

# **CHANGES IN USE OF ARABLE LAND IN SLOVAKIA AND BULGARIA DURING THE TRANSFORMATION PERIOD**

**M. Kopecká, R. Vatseva, J. Feranec, J. Oľahel',  
A. Stoimenov, J. Nováček, V. Dimitrov**

# Introduction

- Transition of agriculture in the post-communist countries → simplification of agri-diversity (Kopecká in print, Varoščák 2009) and arable land abandonment (Zaušková, 2009, Sviček and Gasiorková 2009)
- disappearance of the traditional landscape mosaic and eventual reduction of biodiversity

# Introduction

## ■ Regional or national level

- real estate cadastre
- Land Parcel Identification System (LPIS)
- statistical data (land use, sown area...)

## ■ All-European level:

- CORINE Land Cover (CLC) data layers (1990, 2000 and 2006 ) – assessment of short- term landscape changes (Feranec et al. 2007)

## Aim:

- characterize changes in agricultural use of arable land in the territory of two post-communist countries - **Slovakia and Bulgaria** - using statistical data and CLC data layers, particularly by means of percentages represented by the areas of selected changes in agricultural landscape per 1 km<sup>2</sup>

## Methodology

- CLC project - compatible land cover database of Europe at scale 1:100 000 - information on the physiognomic characteristics of Earth surface objects approximately in the early 1990s, 2000 and 2006
- Two data layers of LC changes - **CLC 1990-2000** and **CLC 2000-2006** = input data

# Methodology

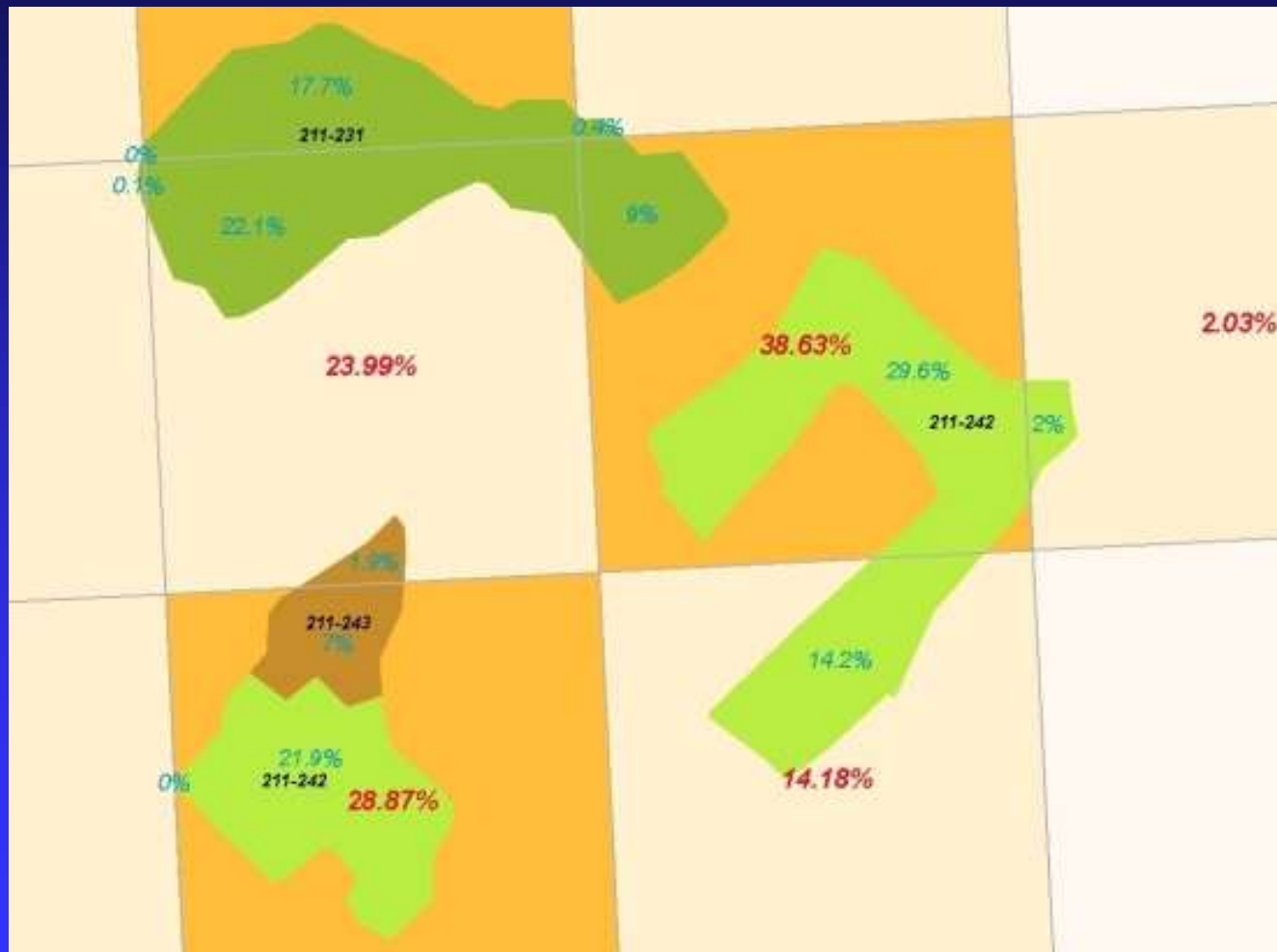
## ■ Types of changes

- ◆ Conversion of **211 into 231** (arable land into grassland – meadows, pastures, unused farmland in initial stages of natural succession )
- ◆ Conversion of **211 into 242** (arable land into mosaic of fields, meadows and permanent cultures, in Slovakia also conversion of parcels with large-scale farmed arable land into parts with small-block arable land )
- ◆ Conversion of **211 into 243** (arable land into land cover principally occupied by agriculture -abandonment of land in mountain and sub-mountain regions followed by natural succession )

# Methodology

- Rate of changes (methodology presented by Feranec and Nováček, 2007) - percentages of changed areas per 1 km<sup>2</sup>
  - 5 intervals:
    - ◆ Less than 0.1 % – no change
    - ◆ 0.1 % - 25 % – small change
    - ◆ 25.1 % - 50 % – considerable change
    - ◆ 50.1% - 75% - significant change
    - ◆ 75.1% - 100 % – complete change
- kilometre grid makes it possible to represent frequency of changes that do not exceed 5 ha in a comfortable map scale

# Methodology





# Areas of Interest

## ■ Slovakia

- ◆ total area of agricultural land - 2,428,889 ha
- ◆ considerably fragmented ownership (12.5 mill. of registered plots with average area of 0.45 ha and average share of 12-15 co-owners is now subject of the registry under restoration )
- ◆ markedly lowest share of land farmed by their owners in EU (less than 10%)
- ◆ greatest share in the area of the farmed land corresponds to agricultural cooperatives

## Areas of Interest

### ■ Bulgaria

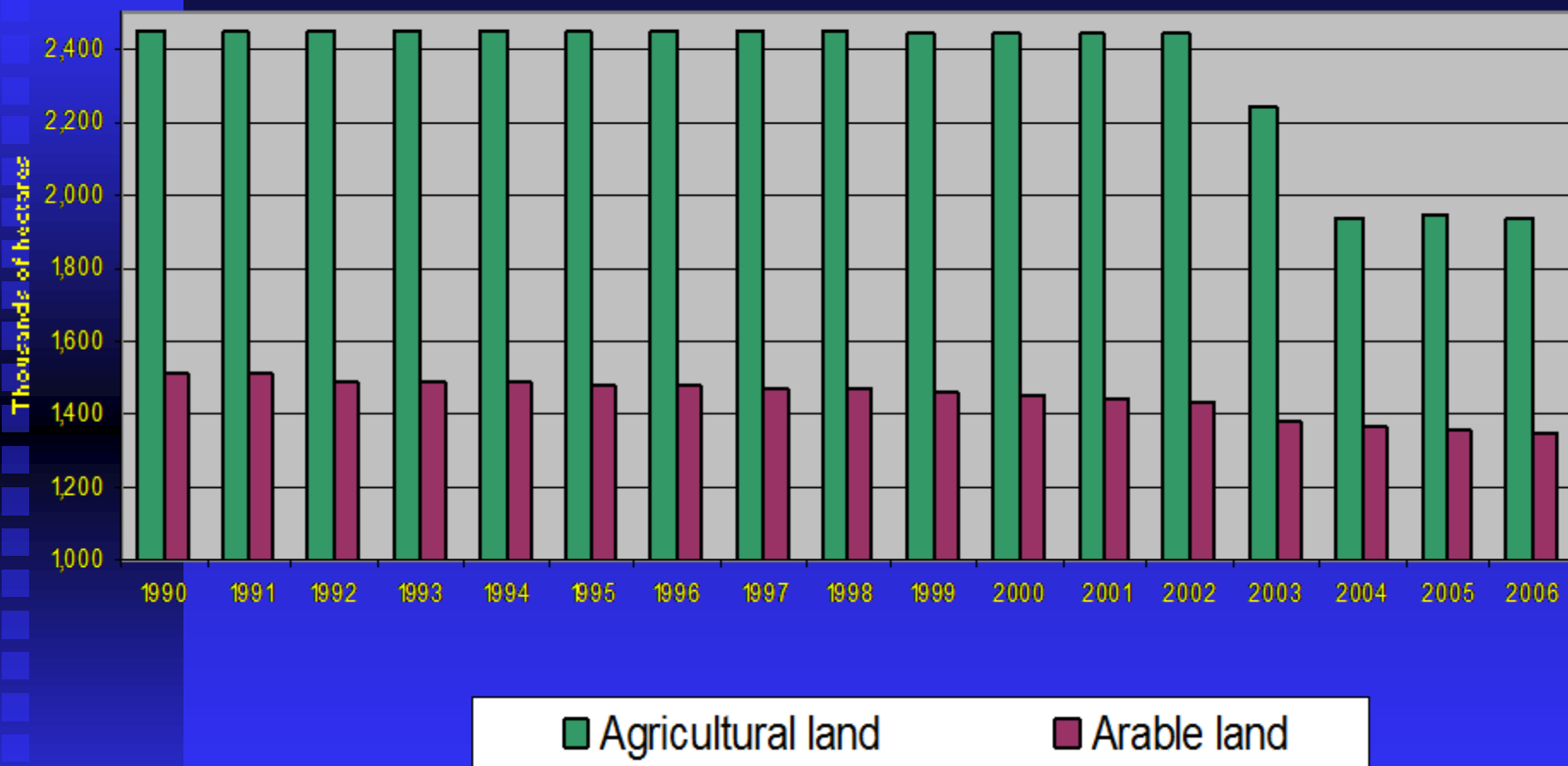
- ◆ together with Slovakia and Czech republic) has the lowest share of own-farmed utilized agricultural area in Europe
- ◆ high share of family farm labour force
- ◆ high share of agricultural holders over 65 years old

