% of the countries, in 45% of countries for sheep, in 42% for pigs, in 38% for equidae, in 26% for poultry, in 23% for companion animals, in 17% for bees and in 9% for wild animals (Graph 4).

**Graph 4**

**Mandatory animal identification and its distribution by species**

(percentage of ‘yes’ answers from countries)

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>75</td>
</tr>
<tr>
<td>Equidae</td>
<td>38</td>
</tr>
<tr>
<td>Pigs</td>
<td>42</td>
</tr>
<tr>
<td>Sheep</td>
<td>45</td>
</tr>
<tr>
<td>Poultry</td>
<td>26</td>
</tr>
<tr>
<td>Bees</td>
<td>17</td>
</tr>
<tr>
<td>Companion animals</td>
<td>23</td>
</tr>
<tr>
<td>Wild animals</td>
<td>9</td>
</tr>
</tbody>
</table>

It should be noted that the replies saying that systems of standardisation and of identification exist do not necessarily mean the mass application of such systems to all stocks of the different species in the countries, since in some countries they are used in connection with specific disease control and eradication programmes, and in others in connection with programmes for certifying meat exportation.

Two countries stated that animal identification is mandatory in their country yet they have no regulations on animal identification.

Six countries have regulations on animal identification yet stated that animal identification is not mandatory in their country.

Four countries stated that animal identification is mandatory in their country yet fail to say for which animal species identification is mandatory in their country.

Some countries stated that identification is mandatory for a species in their country although there is no individual identification for that species. This applies to:

- 9 countries for cattle.
- 2 countries for equidae.
- 18 countries for pigs.
- 12 countries for sheep.

When we analyse the replies concerning the number of countries that carry out individual or herd identification, we see that in the case of cattle, 34% of countries identify herds and 64% identify individual animals. In the case of pigs, 35% of countries identify herds, whilst a very similar figure of 33% identify individual animals, which might be influenced by intensive production systems. It is in the case of equidae that we see a great divergence between the number of countries identifying production establishments (6%) and the number identifying individual animals (41%), where the species and purposes for which identification is used play a very important role (Graph 5).

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*Animal Identification and Traceability*
As there is a great diversity worldwide, in geographical, economic, cultural and other terms, it was considered very important to find out the OIE Member Countries’ purpose for animal identification:

Eight countries failed to reply to the question.

Except for the animal health factor, some countries mention certain other factors as their animal identification purposes, yet fail to classify these factors as essential, very important or important in reply to question no. 13 of the questionnaire:

- With regard to the "ownership" factor:
  - Four countries for cattle.
  - Two countries for equidae.
  - One country for pigs.
  - One country for sheep.
  - One country for companion animals.

- With regard to the "public health" factor:
  - One country for cattle.
  - One country for companion animals.

- With regard to the "movements" factor:
  - Two countries for cattle.
  - One country for equidae.
  - One country for pigs.

- With regard to the "domestic trade" factor:
  - One country for cattle.
  - One country for equidae.
  - One country for sheep.
  - One country for companion animals.

- With regard to the "international trade" factor:
  - One country for cattle.
In spite of the diversity we mentioned earlier, some common purposes can clearly be seen. Taxation is not a common purpose of animal identification, since the percentage of countries answering ‘yes’ is very low, from 1.1% of countries (for wild animals) up to a maximum of 10% of the countries replied ‘yes’ to this aspect.

Another of the aspects with a high degree of convergence between the countries with regard to the purposes of animal identification is for cattle, where 75% of countries use identification for the purposes of ownership, 80% for animal health, 67% for movements and, to a lesser extent, for domestic and international trade (55%) (Graph 6).

