



XXVII FIG CONGRESS

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The use of orthophotomaps to verify the network of agricultural transport roads in the land consolidation project

Artur WARCHOŁ

assistant professor

Kielce University of Technology (Poland)

Monika BALAWEJDER

assistant professor

The Bronisław Markiewicz State University of Technology
and Economics in Jarosław (Poland)

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AGENDA

- **Goals**
- **Methodology**
- **Study area**
- **Data sets**
- **Results**
- **Conclusions**

GOALS

- in the south part of Poland plots are very small or narrow and long
- some parcels have not access to public road
- these plots are useless or using them is difficult



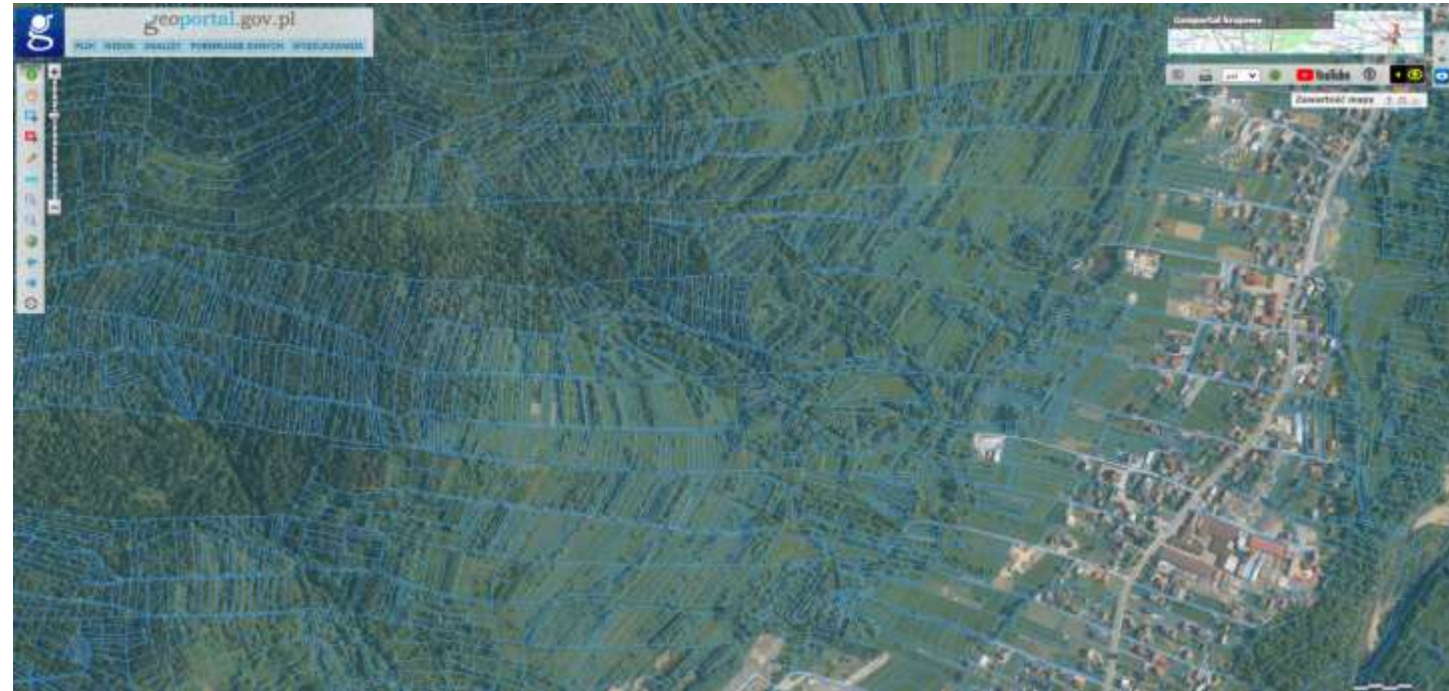
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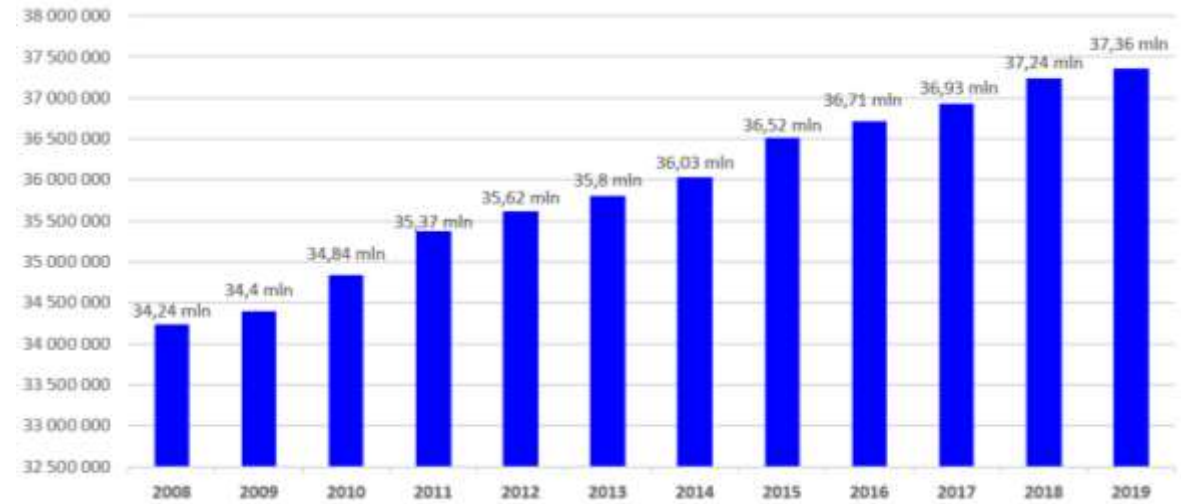
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-
- 6-15 x 600-800



GOALS

In those research the main goals were:

- to show **which** plots have not access to the public road
- **how many** plots have not access to the public road
- what are the **differences between the registry and reality** – this is very important in the context of land consolidation



Number of cadastral plots in Poland

METHODOLOGY

$$W_1 = \frac{L_A - L_B}{L_A} \cdot 100\%$$

where:

L_A – total number of plots in the research facility before consolidation;

L_B – total number of plots in the research facility after consolidation.

$$W_2 = \frac{D_B - D_A}{D_B} \cdot 100\%$$

where:

D_A – average plot area in the research facility before consolidation;

D_B – average plot area in the research facility after consolidation.

