Traceability and cross compliance: towards common data descriptions

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Abstract

The work presented here was performed within the European R&D project GTIS-CAP that aims at promoting geo-traceability thanks to the use of the LPIS (Land Parcel Identification System) implemented in all EU Member States. Traceability of food products on one hand, and cross compliance control on the other hand impose more and more information exchanges between farmers, food supply chain, CAP control bodies and last but not least, advisory organisations. These information exchanges make it necessary to develop of standards that enable farming operations (including their geo-localisation) and products to be described.

The objective of our work was to achieve a better understanding of the common points between existing or under-development data norms and standards for information exchanges in the agro-food sector. The survey performed confirms that, despite a number of differences, there are fundamental common points between the tools elaborated in Germany, Belgium/the Netherlands and France. The three analysed tools include:
- a data structure description
- a set of dictionaries or lexicons
- a description of methods for observing/computing variables, i.e. an ontology.

A harmonisation at European level of existing tools thus seems possible.

Key words: data dictionary, EDI, XML, agricultural norms and standards, data exchange.

1 Introduction

CAP regulations as well as traceability involve three main kinds of actors: farmers, the CAP management and control bodies, agro-food supply chain, plus other intermediate bodies (for example, advisory organisations). Between them, information flows may be described as shown in figure 1.

Between farmers and the agro-food supply chain, there are data exchanges (quite often using EDI) such as invoices, payments, logistical and traceability information.

Between farmers and the CAP management and control body, sometimes through intermediate bodies (agricultural chambers, advisory organisations, co-operatives...), there are information exchanges concerning declaration and control of: surfaces/areas, crop rotations, organic farming, integrated farming, certification, good practices... sometimes through the web, with or without specific computer software tools.

There is no global ICT tool for food supply chain to manage information on traceability (becoming mandatory because of EU regulations) and each actor is using his own tools to meet his obligations.
Traceability has to be addressed at two levels:
- Products (in that case, a farm identifier is needed)
- Operations (in that case, a plot identifier has to be used)
but also:
- Inside the enterprise (traceability linked to production management IS)
- Between enterprises

Information exchanges are difficult since there is a lack of normalisation, e.g. concerning crop identification at the European level. Only one data dictionary is used for drawing statistics (see Eurostat), but it is not precise enough. This is the reason why since the eighties, we have seen different initiatives to meet the need for normalisation of data described above.

In recent years, this need is becoming more and more crucial since CAP regulations also aim at an evaluation of agricultural policies. So a precise nomenclature is needed in order to make possible evaluations and comparisons, as well as traceability.

2 Existing data norms and standards in France

2.1 AGRO EDI Europe (AEE)

Since 1992, Agro EDI Europe is working on organisation and standardization of electronic data interchanges on the agricultural and agro-industrial sectors. Today the association gathers about 250 members coming from several sectors (agricultural input, agro equipment, software editors, accounting centres, bank, insurance, logistics, storage, analysis laboratories, etc.). Agro EDI Europe is member EDIFRANCE, and of of GS1 France, so as to be able to attribute in order to be able to allot, for each member, a single and international global location number (GLN) to identify the deposits, logistic platforms and departments of service of all its partners.

Since 2001, within the Agro EDI Europe association, the economic partners of the farm, agreed to define a standard data-processing format of exchange for the feedback related to the data crop sheet: the DAPLOS message.

When developing this "plot message", AEE works addressed the problems of follow-up of cultivation operations and computation of gross margin, and benchmarking of crop husbandry techniques. Later, AEE members turned to the domain of traceability, all tools enabling farm production management being marketed today as traceability solutions.
AEE created the “plot message” (DAPLOS: Data Plot Sheet) which is a standard for describing information related to a specific cultural plot, in order to facilitate data exchange between various information systems. Software editors in France make many efforts to stick to this standard while developing programmes and databases, mainly by implementing some export / import functions for writing or reading data according to AEE message.

AEE DAPLOS message has focused attention on the relationships between the producer and service suppliers, and it does not especially address the Administration.

A short presentation of the AEE DAPLOS information exchange format is proposed hereafter.

This DAPLOS (Data Plot Sheet) message is based on the EDIFACT language and is the result of a huge amount of work, which was finalised in 2003. This information exchange format has been adopted by a number of French agricultural ICT companies. Privately developed and owned, the DAPLOS description is not publicly available e.g. on the web and on a free of charge basis.

