The European Commission's science and knowledge service

Joint Research Centre

Early Stages of IACS (1993-2000)

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25th MARS Annual Conference, Prague, CZ, November 26-28 2019

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Early Stages of IACS ?

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Already two retrospectives ....

- **In 1998 @ Venezia conference**
  - *A detailed review of the evolution of CwRS methodology, its adaptations and the contributions from EU Member States …*

- **in 2012 @ Paphos conference**
  - *A tentative analysis of CwRS as an "innovation process" , describing the social context and enabling factors facilitating the up-take by EU Member States …*

A focus on early years of IACS deployment (93-2000) and the specific contribution of Earth Observation ....

- ***Identify a few stories of interest for next CAP & Copernicus***

Warning: *"Any resemblance with existing or past situations is **NOT** totally coincidental !"*

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Geographic information is crucial for Agriculture

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Some very early LPIS prototypes!

Rock engraving from Bronze/iron age (3000-1000 BCE)

Basis of geometry and Land survey ?

were developed in Ancient Egypt for the purpose of parcel area measurement and harvest forecast !

Rock engraving from Val Camonica (IT) and an interpretation
https://journals.openedition.org/etudesrurales/8156?lang=fr

Tomb of MENA, Thebes
Circa 1500 BCE
https://link.springer.com/referenceworkentry/10.1007%2F978-1-4020-4425-0_9331

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Geographic info is crucial for EU policies !

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A Short QUIZ !

- ***What is the 1st EU Reg. to made compulsorily the use of GIS and othoimagery ?***

  OLIVE TREE REGISTER in 1998 (EC Reg 2366/1998)

  In fact EU Parcels Registers were first foreseen in the mid 70's for Permanent Crops (vineyard olive trees)

- ***And the 1st EU Reg. annexing a "Map" in the official Journal ?***

  LESS FAVORED AREAS in 1975 (Council Dir. 268/1975)

  This regulation is a precursor of Rural Development (II Pillar)

- ***the 1st EU Reg. recommending and funding the use of Satellite remote sensing for Control purpose ?***

  93 CAP Reform (EC 3508/92 & Com 3887/92)

  Establishing the Integrated Administration & Control System

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The Mac SHARRY 93 CAP Reform

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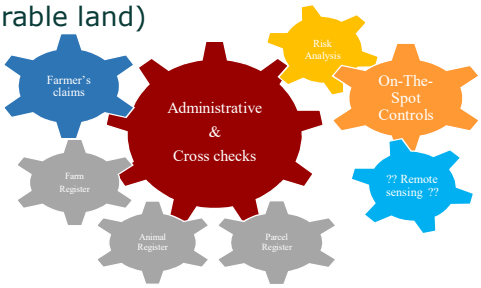
- **A main CAP Reform**
  - aimed at reducing over-production on Europe
  - Reduce distortion for a free market (cf GATT, Uruguay Round)
- **A total disruption with former policies**
  - Direct payments to EU Farmers
  - Subsidies based on cultivated areas (ie. decoupled from yield)
  - + Other obligations of Set-Aside and eligibility (arable land)
- **Setting the basis of IACS**
  - i.e is main components and functions
  - Specific requirements of controls, etc
  - Obligation of computerized system
  - With digital databases , but no GIS obligation
  - **Possible use of Satellite image for OTSC**



A Huge challenge for EU M.S : Implement IACS in 2 years !

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The Mac SHARRY 93 CAP Reform

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- **Just an opportunity for EO & Geomatics ?**
  i.e the development of Controls with Remote Sensing IT of IACS, LPIS or GPS for measuring parcels?

- **… but more than that!**
  - 93 CAP Reform was in fact made possible thanks to results of projects and existing EO systems
    - Results of **MARS projects** since 88 (Reg. Inventories, Action IV)
    - Experience of **ITALIA on Parcel Registers** (Vineyard, Olive trees) using Cadaster + Aerial photography since 87
    - Pilot project on control of Set aside in 90 in FR (CNASEA)
    - Two Pilot Studies in 90 on **Durum Wheat** (Sicilia, North Greece)

Historical review of control with remote sensing within the CAP

Michel Jacquot

The history, or the adventure, as I would rather say, of remote sensing in the Directorate-General of Agriculture is less than ten years old... But these are ten "light years", ten years during which a handful of officials, Wolfgang KUMMER, then Prosper de WINNE who now follows another vocation, and especially their direct collaborators, Michel VAN de STEENE and Jacques DELINCE, have worked with competence, determination and intelligence to impose, within the management of the Common Agricultural Policy and particularly for its control, the technique of remote sensing, then still in its infancy.