**Graph 6**

**Purposes of cattle identification**

(percentage of ‘yes’ answers from countries)

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**Table 2**

**Purposes of animal identification**

(percentage of ‘yes’ answers from countries)

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Cattle</th>
<th>Equidae</th>
<th>Pigs</th>
<th>Sheep</th>
<th>Poultry</th>
<th>Bees</th>
<th>Companion animals</th>
<th>Wild animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership</td>
<td>75</td>
<td>43</td>
<td>47</td>
<td>52</td>
<td>32</td>
<td>22</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>Animal health</td>
<td>80</td>
<td>33</td>
<td>49</td>
<td>51</td>
<td>30</td>
<td>23</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>Public health</td>
<td>67</td>
<td>27</td>
<td>39</td>
<td>38</td>
<td>24</td>
<td>11</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Quality</td>
<td>28</td>
<td>14</td>
<td>16</td>
<td>16</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Genetics</td>
<td>48</td>
<td>35</td>
<td>31</td>
<td>30</td>
<td>15</td>
<td>8</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Shows or competitions</td>
<td>33</td>
<td>40</td>
<td>24</td>
<td>26</td>
<td>7</td>
<td>5</td>
<td>19</td>
<td>3</td>
</tr>
<tr>
<td>Movement</td>
<td>67</td>
<td>34</td>
<td>48</td>
<td>47</td>
<td>19</td>
<td>13</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Domestic trade</td>
<td>56</td>
<td>28</td>
<td>39</td>
<td>38</td>
<td>20</td>
<td>13</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>International trade</td>
<td>55</td>
<td>33</td>
<td>34</td>
<td>44</td>
<td>22</td>
<td>16</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>Taxation</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>
Continuing with the specific aspects, the countries were asked which identification elements they use for each animal species:

Seven countries failed to reply to the question.

Some countries stated that more than two elements of identification are used to identify an animal species:

- 25 countries for cattle.
- 23 countries for equidae.
- 6 countries for pigs.
- One country for sheep.
- 10 countries for companion animals.

Some countries have a competent authority for an animal species at the Presidential or Prime Ministerial level, or at Ministerial or national level, yet fail to specify the identification elements used to identify this species:

- One country for equidae.
- One country for pigs.
- One country for sheep.
- Eight countries for poultry.
- Three countries for bees.
- Two countries for companion animals.

Some countries stated that there is a harmonised national system for managing animal identification in their country, yet fail to specify which identification elements are used to identify the animals:

- One country for pigs.
- One country for sheep.
- Eight countries for poultry.
- Four countries for bees.
- One country for companion animals.

Some countries stated that animal identification is mandatory in their country, yet fail to specify which identification elements are used to identify the animals:

- Two countries for equidae.
- Three countries for pigs.
- Two countries for sheep.
- Twelve countries for poultry.
- Six countries for bees.
- Four countries for companion animals.

Some countries stated that their country has a harmonised national system for managing animal identification, yet use more than two identification elements to identify an animal species:

- 15 countries for cattle.
- 13 countries for equidae.
- 3 countries for pigs.
- 3 countries for sheep.
- 3 countries for companion animals.

In such cases it may indicate that the countries are switching from using one identification element to another and that for a time the two identification elements overlap, or on the contrary, that the harmonisation process is inadequate.

As can be seen in Table 3, traditional identification elements are used in most cases. Seventy-seven percent of countries use ear tags to identify cattle, 59% to identify sheep and 42% to identify pigs. Hot branding is used to identify cattle in 41% of countries and to identify equidae in 20% of countries.
For a number of countries, there appears to have been a confusion between ear tags and brands to indicate the methods of identifying cattle:

Tattoos are used in 38% of countries for pigs, 26% in sheep and 20% in cattle. The use of microelectronic elements (microchips) is limited to 28% for companion animals and 21% for equidae.

