The Project

Research Project

Europe- Canda

IST-200134281

Geographical Traceability of Food Products

B. TYCHON and R. OGER

Fondation Universitaire Luxembourgeoise (Belgium)
Centre de Recherches Agronomiques (Belgium)

GeoTraceAgri Partners

Concept of geographical traceability

⇨ Associate geographical coordinates to relevant information on production traceability and develop local GIS for the management and use of these data

Position X=4,233,5645,625
Y=2,858,5616,780

Type   B-II
Propriétaire   Dupont

General Context

Succesive crisis in different agricultural food chains (dioxine, USB,...)

Food security has become a main concern for consumers and public authorities (AFSCA).

With the increasing globlisation, Georeferenced information is the most universal tool for visualising on the WEB current status and events.   Certification and control tools
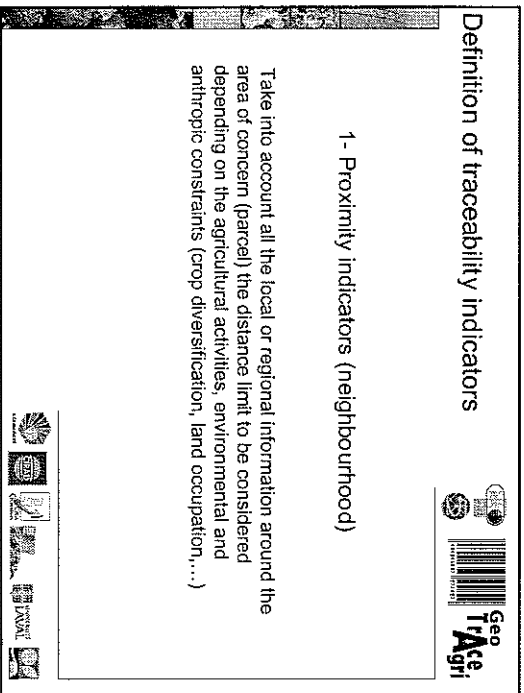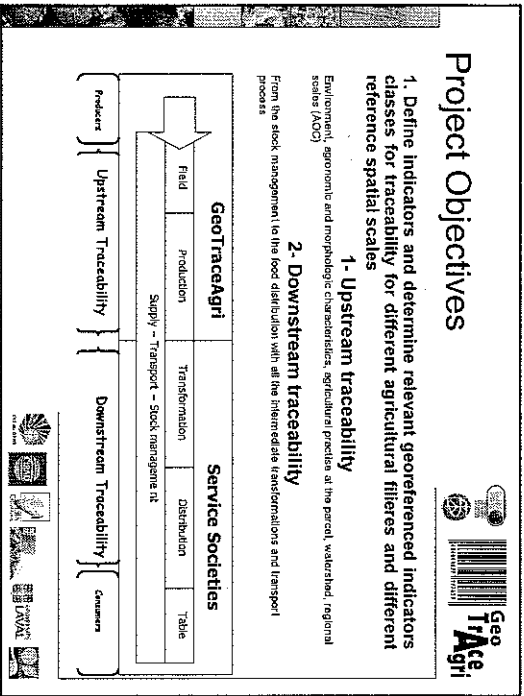
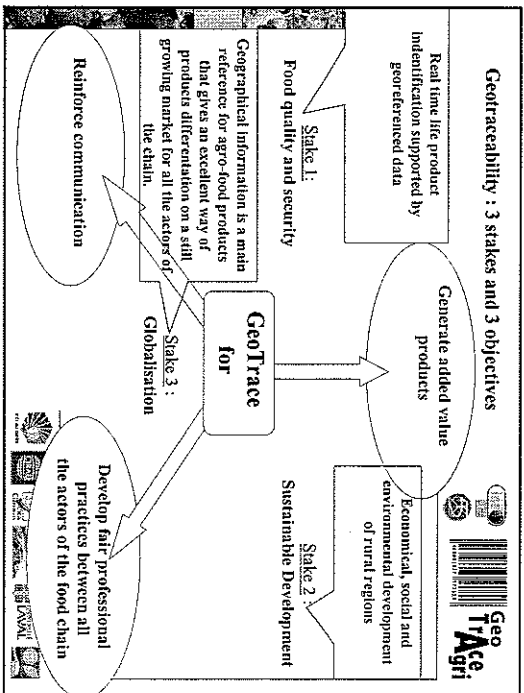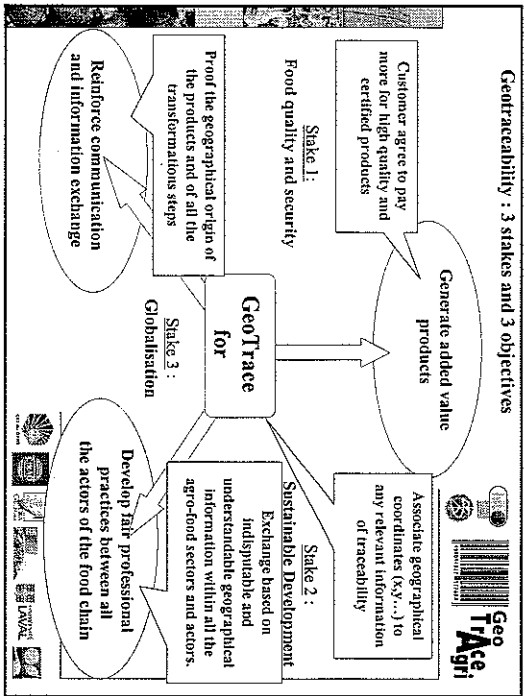### Geographical Traceability in Agriculture

