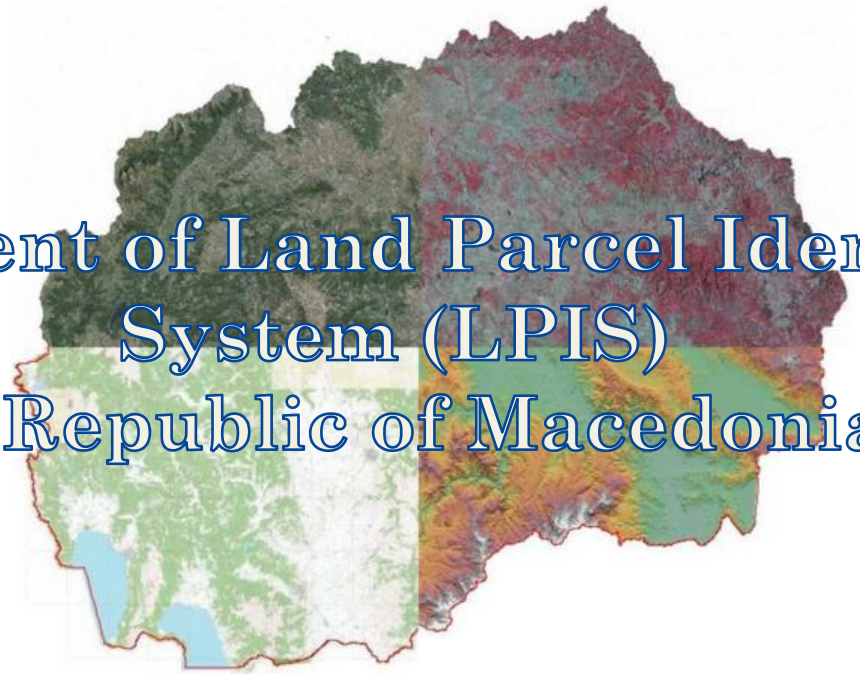
Republic of Macedonia
Ministry of agriculture,
forestry and water economy



Establishment of Land Parcel Identification System (LPIS) in Republic of Macedonia

Misho Manev
LPIS management unit

"LAND ADMINISTRATION AND MANAGEMENT – PRISHTINE 2011"

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II. Organization
III. Preparatory activities
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VI. Challenges

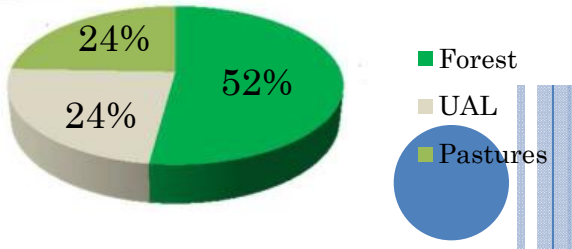
FACTS ABOUT MACEDONIA



Population: 2.046.177
Total area: 25,713 km²
(Hills and mountains 79,0 %)
(Plains 19,1 %)
(Natural lakes 1,9 %)

Agriculture:
Forests: 1.159.600 ha
Utilized agricultural land: 523.185 ha
Pastures: 542.000 ha
Number of individual agricultural holdings: 192.675
Number of registered farmers in Farm register: 102.599
Average farm size: 2.5 – 2.8 ha
Reference parcel: farm block





