



WP-2 Analysis of current situation in EU27+Sw

Country report of FRANCE

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About the agriXchange project

agriXchange is a EU-funded project and it is a coordination and support action to setup a network for developing a system for common data exchange in the agricultural sector.

Project summary

Within the knowledge-based bio-economy, information sharing is an important issue. In agri-food business, this is a complex issue because many aspects and dimensions play a role. An installed base of information systems lack standardization, which hampers efficient exchange of information. This leads to inefficient business processes and hampers adoption of new knowledge and technology. Especially, the exchange of information at whole chain or network level is poorly organized. Although arable and livestock farming have their own specific needs, there are many similarities in the need for an integrated approach. Spatial data increasingly plays an important role in agriculture.

The overall objective of this project is to coordinate and support the setting up of sustainable network for developing a system for common data exchange in agriculture. This will be achieved by:

- establishing a platform on data exchange in agriculture in the EU;
- developing a reference framework for interoperability of data exchange;
- identifying the main challenges for harmonizing data exchange.

First, an in-depth analysis and investigation of the state-of-the art in EU member states will be carried out. A platform is built up that facilitates communication and collaborative working groups, that work on several, representative use cases, guided by an integrative reference framework. The framework consists of a sound architecture and infrastructure based on a business process modeling approach integrating existing standards and services. The development is done in close interaction with relevant stakeholders through the platform and international workshops. The results converge into a strategic research agenda that contains a roadmap for future developments.

Project consortium:

- Wageningen University & Research Center (LEI, LSR, Alterra) - The Netherlands
- Kuratorium für Technik und Bauwesen in der Landwirtschaft (KTBL) - Germany
- MTT Agrifood Research - Finland
- Wireless Info (WRLS) - Czech Republic
- Institut de l'Élevage (ELEV) - France
- Institut de Recerca i Tecnologia Agroalimentàries (IRTA) - Spain
- Teagasc - Ireland
- Universität Rostock -Germany
- Forschungsinstitut für Biologischen Landbau (FiBL) - Switzerland
- Altavia - Italy
- Poznan University of Life Sciences (PULS) - Poland
- ACTA Informatique - France
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Executive summary

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1 Agricultural characteristics

Give the agricultural characteristics of the country or region regarding the mentioned sectors. Use, where possible, the latest official EU statistics.

Key words:

number of farms, size, size distribution, labour, crops, animal numbers, production volumes.

1.1 Short description of general characteristics

Looking at the provisional account of agriculture, in 2009, the French agricultural production except subsidies amounts 61.5 millicent of euros (-8.5% compared to 2008). This decrease is essentially due to the decrease of the prices. On 100 euros of agricultural production, 58 come from crop production, 12 from dairy production and 10 from meat cattle production.

The total cultivated area of the French farm amounts in 2009 27.5 millions of hectares. It consists of:

66.5 % arable area

30% always in grass area

17 % artificial and temporary meadows and annual fodder.

In 2007, the agricultural active population of professional exploitations amounts 769 000 people working full time or part-time.

Metropolitan territory repartition (thousand hectares, * estimation) Source: Agreste

	1990	2009*
Used agricultural area (UAA)	30 596	29 280
- Arable area	17 950	18 400
- Always in grass area	11 437	9 910
- Vineyard, orchard, others	1 209	970
Non cultivated agricultural area	2 807	2 550
Poplars, wood, forest	15 026	15 570
Non agricultural area	6 490	7 519
Metropolitan area	54 919	54 919

Agriculture takes today 32 millions of hectares on the 55 millions of the French metropolitan area, and the forest and wood 15.6 millions. The other 7 million ha is the non agricultural area.

The used agricultural area (UAA) decreases regularly since a half-century. The part of used agricultural area is bigger in the north of France than in the south. The decrease of UAA is stronger in not very agricultural area or in urban area.

326 000 professional farms are numerated in 2007. The farms often adopt a company status.

The size of farms is always increasing. In 2007, 6% of the professional farms have more than 200 hectares. They cultivate 20% of the UAA of professional farms. The growth of farm is made by taking over farms that stop their activity. The decrease of number of farms is as fast as their area is small. There are less and less individual farms but more and more society farms.

Commercial position of professional farms in 2007 (in %) – Source: Agreste

Commercial position	%
Big crops	22.9
Dairy cattle	16.3
Vineyard	13.5
Crop and breeding	13.5
Meat cattle	12.2
Other herbivores	5.9
Pigs and poultry	4.1
Poly-crop	3.4
Market gardening and flowers	3
Fruits	2.8
Mixed cattle	2.6

The most important commercial position for professional farms is big crops, then dairy cattle and vineyard.

1.2 Arable sector

Arable area repartition (thousand hectares - * estimation) Source : Agreste

	1990	2009
Cereals	9 031	9 446
Oilseed	1 916	2 243
Protein seed	713	206
Forage crop	4 759	4 718
Vegetable crop	444	388
Fallow land	233	701
Others	854	698
Arable lands	17 950	18 400

Principal plant production in 2008 (value in Millicent euros, included subsidies on the products) –

Source: INSEE

	2008
Cereals	11.5
Oilseed, protein seed	2.6
Industrial plants (beets, tobacco, other)	1.1
Forage crop	5.4

Fresh vegetables	3.2
Plants and flowers	2.2
Potatoes	1.3
Fruits	3
“appellation” vine	7.8
Others vines	1.6

Cereals and vine are the main agricultural French production in value. Cereals are a long way ahead. The three main cereals are common wheat, barley and grain maize.

In arable areas, there are less fallow lands and more cereal areas. The big cultures cover a little more than 40 % of the UAA. Their total area has increasing continually until the implementation of the CAP (common agricultural policy) in 1992. After that, their level has globally stabilized about 12 million hectares.