Survol historique des contrôles par Télédétection dans la PAC

Michel Jacquot

L'histoire, l'aventure dirais-je plutôt, de la télédétection à la Direction générale de l'Agriculture n'a pas dix ans... Mais ce sont dix « années-lumière », dix années au cours desquelles une poignée de fonctionnaires, Wolfgang KUMMER, puis Prosper DE WINNE qui ont maintenant suivi une autre destination, et surtout leurs collaborateurs directs, Michel VAN de STEENE et Jacques DELINCE, a oeuvré avec compétence, avec détermination et intelligence pour imposer, dans la gestion de la Politique Agricole Commune et particulièrement pour les contrôles de celle-ci, la technique, alors balbutiante de la télédétection.

Speech of Michel JACQUOT,

Director of DG AGRI

(Venezia 98 MARS Conf.)

- **These elements discussed in Nov 90, provided the general feasibility of administration & control of Farms/ Parcels**

… thus the overall conception of IACS

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Early stages of Control with Remote Sensing

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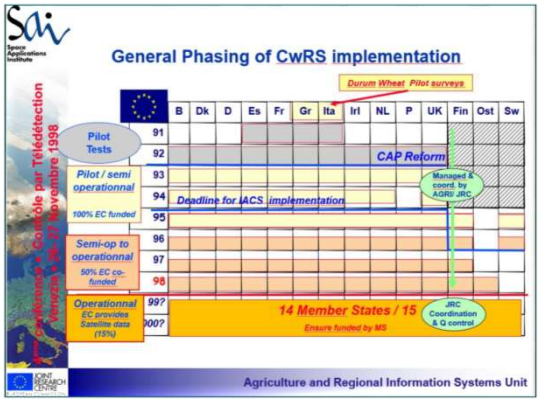
A Four steps implementation (T=1993)

1. **Preliminary Tests in 91 and 92** **T-2y !**
   - From 4 to 12 Member states
   - 1 site and 30-50 dossiers / M-States
   - **100% funded by DG AGRI**
   - More **awareness raising** than real pilot !
2. **Pilot CWRS projects 93 -95** **T+3y**
   - 11 – 14 Member States (100-200 dossiers, few sites)
   - **100 % Funded by DG AGRI**
   - Real pilots closely monitored and evaluated by MS & EC
3. **Semi-op. to operational 96 -98** **T+6y**
   - 11 – 14 Member States
   - **50 % Funded by DG AGRI**
4. **Fully Operational > 98**
   - **Mainly funded by Member-States**
   - DG AGRI funds only Satellite images (circa 15% costs)
   - **Technical support fully ensured by JRC**



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Early stages of Control with Remote Sensing

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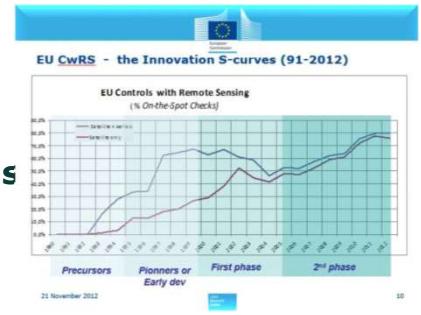
A general coordination by DG AGRI & JRC

- Yearly Call for Tenders launched by DG AGRI
- Common ToR + technical Recs by JRC (from 1 -4 docs)
- Available in 3 languages (ENG, FR, DE)

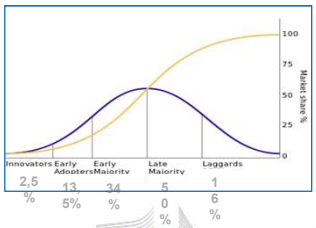
with Detailed technical follow-up /evaluations

- Kick off with contractors, Visits in MS,
- Results evaluated & discussed with all MS
- First in EAGFF Committees (92-95)
- then in restricted sessions of MARS Conf (96- 98)
- Provision of detailed Summary EU Statistics on CwRS 93-2005



• The Operational take-over by MS after 99

- Varies according to MS control strategies (between precursors, pioneers… and more prudent countries, laggards…
- and evolution of methodologies (use of aerial, rapid field visits) or control obligation (ex huge control rate in ITA)



