DETERMINATION OF AGRICULTURAL LAND ABANDONMENT IN SOUTHERN MARMARA SEA REGION, TURKEY

Prof. Dr. Levent GENC
Res. Asst. Melis INALPULAT

*Canakkale Onsekiz Mart University Faculty of Agriculture
Agricultural Sensor and Remote Sensing Lab.
17020, Canakkale / TURKEY

Statement of Purpose

Many human activities forced to change land use land cover from one type to an other.

Southern Marmara region is expected to be the most populated region in Turkey within 50 years

Now, planners need to understand what is the present issues that force LULC to change and also what is the trend of LULC classes

Bursainvest.gov.tr

Statement of Purpose **SOUTHERN MARMARA**

Uyduharita.org

Gezi-rehberi.com

Industry

Tourism
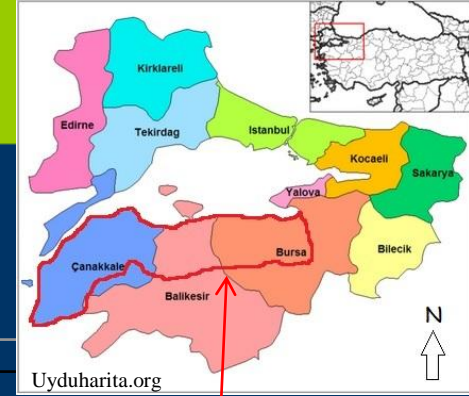
**Agriculture and
Livestock Production**

Radikal.com.

Mining

are the major and expansive economic activities in the region.
Food , sugar, paper, textile, automotive industries are
well developed.
Lignite, boron, and marble quarries are running in present...

Radikal.com.

Karacabeyblogspot.com

ASRESEL

Uyduharita.org

SOUTHERN MARMARA

Area is abounding in streams, lakes, gulf and islands

Most important settlement :   BURSA

Others are;   BALIKESIR
                                                    CANAKKALE

                                                    Bandirma
                                                    Biga
                                                    Erdek
                                                    Gemlik
                                                    Gonen
                                                    Karacabey
                                                    Mustafakemalpasa

ASRESEL

SOUTHERN MARMARA

Uyduharita.org

The area is known to be:

- The most beneficiary region that make good use of agricultural products,
- Have the broadest cultivated area in quantity.
- However, not acknowledged as self-sufficient and imports agricultural products from other regions..

On the other hand :

- internal migration to the area presently continues due to employment potential

Uyduharita.org

SOUTHERN MARMARA

Theaustralian.com.au

Population

Yenibursa.com

Urbanization

NEEDS

Flammerouge.je

Yenibursa.com

LULC CLASSES

Bobiler.org

ASRESEL

GOALS

Uyduharita.org

- Analyzing the impacts of agricultural land change around the fast development rural areas in Southern Marmara Region, Turkey using remote sensing and population data

- Generate Land Use and Land Cover maps to determine current and past (2013 & 2003) LULC status of Southern Marmara Region, Turkey

WHOLE AREA

PILOT AREAS

IN FURTHER STUDY :
Develop expecting LULC scenarios and LULC Maps
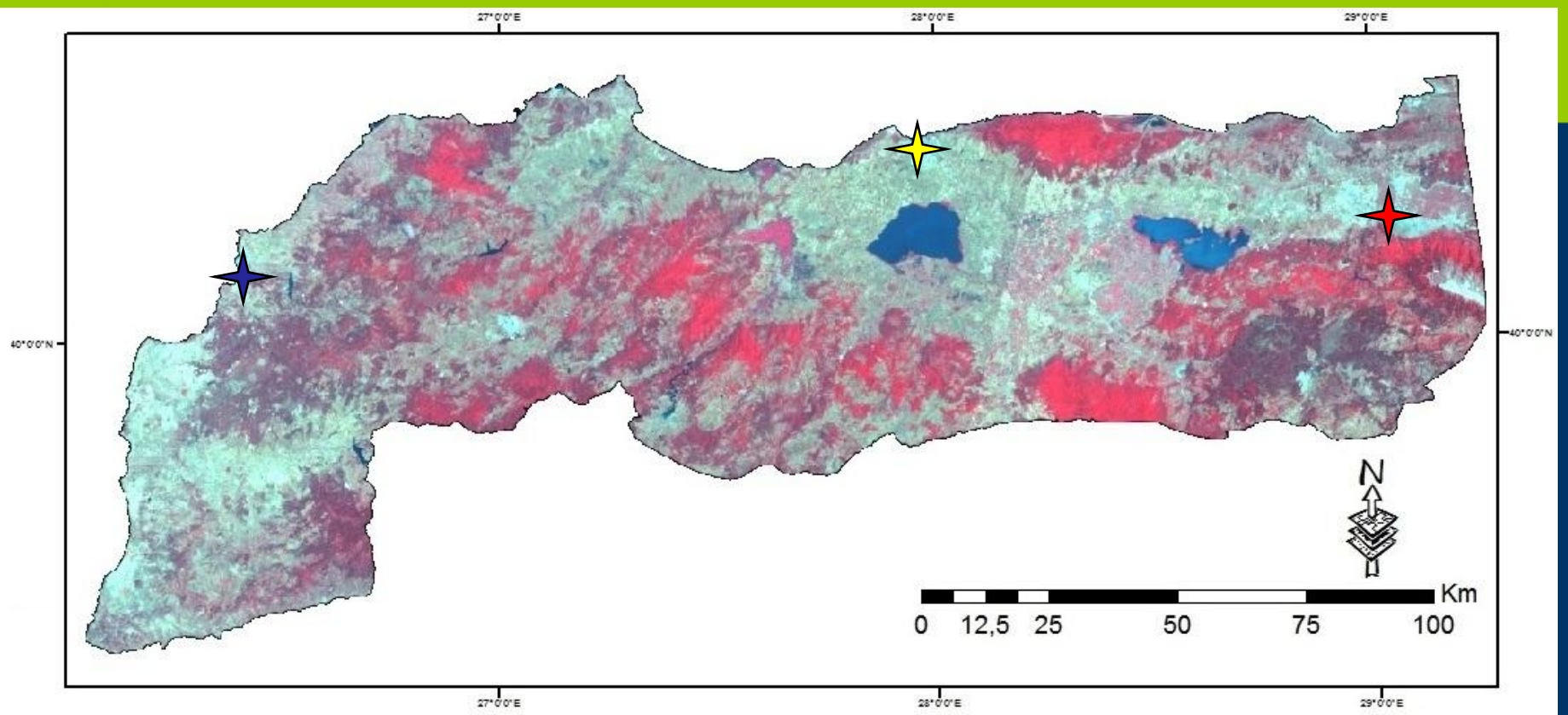
depending on the future population estimates