METHODOLOGY

$$W_3 = \frac{S_A - S_B}{S_A} \cdot 100\%$$

where:

S_A – average number of plots on an individual farm in a research facility before consolidation;

S_B – average number of plots on an individual farm in a research facility after consolidation.

$$W_4 = \frac{G_2 - G_1}{G_2} \cdot 100\%$$

where:

G_1 – road network density in the research facility before consolidation;

G_2 – road network density in the research facility after consolidation.

METHODOLOGY

$$G_1 = \frac{\text{dł. A}_-[\text{km}]}{100 \cdot \text{GR}_-[\text{ha}]}$$

where:

dł. A – length of roads measured in kilometers at the test facility before consolidation;

GR – area of agricultural land in [ha].

$$G_2 = \frac{\text{dł. B}_-[\text{km}]}{100 \cdot \text{GR}_-[\text{ha}]}$$

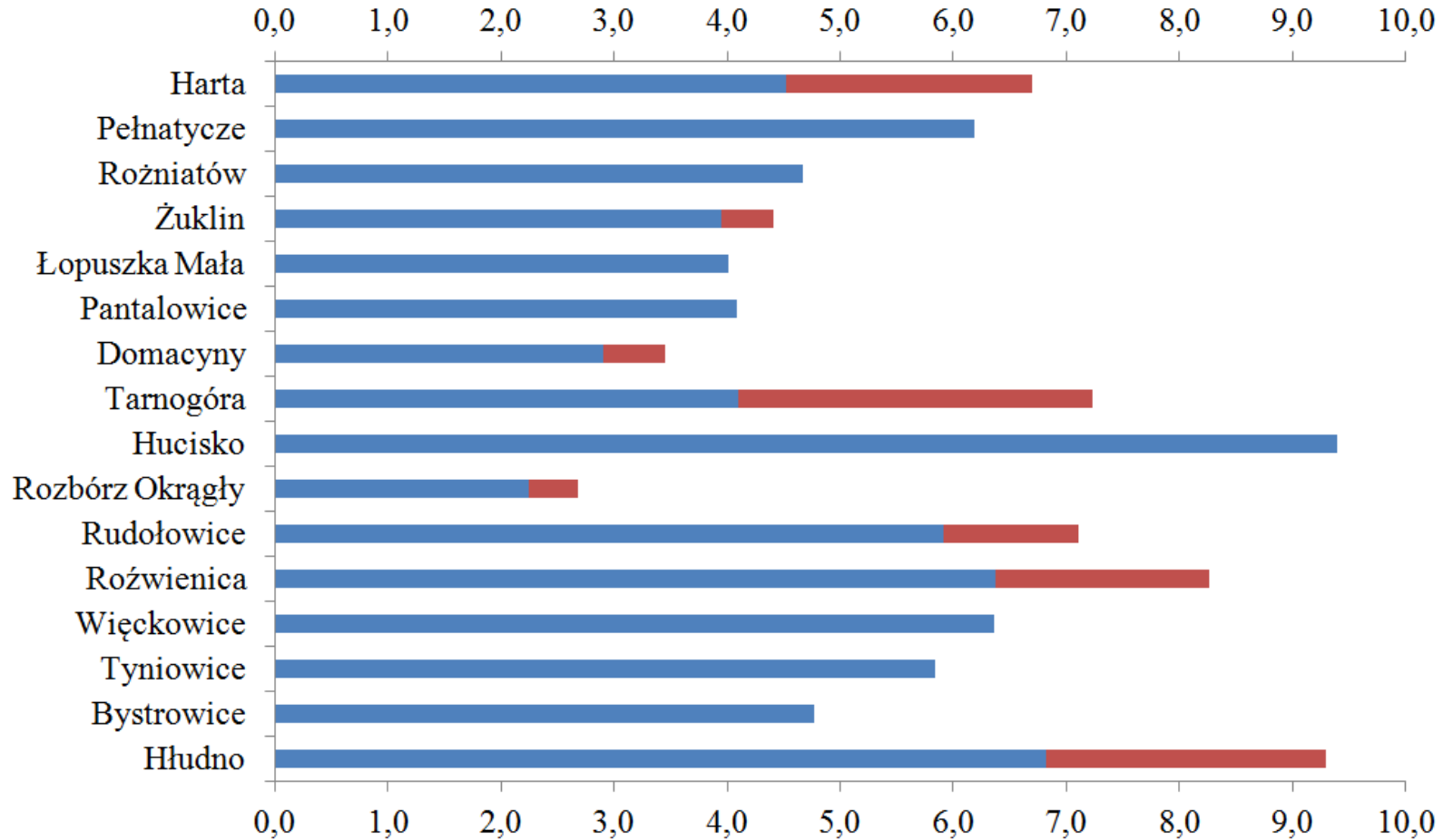
where:

dł. B – length of roads measured in kilometers at the test facility after consolidation;

GR – area of agricultural land in [ha].

