EVALUATION OF VULNERABILITY TO SOIL EROSION USING GIS AND AHP CONSENSUS MODEL

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- Soil erosion is one of the threats to the conservation of soil and water resources

- In order to evaluate the vulnerability to soil erosion in this study, GIS and AHP consensus model was used

- Solutions for evaluating vulnerability to soil erosion challenges frequently involve highly complex spatial decision-making processes that require the simultaneous use of several decision support tools such as Geographic Information Systems (GIS) and Multi-Criteria Decision Making (MCDM) techniques

• The study was conducted on the mountain Fruška Gora in the Vojvodina province, the northern part of Serbia
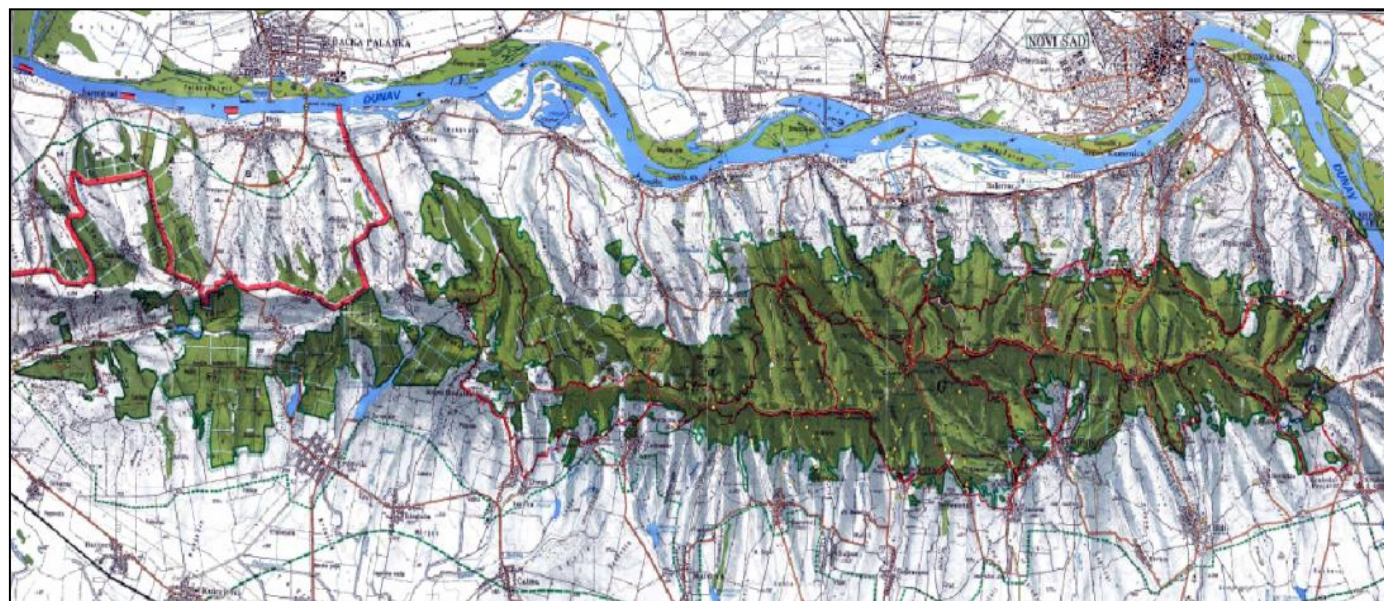
The main factors of soil erosion include:

- Geomorphology, which focuses on the quantitative analysis of interconnected processes,

- Pedology – soil properties, which are important for evaluating potential and actual soil erosion risk,

- Slope of the terrain, which has an important influence in controlling erosion rates and

- Land cover/land use (CORINE database) as the essential database for evaluating actual soil erosion risk