Overall, a progressive but steady innovation process ***(see Paphos ppt)***

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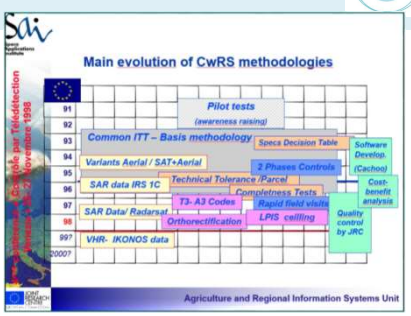
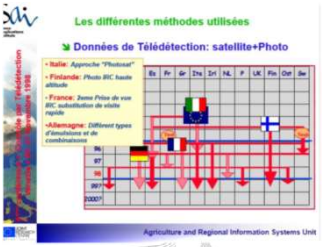
The main initial interest of CwRS

- Was to allow MS to focus on priorities (IACS IT, entry & checks of farmers claims, animal register …)
- To have some deterrent effect on frauds
- To allow some checks of reference years (eligibility)
- To provide some help from the EC to MS



In practice, its coordination provided an unpreceded opportunity of technical exchanges between Member-States and the Commission



Content wise, the initial CWRS method

- Was kept with **common set of principles & rules**
- but has been subject to **dramatic improvements,** with many adaptation or variants by **inputs from Member States.**

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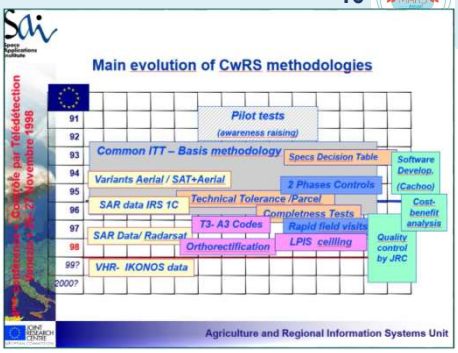
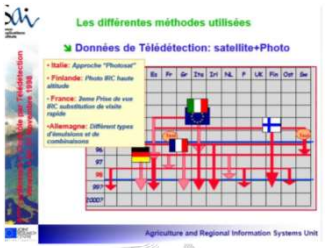
As a result, CwRS progressively moved between 93 and 97



- ***from a kind of plausibility checks***
  - mainly on the Land-use (area provided by ref parcel)
  - Some decision tables @ groups and farm levels, sorting the claims to be field inspected (a mix of administrative and technical tolerances)



- ***to a real OTSC, covering area & Land-use,***
  - Strict Tech. Tolerances, applied @ Parcel level (96)
  - combined use of Aerial (preparing the VHR in 99)
  - Clear decision rules to ACCEPT/ REJECT an application, including the COMPLETENESS of control

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Early stages of Control with Remote Sensing

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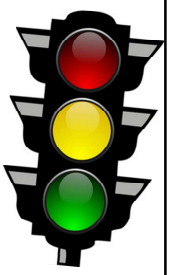
Scientists dreamed of "silver-bullet" solutions, i.e providing error-less results (i.e. Y/N, Accept /Reject in 100% of cases) !

In fact, in 93-97, analyzing the the "Doubtful " cases (i.e the grey zones or yellow traffic-lights) has been the most fruitful !



- **Several iterations with MS to clarify the meaning of "Doubtful" cases :** ***Uncertain? benefit of the doubt ? Non conclusive? Incomplete ? Borderline ? Problematic ? Suspicious?***
- **Detailed analysis, using clear flags for doubtful cases at parcel level:**
  - ***Technical problems (up to 6 codes T1-T6),***
  - ***Anomaly Codes (A1-A4) or obvious error (E1)***
  - ***Conformity codes (C1-C4) , ie result of the control***

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Such analysis allowed to identify general weaknesses affecting the overall IACS , i.e.