ROAD NETWORK DENSITY

- Road network density before land consolidation (blue) and after land consolidation (red) in 16 objects
- Selected 16 objects were after consolidation in PROW 2007-2013 program – W_1 , W_2 , W_3 , W_4 and G_1 and G_2 parameters available to calculate
- Road network density is one of the parameters that indicates the size of the development after land consolidation



STUDY AREA

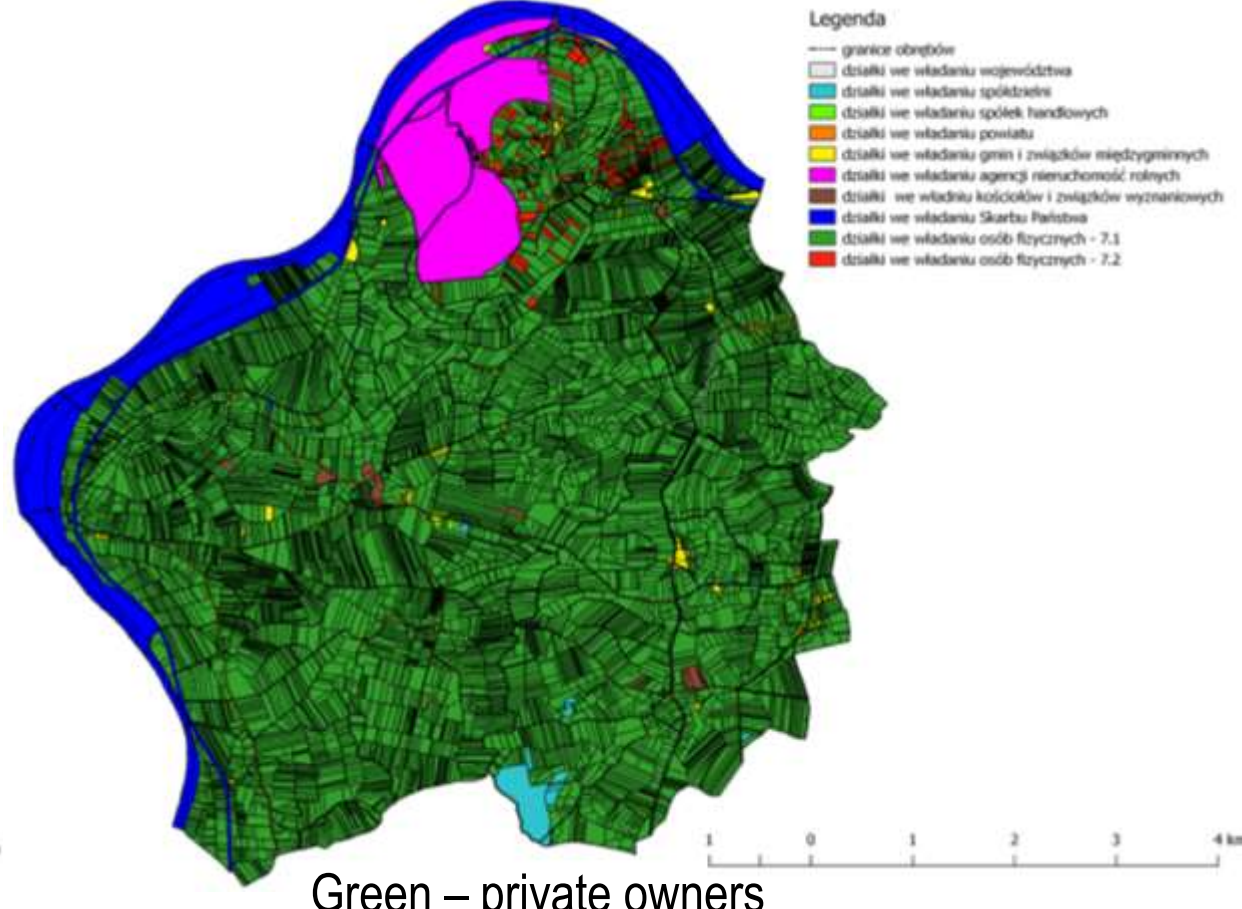
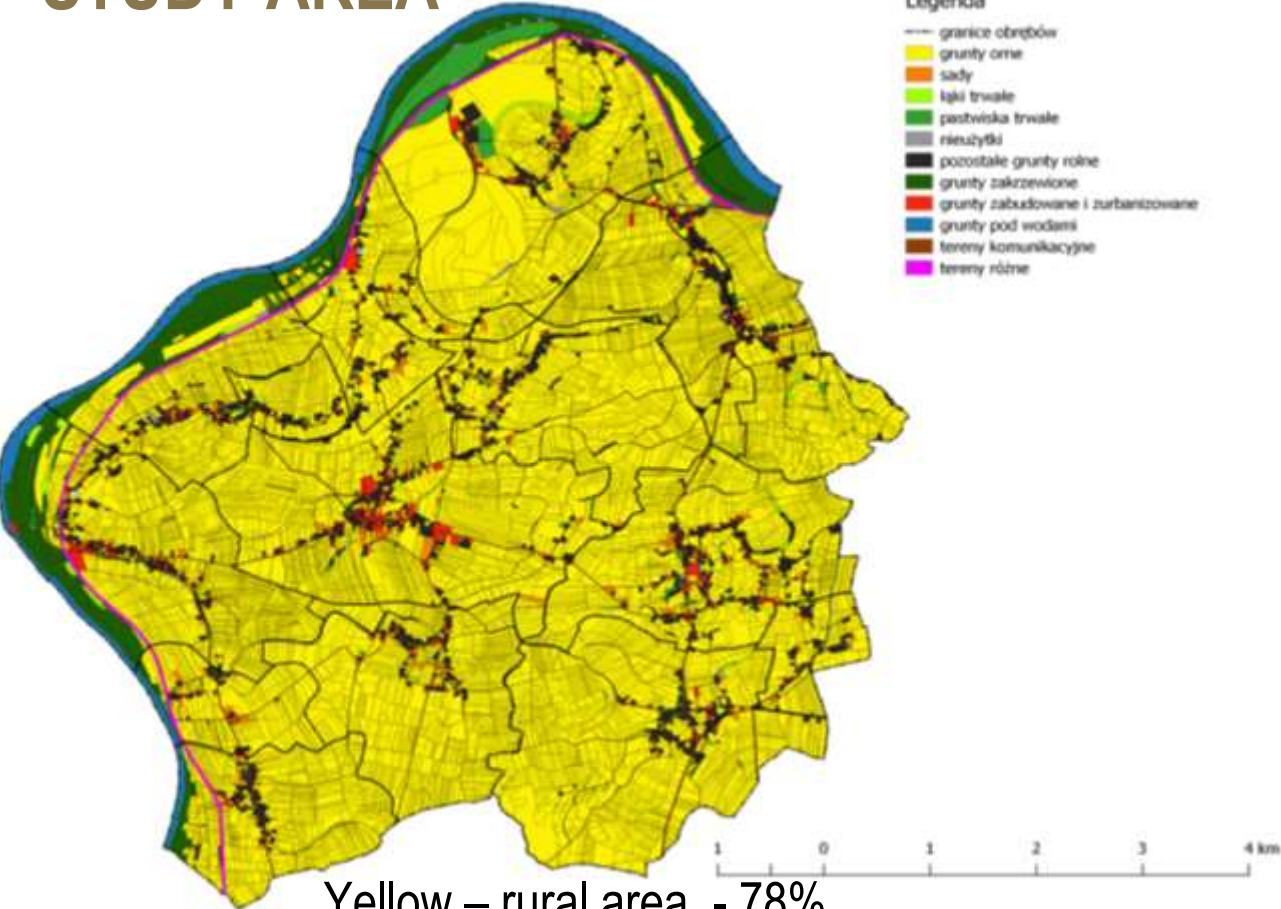
- Area of Gręboszów commune - 4849 ha (48.5 km²)
- Area of public roads in Gręboszów - 112 ha
- Average area of a parcel - ca. 0.5 ha
- Number of plots: 8982