Geomorphology
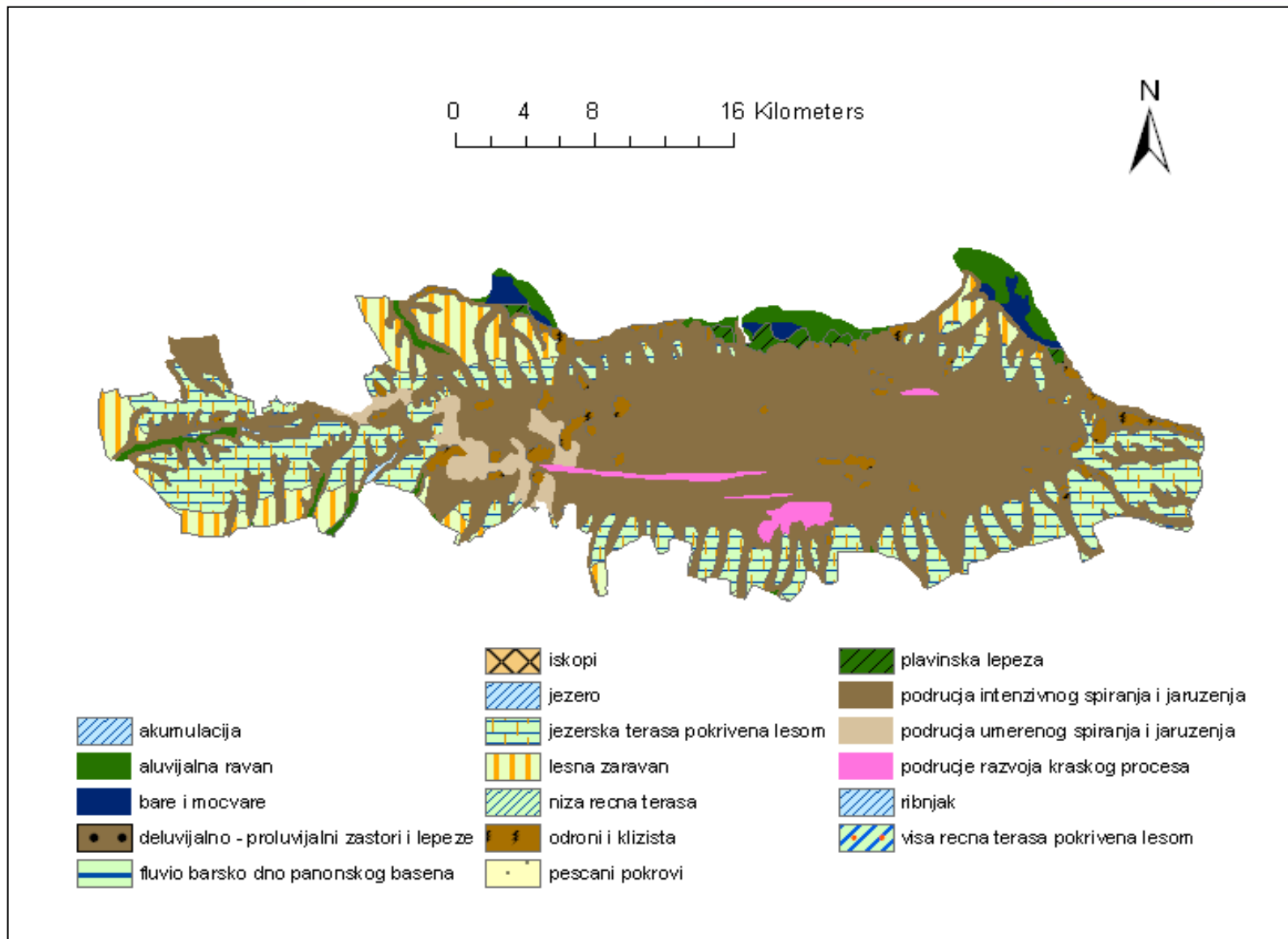
geomorphology

class	criteria weights	area (ha)	%
1	0,045	3383.709	4.5
2	0,080	5534.376	7.4
3	0,142	14758.54	19.6
4	0,257	3095.045	4.1
5	0,476	47384.99	63.0