- **Problems also encountered in "traditional" OTSC**
- **And/or reducing the performance of overall administration and cross-checks**

And practically resulted

- ***in implementation of appropriate Follow-up actions:*** *Rapid field visits, letter to farmer or group of farmers (DK)*
- ***in identifying main improvements of IACS:***
  - *Real time check of claim, Provision of maps and pre-printed forms*
  - *Establishment of specific LPIS …*

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GPS and Parcel Measurement

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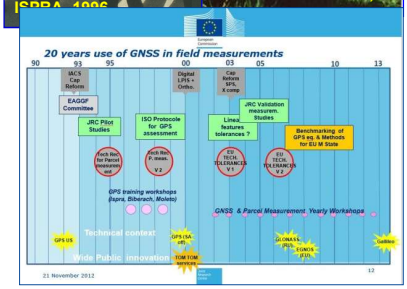
- **GPS was very early (93) identified by MARS as a promising tool for parcel measurement** (EAGFF Committee on parcel identification & measurement)
  - MS used very diverse tools (chains, survey wheel, total station)
- **Pilot studies by JRC allow to assess performance of differential GPS** *(propagation of absolute point location error to parcels area error)*
  - ***1st General guidelines on Parcel Measurement in 95***
- **The start of regular activities by MARS**
  - **Organization since 95 of regular workshops & seminars**
  - **Technical watch & benchmarking on new devices and new GNSS EGNOS systems**
  - **Definition and updating of Technical Tolerances for parcel measurement (2002)**

Important uptake by EU MS, with Technical Tolerances and guidelines making sense



Land Parcel Information System

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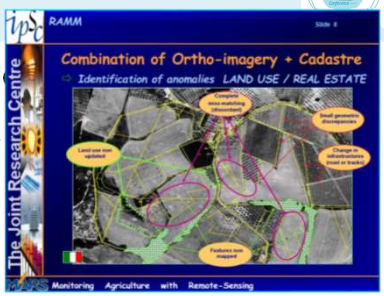
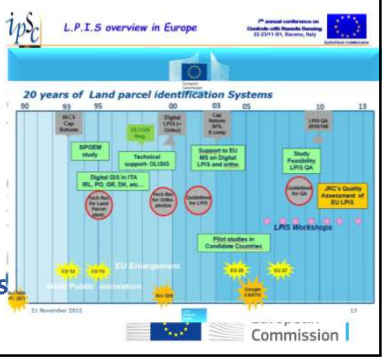
- **EU MS started to use their only available large scale map (i.e. Cadaster, O.S maps)**
  - Generally only paper ⟶ **IACS was an "Half GIS"**
- **Need of building new Systems in countries without Cadaster (GR, part of PO)** projects of parcels and block delineation on ortho-photos
- **Some others Countries moved earlier to specific LPIS using orthophotos (IE, DK, IT)**
- **CwRS allowed to document the poor suitability of Cadasters for the IACS**

➢ ***The basis of adoption of EC Reg. 1593/00 Regulation making Compulsorily for All***
  - ➢ ***the use of GIS, i.e fully Digital LPIS***
  - ➢ ***+ recommending combined use of 1m Ortho-images***





A few lessons learnt

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New Technologies provide excellent opportunities

- a perfect entry to discuss and improve current practices between MS

But there are no unique and simple turn-key solutions

Ex: Development of a unique CwRS software (Cachoo)

Efficient Implementation need to fit to national/regional context

- Need to balance between subsidiarity and common rules/ framework
- Identify what can be mutualized at EU level ? *Ex Satellite images*

Initial CWRS failed on a few points:

- Automated processing didn't replaced CAPI (mainly due to poor LPIS)
- Reference checks (5 years archive) were dropped (not cost-efficient, weak legal value)

The devil is in the details… Need to pay attention on what does make sense for the Policy goal as for the farmers …

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A few lessons learnt

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Innovation is not Invention

Research → Invention → Innovation

Innovation process, i.e. the successful implementation of a creative novelty within a given activity or organization…

Requires both <u>TIME</u> and strong <u>INTERACTION with USERS</u>

- **Time** between Proof of Concept, to Demonstration in different contexts, to measure actual performance in semi-operational conditions, assess feasibility and resources requirements for operational deployment…
- **Interactions** with users to really meet requirements or identify new ones, to integrate their contributions
  - A real shift of perspective between "techno-push" to "user-driven"
  - The new method becomes fully owned by users.

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A few lessons learnt

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The innovation is thus not a linear process where "users" are met twice

User's Requirements → Development → Prototype Demo → User's Dissemination

But more as a circular process with permanent inputs / iterations between the stakeholders …

- **Bridging between result of research and possible applications**
- **Integrating new technologies when their appear**
- **Peer exchanges across Users Community : Return of experience, best practices , etc…**

Such circular process is not static but has to move in the right direction / goal.

This is made possible by a strong coordination/ piloting, having clear vision and defining common objective !

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Any questions?

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