1.3 Animal sector

Number of animals (thousand of head) Source : Agreste

	2000	2008
Bovine	20 109	19 366
Which cows	8 367	7 981
Pig	15 168	14 810
Sheep	9 324	7 715
Goat	1 214	1 265
Horse	448	450
Poultry	292 812	249 079

Number of farms with cows (thsd) (source : SSP)

	2000	2008	2009
With bovines	278	198	191
With cows	258	184	178
Of which dairy	135	86	82
Of which suckling	161	121	118

Dairy farms size at 1st november 2009 (source : SSP)

	Nb farms (thsd)	% of total farm	Nb of cows (thsd)	% of total cows
Less than 20 cows	10	13	104	3
20 to 29 cows	9	11	210	6
30 to 39 cows	17	20	560	15
40 to 49 cows	15	19	655	18
50 cows and more	31	37	2144	58

Suckling farms size at 1st november 2009 (source : SSP)

	Nb farms (thsd)	% of total farm	Nb of cows (thsd)	% of total cows
Less than 20 cows	29	25	128	3
20 to 29 cows	19	17	272	7
30 to 39 cows	28	23	769	19
40 to 49 cows	11	9	463	11
50 cows and more	31	26	2518	61

Number of cows (thsd) at 1st January (source : SSP)

	2001	2008	2009	2010
Dairy cows	4195	3759	3793	3673
suckling cows	4200	4163	4187	4449
Total bovines	20281	19124	19366	19199

Flock size (thsd) (source : SSP)

	2000	2008	2010
Total sheep	9 324	7 781	7 258
ewes	7 306	5 930	5 769
Of which suckling ewes	5 704	4 341	4 146
Of which dairy ewes	1 602	1 588	1 623

Number of farms with sheep (source : SSP)

	1999	2008	2010
Total with sheep	96 940	59 917	57 997
With suckling ewes	89 040	54 247	52 333
with dairy ewes	5 990	4910	4 858
With sheep headage payment (over 10 ewes)	53 070	37 649	35 452

Goat flock (thsd) (source : SSP- Agreste)

	2000	2007	2008
Mated goats	843	855	851
All goats	1 214	1255	1265

Globally, the number of animal goes on decreasing every year, especially the total bovine and sheep. The main breeding is still the bovine's one. The number of dairy cows is decreasing while the number of suckling cows is increasing.

The number of farms with animals is decreasing. The farms become bigger and bigger. For the farm with bovine, there are essentially big farms with more than 50 cows.

Production of meat and eggs (thousand ton carcass equivalent) Source: Agreste

	2000	2008
Big cattle	1 462	1 442
Calves	307	276
Pigs	2 311	2 319
Sheep – goats	138	119
Horses	12	6
Poultry	2 248	1 851
Eggs (billion units)	14.1	14

Average milk yields (cows) – Source: CNIEL

	2007	2008	2009
Estimate of milk production/cow (kg)	6440	6 462	6310
Number of farms (in performance recording)	57.2	55.2	55.9
Number of cows	2680	2 666	2562
Milk yield (kg)	8085	8 185	8110

France is one of the main countries that produce meat in Europe: 1st rank for bovine production and poultry, 3rd rank for ovine production, 4th for pig production. The most important is bovine production.

In value, in 2008, milk and bovine meat represent 60% of the total animal production in France.

1.4 Forest sector

The French forest covers 27% of the area, and at this number it needs to be added 4% for the other wooden areas. It plays an important role in the production of wood but also in other field like protection of environment.

2 Farm automation level

Give a description of the country or region regarding the level of farm automation for intra as well as inter enterprise use.

Key words:

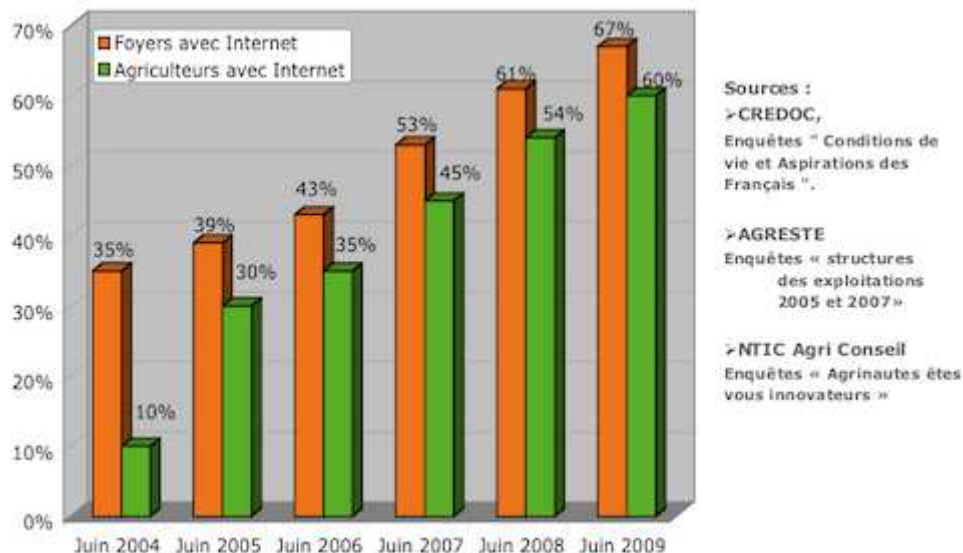
Numbers, percentage, PC, internet, mobile/handheld devices, farm management information systems, process automation applications, ISObus, positioning systems, on-farm networking systems, e-business applications

New information and communication technologies know since several years a big spreading around population. The new technologies include techniques which are used for the treatment and the exchange of information. They are based mainly on IT, Internet and telecommunication.

Among these tools, there are mobile phone, micro-computer and high-speed Internet access. These tools have strongly helped to change the information exchange.

For the farmers and the breeders, there are more and more computing tools offered to them for management and decision-making support. These tools can cover the whole administrative management on the farm.

2.1 Farmers



In 2007, the INSEE survey showed that 45% of the French agricultural holdings had an Internet access.

In one year, the Internet access's rate has increased of 6 points to reach 67% with big differences between suburbs and country: 64% in country, 86% in big towns. Today, 63% of the farmers are equipped with a PC and 50% (63% for professional holdings) have Internet access, 90% have ADSL but 60% don't reach 2 Mo.

2.2 Breeders

A phone survey has been made on about 600 ruminant breeders by the “Institut de l’Elevage”, with the collaboration of “Assemblée Permanente des Chambres d’Agriculture” and “France Informatique Elevage et Agriculture”. The survey concerns holdings which have more than 20 cows or more than 100 ewes or more than 50 goats. It doesn’t deal at all with little holdings.