Table 3
Use of identification elements
(percentage of ‘yes’ answers from countries)

<table>
<thead>
<tr>
<th></th>
<th>Cattle</th>
<th>Equidae</th>
<th>Pigs</th>
<th>Sheep</th>
<th>Poultry</th>
<th>Bees</th>
<th>Companion animals</th>
<th>Wild animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot branding</td>
<td>41</td>
<td>22</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Cold branding</td>
<td>9</td>
<td>14</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>De-pigmentation</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Ear tags</td>
<td>77</td>
<td>2</td>
<td>42</td>
<td>59</td>
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<td>6</td>
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<td>7</td>
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<tr>
<td>DNA</td>
<td>6</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
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<td>0</td>
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<td>6</td>
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<tr>
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<td>14</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>*Other (Specify)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Another aspect included in the questionnaire was that of the documentation required for the different types of animal movement:

11 countries failed to reply to the question.

4 countries stated that there is an individual document for each bird.

One country stated that there is an individual document for each beehive.

Some countries have an individual document for each animal and a document for each batch of animals:

- 20 countries for cattle.
- 11 countries for equidae.
- 8 countries for pigs.
- 6 countries for sheep.
- 3 countries for poultry.

Some countries do not have mandatory identification, yet have a document for animal movements in the country:

- 14 countries for cattle.
- 12 countries for equidae.
- 12 countries for pigs.
- 14 countries for sheep.
- 30 countries for poultry.

In answer to this point, in the case of cattle, 70% of the countries report that they use documents for movements between farms, and between farms and markets, and 75% use documents for sending cattle to a meat processing plant. Finally, 47% of countries use an individual document for cattle movements (Graph 7).

The documentary aspect is an essential part of any analysis (e.g. epidemiological aspects). A great disparity is apparent between the countries with regard to documentation systems for animal movements, except in the case of cattle where, as mentioned later, 75% use some form of document for movements. For the other animal species, such as poultry, only 34% use documents for movements between farms and 55% for movements to meat processing plants (Table 4).
The next question examines the issue of animal identification registers. The aim was to find out where registers are kept, whether in farms, at regional level, at national level or whether no registers are kept, and also to ascertain the structure of the databases for these registers, whether in written or electronic form:

Seven countries failed to reply to the question regarding the place where the identification register is kept.

Ten countries failed to reply to the question on the type of data structure for the identification register.

Some countries stated that they have no identification register:

- 6 countries for cattle.
- 7 countries for equidae.
- 7 countries for pigs.
- 7 countries for sheep.
- 11 countries for poultry.

Except for cattle, some countries failed to say whether they have an identification register in farms or at regional or national level:

- 29 countries for equidae.
- 24 countries for pigs.
- 23 countries for sheep.
- 40 countries for poultry.
Some countries stated that they have an identification register in farms or at regional or national level, yet fail to say whether this register is written (manual or electronic):

- 5 countries for cattle.
- 9 countries for equidae.
- 11 countries for pigs.
- 10 countries for sheep.
- 5 countries for poultry.
- 10 countries for companion animals.

Except for cattle, some countries stated that they have an identification register in farms or at regional or national level, yet fail to state the identification elements:

- 3 countries for equidae.
- 4 countries for pigs.
- 1 country for sheep.

For this point, the Member Countries’ replies are shown in Graph 8, illustrating that a small percentage (between 7% and 14% depending on the animal species), does not keep any type of animal identification register, whilst a high percentage of countries does, by contrast, keep some form of register, either at farm, regional or national level.

Graph 8

Identification registers
(percentage of ‘yes’ answers from countries)

With regard to the structure of databases, it is clear that virtually all countries have databases for cattle, either written (43%) or electronic (54%). A high percentage of countries have databases for pigs and sheep.

Only 7% to 9% of countries (depending on the species) have no database structure for animal identification.

When asked when and how farm-based animal identification is carried out, by specifying the time when identification takes place (at birth, upon entering the farm, upon leaving the farm or re-identification of imported animals):

10 countries failed to reply to the question asking when animal identification is carried out.

Some countries replied to the question, yet failed to say whether identification is carried out at birth or upon entering or leaving the farm:

- 1 country for cattle.
- 38 countries for equidae.
- 26 countries for sheep.
- 32 countries for pigs.
Some countries replied to the question, yet failed to say whether identification is carried out at birth or upon entering or leaving the farm, even though they replied to question no. 6 saying that identification is mandatory:

- 1 country for cattle.
- 3 countries for equidae.
- 2 countries for sheep.