STUDY AREA

- Legenda
- granice obszarów
 - grunty orne
 - sady
 - łąki trwałe
 - pastwiska trwałe
 - resztytki
 - pozostałe grunty rolne
 - grunty zakrzewione
 - grunty zabudowane i zurbanizowane
 - grunty pod wodami
 - tereny komunikacyjne
 - tereny różne

- Legenda
- granice obszarów
 - działki we władaniu województwa
 - działki we władaniu spółdzielni
 - działki we władaniu spółek handlowych
 - działki we władaniu powiatu
 - działki we władaniu gmin i związków międzygminnych
 - działki we władaniu agencji nieruchomości rolnych
 - działki we władaniu kościołów i związków wyznaniowych
 - działki we władaniu Skarbu Państwa
 - działki we władaniu osób fizycznych - 7.1
 - działki we władaniu osób fizycznych - 7.2



STUDY AREA - Patchwork of individual plots

No. of interval	Size of individual plots	No. of plots	No. of plots [%]	Plots area [ha]	Part of area [%]	Mean area of the plots [ha]
1	0,00-0,10	1138	15.8	51.08	1.4	0.04
2	0,11-0,30	2183	30.4	467.98	12.9	0.21
3	0,31-0,60	1932	26.9	883.78	24.4	0.46
4	0,61-1,00	1012	14.1	780.03	21.5	0.77
5	1,01-2,00	785	10.9	1034.62	28.6	1.32
6	2,01-5,00	137	1.9	370.53	10.2	2.70
7	5,01-10,00	2	0.0	11.79	0.3	5.90
8	10,01-15,00	0	0.0	0.00	0.0	0.00
9	powyżej 15,01	1	0.0	23.54	0.7	23.54
Sum		7190	100.0	3623.35	100.0	0.50

DATA SETS

Land and buildings register (EGiB)

database records of land and buildings register real estate cadastre as an information system ensuring the collection, updating and land information sharing, to be interpreted uniformly (in terms of location, boundaries, area, and land type), in this study, a vectorised map was used for the land and buildings analysis, as well as a registration plot database together with land contours records.