The equipment of computer’s rate, the Internet access’s rate and the mobile phone’s rate are quite similar between the different types of breeding and are quite high. The equipment in PDA and pocket PC are rather low, about 8% for all the answers. Goat breeders are more equipped in PDA and pocket PC than the other types of breeders. The best equipped are young breeders and in farms which have more animals.

	Computer		Internet		Mobile Phone		Pocket PC / PDA	
		IC 95%		IC 95%		IC 95%		IC 95%
Dairy cattle	80,5%	± 5	73,1%	± 5	78,6%	± 5	8,5%	± 4
Meat cattle	73,2%	± 6	64,8%	± 7	83,5%	± 5	5,0%	± 3
All small ruminants	77,4%	± 6	66,3%	± 8	82,3%	± 6	12,9%	± 5
Dairy sheep	80,2%	± 9	59,6%	± 13	73,9%	± 12	8,1%	± 8
Meat sheep	70,4%	± 11	65,8%	± 12	84,4%	± 9	12,9%	± 9
Dairy goats	92,8%	± 5	78,6%	± 12	89,7%	± 7	20,4%	± 12

Equipment’s rate in computer tools

	Type of Internet connection	
		IC 95%
ADSL	79,3%	± 4
Phone Modem	8,6%	± 3
Wifi	6,4%	± 3
Wimax	2,2%	± 1
Satellite	1,8%	± 1
Mobile phone (3G,...)	0,7%	± 1
Cable	0,6%	± 1
Don't know	0,5%	± 1

Access ways for breeders equipped with internet connection

Among breeders that have an Internet access, ADSL access is the most frequent with about 80% of internet connection. The part of satellite, Wimax, Wifi, which are available since only a few years in order to cover areas where there isn’t ADSL, represents about 10% of internet access ways. The access by Phone modem is still important.

Breeders use IT’s tools for 5 different fields: accounts, technical and economic management, fertilization, sanitary, and animal identification.

	Identification		accounts		Technical and economic		Sanitary		Fertilization	
		IC 95%		IC 95%		IC 95%		IC 95%		IC 95%
Dairy cattle	73,6%	±7	57,3%	±8	42,2%	±8	41,0%	±8	33,3%	±7
Meat cattle	71,0%	±8	37,6%	±9	36,7%	±9	26,3%	±8	32,0%	±8
All small ruminants	49,4%	±10	49,6%	±10	41,3%	±10	30,9%	±9	25,6%	±9
Dairy sheep	40,7%	±18	54,0%	±18	30,1%	±17	16,3%	±13	33,3%	±18
Meat sheep	50,4%	±16	40,2%	±16	47,1%	±16	38,1%	±15	26,1%	±14
Milk goats	57,6%	±15	64,1%	±16	42,5%	±16	33,2%	±16	15,8%	±12

Use's rate of IT application by domain by breeding types in holding that use IT in their breeding management

Breeders mainly use IT systems for identification management.

Due to regulation, ruminant's breeders have to register animal movements so that the movements can be recorded in the identification national data base managed by Agriculture Ministry. They can send their registration either by sending a paper to EDE or by electronic. In the first case, EDE has to enter the data in the data base. In the second one, it is a direct transmission to the data base. They can make their electronic registration by three means: minitel, web gate and specific IT system on micro computer. The survey shows that the rate of bovine breeders that use electronic way is of 49%.

Breeders also do other administrative registration by using IT systems:

Registration for agricultural help request for the CAP on the internet site TELEPAC

Registration for Agricultural social mutual company (MSA)

Registration charge to Inland revenue

3 Data exchange: process level automation level

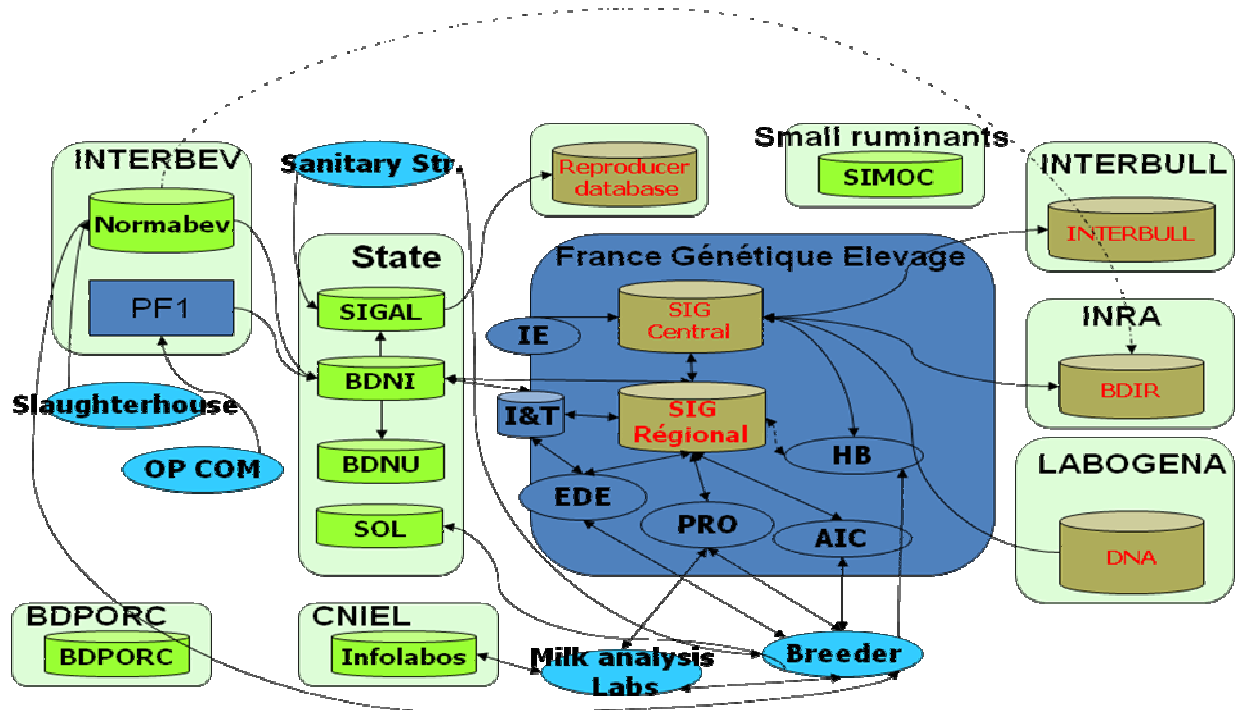
Which relevant data exchanges are used at process level (bottlenecks, challenges)?