MACEDONIAN AGRICULTURAL LANDSCAPE



the harvested wheat field



tomatoes



plantation with pepper



strawberry plantation

MACEDONIAN AGRICULTURAL LANDSCAPE



plantation of apples



plantation of vine

MACEDONIAN AGRICULTURAL LANDSCAPE



Agricultural landscape near Mavrovo lake

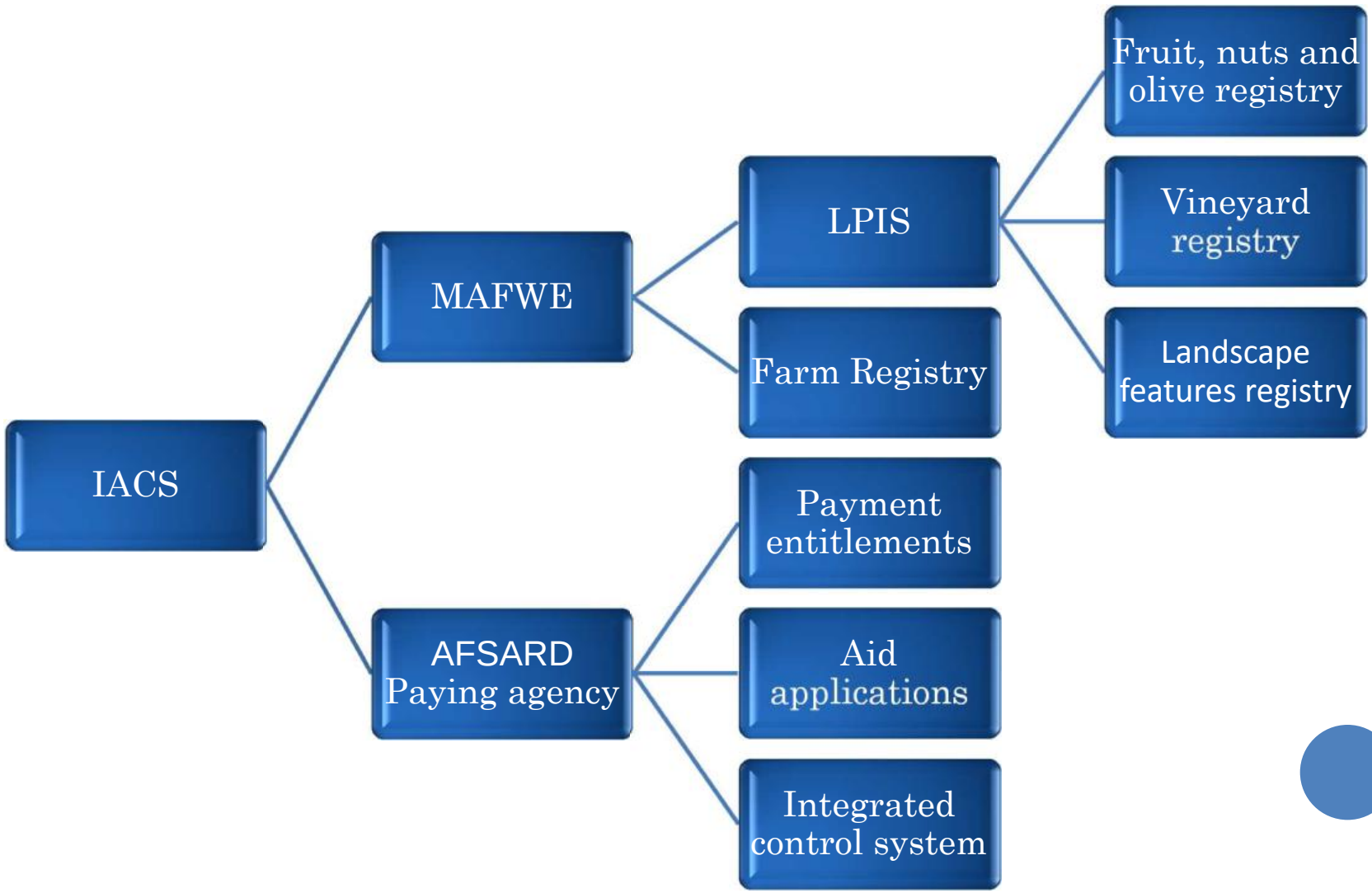
LPIS in Republic of Macedonia

Institutional setup

- Legislation:
  - Law on Agriculture and rural development
    - Rulebook on IACS (in preparation)
    - Rulebook on LPIS (in preparation)
  - Law on establishing the Agency for financial support of agriculture and rural development
- Ministry of Agriculture, Forestry and Water Economy -MAFWE
  - establishment and maintenance of Farm Registry
  - establishment and maintenance of LPIS and related registries
  - central LPIS unit with three full-time employees
  - 90 local offices in 33 cities with 200 people for maintenance of LPIS
- Agency for Financial Support of the Agriculture and Rural Development (National IPARD/Paying Agency)
  - Administration and control of support schemes
    - Department for the control