parcels from EGiB – data validity for 2017

DATA SETS

Orthophotomap

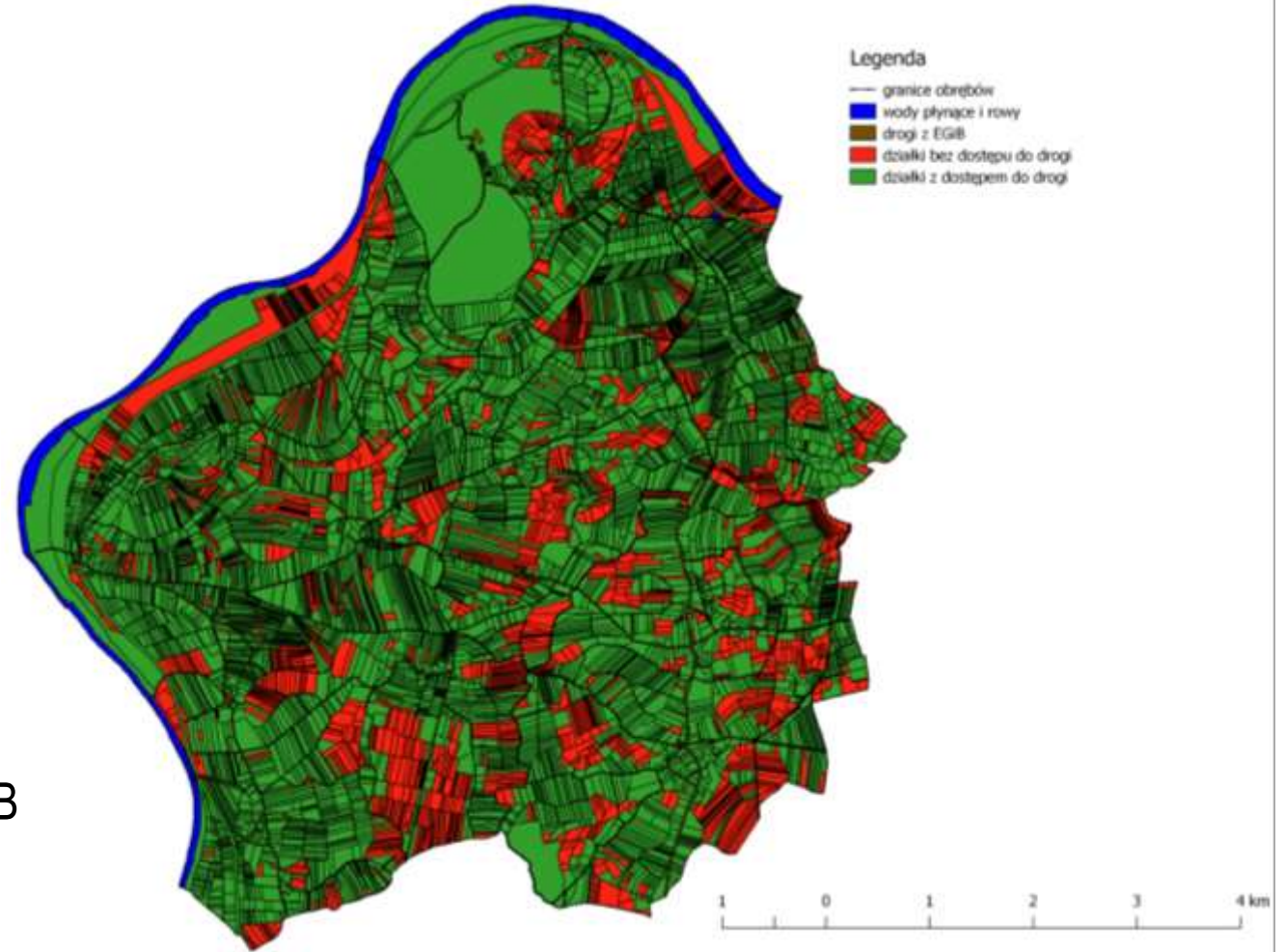
comes from year **2015**, GSD (Ground Sampling Distance) of the data used for this study analysis was **0.25 m**.



RESULTS - Orthophotomap plot access availability

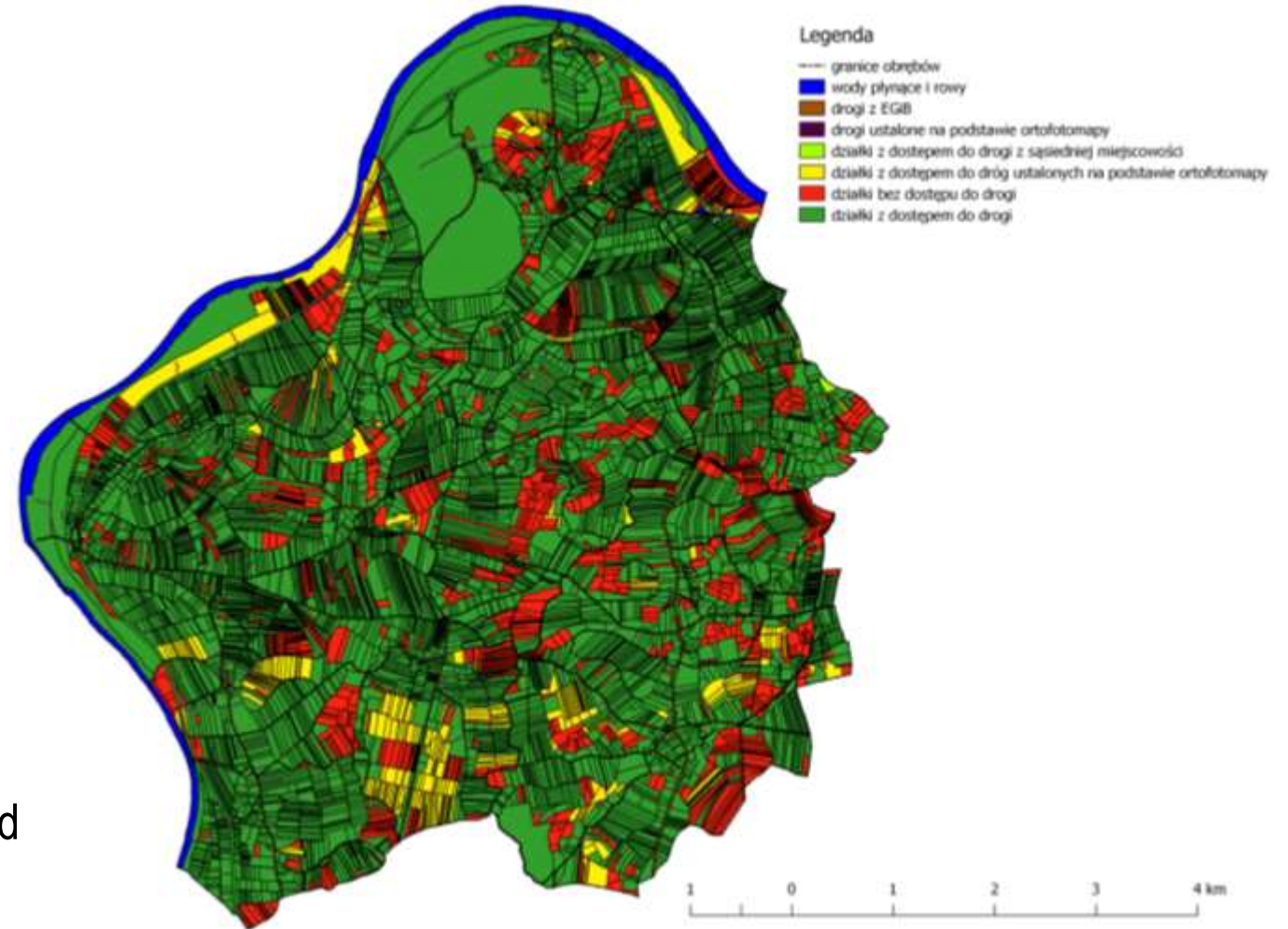
No.	Gręboszów Commune	Plot number		Area	
		No.	%	[ha]	%
1	Plots with no road access	1910	21.4	792.66	17.2
2	Plots with road access belonging to neighbouring locality	5	0.1	3.34	0.1
3	Plots with EGiB road access	6597	73.9	3514.78	76.2
4	Plots with an orthophoto map road access	411	4.6	300.17	6.5
5	Total	8923	100.0	4610.95	100.0
6	Plots being EGiB roads	304	-	112.00	-
7	Running waters and ditches	52	-	125.72	-
8	Calculated with running waters and ditches	9279	-	4848.67	-