Its structure is as follows:
- Header (Document number / Stakeholders' identification)
- Description of 1 to n plots
  - General description (date, crop, variety, surface, contract, etc.)
  - Plot history (previous crop, fertilisation)
  - Soil analyses
  - Events (observations, advices, operations)

DAPLOS includes a glossary and "management rules" (i.e. ontology) that enable users to have common observation / measurement methods. This set of rules defines e.g.:
- Definition of the plot
- Definition of previous crop when two (or more crops) were implemented the year before.
- Event identification

The DAPLOS message includes a number of proposals for information standardisation:
- Reference tables proposed for e.g. botanical species, mechanical implements, fertilisers (mineral, organic), soil types (pH, depth, etc.), contracts, crop stages (for wheat, maize, potatoes, etc.), weather events, crop protection chemicals (type of treatment, product number)
- Descriptions of quantitative variables e.g. yield
- Surface area border points

As stated above, the AEE DAPLOS message deals with information exchange between private stakeholders: benchmarking of farm production management methods and / or traceability purposes. Information exchanges between farms and CAP control bodies are not entirely taken into account. Developed before new CAP implementation, the DAPLOS message does not adopt established geographical standards. If compared with AgroXML (see below: 3 Existing data norms and standards in Germany), the data description is not included since it is an EDIFACT message. But the recent submission of the DAPLOS message to ISO authorities is an important step forward.

2.2 GIEA (Gestion des informations de l’exploitation agricole)

GIEA group initiated by APCA (French Agricultural Chambers) works on farm information management, with the help of CEMAGREF scientists. Their approach concerns both the producers and the organisations which act in a production sector, together with the administration as shown in figure 2.
The two main instigators of GIEA joined Agro-EDI. They are working on a new conceptual data model, "derived" from the “plot message” and including a farm identifier related to a national database.

Some elements in GIEA approach are similar to a control points system.

3 Existing data norms and standards in Belgium and the Netherlands

Compliant with TAURUS norm, ASDAC (Agricultural Syntax for Data Communication) has been developed to allow data exchange between various data management software tools, but also between different equipments (for example: the farmer’s PC and his milking system). It is used for traceability management and accounting data transfer.

The exchange format, available in 4 languages (English, Dutch, German, French) uses the CAS ADIS norm (ISO 11 787). It consists in text files containing both table description according to code lists, and data lines. If needed, translation between languages is performed during exchange.

Plot identification is based on a simple system: subscriber code followed by an internal sequential number.

It is possible to access the ASDAC standard, but it is not available on the Internet as it is a private system as is AEE. It is less restrictive: AEE applies mainly to large-scale crops; ASDAC can be used for any farm production including, for example, cattle breeding.

There still is a lack for a reference database for crop protection products.

The main advantage of the ASDAC solution seems to be its simplicity and versatility. To add a variable or to introduce a new possible item to a qualitative variable is quite easy. The weakness of this solution is that the variable is coded by numbers of 5 digits, so ASDAC messages are not easily understood.

4 Existing data norms and standards in Germany

4.1 ADED / ADIS

LKV (Landeskontrollverband) Westfalen-Lippe designed a data dictionary for building up a unique German Internet database in the environment of ISO/SC19. As with the majority of such data dictionaries, it relies on items, entities, entity-item relationships and code sets.

The data model has a multi-language capacity, is ready to work with XML and is available on the Internet. It could be integrated in existing users’ systems.
4.2 AgroXML

AgroXML is under development and is based on three elements:
- Schemes: hierarchical data description readable by computers and men
- Dictionaries: standard vocabulary and definition, plus synonyms
- And ontology, i.e. description of standardised methods to measure / observe / describe agricultural phenomena. The ontology describes the addressed knowledge domain (i.e. agriculture) thanks to a standardised terminology.

AgroXML is a language that enables the description of agricultural data that will then enable a complete documentation of agricultural production processes. The objective of AgroXML is to allow information exchanges without redundancy between the different actors: land owners, farmers, advisory services, food industry, etc. AgroXML will be available free of charge on the web, and will be platform independent.

The main advantages of XML (eXtensible Markup Language) are: it is a standard language based on a world standard data description (XML-Scheme), independent from any platform, international, readable by both computers and men.

An example in German:

```xml
<Schlag>
  <Name>Wendeliner Schlag</Name>
  <Groesse einheit="ha">5</Groesse>
  <Hauptfrucht>Kartoffel</Hauptfrucht>
  <Sorte>Serafina</Sorte>
</Schlag>
```

5 Conclusion

The survey performed enables the confirmation that, despite a number of differences, there are fundamental common points between the tools elaborated in Germany, Belgium and the Netherlands, and France. The three analysed tools include:
- a data structure description
- a set of dictionaries or lexicons
- a description of methods for observing / computing variables, i.e. an ontology.

A harmonisation of existing tools at the European level seems thus possible and is desirable.

The result of this harmonisation should be an XML norm, available for free on the web with possible proposal of updating and additions by users.

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