ASRESEL
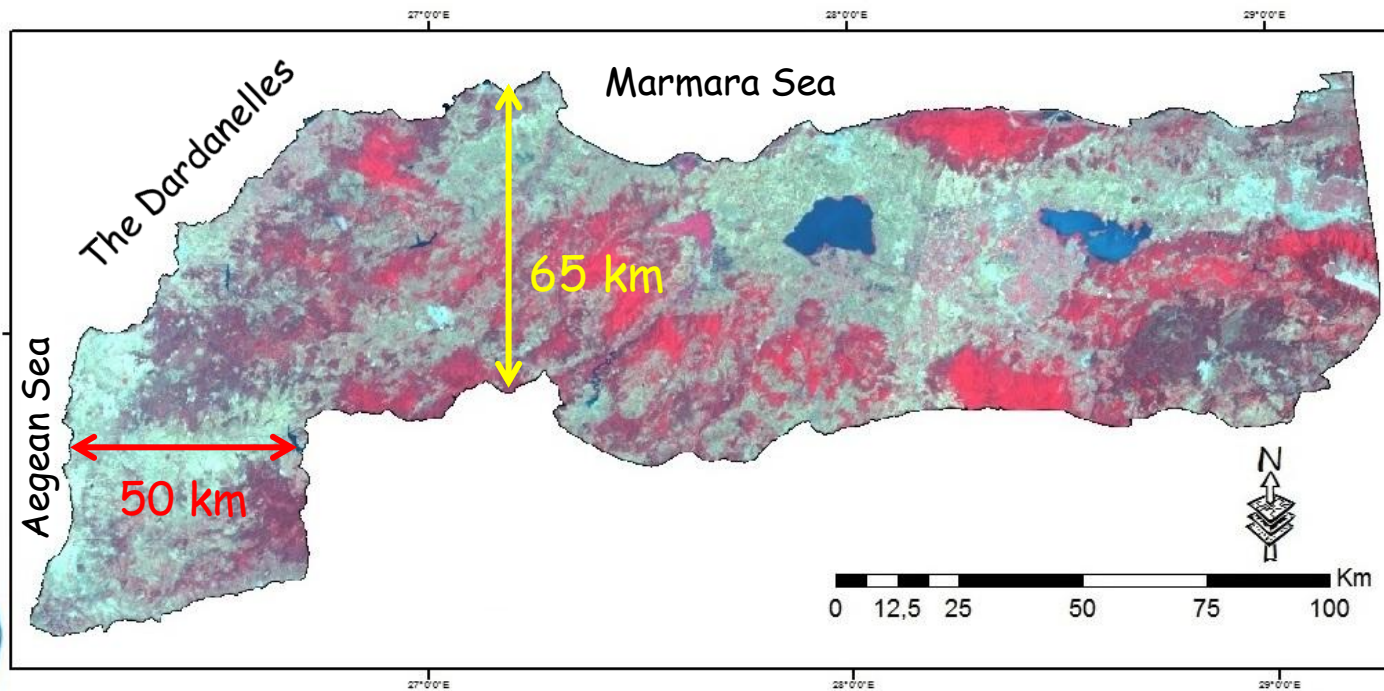
STUDY AREA

The study area has a perimeter of 890 km and covering approximately 16315 km^2 area.