RESULTS



Red plots – parcels without access to roads by EGIB

RESULTS



Red plots – parcels without access to roads – information from orthophotomap , yellow - recovered

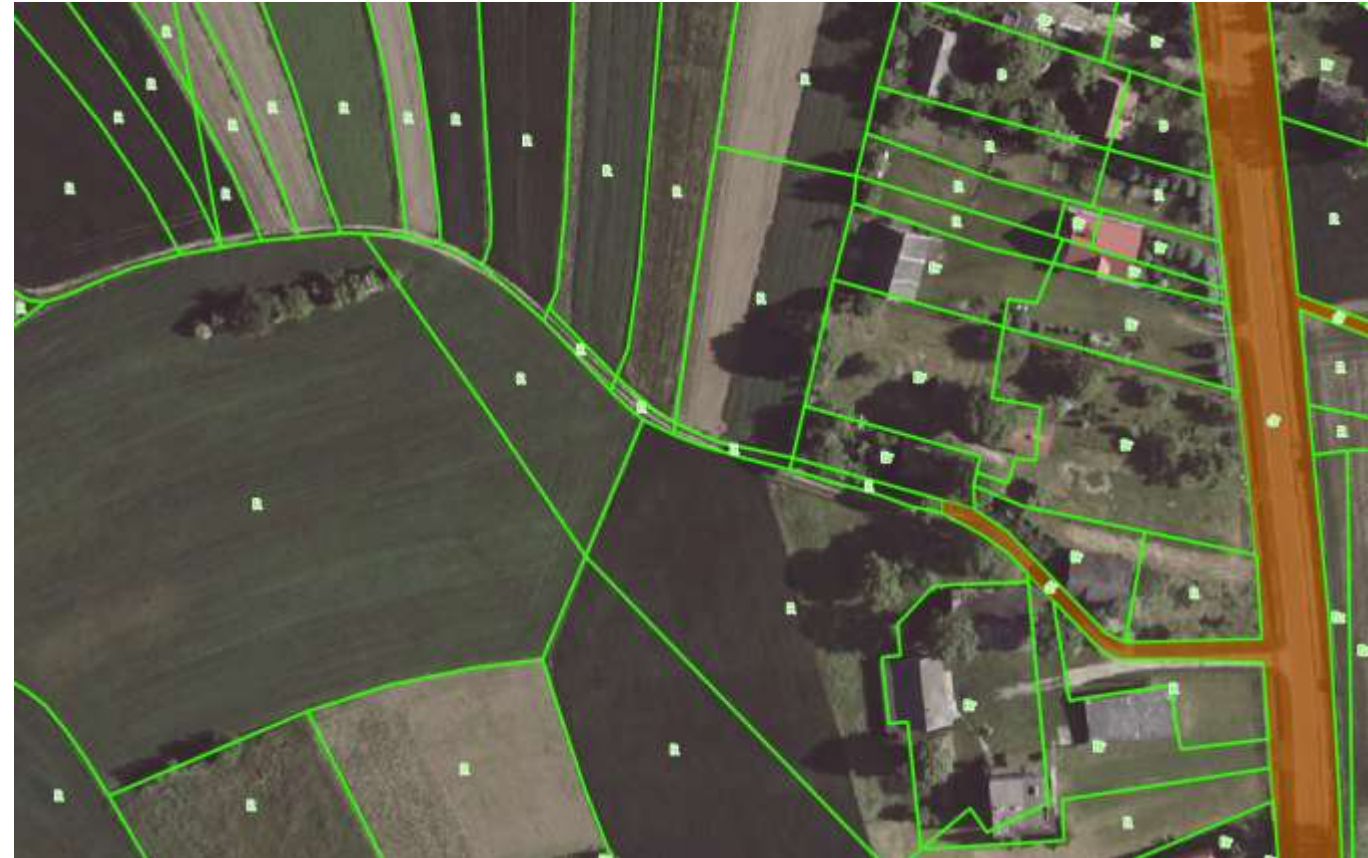
RESULTS - Differences between EGiB and orthophotomap