Traceability, capacity to trace the history, the use or the location of an entity through registered indentifications.

The traceability allows to follow and therefore to recover a product or a service from its creation (production) up to its destruction (consumption)

Geotraceability : 3 stakes and 3 objectives

Stake 1: Food quality and security

Customer agree to pay more for high quality and certified products

Proof the geographical origin of the products and of all the transformations steps

Reinforce communication and information exchange

Generate added value products

Associate geographical coordinates (x,y...) to any relevant information of traceability

GeoTrace for

Stake 3: Globalisation

Stake 2: Sustainable Development

Exchange based on indisputable and understandable geographical information within all the agro-food sectors and actors.

Develop fair professional practices between all the actors of the food chain

---

Project Objectives

1. Define indicators and determine relevant georeferenced indicators classes for traceability for different agricultural filieres and different reference spatial scales

1- Upstream traceability

Environment, agronomic and morphologic characteristics, agricultural practies at the parcel, watershed, regional scales (AOC)

2- Downstream traceability

From the stock management to the food distribution with all the intermediate transformations and transport process

GeoTraceAgri			Service Societies	
Field	Production	Transformation	Distribution	Table
	Supply – Transport – Stock management			

Producers { Upstream Traceability } { Downstream Traceability } Consumers

---

Geotraceability : 3 stakes and 3 objectives

Stake 1: Food quality and security

Real time life product indentification supported by georeferenced data

Generate added value products

Geographical information is a main reference for agro-food products that gives an excellent way of products differentiation on a still growing market for all the actors of the chain.

Reinforce communication

GeoTrace for

Stake 3: Globalisation

Stake 2: Sustainable Development

Economical, social and environmental development of rural regions

Develop fair professional practices between all the actors of the food chain

---

Definition of traceability indicators

1- Proximity indicators (neighbourhood)

Take into account all the local or regional information around the area of concern (parcel) the distance limit to be considered depending on the agricultural activities, environmental and anthropic constraints (crop diversification, land occupation,....)

Slide 1

Definition of traceability indicators
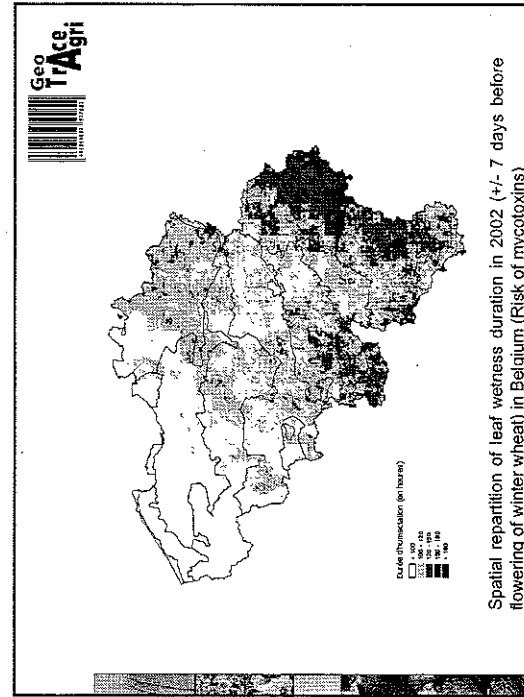
3- Generic indicators (environment)