5) areas of intense sheet and rill erosion as deluvio-proluvial relief with slumps and landslides as coluvial relief,
4) areas of moderate sheet and rilll erosion as deluvio-proluvial relief with areas of karstic processes as karst relief,
3) areas of marine-lacustrine terrace covered by loess as forms of fluvio-marshy environment,
2) areas of loess plateau as eolian relief,
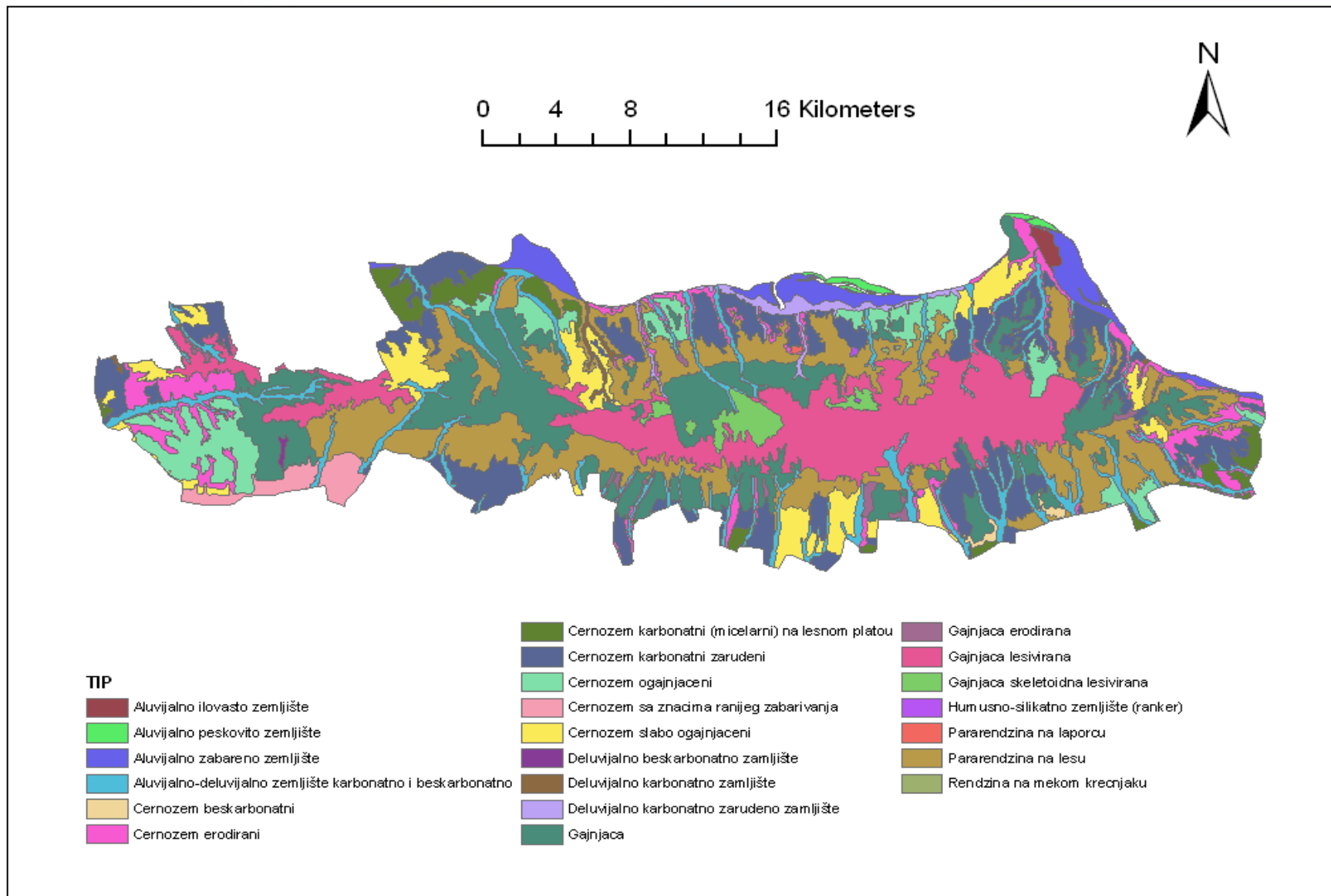1) areas of alluvial plain as fluvial relief.

0   4   8   16 Kilometers

N

Legenda

🟩	Aluvijalna ravan	🟨	Umereno spiranje i jaruzenje
🟩	Lesna zaravan	🟧	Intenzivno spiranje i jaruzenje
🟨	Jezerska terasa	⬜	Ne razmatrano (vodene i vestacke povrsine)

Pedology –
soil properties

TIP

- Aluvijalno ilovasto zemljište
- Aluvijalno peskovito zemljište
- Aluvijalno zabareno zemljište
- Aluvijalno-deluvijalno zemljište karbonatno i beskarbonatno
- Cernozem beskarbonatni
- Cernozem erodirani
- Cernozem karbonatni (micelarni) na lesnom platou
- Cernozem karbonatni zarudeni
- Cernozem ogajnjaceni
- Cernozem sa znacima ranijeg zabarivanja
- Cernozem slabo ogajnjaceni
- Deluvijalno beskarbonatno zamljište
- Deluvijalno karbonatno zamljište
- Deluvijalno karbonatno zarudeno zamljište
- Gajnjaca
- Gajnjaca erodirana
- Gajnjaca lesivirana
- Gajnjaca skeletoidna lesivirana
- Humusno-silikatno zemljište (ranker)
- Pararendzina na laporcu
- Pararendzina na lesu
- Rendzina na mekom krecnjaku