## Areas of Interest

Indicator	Unit	Slovakia	Bulgaria	EU - 27
Utilized agricultural area - UAA	1000 ha	1879	2729	156,039
Share of utilized area own-farmed	%	9.1	17	53.6
Number of agric. holdings	1000	68.6	534.6	14478.6
Share of legal entities in number of holdings	%	11.9	2.7	3.2
Share of UAA farmed by legal entities	%	81.8	56.0	25.5
Total farm labour force	1000 AWU	99	625	12714
Family farm labour force	% of total	43	87	81
Agric. holdes over 65 years old	1000	20	222	4722

Source: Eurostat 2009

## Area of agricultural and arable land in 1990-2006



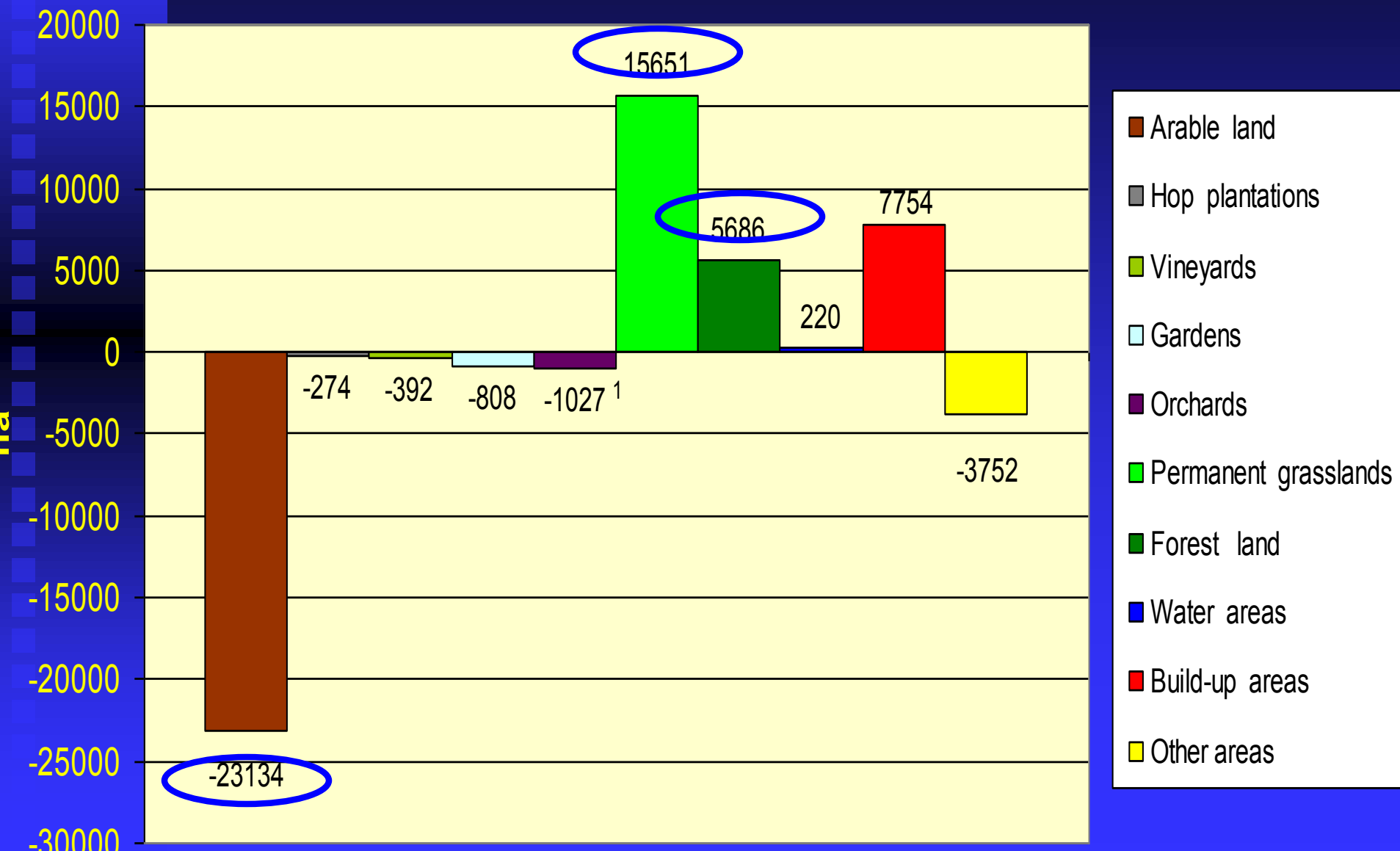
Agricultural land: **1990** - 2, 448.000 ha