13 countries failed to reply to the question asking how animal identification is carried out.

Some countries stated that an animal is identified solely by the herd number, yet replied to question no. 6 saying that identification is done on an individual basis for each animal:

- 3 countries for cattle.
- 3 countries for sheep.
- 5 countries for pigs.

Seventy-seven percent of the countries identify cattle at birth, 55% re-identify imported cattle and for the remaining species the time of identification varies widely (Graph 9).

Graph 9

Time when animals are identified
(percentage of ‘yes’ answers from countries)

<table>
<thead>
<tr>
<th></th>
<th>Cattle</th>
<th>Equidae</th>
<th>Pigs</th>
<th>Sheep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identif. using country code</td>
<td>55</td>
<td>13</td>
<td>23</td>
<td>26</td>
</tr>
<tr>
<td>Identif. using herd number</td>
<td>13</td>
<td>1</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>Identif. by the owner</td>
<td>49</td>
<td>24</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Identif. by specialised technician</td>
<td>11</td>
<td>17</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Identif. by a veterinarian</td>
<td>11</td>
<td>13</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>
The final question in this block was whether the Member Countries had adopted any official standardisation and harmonisation procedure for identification and traceability:

- 3 countries failed to reply to the question on identification.
- 10 countries failed to reply to the question on traceability.
- Six countries stated that they have a harmonised system for managing animal identification, yet failed to answer that they do implement some form of official standardisation or harmonisation for the purpose of identification.
- Three countries replied that they do implement some form of official standardisation or harmonisation for the purpose of identification, yet said that they have no harmonised system for managing animal identification.
- Sixty-one percent and 52% of countries respectively replied that they do implement some form of standardisation or harmonisation for identification and traceability.
- A series of additional comments were also received from some of the Member Countries, stating that the identification and traceability systems are used for specific programmes in different health campaigns for disease control or eradication, such as brucellosis, and in other cases for special exportation programmes.
- Likewise, many countries have had some degree of harmonisation in animal identification and movement systems dating back many years, mainly designed to protect ownership. Comments also indicated that there are standardisation and harmonisation for blocks of countries. In this respect, it was suggested that existing rules and harmonisation should be taken into account for any future work on this matter.

5. ANIMAL IDENTIFICATION AND TRACEABILITY AS THEY RELATE TO PUBLIC HEALTH, ANIMAL HEALTH, BIOTERRORISM AND WORLD TRADE

In this point, the aim was to ascertain what relationship the Member Countries assign to animal identification and traceability with regard to the different measures common to the various animal production systems:

- Five countries failed to reply to the question.
- More than 50% of the Member Countries replying to the questionnaire believe the relationship with factors such as ownership, animal health, public health, movements and international trade to be ESSENTIAL. Most countries do not consider other factors like bioterrorism and taxes to be essential or very important.
- With regard to the relationship established by Member Countries with animal identification and traceability, and after having examined the issue in more detail in the previous set of questions, it is not possible to overlook a reality that is being voiced, experienced or sensed in the world of foodstuffs and of consumers.
- The stable to table or farm to fork issue is being more and more forcefully debated, under the impact of health factors and a wide variety of other factors, coupled with the greater pressure which consumer organisations now bring to bear on decision-making.