Pedology – soil properties

		pedology	
class	criteria weights	area (ha)	%
1	0,061	2409.469	3.2
2	0,133	43982.61	58.8
3	0,245	20328.38	27.2
4	0,522	8118.039	10.8

4) Sandy loam
3) Loam,
2) Clay loam,
1) Clay
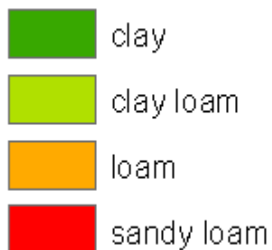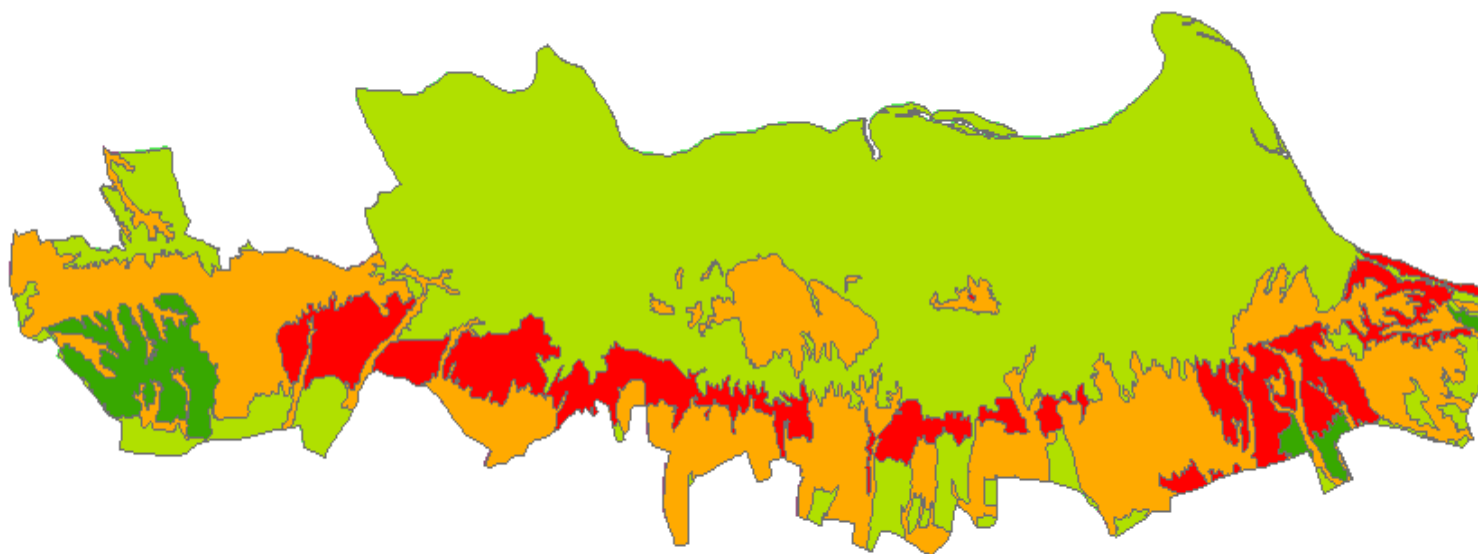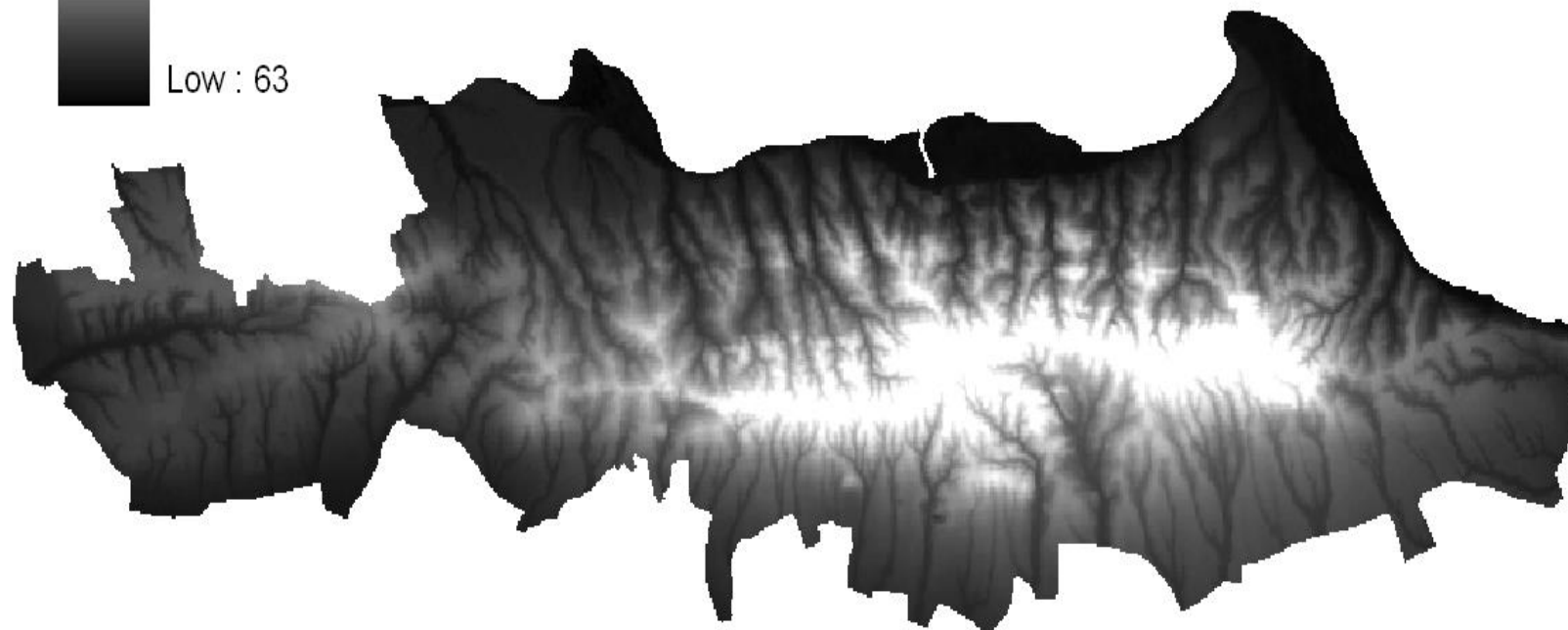
Slope of the terrain