**2006** –1,939.000 ha (79,2%)

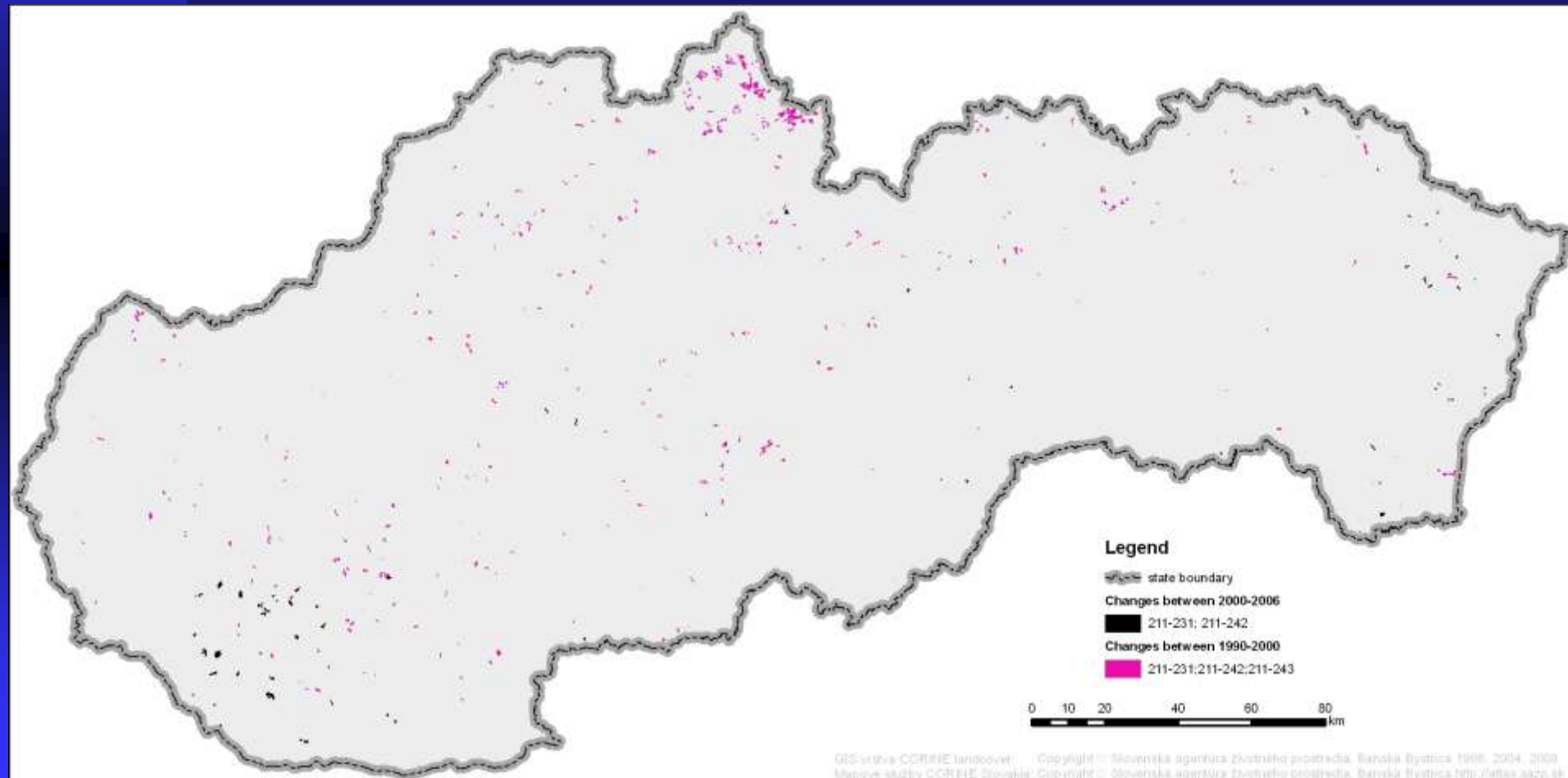
Arable land: **1990** - 1,509.000 ha

**2006** – 1,344.000 ha (89,7%)

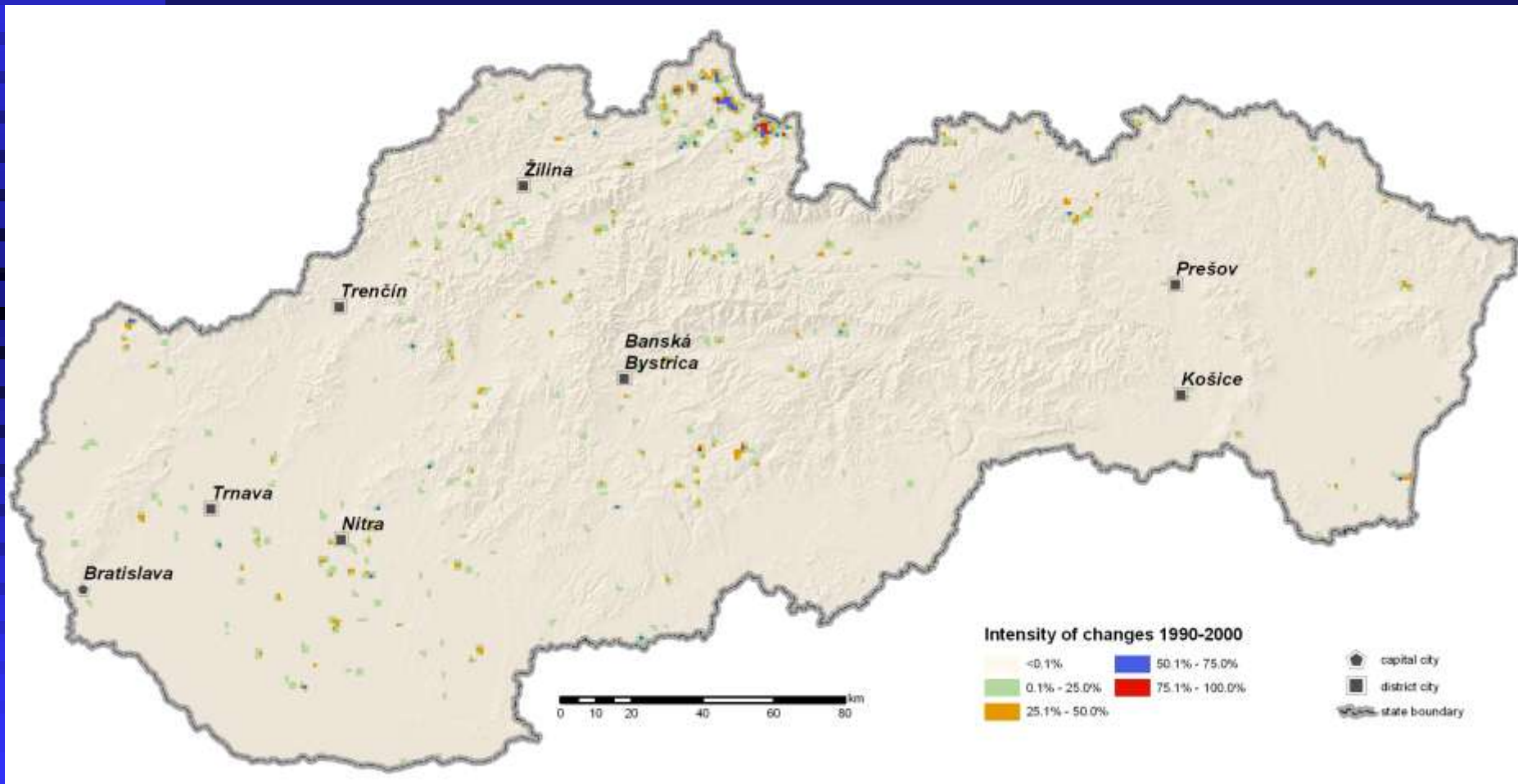
# Land use changes in the period 1. 1. 2001 - 31. 12. 2006



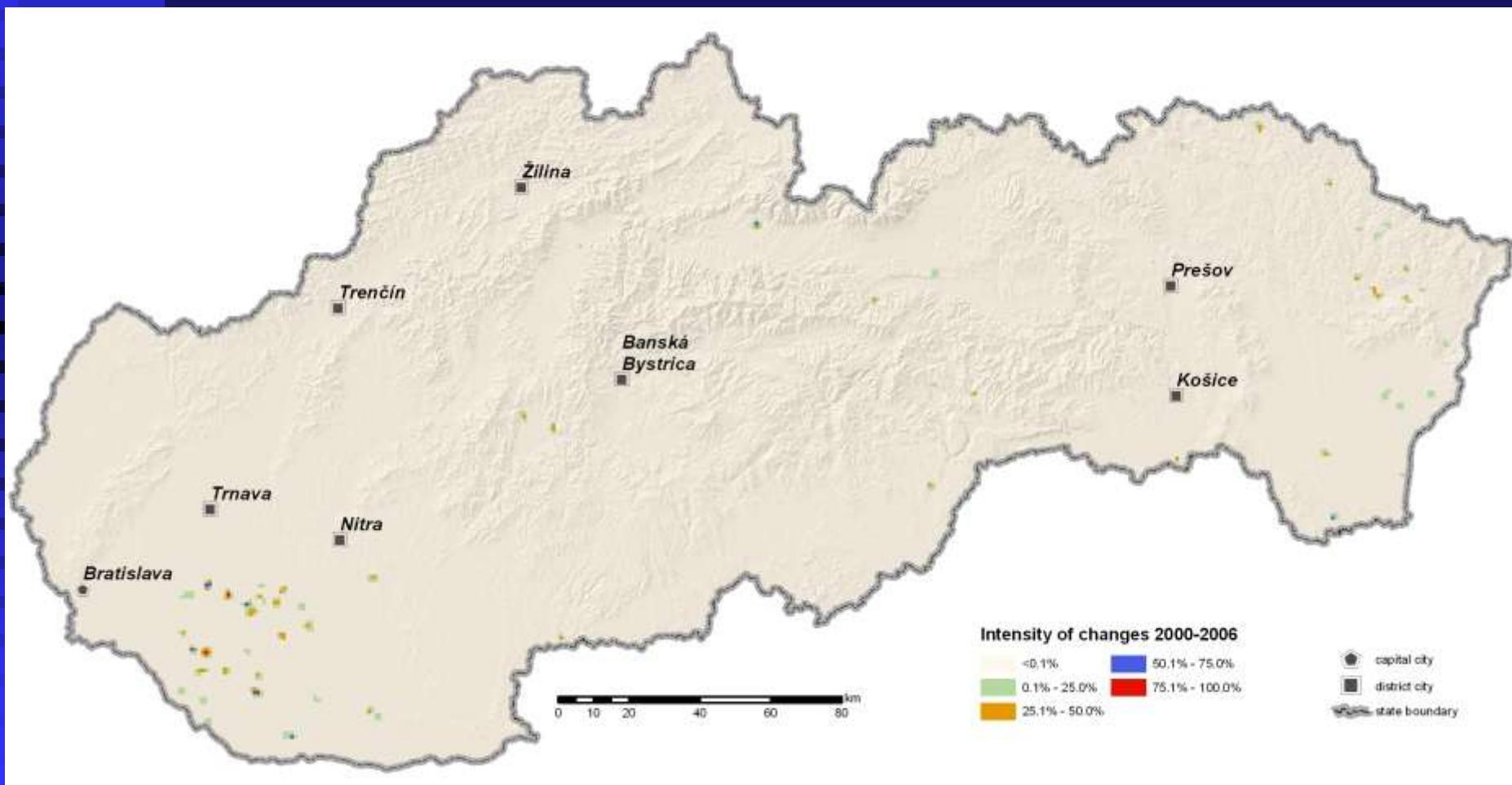
Change of arable land into permanent grassland, mosaic of fields and meadows, and agricultural land with the dominant share of natural vegetation in the SR in 1990 – 2006