LPIS in Republic of Macedonia

Organizational structure



LPIS in Republic of Macedonia

Main Features of Macedonian LPIS

- LPIS - multifunctional reference system used for administration and control of area-related subsidies, including the area of cross-compliance, permanent crops and organic farming
- Reference parcel: farmer block
- Computer-assisted photo interpretation - on-screen digitization using digital orthophoto maps
- Link between photointerpreted agricultural land and the farmers shall be established during direct consultations with farmers
- On-going vineyard registration will be merged with the process of LPIS creation
- LPIS reference parcel layer shall hold the following information: parcel geometry, unique ID, area, perimeter, land use category, farmer ID, administrative unit ID, and terrain characteristics

LPIS in Republic of Macedonia

Establishment phase – 2008-2010

- The Government of Republic of Macedonia accepted an action plan for establishment of LPIS in 2008:
  - September 2009 - January 2010, production of digital ortophotomaps, Digital Terrain Model-DTM and initial LPIS data:
    - ✓ pixel size 0.5m corresponding to an orthophotomap in scale 1:5000;
    - ✓ orthophotomap accuracy ± 1.5m of the orthophoto;
    - ✓ DTM height accuracy ± 2m;
    - ✓ 24bit RGB ("true colour") and 24bit colour infrared ("CIR") orthophotomaps;
    - ✓ digitized physical boundaries of agricultural land for the whole territory of the Republic of Macedonia;
    - ✓ photo interpretation and digitization according to permanent boundaries visible and interpretable on digital orthophotomaps;
    - ✓ each polygon of agricultural land is attributed according to its land use type;

LPIS in Republic of Macedonia

Establishment phase – 2008-2010

- The Government of Republic of Macedonia accepted an action plan for establishment of LPIS in 2008:
  - January 2010 – March 2010, quality control of delivered data:
    - ✓Completeness check of delivered data
    - ✓Radiometric quality check of images and orthoimages
    - ✓Geometry check of DTM and orthoimages, including:
      - sample characteristics
      - accuracy requirements, selection and location of Control points (CPs)
      - result calculation
    - ✓Visual checking of the quality of the orthophotos and the DTM

LPIS in Republic of Macedonia

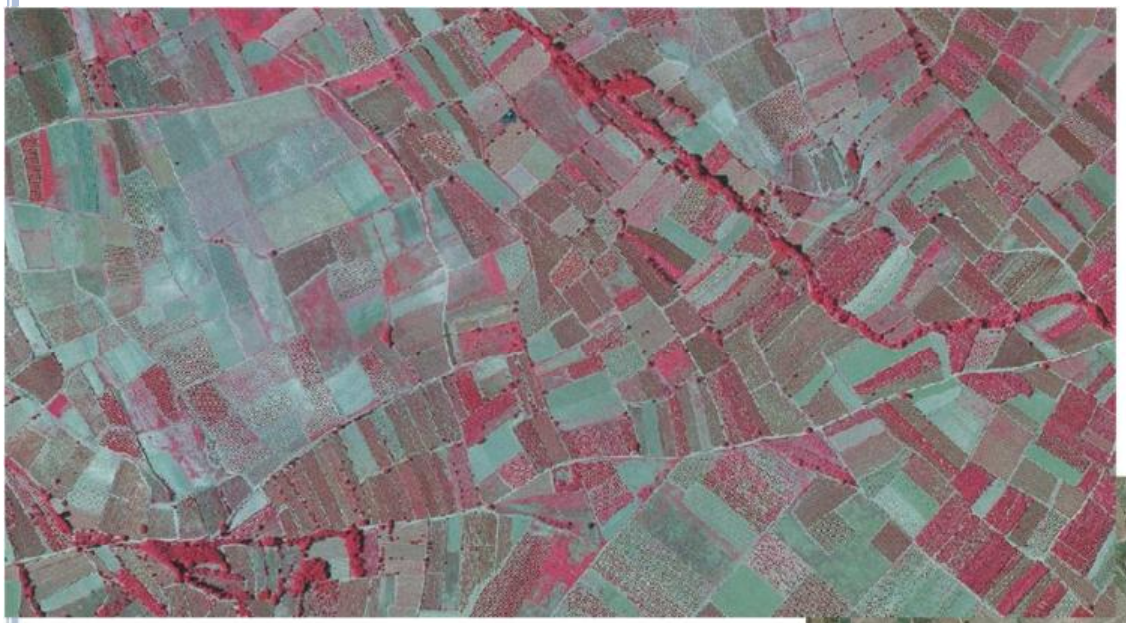
Features of the data produced – digitalization