The area were limited based on the distance from the coastals of Marmara and Aegean seas and Dardenelles.
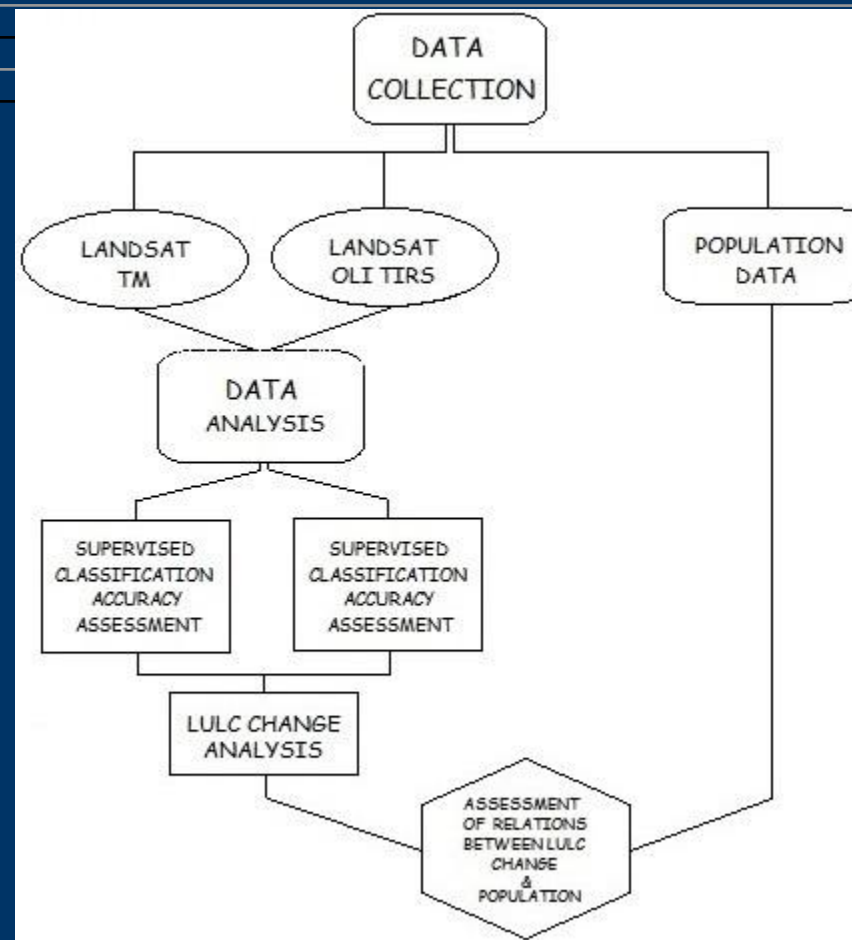
Topographic structure of the region is complex.

ASRESEL

	POPULATION IN 2000	POPULATION IN 2013
CANAKKALE	397518	438387
Bandirma	279681	291844
BURSA	1724778	2301068
TOTAL	2401977	3031299

© 2008.http://tual.comu.edu.tr

ASRESEL

METHODS

METHODS

Data Collection