Indicators that will describe the general context (physical, morphological, biologicaln climatic, hydrologic,...) to define the environment where the production takes place
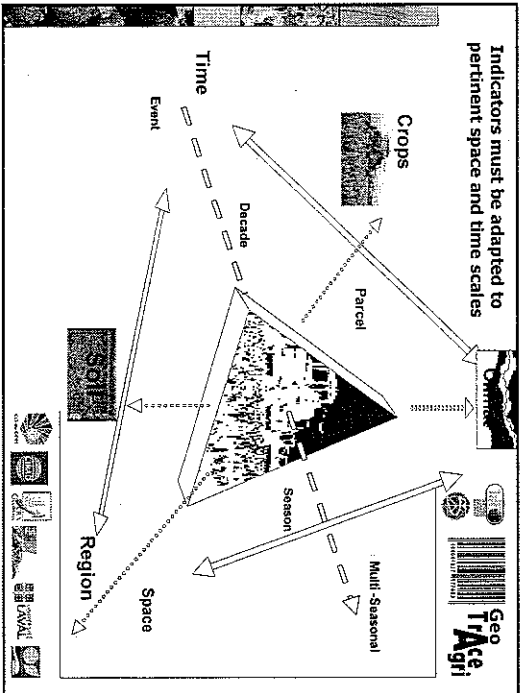
Slide 2

Spatial repartition of leaf wetness duration in 2002 (+/- 7 days before flowering of winter wheat) in Belgium (Risk of mycotoxins)

Slide 3

Definition of traceability indicators

2- Agri-environmental indicators (Use of the Environment)

Indicators related to the agricultural and agri-environemental practises (fertilisation, length of the growing period, biomass and yield (EU-CGMS), impact on the groundwater, ...)

Slide 4

Definition of traceability indicators

4- Events indicators

Indicators that will describe how the year of production is unusual by comparison with a common year. For example meteorological conditions (drought, frost, inondations,...) environmental incident, human actions (new building,new material,...) around or into the parcel may be used to build events indicators.

Indicators must be adapted to pertinent space and time scales

Crops · Parcel · Region · Soil · Time · Event · Decade · Season · Multi-Seasonal · Space

Project objectives

2- Set up a geomatic reference system for geographical traceability for vegetal sectors and transposed it in a second step in other agricultural sectors (animal, sea food,...)) in order to :

- qualify the georeferenced agricultural information as an essential identification tool that will increase the products and service value of the different vegetal sectors;

- develop integration, visualization and diffusion tools of geospatial traceability data with their metadata extracted from the system.

- build geo-directories at regional and local scale for a management of historical data;

The referential set up

Note 1 : High variety of data for the qualification of agricultural products and their impact on th environment.

- *land use and land occupation ;*
- *topography ;*
- *climatology ;*
- *soil type ;*
- *soil and parcel hydraulic ;*
- *yields ;*
- *inter and intra-parcel agricultural practices (variety, fertilization, harvest date).*

Note 2 : Recent technological evolution (new aerospatial and remote sensors, yield sensors on agricultural machines, GPS, probes...)

1) Visual interpretation of Pseudo-color infrared image using the 750,650 and 550 nm bands to RGB : roads, vegetated areas, farms, ... are clearly identified

2) The experimental site : three positions in the site providing contrasting ligther tone (Point A), darker tone (Point C) and middle tone (Point B).

3) Radiance spectrum of the three pixels; the ligther point tone above the others.

Referential Set up

The Different scales of traceability

Producer

Parcel (seasonal and annual)
(1 meter or less)

Parcelle
Field (seasonal and historical)
(1 meter)

Farm (historical)
1:5 000

Région

Local
1:20

Regional (statique mise à
l'échelle)
1:50 000

Region

UNIVERSITÉ LAVAL
GAAP

Referential set up

The graphical farm plan manage agri-
environemental and agricultural
information and calculates
geographical production traceability
indicators

The referential set up

Geographical space and data scales

A
B
C
D
E
F

- smallest identification level = pixel level   A
- agricultural parcell   B
- farm   C
- agricultural region or watershed   D
- Country   E
- EC   F