Key words:

farm process automation vs. information systems, farmers IT vs. national/EU systems, farmers IT vs. extension services, farmers IT vs. production chain systems

3.1 Animal

In this schema below, it can be seen the relation between all the national data bases which exist in animal sector. It shows that a lot of organizations bring data to the bases and that there are a lot of exchange between all the data bases.



Animal data exchanges

Glossary

BDNI: National Database for Identification & Traceability

BDNU: National Database for Users

SIGAL : Sanitary Information System

PF1 : Focal point of notification for commercial operators and integrators

BDIR: Database for index and research

CNIEL: Milk Industry Professional Representation

INTERBEV: Meat Industry Professional Representation

BDPORC: Porcine National Database

SIMOC: Information System for small ruminant's traceability

IE: Institut de l'Élevage

I&T: Identification and Traceability

PRO: Performance Recording Organisation

HB: Herd Book

AIC: Artificial Insemination Center

EDE: breeder's associations

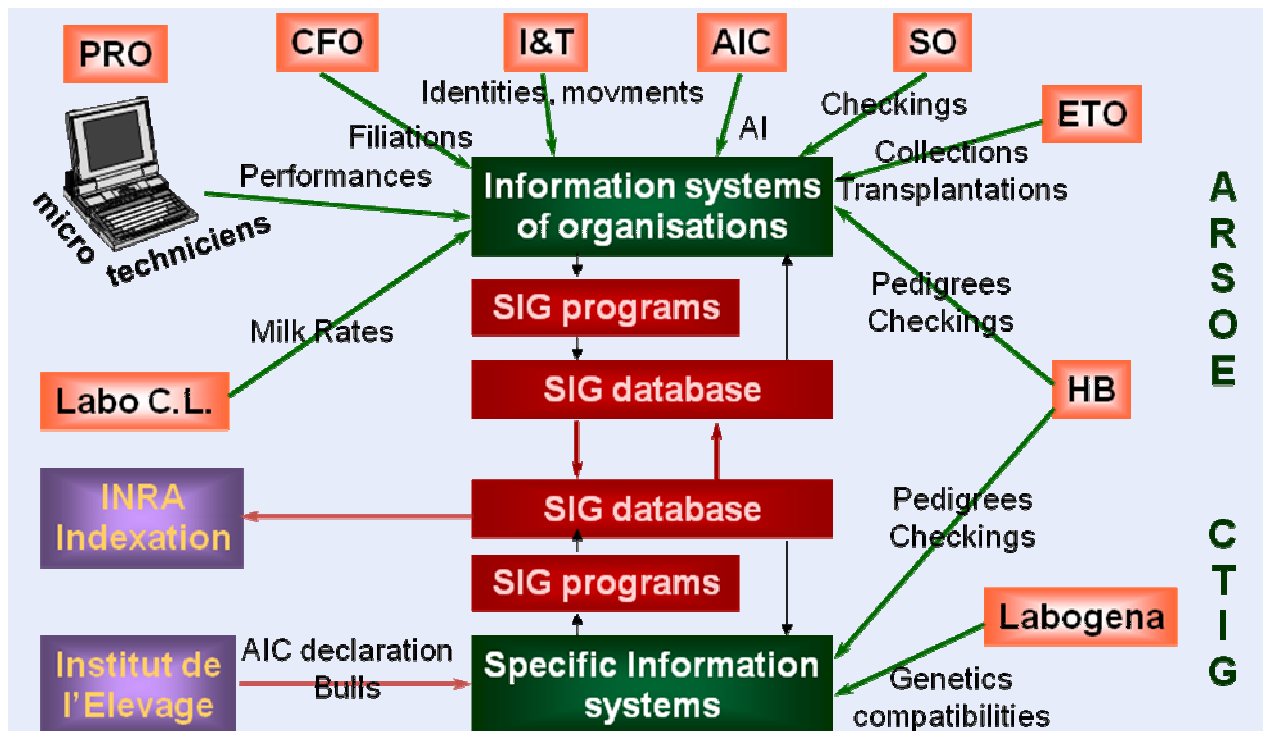
- In cattle

For dairy and beef cattle

Almost 90 % farmers are paid by slaughterhouses according objective carcass characteristics. About 3 000 000 carcass results (weight and EUROP classification) are transmitted by slaughter houses to the farmers by NORMABEV which is a private non profit association. Standard for data exchange is provided by "Institute de l'Élevage",

Veterinary purposes.

Important specific systems are used for data exchange for veterinary purpose: blood samples analyses. These exchanges imply veterinaries, farmers, government and veterinary laboratories. They are based on XML and file transfer. The standards are maintained by the government.