Landsat TM Images of July, 2003   (USGS)

Landsat OLI TIRS Images of July, 2013   (USGS)

Population statistics of 2000 & 2013   (TUIK)

Image Classification

Supervised classification method (maximum likelihood algorithm) was applied

Area was classified into 5 main LULC classes:
- Forest
- Residential area & Bare Soil
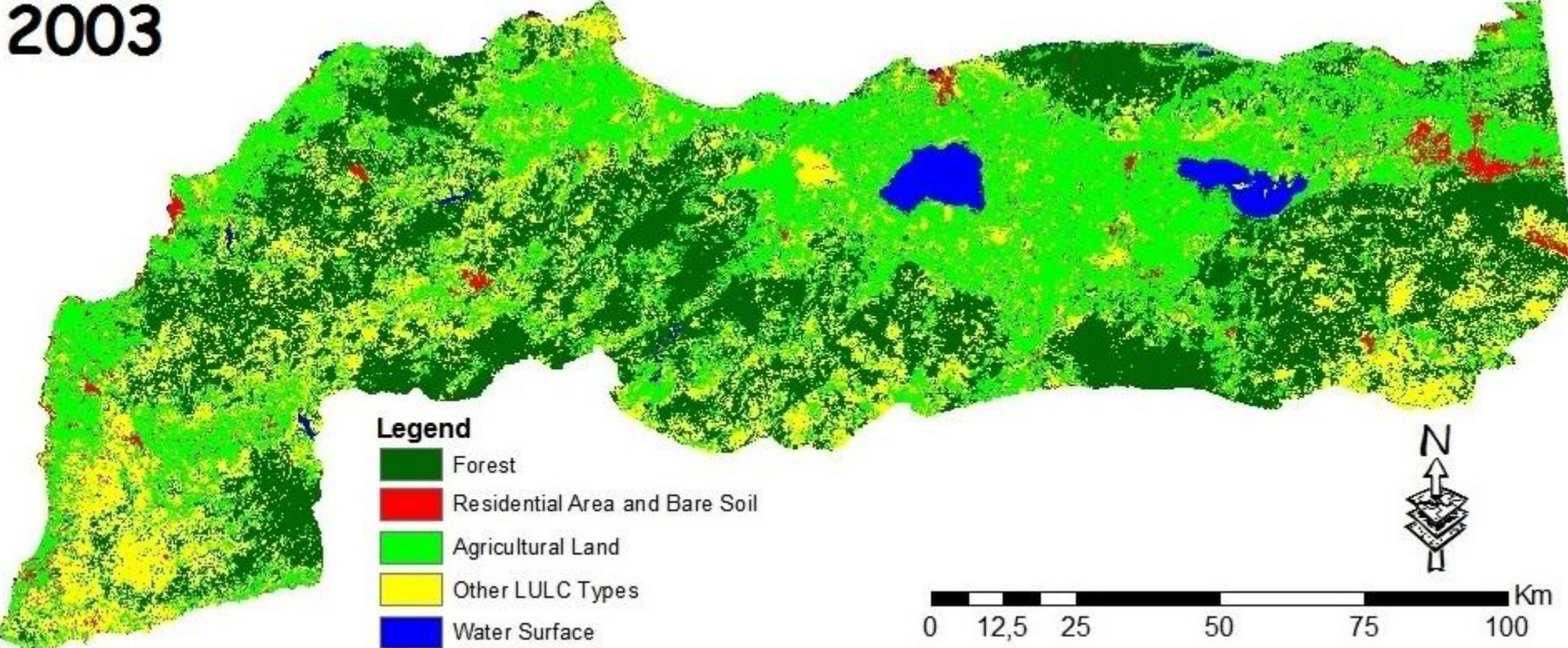- Agricultural Land
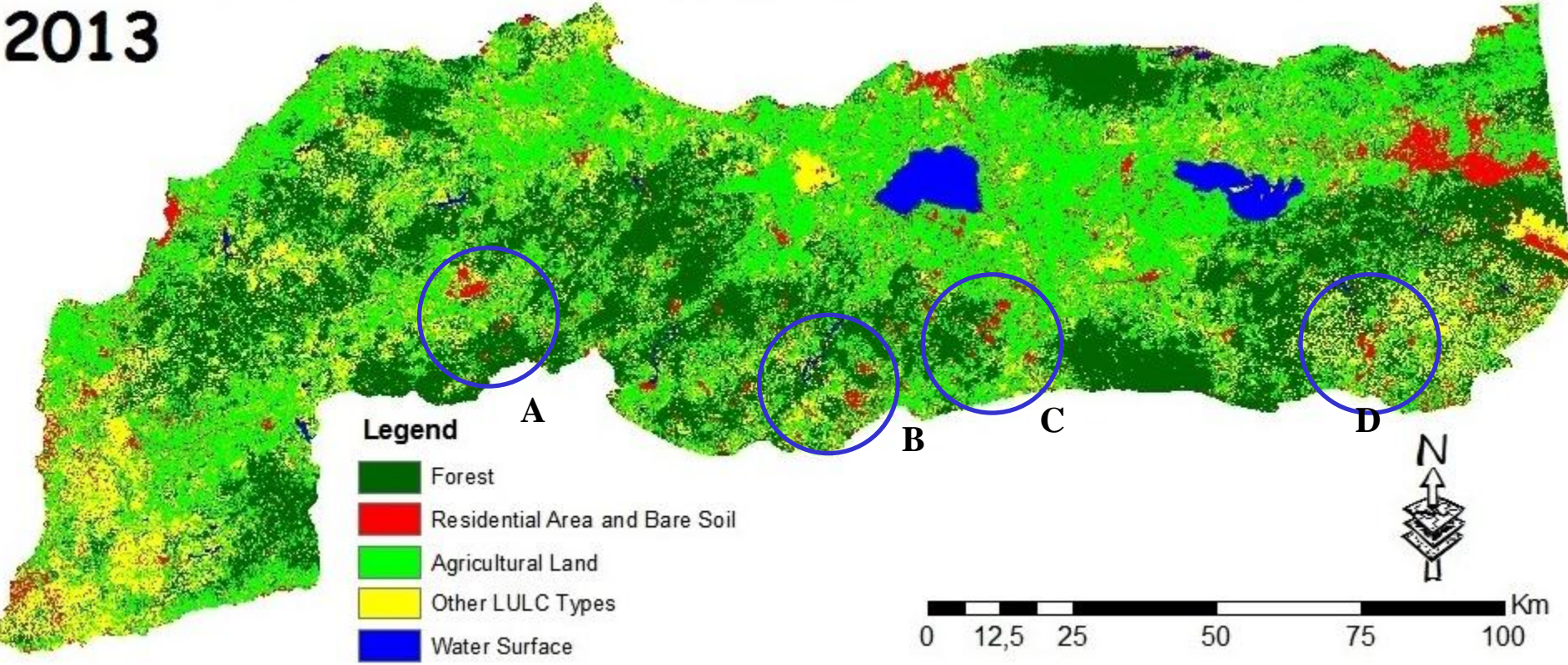- Other
- Water Surface