Example 1



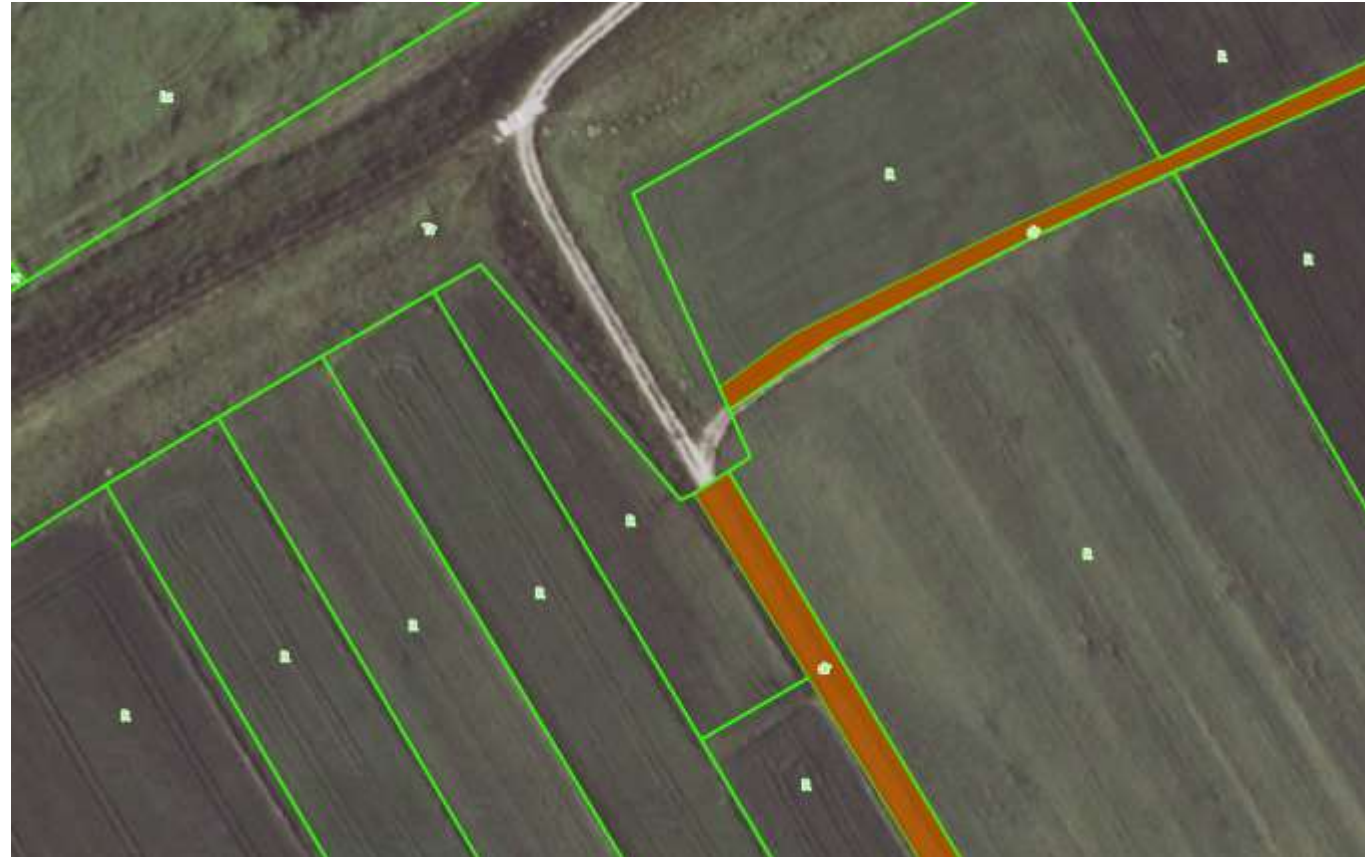
RESULTS - Differences between EGiB and orthophotomap

Example 2



RESULTS - Differences between EGiB and orthophotomap

Example 3



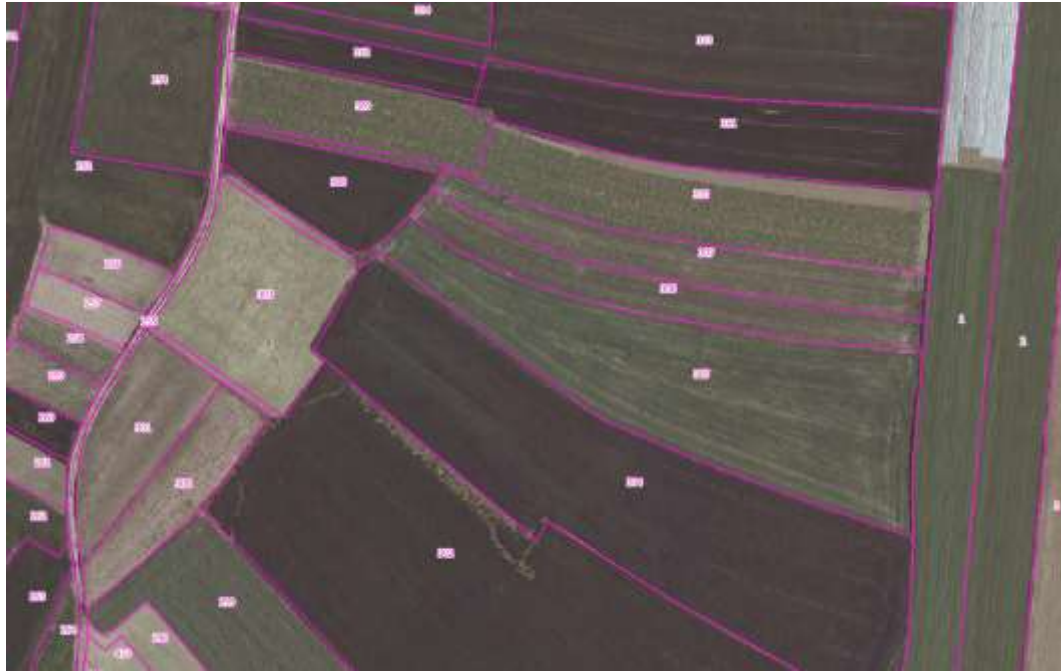
RESULTS - Differences between EGiB and orthophotomap