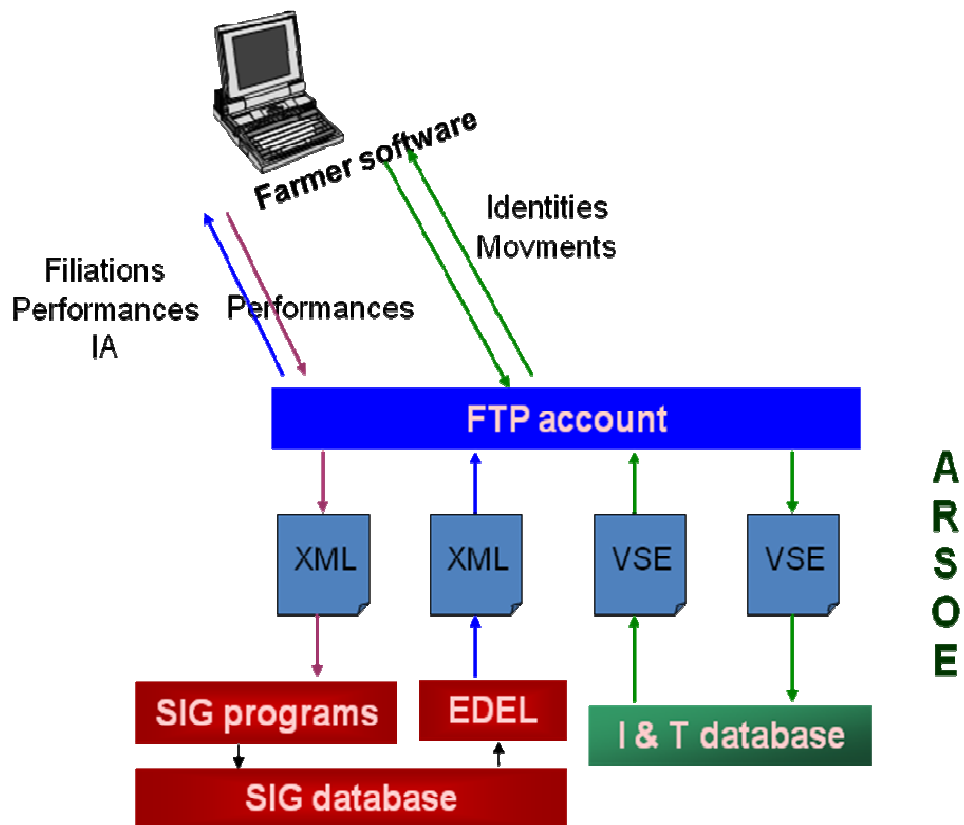
Data flow with organizations

For the cattle sector, there are a lot of data exchange between organizations and the national genetic data base, SIG.

Data which are exchanged are identities, movements, artificial insemination, checkings, collections, transplantations, pedigrees, genetics compatibilities, milk rates, filiations, performances, artificial insemination bulls.

The organizations which exchange information are performance recording organizations, breeders' associations, artificial insemination centers, herdbooks, selection enterprises, embryo transfer teams, laboratories, INRA (research institute which do the genetic evaluation) and the "Institut de l'Elevage".

It also exists data flow with farmers and the data base. Farmers have software to send data of identities, movements, filiations, performances and artificial inseminations. They can also receive information.



Data flow with farmers

- In dairy cattle

Dairy breeders get services from various organizations carrying out interventions, advices and performance recording on the herds.

Data exchanges between dairy breeders IT and breeding organizations are focused on:

- sending and reading data from monitoring software of dairy herd developed by breeding organizations, suppliers (milking equipment companies,...),
- breeding information from breeding organizations (Milk Recording Organizations for example),
- production information milk (for example, milk quality program "Infolabo" between dairy breeders, Centre National de l'Economie Laitière CNIEL and milk testing laboratories).

Today, there are 57 monitoring software of dairy herds approved for recording data on animal identification, livestock health data, reproduction, fertility, feeding, technical and economic data, selection of breeding animals by insemination (AI).

All these software allow dairy breeders to download files in format TAURUS, csv, xls, pdf by File Transfer Protocol exchange.

In 2009, 9 % of dairy breeders IT have recorded data on clinical mastitis (new trait evaluated) directly by software of dairy herds.

Recorded data (for genetic evaluation) are consolidated in collective database (French Genetic Information System SIG) that is enabled to return technical reports to technicians and dairy breeders.

The possibilities for exchanging data between processes (for example milk yield recording) and Genetic Information System concern only farms equipped with an Automatic Milking System (AMS).

945 dairy breeders, out of 55 000 dairy cattle breeders, are equipped with an Automatic Milking System. Recorded data by electronic milkmeters are exchanged with the Milk Recording Organizations and Genetic Information System.

- In meat cattle

During the 2009 campaign, 10 028 herds belonging to the Certified parentage (244 000 cows) and 13 268 herds have been controlled voluntarily according to the official performance system (668 000 cows). Eleven different breeds are recorded: Aubrac, Bazadaise, Blanc Bleu, Brahman, Blonde d'Aquitaine, Charolais, Gascon, Limousin, Rouge des Prés, Parthenaise and Salers. Calving ease scores and birth weights are recorded by farmers. Calves are weighted quarterly and scored by technicians from organizations which are independent from breeding associations.

The methods of performance recording as well as their expressions are the same for all breeds. Performances are recorded in the National Genetic database by approved software named SIBOVAL (by farmers with personal computer or technicians of Performance Recording Organizations with laptop computer).

The Electronic Data Interchange (EDI) between farmers and breeding organizations are carried out mainly by web based applications (HTTP) and FTP for file transfer.

- Dairy sheep

In 2009, 848 432 dairy sheep (out of 1 588 900) have recording performance by Milk Recording Organization. Data exchange between farms and National Genetic database are performed by specific software named SIEOL. All data are collected by technicians (laptop computer) and transfer to collective database by web based applications (intranet link).

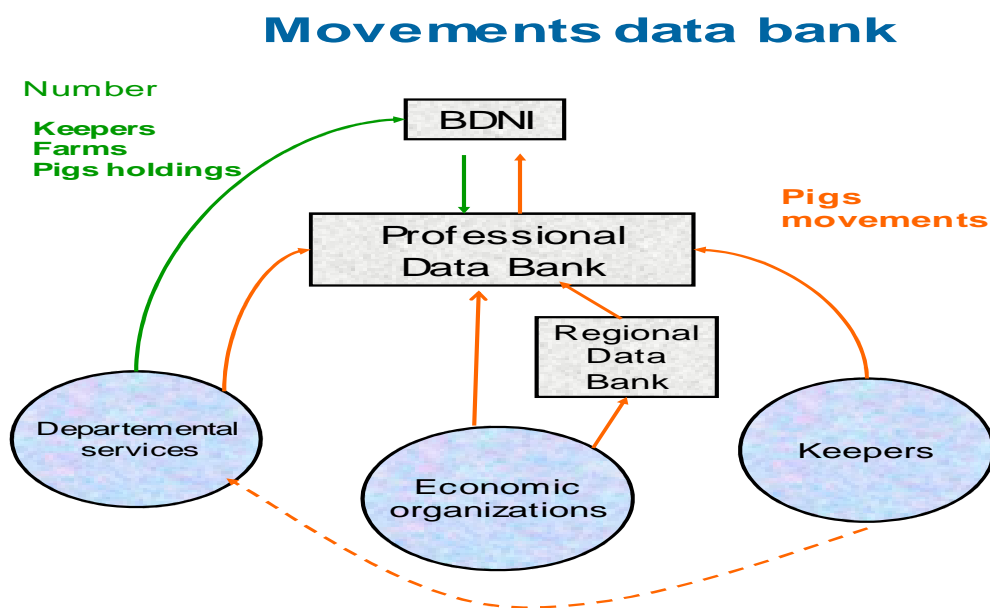
- Goat

In 2009, 360 000 (out of 851 000) have recording performance by Milk Recording Organization. Data exchange between farms and National Genetic database are performed by specific software named SIECL. All data are collected by technicians (laptop computer) and transfer to collective database by web based applications (intranet link).