The Member Countries were asked if traceability was possible to achieve from stable to table, and 84% of them answered that it was:

- A table was given listing different types of animal products and the countries were asked which information the label on each of these products should contain.
- Table 6 is included, so that all the options may be analysed. A high percentage of countries coincided on certain aspects, such as including the country of origin on the label, with the number of ‘yes’ answers ranging from 65% to 82%. Secondly, with regard to the expiration date, the number of ‘yes’ answers ranged from 55% to 89%. With regard to the processing plant, ‘yes’ answers ranged between 44% and 73% for the different products, and with regard to the storage temperature, between 42% and 76% of the countries answered ‘yes’.
- Another of the aspects analysed is whether the individual animal identification is included in the label of cuts of fresh or refrigerated meat. In total, 35% of the countries replied that such information should be mentioned on the label. When one analyses the countries by block according to the OIE classification, the percentages of countries answering ‘yes’ to the question of whether the individual animal identification should be included in the label vary from 65% of countries in Western Europe, to 50% in the Americas, 38% in Africa, 17% in the Middle East, 14% in Eastern Europe and 8% in Asia/Pacific (Graph 10).

**Table 6**

*Information in Labels (percentage of ‘yes’ answers from countries)*

<table>
<thead>
<tr>
<th>Country de Origen</th>
<th>Id. Indiv. del animal</th>
<th>Id. group o batch de anim.</th>
<th>Id. Estab. donde nació el animal</th>
<th>Id. Estab. de engorde</th>
<th>Id. Estab. de Faena</th>
<th>Id. Estab. de Proces.</th>
<th>Fecha de Faena</th>
<th>Fecha de Vencimiento</th>
<th>Temp. de Conserv.</th>
<th>Comp. nutricional</th>
<th>Quality del producto</th>
<th>Food safety del producto</th>
<th>Food safety del proceso</th>
<th>Other</th>
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</thead>
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<td>82</td>
<td>35</td>
<td>32</td>
<td>43</td>
<td>35</td>
<td>74</td>
<td>73</td>
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<td>45</td>
<td>38</td>
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<tr>
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<td>31</td>
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<td>45</td>
<td>67</td>
<td>47</td>
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<td>67</td>
<td>43</td>
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</tr>
<tr>
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<td>24</td>
<td>57</td>
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<td>51</td>
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<td>42</td>
<td>34</td>
<td>30</td>
</tr>
</tbody>
</table>


**Graph 10**

*Labelling of Meat Cuts – Individual Animal Identification (percentage of ‘yes’ answers from countries by region)*
6. ECONOMIC ASPECTS OF ANIMAL IDENTIFICATION AND TRACEABILITY

In spite of wide differences between the various national systems of identification and traceability, we wanted to try to have at least a few parameters for the costs of animal identification and traceability, so we divided the question into implementation and maintenance, and also the share contributed by governments and animal owners:

- 50 countries failed to reply to the first part of the question, and 60 to the second part of the question.
- The different systems vary widely and, from an analysis of these systems, it is possible to analyse the costs for cattle and sheep.
- Information was also received from some countries informing us of the cost of implementing and maintaining electronic databases, with the cost for cattle of US$ 0.35 for implementation and US$ 0.020 for maintenance per animal per year, for a stock of 1,800,000 head.
- In another case, a cost of US$ 0.075 was reported for implementation and US$ 0.040 for maintenance per bovine per year, for a cattle stock of approximately 6.5 million head.
- With respect to the costs of implementing identification and traceability systems, Graph 11 shows the variation in costs reported, which doubtless reflects the differences in the national systems. The costs range from US$ 1 to US$ 25, with an average of approximately US$ 7. If we discount the four extreme values, the average is US$ 6.2. Graph 12 shows the costs for implementing identification and traceability systems for sheep.

Graph 11
 Costs of implementing identification and traceability systems for cattle
 (the 30 different replies from the countries)
The same question asked who is responsible for financing animal identification and traceability programmes. Twenty-four percent of the countries replied that the government finances both animal identification and traceability, while the private sector finances identification programmes in 22% of the countries, and traceability programmes in 14% of the countries. In 39% of the Member Countries both finance identification programmes and in 33% of the countries both finance traceability programmes.