Referential set up

Metadata

Farm plan

Overlapping

Aerial photo

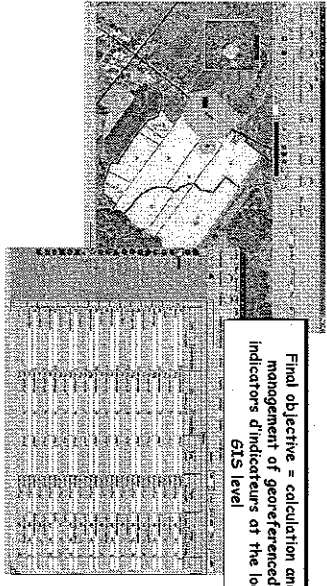Land Register map or
agricultural parcel

Referential set up

The farm plan and its associated data bases manage all the agricultural practises information
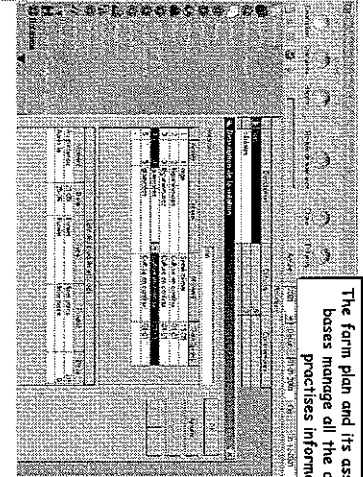
Referential set up

Final objective = calculation and management of georeferenced indicators d'indicateurs at the local GIS level

Referential set up

For example, the farm plan and its associated data bases can manage N-balance through fertilizer inputs and N exportations in close link with soil nitrogen behaviour.

Ex: fertilizer indicators are calculated according to each sector by the software.
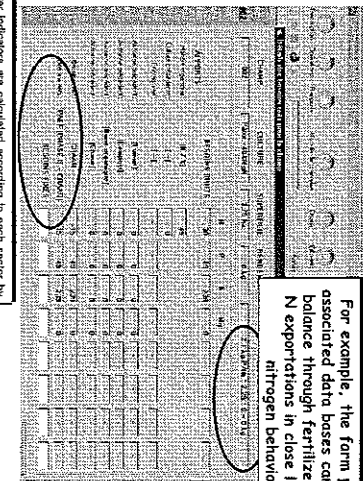
In BELGIUM the crop acreages are precisely known, thanks to the Integrated Administration and Control System (IACS) managed by the Ministry of Agriculture

⇨ Map with boundaries of nearly all agricultural fields (± 600 000)
⇨ Yearly updated with farmer declarations (!)

Proof of geometric accuracy: overlay IACS with geo-corrected SPOT-XS images

SPOT-XS, 30 May 1997

SPOT-XS, 6 August 1997

The system GeoTraceAgri

Système Décisionnel GeoTraceAgri
(Base de données distribuées géographiquement)
Serveur central de traitement et de contrôle d'accès

SIG + SGBD
- Région A
- Région B
- ?
- Région D
Système traditionnel

Intégration agrégation

INTERNET WEB

BD Usagers & Module de traitement

Filière végétale
Filière animale
Autre client

Clients

BD → SYSTÈME → CLIENTS
Local GIS   Web GIS

Thank you

Project objectives

3 – Develop an operational computer decision system that will ensure the geographical traceability of the agricultural products for all the actors of the different sectors (production of demonstrator)

Germany	Belgium	France	Netherland	Luxembourg	U.K. Uni	Québec Canada
Sea Food sector	Potatoes sector	Cereal sector	Horticulture sector	Cereal sector	Meat sector	Cereals sector
	Fodder production	Tropical Fruits				Porc
	Cereal sector	Traditional agriculture	Traditional agriculture			Beef
						Fruits
						Precision
						farming
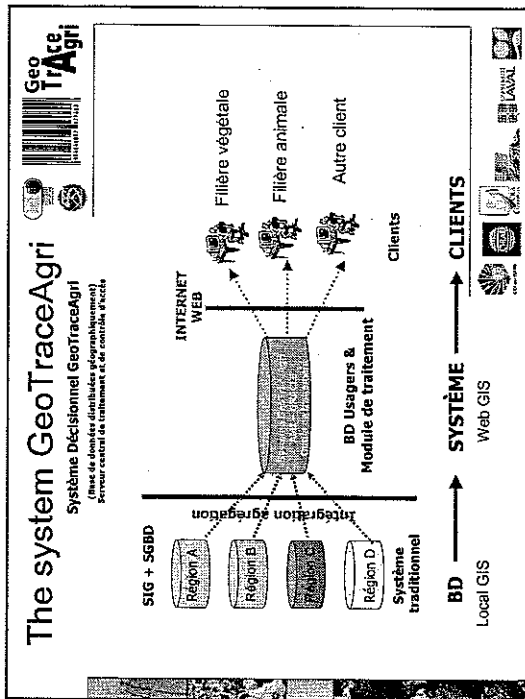
Achievement

1) Definition of the indicators that are relevant to geographical traceability;

2) Definition of norms valid at the EU-level;

3) Definition of a geomatic reference system;

4) Development of secure and user-friendly visualization and communication tools for the information transfer through the food chain of all agricultural sectors

5) Validation of steps 1-4 by various contributors and user groups (participative approach) and dissemination