- Digitization of physical boundaries
- ✓ Performed by selected contractor
- ✓ Digitized all utilized agricultural land excluding highland pastures
- ✓ Average size: 1.4 ha
- ✓ Number of polygons: 374.123

LANDUSE	ha
Arable land	349.881
Green houses	3.513
Meadows	56.578
Vineyards	29.814
Orchards	9.599
Mixed landuse	64.814

LPIS in Republic of Macedonia

Data examples



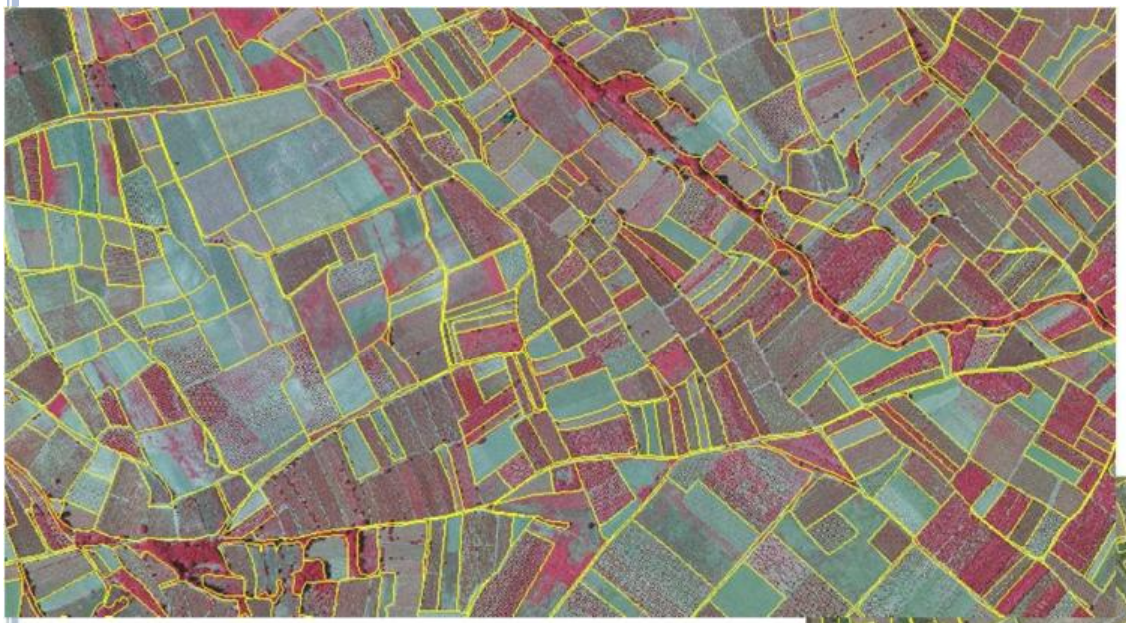
CIR DOP 2009



RGB DOP 2009

LPIS in Republic of Macedonia

Data examples



Initial LPIS 2009 on CIR DOP



Initial LPIS 2009 on RGB DOP