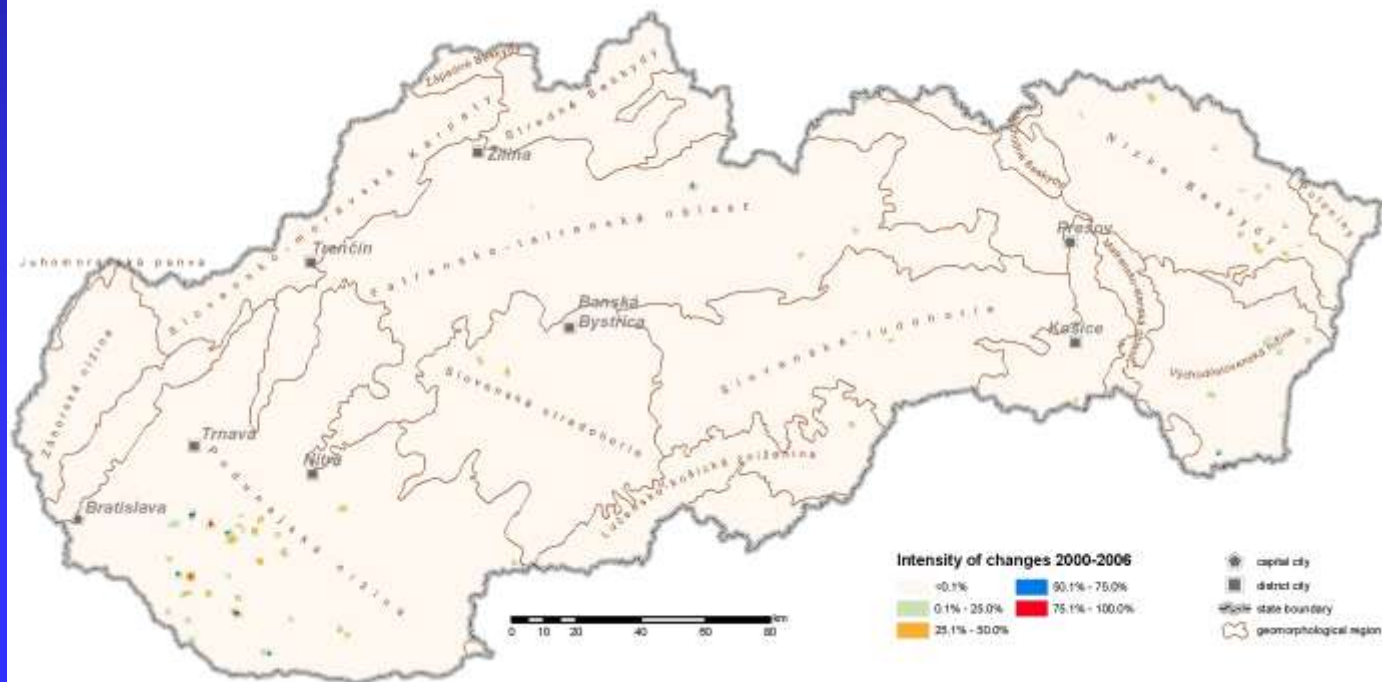
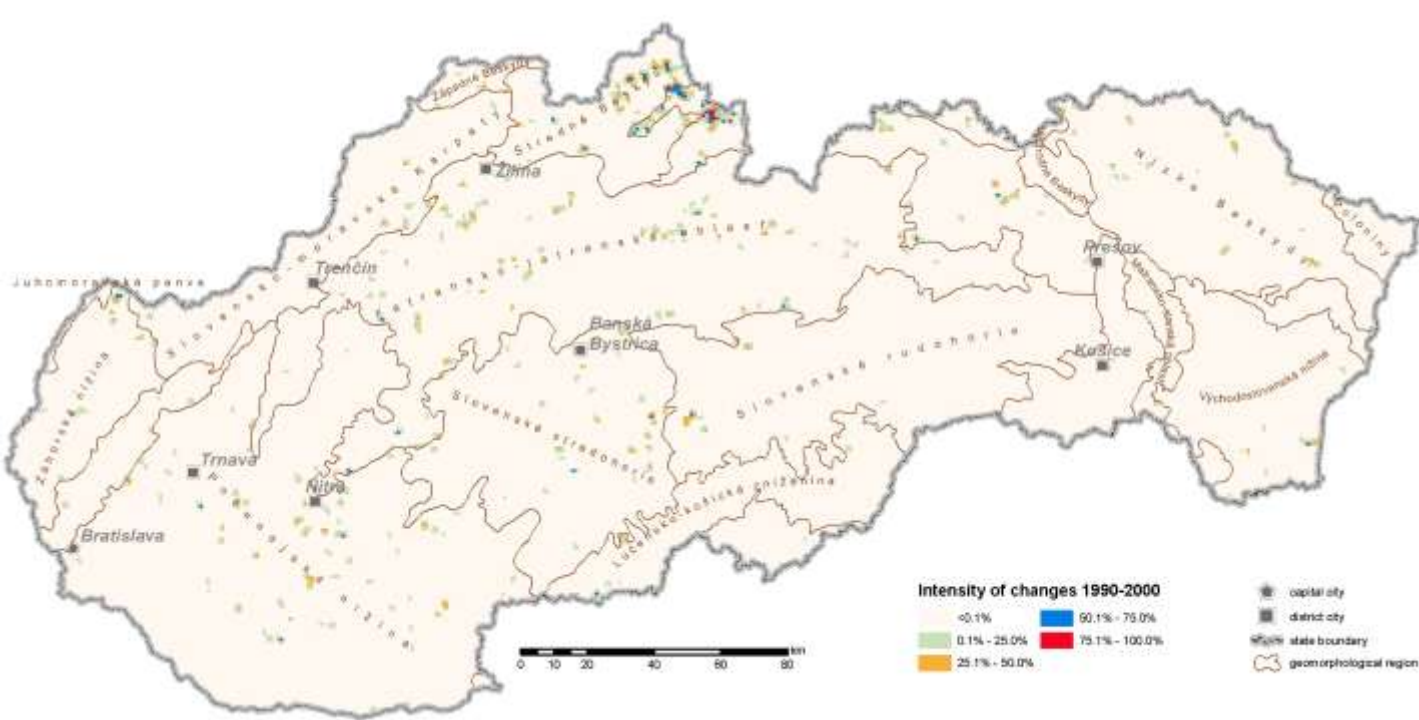
## Change rate of arable land in the period of 1990 – 2000