- Pig production

A professional data bank (BDPORA www.bdporc.com) has been created in 2005-2006 and allows to:

- centralize professional data,
- transfer pigs movements,
- exchange data between holders, holdings, keepers, Departemental Services (EDE), economic organizations, BDNI (identification),
- respond quickly in case of sanitary crisis,
- manage professional indicators (sanitary and quality).



The breeder is responsible for notifying all movements of pigs into BDPORA by :

- direct connexion on the internet site,
- sending a copy of the official movement document at the Departemental Service,
- delegating the notification to his commercial or technical partner.

The genetic national system includes a national database pig genetic named BANAPOG, a national database for the monitoring of boars named PORCIA, software for data recording in farms (selection and multiplication GTTT or GTE).

Developments in genetic database are conducted by Institut du Porc IFIP and INRA.

The movement of information between pigs farms and genetic national database is performed as follows :

- standardization of data exchange in XML format,
- development of Web tools to view and download information by software (breeders and organizations).

3.2 Arable farming

For the arable sector, all is described in the part 4.

3.3 Others

There are data exchanges in other fields like bank data or administrative data or economical data.

3.4 Bottleneck/challenges

Globally it lacks of standardization in data exchange.

- In dairy cattle

Generally, dairy breeders want to maximize the use of dairy automats (robots, electronic milkmeters,...) allowing data transfer with other software.

Another aim is to reduce the burden and costs associated with registration and processing data by partners (for example milk yield for Genetic evaluation).

Many milking equipment manufacturers often developed their own systems without care for possibilities to exchange data with others. Today, 1 465 dairy breeders equipped with electronic milkmeters on milking parlour meters, can't send directly data (milk yield for example) to the collective database, because files format of milking systems are not standardized.

Dairy breeders want that :

- already recorded data feed back quickly and automatically software of both on farm automats and computers to avoid them double data typing,
- some new sensor captured data are transmitted automatically to their external partners (between herd management software and technician software) without being typed.

Under the responsibility of "France Genetique Elevage" a national project (named EDEL) is setup to define standardized modalities for exchanging data between cattle databases and farm software. The aims are :

- standardization of data exchanges, in both directions, between collective database and herd managing systems,
- cooperation between breeding organizations and software editors,
- using Extensible Markup Language (XML) standards and File Transfer Protocol (FTP).
- create an import-export interface compliant with international standards, between milking systems, automatic feeding and herd management software.

Another challenge is to develop cross border data exchange and exchange between the national identification data bases.

4 Data exchange:

Application level

Concerning the processes mentioned in 3, what (kind of) applications can be mentioned? Describe this in common and if relevant by (some) processes.

Key words:

software, databases

4.1 Animal

4.1.1 Bovine

In term of bovine data bases, in France, there is a national identification data base managed by the Ministry of Agriculture. The local establishment of breeding feed this data base by entering the data in local bases which are opened to local professional organisms.

In France, there is also a genetic data base, the bovine SNIG (bovine national genetic information system). This data base contains different types of data:

Identification data like the animal ID number, the movements...

Data of dairy control like membership to dairy control, lactation, dairy index...

Animal weight, carcass weight, EUROP classification

Animal parentage and their belonging to a breed

Inseminations (date, mother number, father number)

Data of dairy or suckling morphology.

The bovine SNIG is made of a national central data base and several regional data bases. In the national data base, there are all the animal files. The regional data bases have only a part of the files. The update and the consistency maintaining of the different data bases are made by a mechanism of exchange and subscription. The users who belong to various organisms can have access to a part of the data relative to their access rights and they send data from their animal from their SNIG access point.

On this system is based a lot of technician tools, like tools of technical help to the breeders, mating plan tools, breeder gate.

The SNIG is a poly-partner database which deals with about 300 French breeding organizations. The organizations and breeders' IT systems are interdependent and can share more and more information thanks to this database. The information is more and more reliable. This data base is a single point to exchange data between partners. It's not necessary to tape several times the same data.

The identification data come from the national identification data base (BDNI).