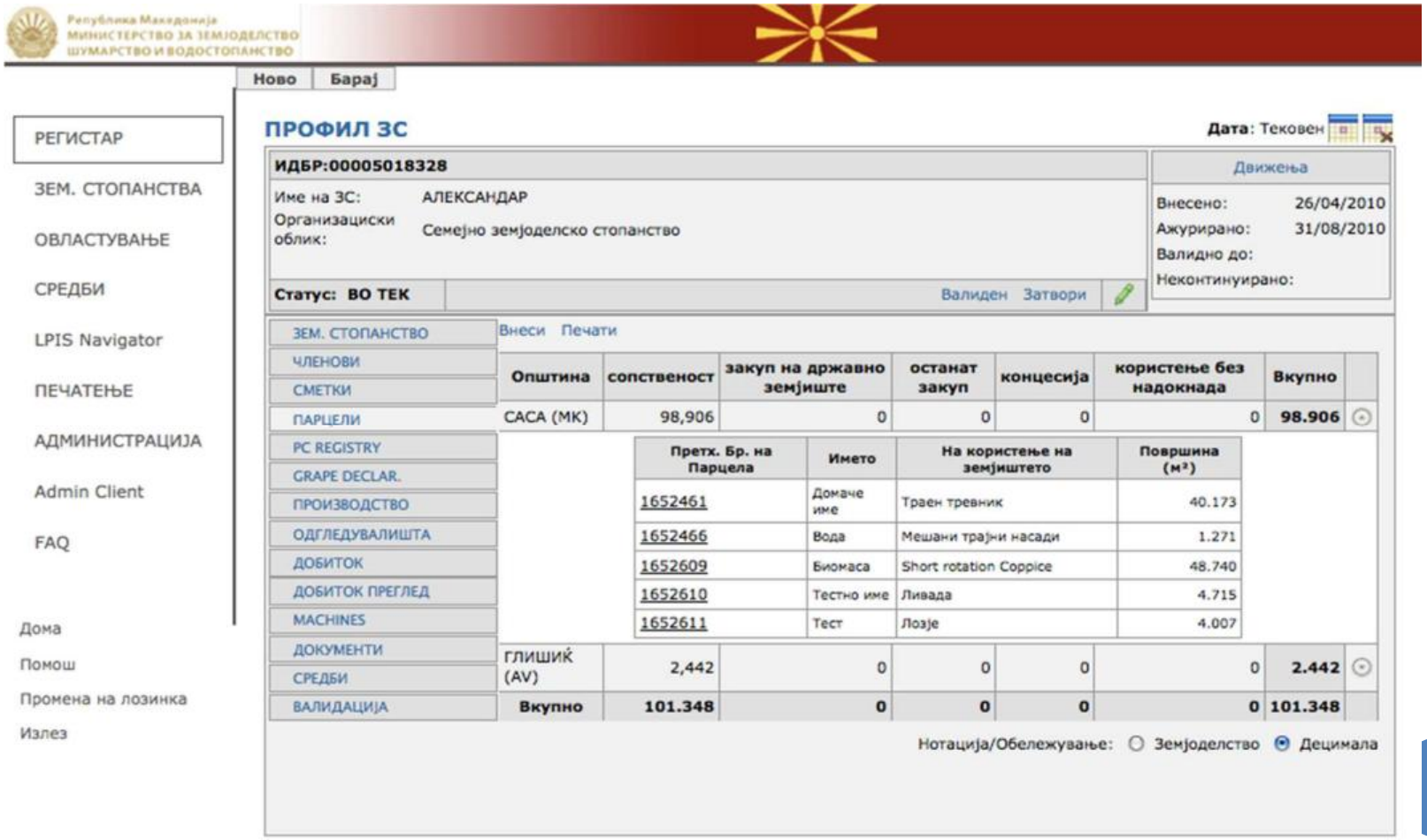
LPIS in Republic of Macedonia

SW Application

- Development of SW Application:
  - ✓ Production stage of the SW will be released at the end of April 2011;
  - ✓ Integration of the Farm Registry and LPIS is already implemented;
  - ✓ Cadastral auxiliary data:
    - ✓ cadastral maps,
    - ✓ topographic maps,
    - ✓ administrative and cadastral units,
    - ✓ 2004 digital orthophoto maps etc.
  - ✓ Permanent crop registers:
    - ✓ vineyard registry,
    - ✓ orchard registry,
    - ✓ nut registry and
    - ✓ olive registry