## Change rate of arable land in the period of 2000 - 2006



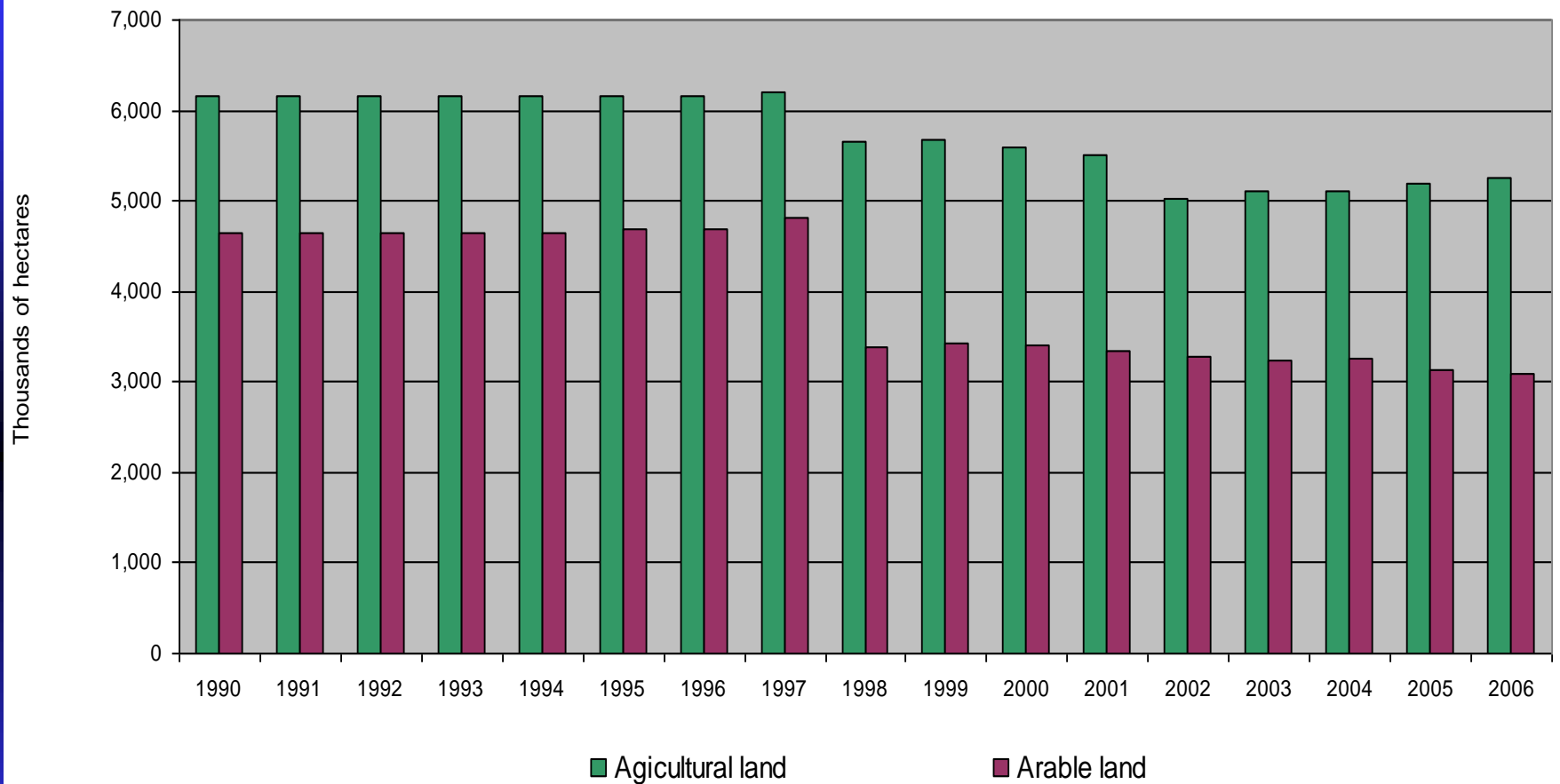




# Podunajská nížina lowland



# Bulgaria



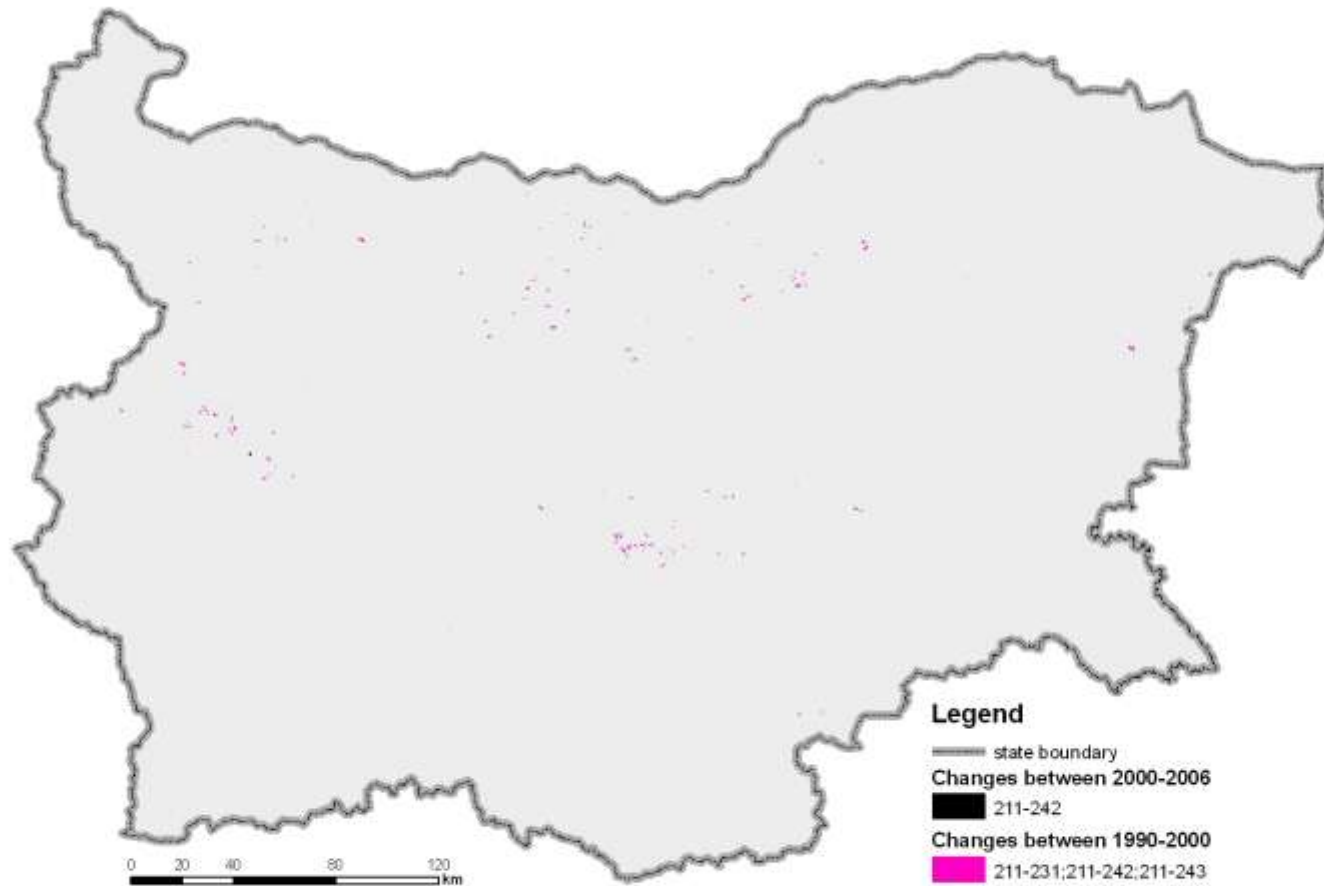
Agricultural land: **1990** - 6,159,000 ha

Arable land: **1990** - 4,643,000 ha

**2006** - 5,265,000 ha (85,5%)

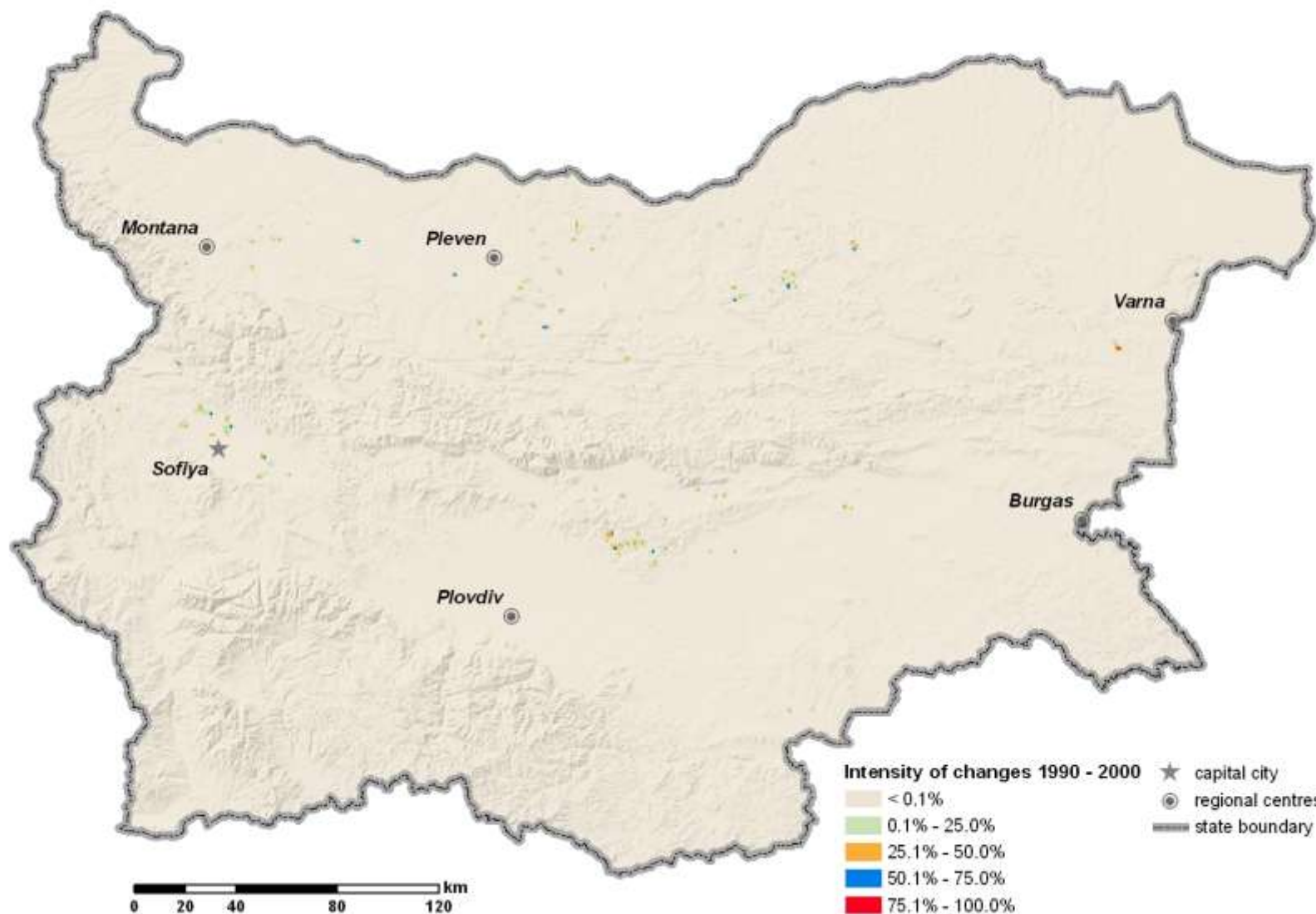
**2006** - 3,090,000 ha (66,6%)

Change of arable land into permanent grassland, mosaic of fields and meadows, and agricultural land with the dominant share of natural vegetation in the SR in 1990 – 2006