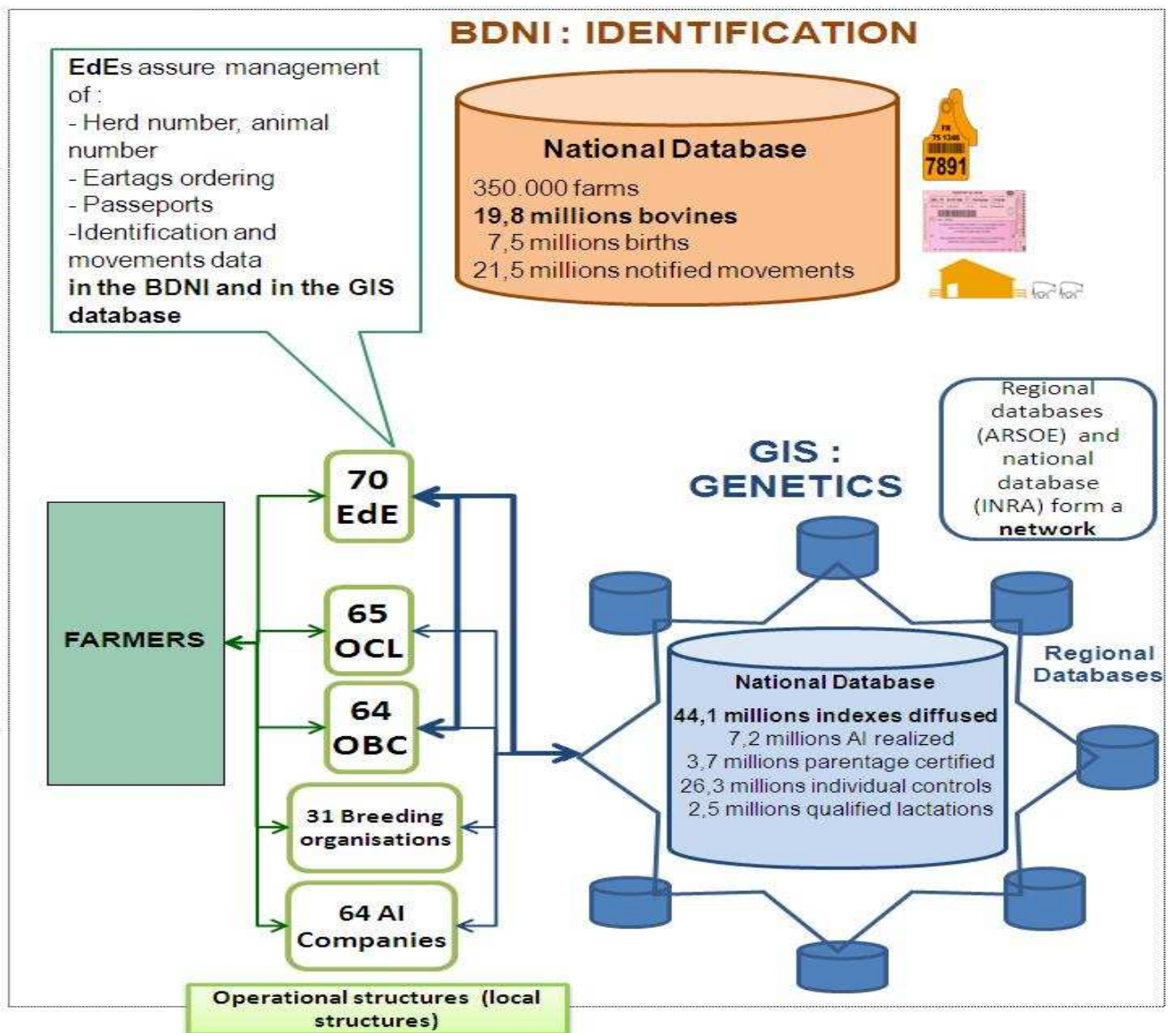
To bring data to the genetic database, the IT organisms have developed tools that can be used by organisms. So we have software for different jobs: milk recording, artificial insemination, breeding associations, performance recording organizations...

For artificial insemination, some software exist to help the inseminator. They mainly have been developed by ARSOE (Breeding organism's services regional association). We can name Genicia++, Win CIA, Winsemin... Some work on PC, other on PDA. These software generally belong to an AI cooperative.

For the performance recording, organisms also have software to manage their activity. For example for the morphology recording, they bring the data of the animal in their technical case and when the technicians are on the field, they can enter data directly in the box and then when they come back to office or to house, they send data to the data base.

Farmers and technicians of performance recording organization bring data about performances in the national genetic database by a software named SIBOVAL.

Key figures (2009)



4.1.2 Small ruminants : sheep and goat

For the genetic information, there are a "SNIG" by ruminant species: bovine: SIG, dairy sheep : SIEL, meat sheep : OVALL and goat : SIECL. They all deal with genetic information and for each system, there exists exchanges between the organisms and the data base. The data bases are used to do the genetic evaluation.

For the tracability information, sheep information is in the BDNI but there isn't data about the individual.

OVINFOS is an ovine national professional data base which belongs to INTERBEV and which is authorized by the Ministry to collect, treat and validate data about the movements of the small ruminants. This base is in relation with the national identification data base BDNI/SIMOC.

4.1.3 Precision agriculture

- In dairy cattle

In the next years, the development of precision technologies will be very important in the livestock sector.

Increasing herd size, production per cow, expenses motivate technological development especially in dairy farming. This includes sensors and supposes to provide information that improves decision making. Recording sensors data in the herd led to Precision Dairy Farming (for example: animal Radio Frequency Identification, on-line body weight scales, on-line milk composition analyser, behavior sensor,...).

4.1.4 Pigs

BDPORG is a pig national professional system which are used by the professional. Inside it, there are data about the pigs, the pig movements by group, and the farms. Users can consult data via a web service but also exchange xml file.

For the pig, the only thing there is in the BDNI is data about holdings, holders. The tracability data are in BDPORG.

PORCIA is a software to manage the AI boar.

In genetic evaluation, the new database BANAPOG includes all genetic information. The development of Web services enables the consultation of genetic national database in real time by farmers, organizations, (genetic values,...) with rights access.

4.2 Arable

Farm management.

These software require a lot of information managed by several data base. These data base are available through internets. The main ones are the following:

Plant characteristics from Culti-LIS by ARVALIS.

Climate from Demeter (www.meteo-agriculture.eu/liens.php)

Phytosanitary products from e-phy (e-phy.agriculture.gouv.fr/) operated by the government

Plant diseases: from database managed by INRA

Pests: from database managed by INRA

Legal notifications

In 2009, 120 000 used a website, TELEPAC (<http://agriculture.gouv.fr/avec-telepac-simplifiez-vous-la>) to declare what are the uses of their parcels in order to get subsidies. About 35 000 of them get back their declarations for management purpose by file transfer. The file standard is defined and maintained by the ministry of agriculture.

Traceability

About 1 000 farmers inform their cooperatives about information dealing with traceability by file transfer. The message which is used is Daplos maintained by AgroEdi Europ.

Extension

About 15 000 farmers inform a national private institute, ARVALIS, about information dealing the use of their parcels.

4.3 Others

In France specific systems are used for fruits and wine.

5 Data exchange: Data level

Are data definitions available in order to be able to share data? Describe this in common and if applicable on earlier mentioned processes.

Key words:

syntaxes, semantics, organization, maintenance, availability, costs, bottlenecks

5.1 Organisational

5.1.1 General

In 2005 a large project was launched in order to gather and establish common definition for all agriculture (GIEA). These references are maintained under the responsibility of the public research Institute CEMAGREF. They are free of use and could be got from a website (<http://www.projetgiea.fr/>). The French major standard makers, AgroEdi Europ for arable and crops, and Institut de l'Elevage (French Livestock Institute) for livestock refer to these common semantics which are implemented according different ways for crops and for livestock.

5.1.2 Arable

The main standard maker is AgroEdi Europ (www.agroedieurope.fr/) which is a private non profit association. This body maintain and promote a message, DAPLOS which is widely used for parcel use description. It is necessary to member of the association and to pay the membership fee to have the right to use this standard.