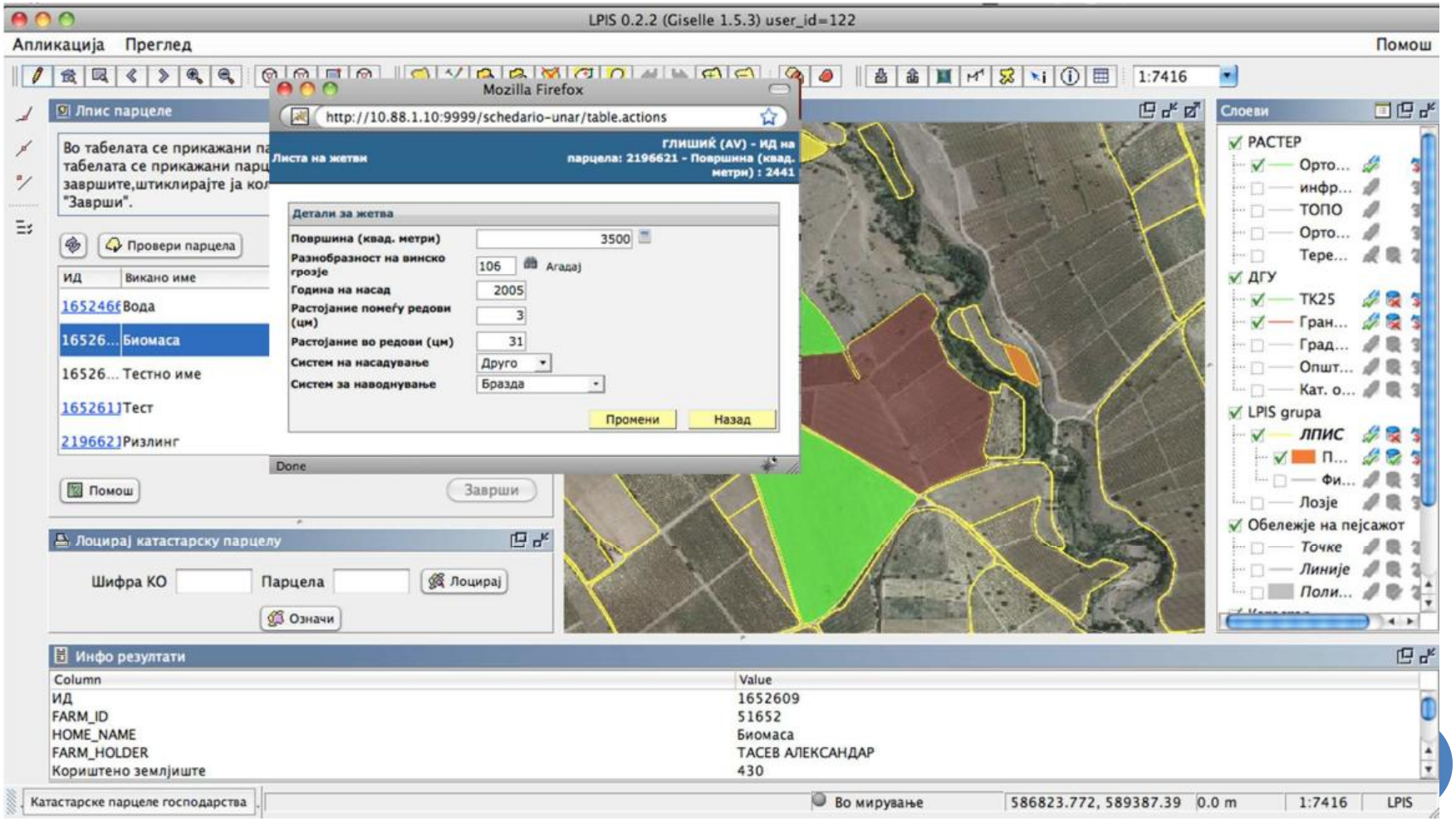
LPIS in Republic of Macedonia

Integration with Farm Registry



LPIS in Republic of Macedonia

Digitization module



LPIS in Republic of Macedonia

LPIS Public viewer



LPIS in Republic of Macedonia

Production phase – current and future activities

- Production phase will take place during 2011 – end 2012
  - ✓ Training and ongoing advice to support capacity building staff of the LPIS/IACS Unit:
    - ✓ Training of 200 operators from 90 local units, placed in 33 different cities;
    - ✓ Help Desk and Quality Control Units;
  - ✓ Media campaign for raising public awareness for LPIS:
    - ✓ 33 informational meetings through the whole territory of the country;
    - ✓ all kinds of promotional material (video, radio, printed);
  - ✓ Legal and internal procedure documents including operating manuals and methodologies:
    - ✓ LPIS rulebook (bylaw)
    - ✓ LPIS operational manual (from basic definitions and rules through photo-interpretation and meetings with farmers)
    - ✓ manuals for using the LPIS SW and Permanent crop registers