Slope of the terrain

class	criteria weights	area (ha)	%
		Slope	
1	0,052	23689.69	31.5
2	0,111	16410.27	21.8
3	0,228	24130.15	32.2
4	0,609	10920.69	14.5

4) >20%
3) 10-20%,
2) 5-10%,
1) <5%

Legend:
- 0 - 5
- 5 - 10
- 10 - 20
- 20 - 73

0   4   8   16 Kilometers

N
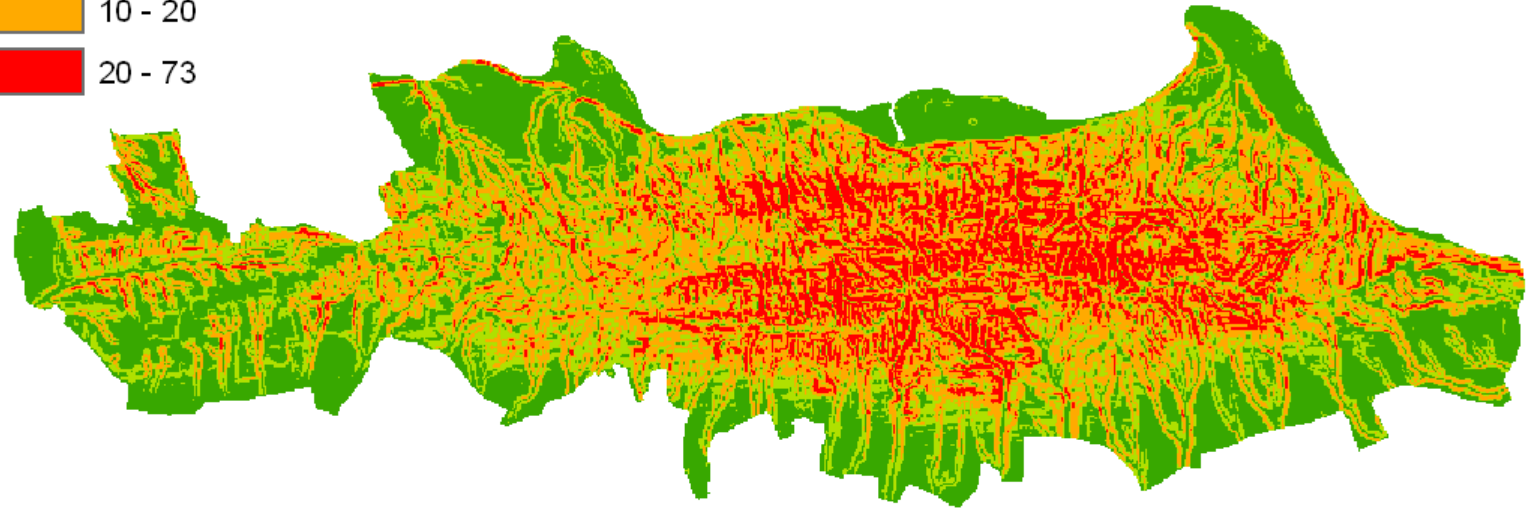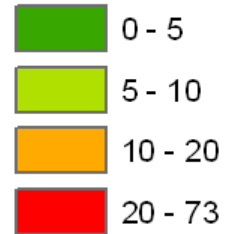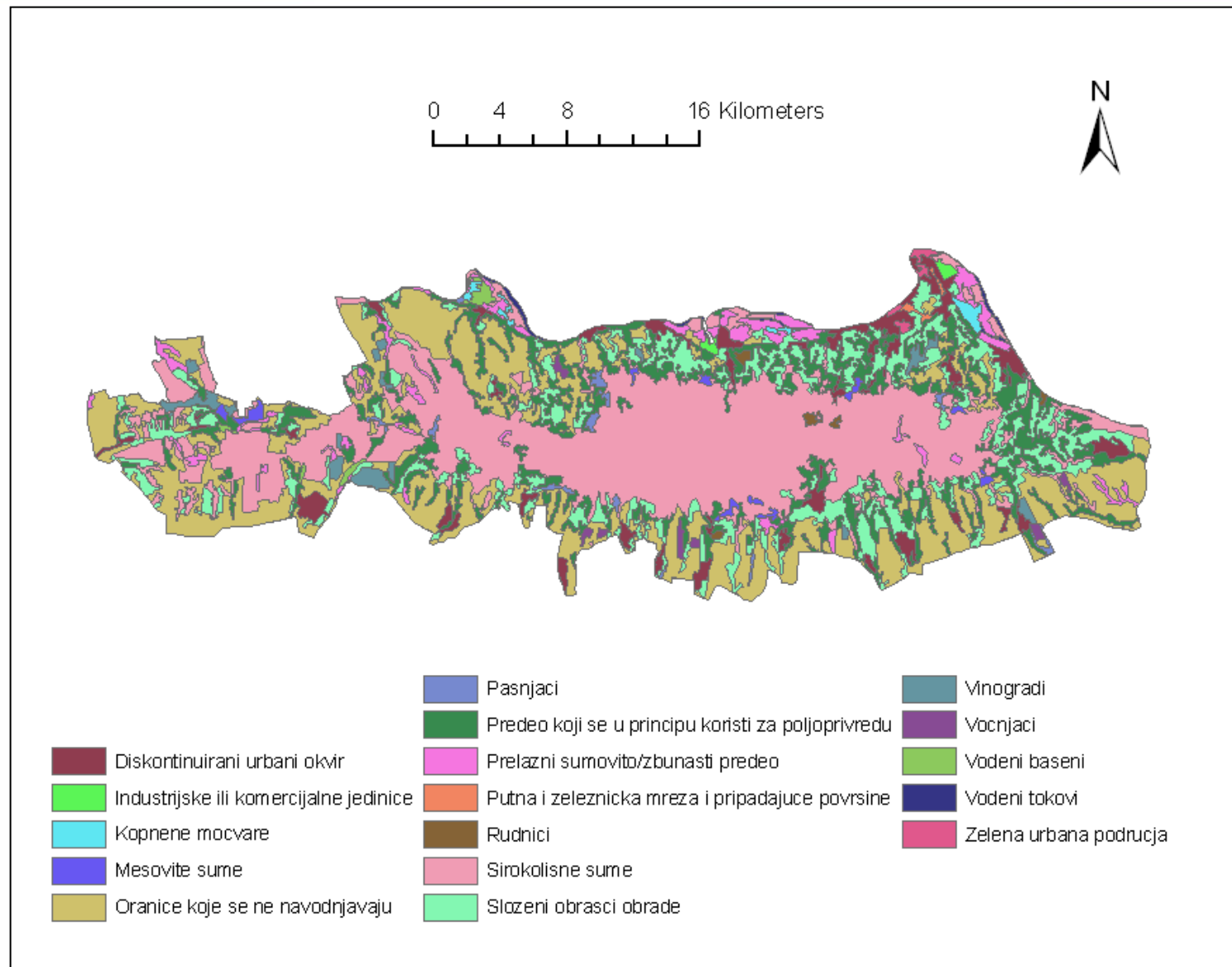
Land cover/land use