METHODS

Change Analysis

Amounts of transforms from one LULC Class to another are determined.

2003

Legend
- Forest
- Residential Area and Bare Soil
- Agricultural Land
- Other LULC Types
- Water Surface

CLASSES	AREA (ha)
Forest	579718
Residential Area and Bare Soil	39820.2
Agriculture	554973.3
Other	430516.3
Water Surfaces	33137.2

2013

Legend
- ■ Forest
- ■ Residential Area and Bare Soil
- ■ Agricultural Land
- ■ Other LULC Types
- ■ Water Surface

CLASSES	AREA (ha)
Forest	509530
Residential Area and Bare Soil	135040
Agriculture	663593
Other	290825
Water Surfaces	34650.5
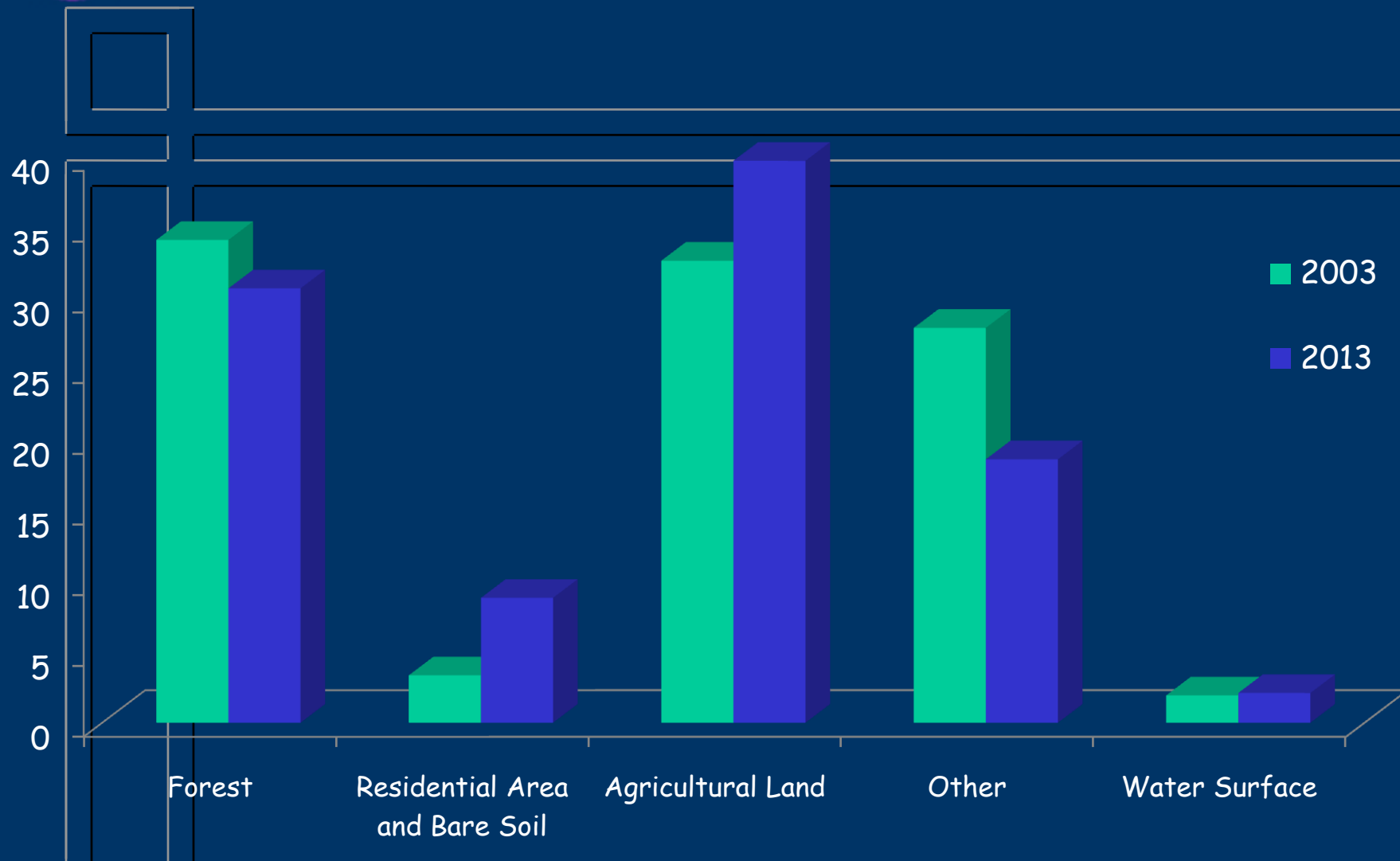
2013

| Area-Based Transformation Between Classes From 2003 to 2013		Forest		Residential Area & Bare Soil		Agricultural Land		Other		Water Surface	
		ha	%	ha	%	ha	%	ha	%	ha	%
2003	**Forest**	449206	77.6	12323.9	2.1	73883.2	12.8	42111.6	7.3	1020.7	0.2
	Residential Area & Bare Soil	526.05	1.3	25741	6.8	7563.3	19.1	5677.3	14.3	166.2	0.4
	Agricultural Land	20214.4	3.7	59257.8	10.7	400296	72.3	71749.8	13.0	2356	0.43
	Other	39525.4	9.2	35926.4	8.4	181733	42.3	171268	39.9	1141.4	0.3
	Water Surface	55.3	0.2	1790	5.6	116.7	0.4	16.7	0.1	29966.1	93.8