LPIS in Republic of Macedonia

Quality Control

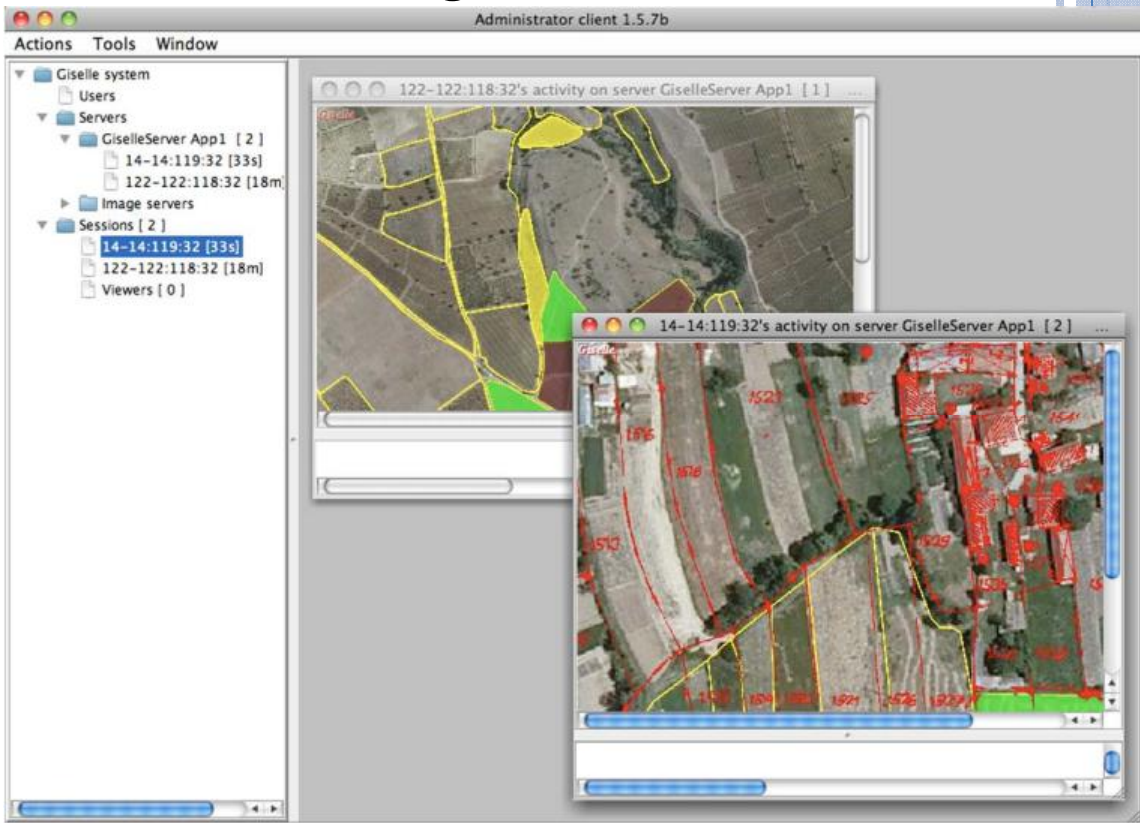
'proactive approach' e.g. build quality into the system on a continuous basis, from conception through implementation and update

- Implementing quality standards during the building of the system
  - Real-time quality checks
    - ✓ Spatial accuracy – no unintentional overlapping is possible
    - ✓ Data consistency
      - ✓ Declared landuse not same as initial LPIS
      - ✓ Non logical data combinations
      - ✓ Area checks within permanent crop registry
      - ✓ …
    - ✓ Prevent user errors at entry level

LPIS in Republic of Macedonia

Quality Control

- Monitoring of consultant's activity
  - ✓ Real-time activity monitoring and support
  - ✓ Support centre is double-checking new user's data