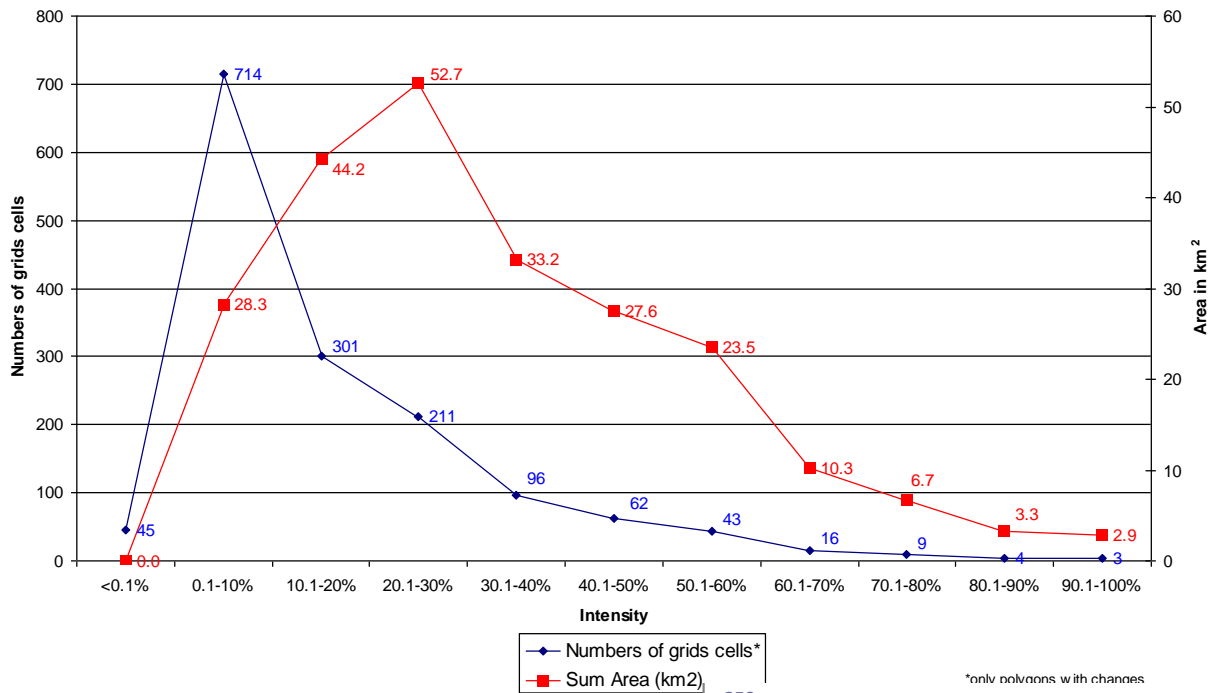


# Change rate of arable land in the period of 1990 – 2000

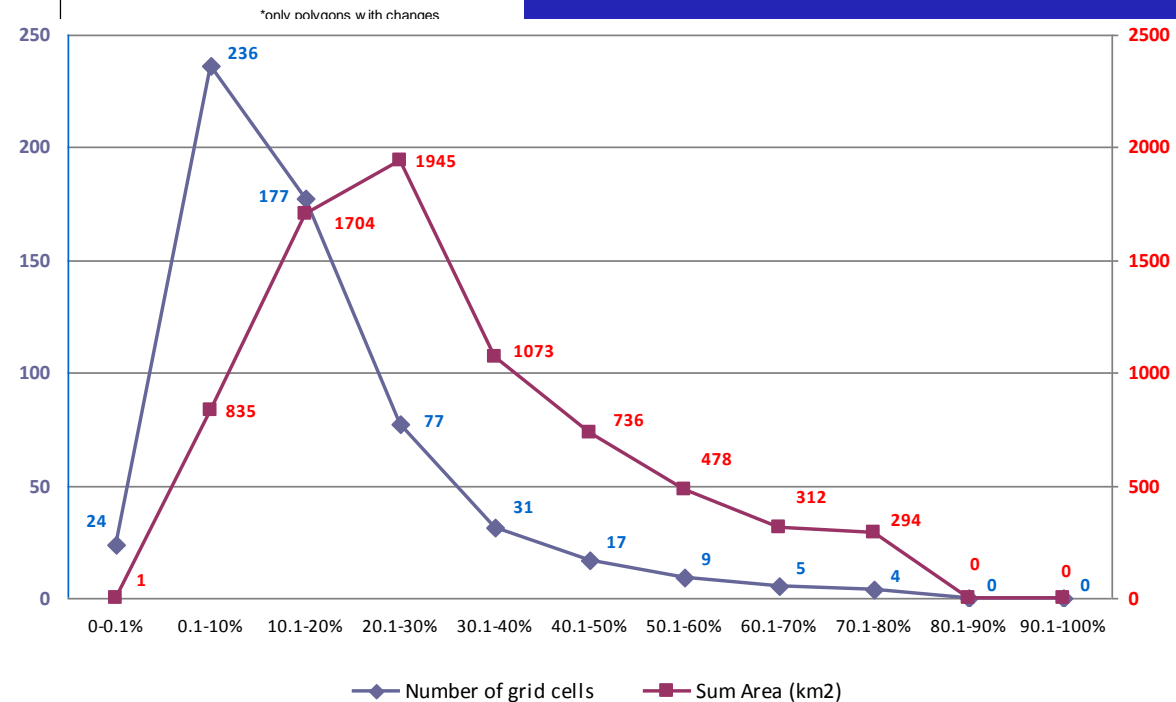


# Slovakia

# Bulgaria

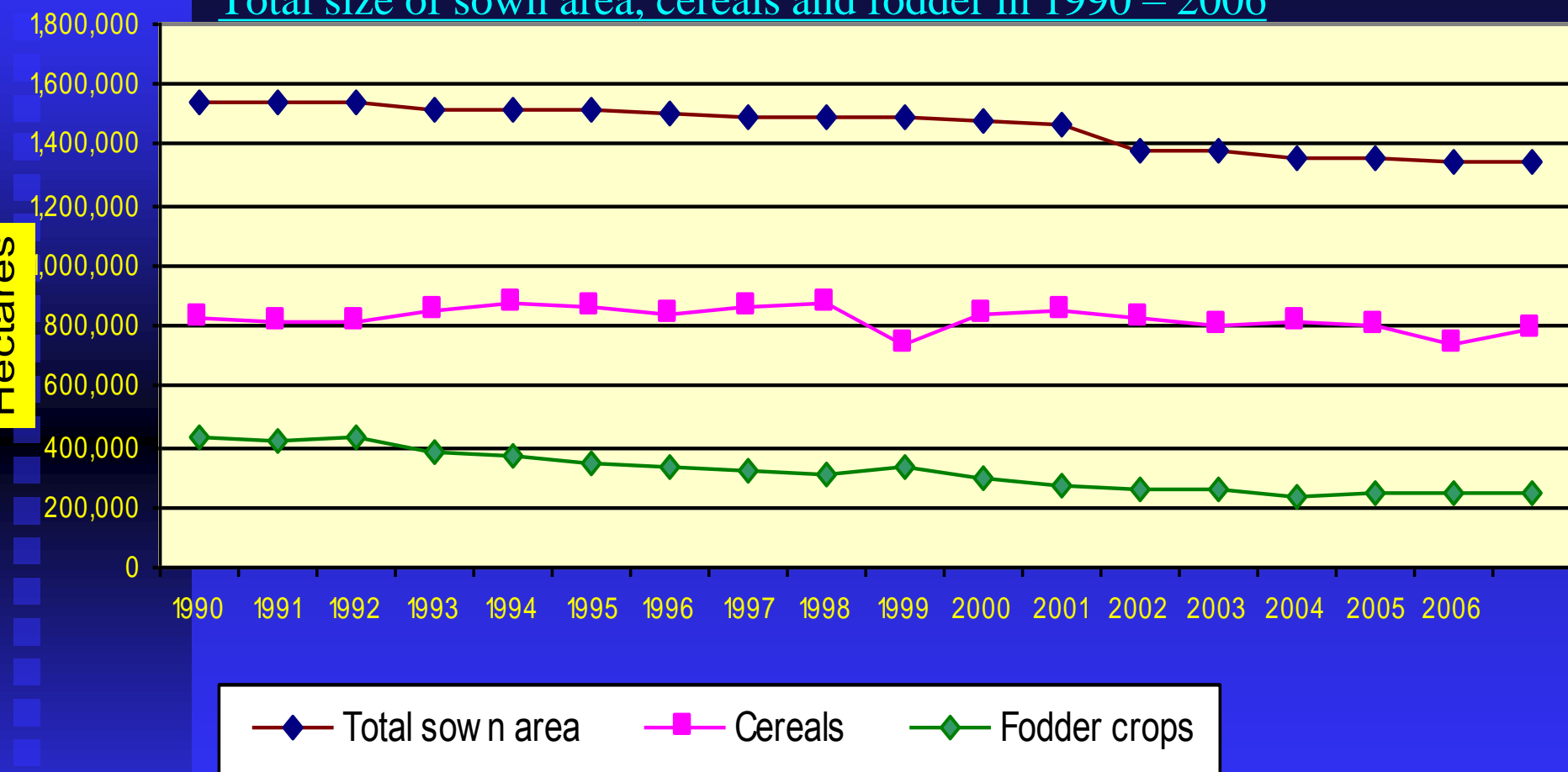


- Similar change rate in both countries
- the highest number of grid cells in the 0.1 – 10% rate
- most extensive changes - the 20 – 30% change rate