LULCC around Residential Areas

Change Analysis for Canakkale City Center

Total area:
8456.282 ha
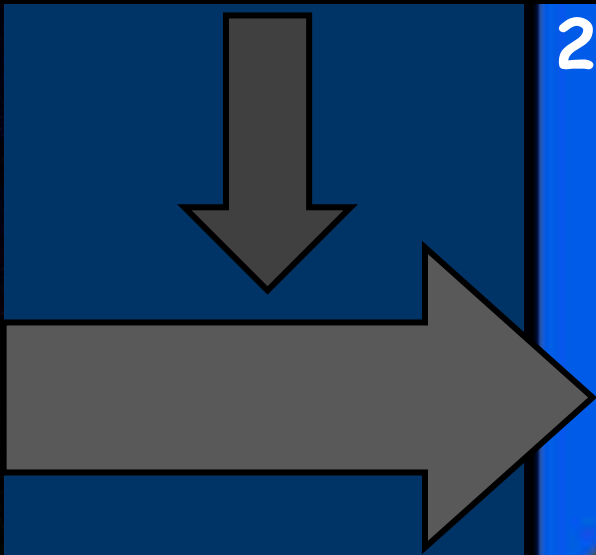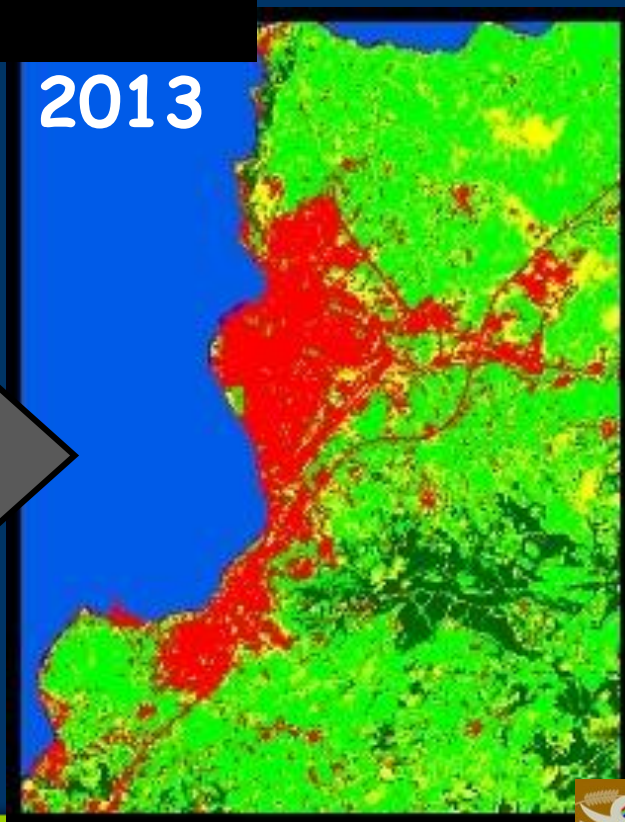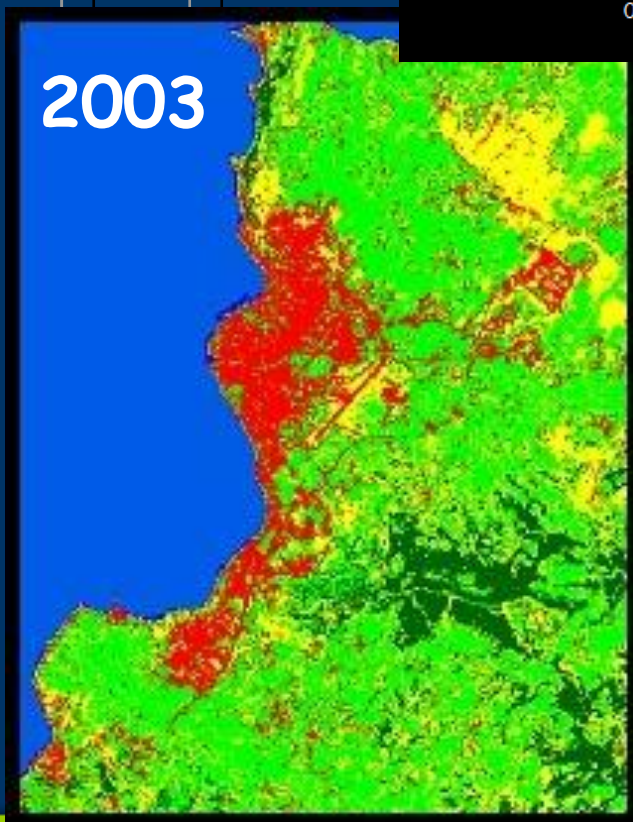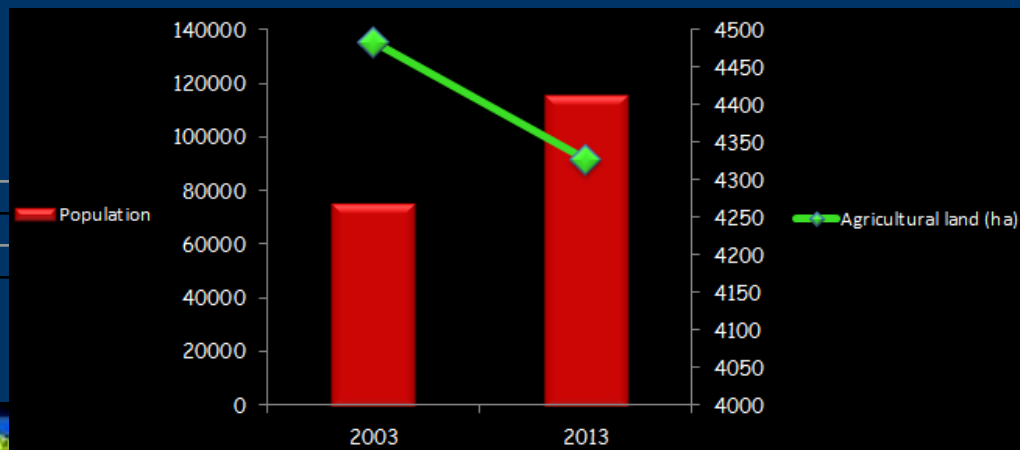
2003

2013

CANAKKALE
PROVINCE

CANAKKALE PROVINCE

Classes	2003	2013
F	882.5	428.0
R & BS	1752.6	2595.2
A	4487.8	4327.3
O	1252.8	1050.8
WS	170.6	55.0