Land cover/land use

LULC

class	criteria weights	area (ha)	%
1	0,069	464.1012	0.6
2	0,174	20350.78	27.1
3	0,222	1343.156	1.8
4	0,535	18403.54	24.4
5	0,000	34626.56	46.1

4) Agricultural land
3) Orchards and vineyards,
2) Pastures,
1) Heterogeneous agricultural areas
5) Forests, Water bodies and urban areas
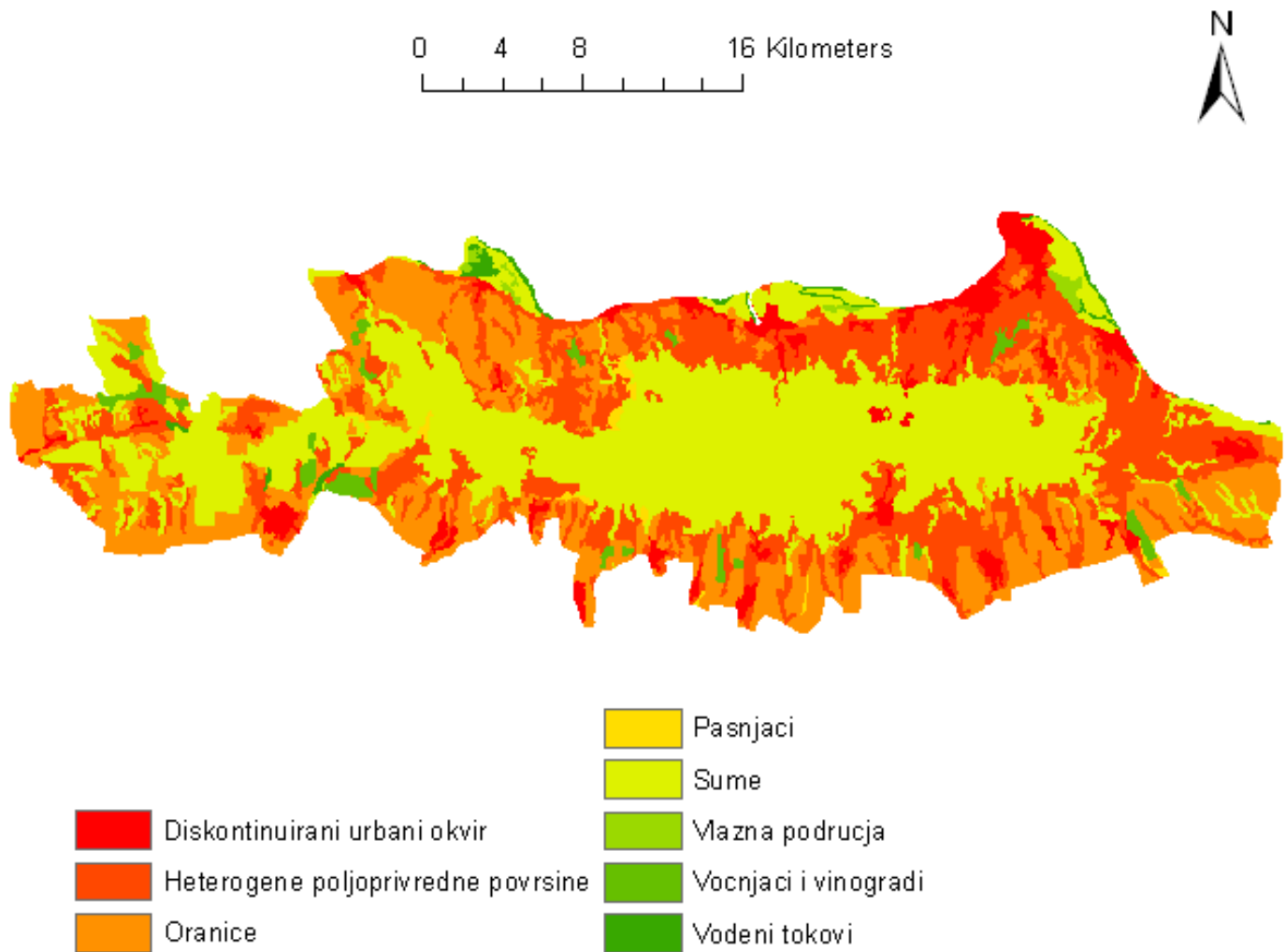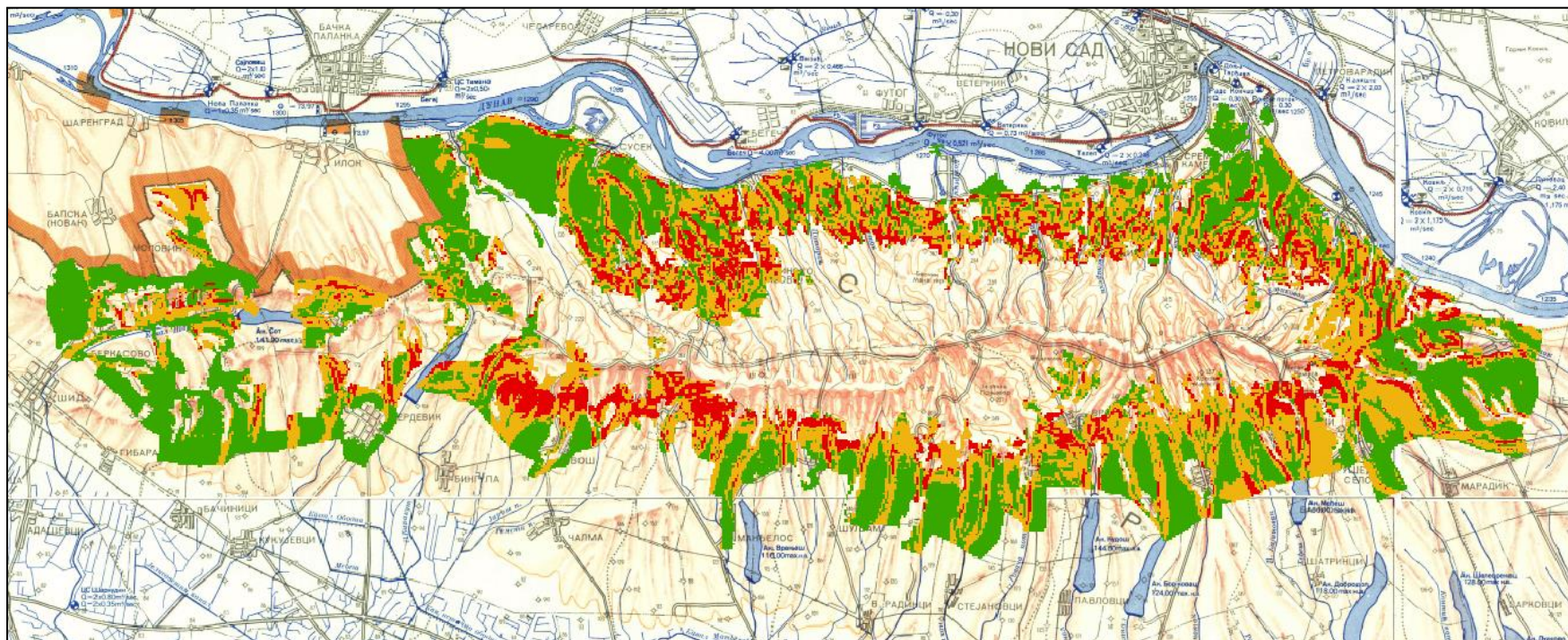
VULENRABILIY TO SOIL EROSION (Pluvial erosion)

High – 9%

Moderate – 22%

Low – 25%

THANK YOU!!