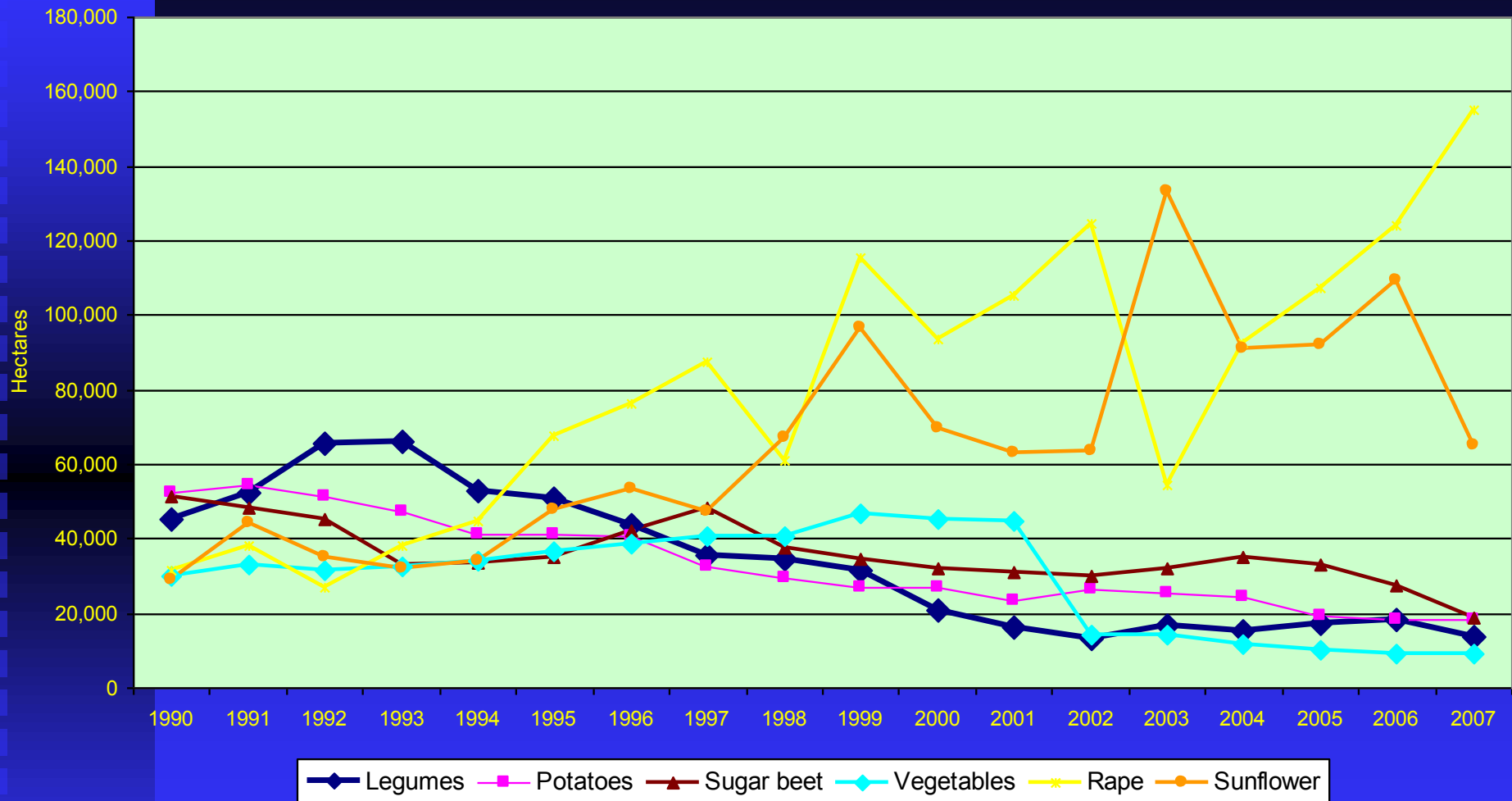
# SLOVAKIA

## Total size of sown area, cereals and fodder in 1990 – 2006



<b>Total sown area:</b>	1990 – 1,543.516 ha	2006 - 1,343.776 ha	(87,1%)
<b>Cereals:</b>	1990 – 825,196 ha	2006 – 739,979 ha	(89,7%)
<b>Fodder crops:</b>	1990 – 433,297 ha	2006 – 247,358 ha	(57,1%)

# SLOVAKIA - Sown areas of selected crops



Legumes – 30,9 %

Potatoes - 34,8 %

Sugar beet – 36,8%

Vegetables – 29,9 %

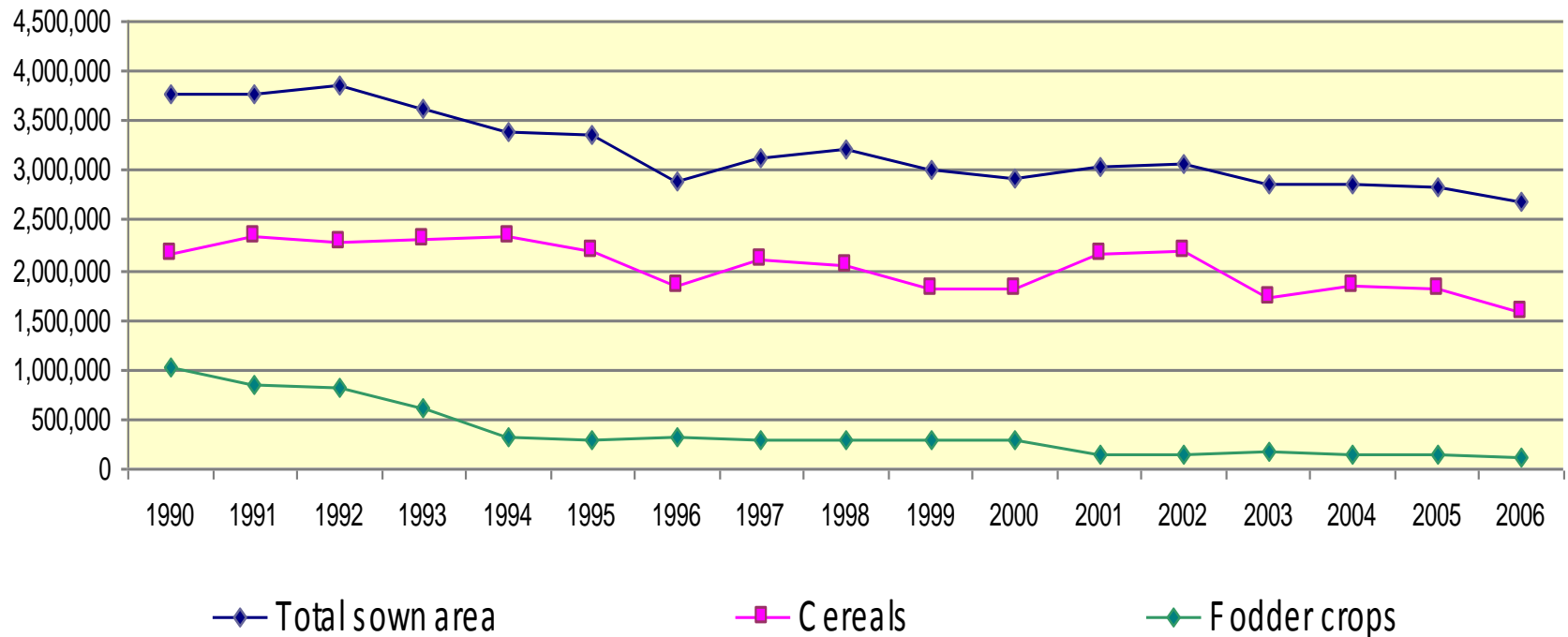
Rape - 488,8 %

Sunflower- 225,6%



# BULGARIA

## Total size of sown area, cereals and fodder in 1990 – 2006



**Total sown area:** 1990 – 3,770.000 ha

2006 - 2,695.000 ha (71,5%)