LPIS in Republic of Macedonia

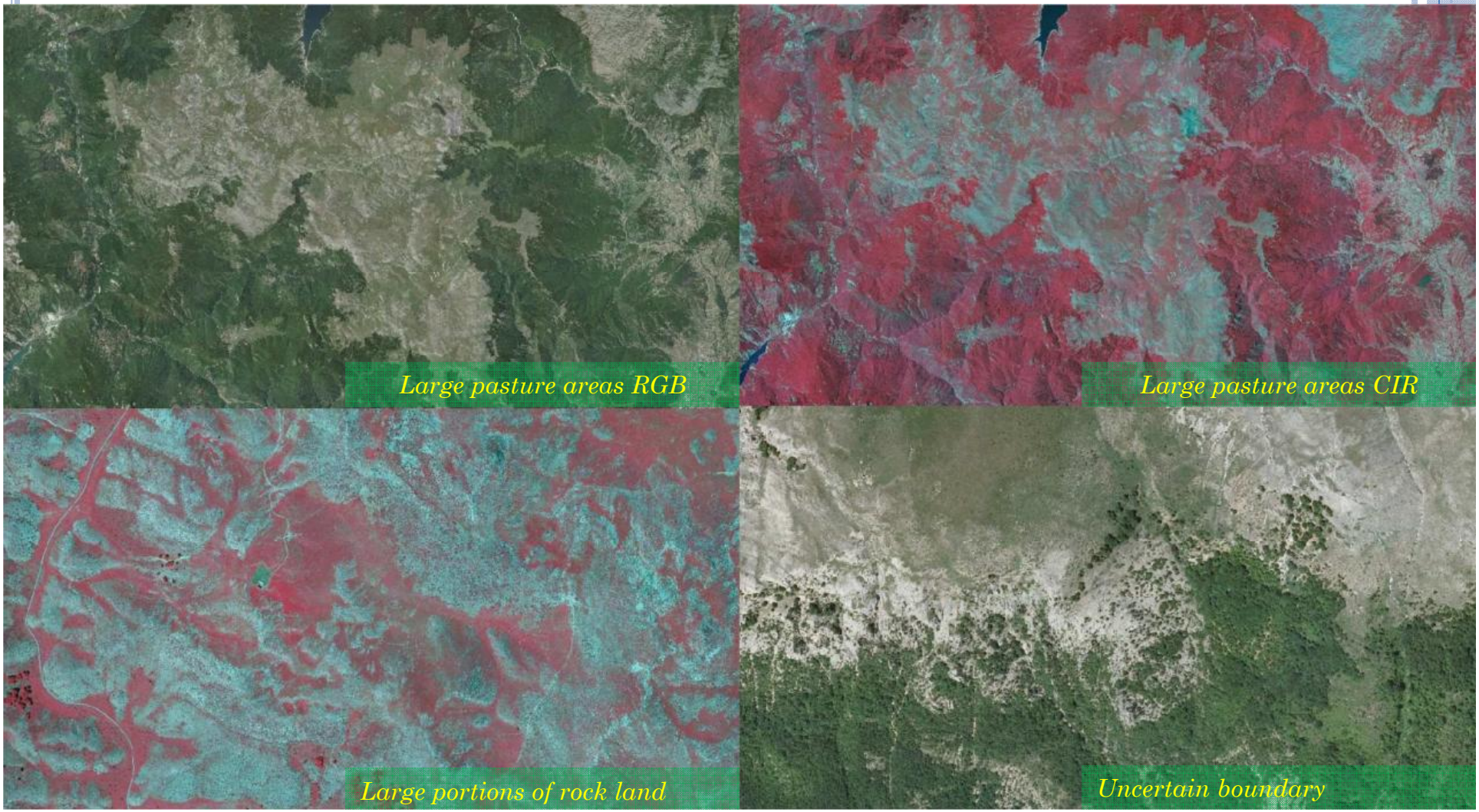
Interoperability

- Required by design
  - ✓Supported by the same infrastructure
    - ✓Farm registry
    - ✓Vineyard, orchard, nut and olive registry
    - ✓Landscape features registry
  - ✓Integration with external systems
    - ✓Web services (Paying agency, Veterinary information system, ...)

LPIS in Republic of Macedonia

Challenges

Mountain pastures near Mavrovo
- Approximately 18.000 ha



LPIS in Republic of Macedonia

Challenges



Mountain area with uncertain boundaries



Mountain area partly covered by grass, shrubs, trees and rocks with uncertain boundaries



Mountain pastures near Popova Šapka



Mountain area with uncertain boundaries of permanent pasture

Republic of Macedonia
Ministry of agriculture,
forestry and water economy



Thank you for your attention!

Misho Manev
LPIS management unit