Bandırma - Seaport
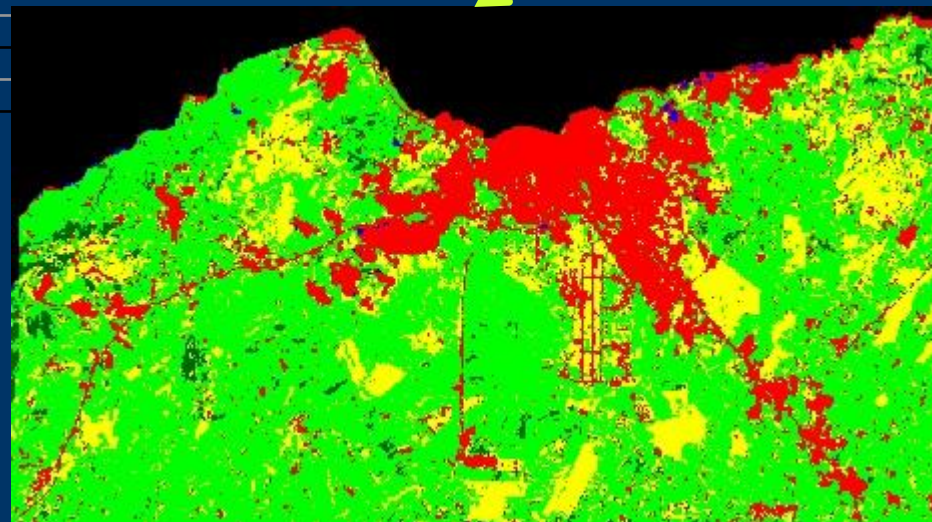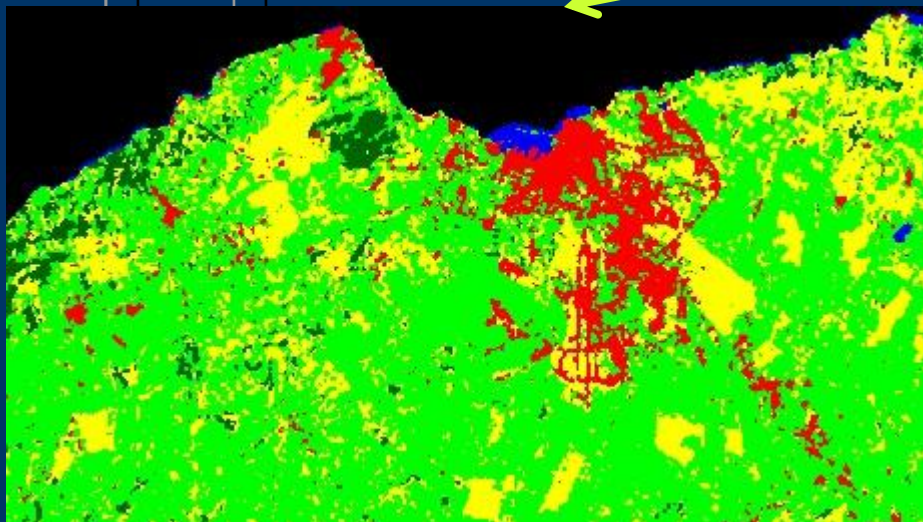
Total area: 40514.79 ha
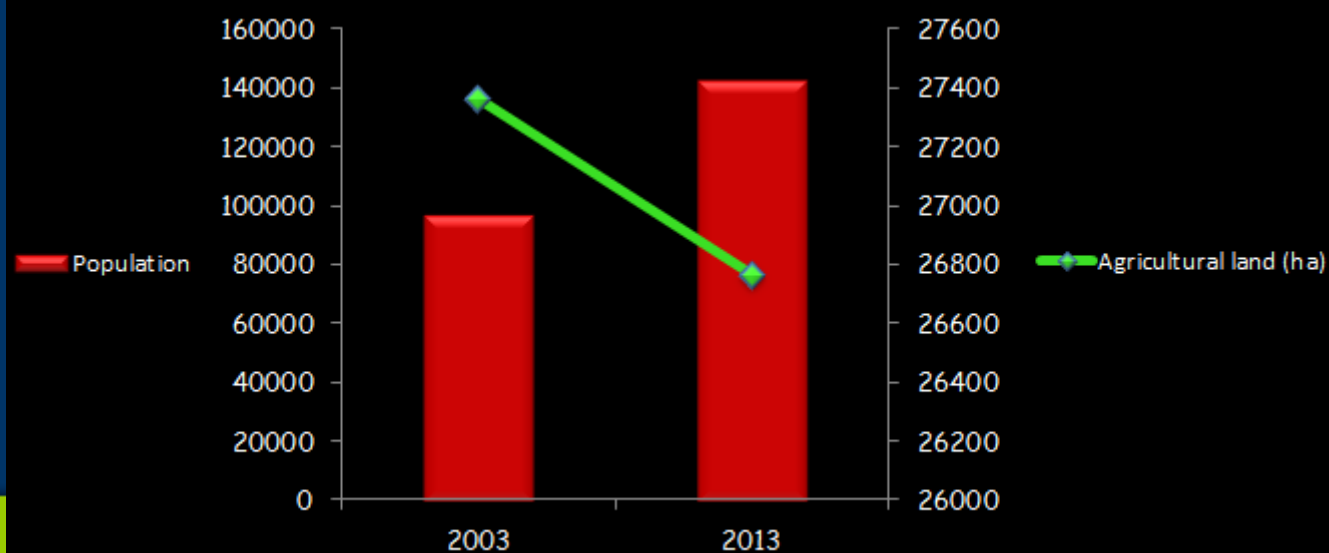
Bandırma - Seaport

Classes	2003	2013
F	2002.7	1448.5
R & BS	2094.6	5379.1
A	27364.8	26767
O	8292.6	6252.2
WS	760.1	558.7

ASRESEL

Population Change

BURSA PROVINCE

2000000

1800000

1600000

1400000

1200000

1000000

800000

600000

400000

200000

0

2000

2013

2003

tual.comu.edu.tr

ASRESEL

Classes	2003	2013
F	13848.9	12421.1
R & BS	9937.8	20269.8
A	40755.9	36900
O	12343.6	7158.8
WS	92.34	110.9

BURSA PROVINCE

CONCLUSIONS

- When whole study area is considered,
  - agricultural lands increased while areas of «Forest», and «Other» LULC classes decreased..
- A part of decreased areas transformed to agricultural fields to meet the demand for growing population's alimentation needs.
- The reminder part of the decrease shifted to residential areas respecting the expanding industries, urbanization or devastated due to mining and etc. activities.
- Because appropriate areas for agriculture is limited, it is anticipated that the increase in agricultural lands will reach to an end
- If expension in urban areas continues, agricultural lands will be under threat of urbanization

ASRESEL

CONCLUSIONS

Investigation of pilot areas seperately, supported that assumption :

Agricultural lands close to urban centres have shifted to residential areas in all pilot areas including settlement centers of Canakkale, Bandirma and Bursa.

CONCLUSIONS
&
PLANS FORFUTURE STUDIES

The study could lead to a spatio-temporal assessment of land use/land cover change occured in the major LULC Classes the Southern Marmara Region within a short period.