**Cereals:** 1990 – 2,157.000 ha

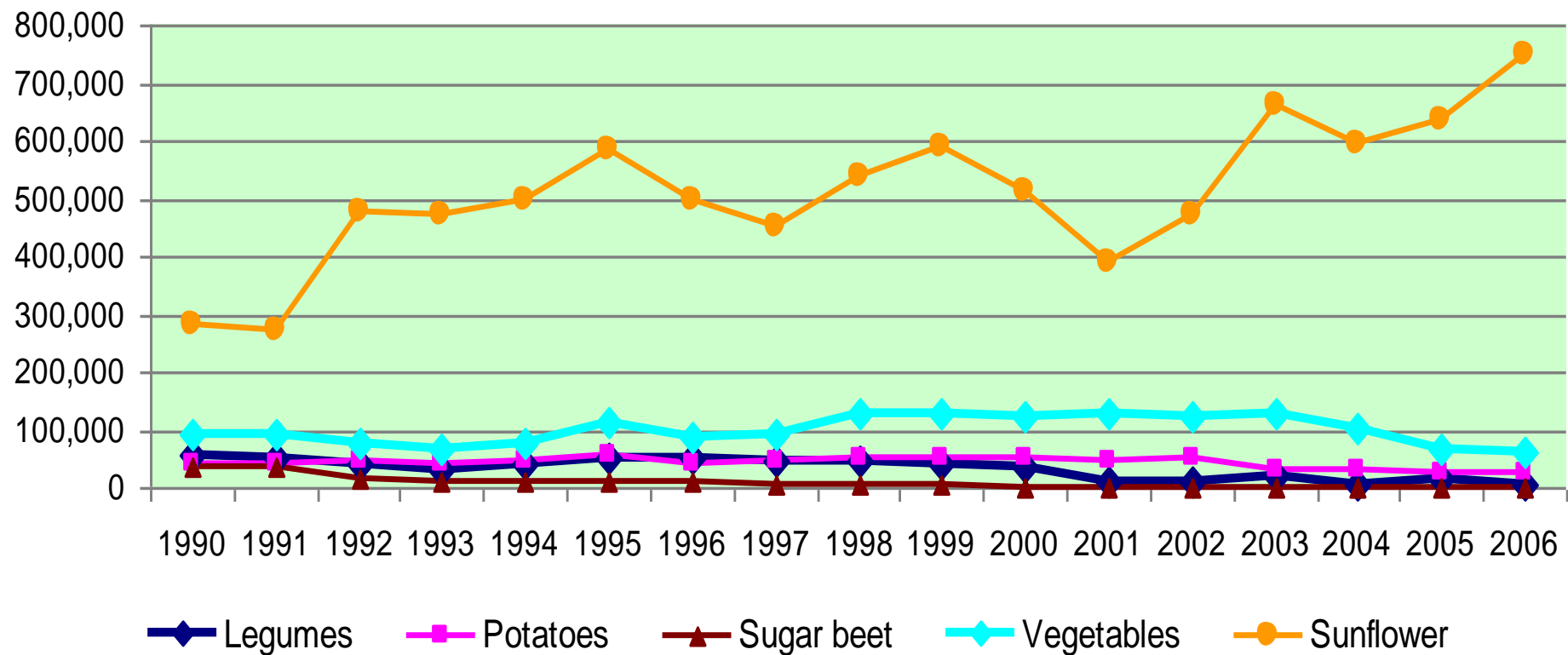
2006 - 1,586.000 ha (73,53%)

**Fodder crops:** 1990 – 1,034.000 ha

2006 - 128.000 ha (12,37%)

# BULGARIA

## Sown areas of selected crops



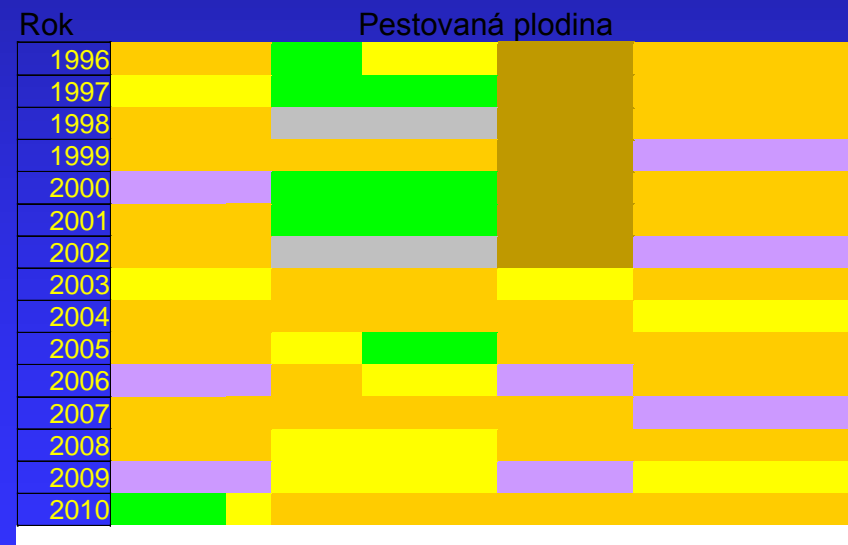
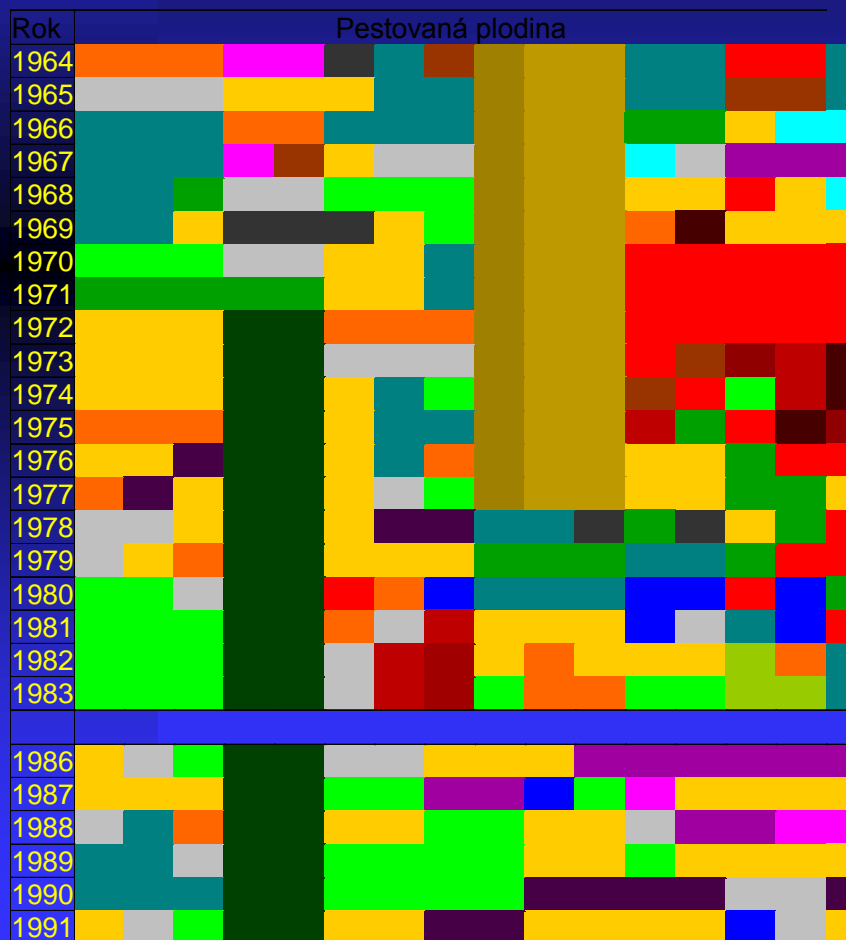
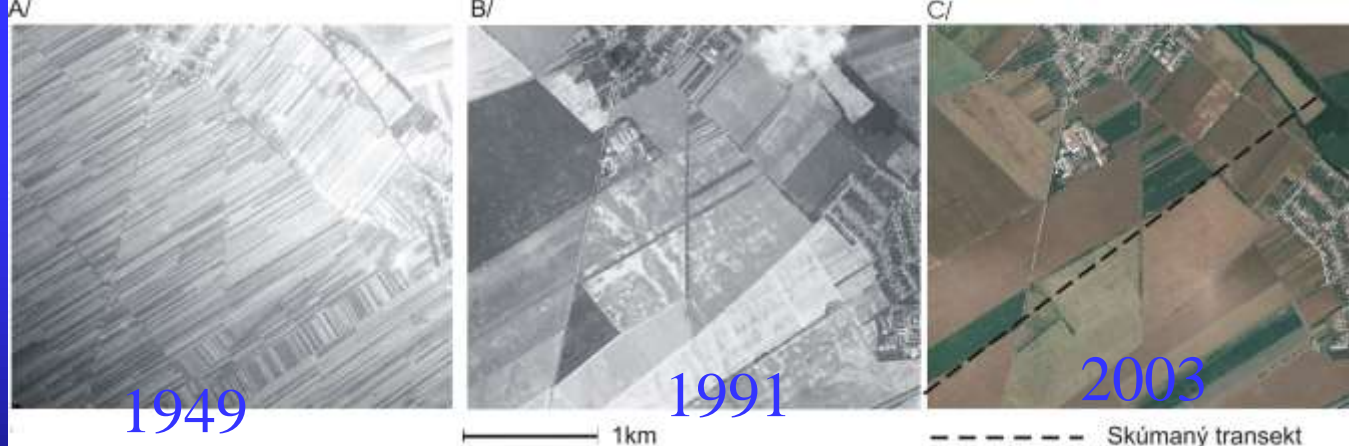
Legumes – 11,1 %

Potatoes - 58,5 %

Sugar beet – 3,7%

Vegetables – 68,8 %

Sunflower- 267,8%



## Conclusion

- In spite of the fact that information from CORINE Land Cover is not sufficiently detailed and cannot replace information from other quoted sources, the presented way of evaluation applying the single European methodology facilitates international comparison of the rate of selected transformation processes
- Similar trends in arable land changes in both countries



Thank you for your attention !