In the next question, the countries were asked whether they had programmes for promoting and financing animal identification and traceability and, if so, which factors the programmes targeted:

- Five countries failed to reply to the question.
- Practically 50% of the countries replying to the questionnaire have such programmes and the remaining 50% do not. For those with programmes, 66% promoted animal health, 61% public health and 57% trade (Graph 14).
Then the countries were asked which factors limit the implementation of an identification and traceability system:

- 11 countries failed to reply to the question.
- The main constraint mentioned by 81% of the countries was ECONOMIC, the next was TECHNOLOGICAL, with 48%, then CULTURAL, with 35%, followed by GEOGRAPHICAL, with 27%, and LEGAL, with 20% (Graph 15).

7. OIE’S ROLE WITH RESPECT TO ANIMAL IDENTIFICATION AND TRACEABILITY

In this question Member Countries were asked how important it is for the OIE to work on harmonising and creating rules and guidelines for animal identification and traceability. The majority of countries felt that the OIE should work on these aspects, as reflected by the 91% ‘yes’ answers (38% ESSENTIAL, 43% VERY IMPORTANT and 10% IMPORTANT) (Graph 16).
When asked what specific aspects the OIE should undertake, 61% of the Member Countries replied that it should draw up GUIDELINES for animal health, 60% for public health and 54% for trade. With regard to STANDARDISATION, 47% replied that it should standardise animal health, 43% public health and 48% trade (Graph 17).

When asked in which further aspects the OIE could be of assistance, some countries called for the OIE to:

- Create a WEB page on identification and traceability to help the countries on this issue and to facilitate harmonisation.
- Provide developing countries with technical support in order to define the problems involved in identification and traceability, and to support the application of this system at regional level.
- Carry out audit missions on identification and traceability.
- Propose the standardisation of protocols for exchanging data on identification and traceability.
8. DISCUSSION

The questionnaire encompassed a range of topics in order to gain an overview of the status of the Member Countries.

A high percentage of countries in Europe, Asia/Pacific, Africa and the Middle East reported that there is a specific department or area in the Veterinary Services of the Member Countries responsible for the aspects of identification and traceability. This percentage falls to less than half in the Americas.

A high percentage of countries in Europe, the Americas, Asia/Pacific and half the African and Middle Eastern countries have regulations on identification and traceability. These regulations differ in scope, in some cases targeted at specific health programmes or export programmes and in other cases covering all stocks of animals.

There is no uniformity with regard to the competent authorities in the various countries, nor with regard to the different animal species involved, with dispersal among the different levels of administration.

With regard to the existence of individual registration systems, except in the case of cattle where high percentages of countries have registers of owners, production plants and processing plants, for the other species, the percentage of countries with individual registers is much lower. Furthermore there is a strikingly low percentage of countries with registers of processing plants.

With regard to the existence of a harmonised national system for managing animal identification, 67% of the countries have one for cattle, whilst only a few countries have one for the remaining animal species included in the questionnaire. Furthermore, in many countries harmonisation is limited to a number of specific programmes and does not extend to all stocks of animals.

Mandatory animal identification varies in the different countries, and with regard to the different animal species, except in the case of cattle in the countries of Europe, the Americas and Asia/Pacific, where a high percentage of countries carry out mandatory identification.

Most of the Member Countries identify cattle for the purposes of animal health, public health, movements and domestic and international trade. This does not apply to the remaining animal species, where there are wide divergences. There is very little interest in carrying out identification for the purposes of taxation, quality and genetics.

With respect to the elements of identification, a very high proportion of countries uses ear tags to identify cattle, sheep and pigs. There is little common ground on the remaining identification elements but rather a wide diversity. Nevertheless, the questionnaire does reveal that microelectronic elements are used for equidae, companion animals and wild animals.

Most of the Member Countries use documents for the movements of cattle, with the exception of the Middle Eastern countries. For the remaining species, there is no uniformity in the use of documentation for the different types of movement. A low percentage of countries that use documentation for the movement of animals (sheep, equidae, pigs, and poultry) from production plants to slaughter plants.

With regard to keeping identification registers and the structure of databases, there is no uniformity in the Member Countries, although a larger proportion keeps them for cattle and keeps data in farms. For the remaining species analysed there is no uniformity.