Expectation : Study would go a long way in
- Determine the LULC changes between 1975-2014
- Facilitate better policies for urban planning strategies
- Develop valid models for estimatiing future LULC status in different periods (10, 20, and 50 years) depending on population-LULC relations throughout 1975-2014 years

Agricultural Sensor and Remote Sensing Laboratory (ASRESEL)

MAIZE

Water stress detection using ASD Agrispec

Photosynthesis measurement

Chlorophyll reading EGGPLANT

Project:
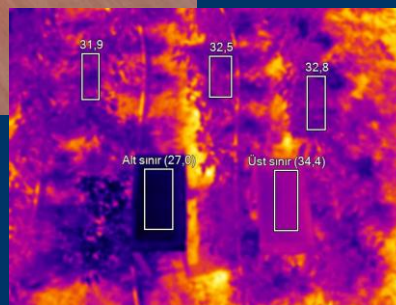Determination of
Agriculture
Potantial of Canakkale
Province

Education Seminars
2006
2008
2010
2014

Thermal camera

Spectroradiometer measurement in Kapija
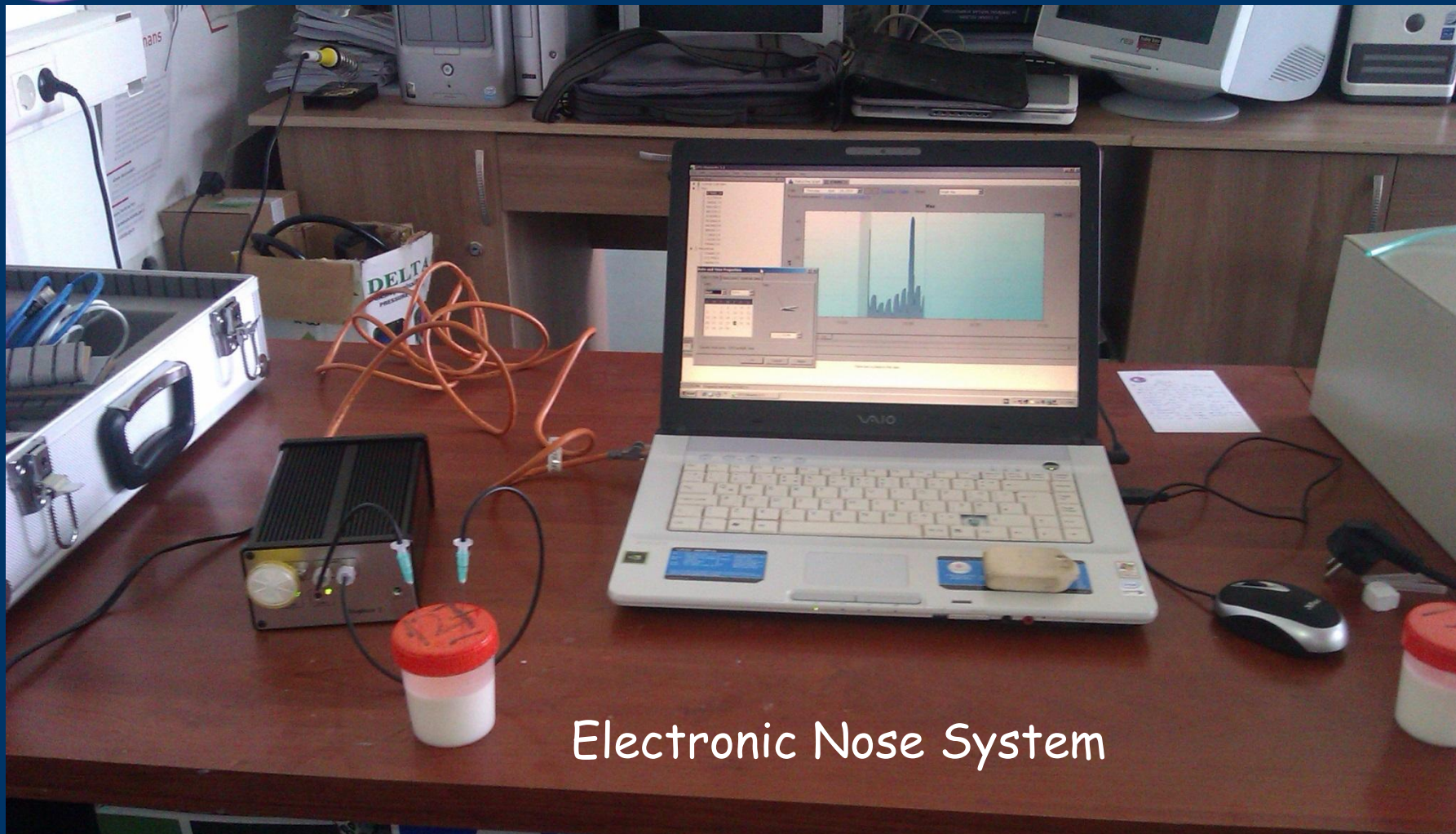
Electronic Nose System

STUDY GROUP

ASRESEL FACILITIES

Portable Photosynthesis System   (Licor LI-6400)
Spectroradiometer   (ASD HH : 325-1075 nm)
Plant Canopy Analyser   (Licor LAI-2000)
Thermal Camera   (Fluke TI-27)
Chlorophyllmeter   (Fieldscout CM1000)
Camera & Spectral Filters   (Nikon D200 DSLR)

Electronic Nose System   (DiagNose-II)

5 Desktop Computers
7 Laptops
2 Printers
1 Plotter
5 GPS

…And other laboratory equipments…

THANK YOU