5.1.3 Livestock

The main standard maker is Institut de l'Elevage (Livestock Institute) which is a national private farmer owned organisation. Institut de l'Elevage has been maintaining for more than 15 years about 30 messages which are used for more than 50 millions data exchange per year by about 40 000 actors. The use of these messages are free and the documentation can be downloaded from 'Institut de l'Elevagé' website. (<http://www.inst-elevage.asso.fr/html1/>). The old messages are flat file according a specific syntax (VSE). The new ones have been designed according "XML" standards. These messages are available for dairy cattle, beef cattle, goat and sheep. In addition, Institut de l'Elevage, maintains specific format according ISO ADED standards for data exchange with miscellaneous on farm automatic devices (Automatic milking systems, electronic milkmeters, transceiver for animal identification by RFID)

The governance for the SNIG programs (bovine SNIG , SIEOL, OVALL, and SIECL) and for their physical data model is provided by "France Génétique Elevage", the French ruminant interprofession.

Each data base has their own data dictionary with some likeness between them because some data arrive in the bovine SNIG and are sent to the others.

Each ARSOE (Breeding organism's services regional association) have got the description of the data and have the program to send data to the data base.

There are about two evolution versions by year to answer to the user's need and to the evolving situation.

A big project is actually to renew this system and to try to integrate all the ruminant species in the same system.

For the national identification data base, a lot of data exchange are done by file transfer with national defined format. Software control the syntax of the file which are sent. Converse is the software for the notification file in the format VSE (exchange standard vector). Confosimoc is the software for the notification file in the format XML.

These two softwares are developed by the Ministry and Institut de l'Élevage is responsible for the documentation. The "Institut de l'Élevage" is the responsible for the exchange messages definitions and the codification of the data. The information are available on the "Institut de l'Élevage's internet site.

The formats TAURUS, csv, xls, pdf are used by dairy breeders.

Agricultural Data Interchange Syntax (ADIS) is used for the description of data models and the standardization of data exchange.

Two format files are approved by "France Génétique Elevage" for data exchange between automat computing system on farm (milking robot) and Genetic Information System :

- file "type 1" which uses TAURUS dictionary,
- file "type 2" which uses ADED (Agricultural Dictionary of Elements Database) dictionary.

Today most of milking manufacturers use different versions of ISO 11788 ADED. Updating ADED to answer actual needs could be an effective way of facilitating automatic exchanges.

Description of file format type 2 (ADED dictionary)

Records have the following structure:

Positions	Data name	Format	Length	Presence	Comments
1-2	Type of line = VN	A	2	O	
3-8	Entity = 880022	N	6	O	
9-23	Number of herd	N	15	F	Right justified
24-38	Identification number of animal	N	15	F	Right justified
39-44	Number of animal (work)	N	6	O	Right justified
45-54	Name of animal	AN	10	F	
55-62	Milking date	N	8	O	yyyymmdd
63-68	Milking hour	N	6	O	hhmmss
69-71	Milk yield (kg)	N	3,1	F	Right justified
72-86	Number of sample (or tube)	N	15	F	Right justified (4 characters signifying)

87	Milking indicator (valid or no)	N	1	O	0 = yes ; 1 = no
88-93	Rack number	N	6	F	

Presence : O = Obligatory
 F = Facultative

There are some projects about the development of EDI standard. For example, GIEA (agricultural holding IT management) in which Institut de l'Élevage is involved has for object the standardization of agricultural holding data which are exchanged. Its aim is the interoperability of existing data information systems. It deals with data about the holding, about the arable production and the breeding. It has been defined a lot of concepts, UML diagrams to show the relation between the concepts. Its final aim is to create messages in the XML format.

The XML format become more and more important. It begins to be used to exchange data between breeder and the genetic IT system. It's the aim of the tool named EDEL.

5.2 Bottlenecks and challenges

The EDI standard are going more and more towards XML file and there are less flat file. Linked to the increase of exchange between different fields of agriculture and with other countries, it is becoming necessary to have message standard and common semantics

6 Data exchange:

Physical level

**Give information about the technical infrastructure. What is available?
How is it organized?**

Key words:

broadband infrastructure (adsl, sdsl, cable, satellite, isdn), network protocols (FTP, e-mail/smtp, http, XML), database structures, information hubs/brokers

6.1 Infrastructure

FTP is a protocol which is very often used in animal sector.
It is used for example by the exchange of animal identification data, by EDEL.

Access to data is often made by breeder portals.

New technologies like PDA (pocket personal assistant) with innovated communication means (GSA satellite, wi-fi...) give the data base and associated services very more easily accessible wherever you are and give the possibilities to enter data the nearest to the event. But the access to the data and to the services must be controlled by an authorization system.

Web services are becoming more and more important so that IT society use them more.
HTTP is also often used.

The electronic identification becomes very important and can make the data exchange easier.

6.2 Bottlenecks and challenges

One bottleneck is the fact that there isn't good Internet connection in every part of the country, so in some rural areas it can be difficult to send or keep back data from the database. That's why new communication means appear.

As the information can be more available, it is necessary to have a good authorisation system.

7 Use cases

Use cases and relevance in EU regions

The four use cases are relevant in France.

7.1 Animal identification

The number of data that need to be transferred to several databases are increasing. The identification data of the animal are one of them. During the whole animal life, the identification data are necessary.

The development of the electronic identification can help but it needs to have standards to help the different systems to read it.

7.2 Animal registration

For the moment, EU regulation orders every country to have a national identification data base but doesn't order them to exchange data about animal movements together. It has been built a team with 3 countries : Netherlands, Deutschland and France to make an exchange pilot.

When an animal moves from one country to another, it is often difficult to translate the passport so it is very important to create an electronic message to support international animal movements. The project has been approved by UN/CEFACT.

In France, we are still working on these two uses cases (animal identification and animal registration).

7.3 LPIS (Land Parcel Identification System)

There already exists a land parcel identification system which is called "RPG" (registre parcellaire graphique). The geographic identification of the building doesn't exist but there is a project on that.

7.4 Geofarmer and fertilizer

It already exists a system for the fertilization of the parcel. Farmer can enter which fertilizer they have put on each parcel.