With regard to the time of animal identification, there is uniformity in identifying cattle at birth, but not for the remaining species. Identification when entering or leaving the farm and re-identification were not reported in high percentages or uniformly.

Half of the Member Countries use the country code to identify animals, but the herd number is used very little. Very few countries use specialised technicians or veterinarians to implement the identification procedure. There is no uniformity in using animal owners to implement identification. In half of the Member Countries it is done for cattle and in less than 50%, for the remaining species.
With regard to the standardisation and harmonisation procedures applied by the countries for identification and traceability, while half answered that they do apply some sort of procedure, they pointed out that these procedures relate to specific animal health or export programmes. There are exceptions, with some countries having harmonisation and standardisation procedures covering all stocks of animals.

The Member Countries have uniformly defined that identification and traceability have an essential, very important or important relationship with factors such as ownership, animal health, public health, movements and local and international trade. The relationship with the aspects of taxation, quality, genetics and bioterrorism was considered to be of lesser importance.

In answer to the question of whether the countries consider it possible to achieve traceability from stable to table, the reply was uniformly affirmative. Views differed on which information should figure in the label on the different products, as did the comments on which information the label should contain in order to carry out the traceability process rapidly, efficiently and safely, so that where appropriate all the products that might be in the market can be called back, as well as making it possible to trace the origin of the product as far back as necessary in line with the problem.

With regard to promoting identification and traceability programmes, the Member Countries agree on the factors as animal health, public health and trade as being important, as they did elsewhere in the questionnaire, giving no importance to factors such as bioterrorism.

With regard to the limitations on implementing identification and traceability programmes, the countries agree on economic factors, followed by technological factors. A high percentage of countries do not consider legal, geographical and cultural factors as limitations.

9. CONCLUSION

The systems of animal identification and traceability currently in operation or being developed have emerged in response to a number of factors, in the absence of international rules, standards or guidelines, which have led to a series of incompatibilities impeding harmonious trade between countries.

The basis for implementing programmes is regulation, and the Member Countries ought to be advised to draw up regulations on identification and traceability not limited to only a few programmes.

As suggested by the majority of the Member Countries, the OIE should draw up international rules and guidelines for identification and traceability in relation to animal health, public health and trade.

Due to the lack of uniformity between countries with regard to the competent authorities responsible for identification and traceability, in some cases with different authorities responsible for different animal species within a single country, the Member Countries ought to be advised to standardise the competent authorities for identification and traceability of animals and animal products.

The Member Countries have defined ownership, public health, animal health, animal movements and local and international trade as the most important objectives for identification and traceability. The OIE should embark on technical studies to propose the basic architecture of identification and traceability systems for these purposes, in order to assist the Member Countries.

In order to be able to guarantee the traceability of animals and animal products, it is first necessary to have an identification system that includes the following elements:

- Identification of farms or, in the case of open-air farms, of places situated in the territory of the country in which animals are kept, raised or handled.
- Elements used for identifying animals.
- Documents on animal movements.
- Identification of plants for slaughtering animals and processing animal products.
- Identification of animal products.
- Register of farms, animals and movements and animal products.
Traceability is easier to manage and operate using a database containing all the data required for the identification of animals and animal products.

For this it is necessary to:

- Define the purpose and scope of the planned traceability system.
- Define the (individual or group) system for each species, based on the risks and the technical capacities for identification management (individual or group).
- Introduce harmonised identification for each species, defining the characteristics of the elements used in order to make the means of identification transparent and thus making it easier to verify the proper implementation of such identification.
- Define an organisation responsible for training livestock farmers in identification, reducing identification costs, helping livestock farmers to implement identification, administering identification data and monitoring the maintenance of animal identification.
- Define the procedures for maintaining animal identification in a country.
- Define procedures for imported animals in order to facilitate the search for information on the affected animals in the country of origin of these imported animals.

The OIE should set up an Ad Hoc Group on identification and traceability.

**BIBLIOGRAPHY**