Example 8a



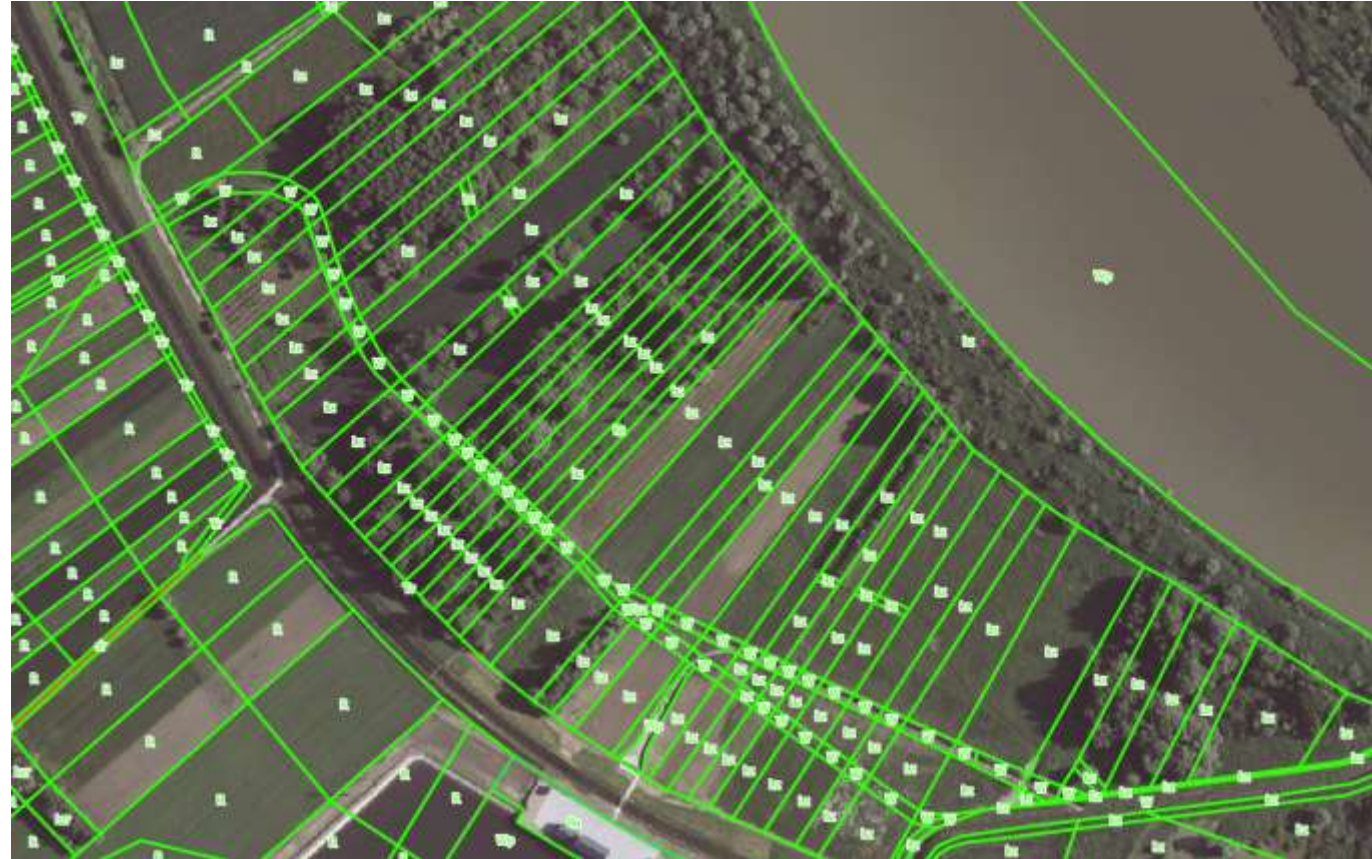
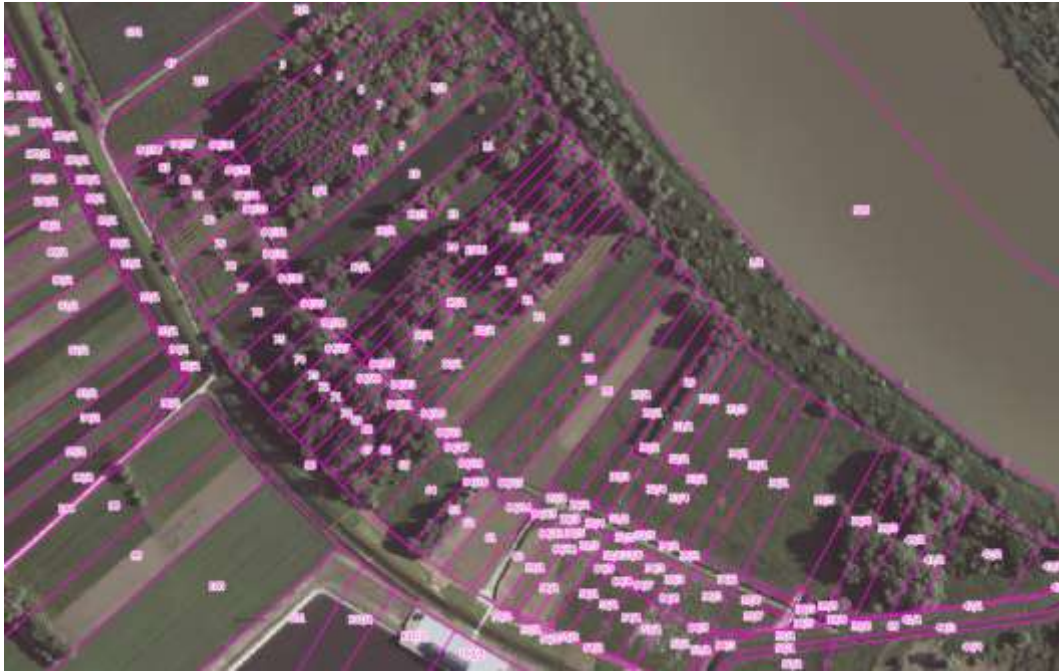
RESULTS - Differences between EGiB and orthophotomap

Example 11-13



RESULTS - Differences between EGiB and orthophotomap

Example 20



RESULTS - Differences between EGiB and orthophotomap

Example 21



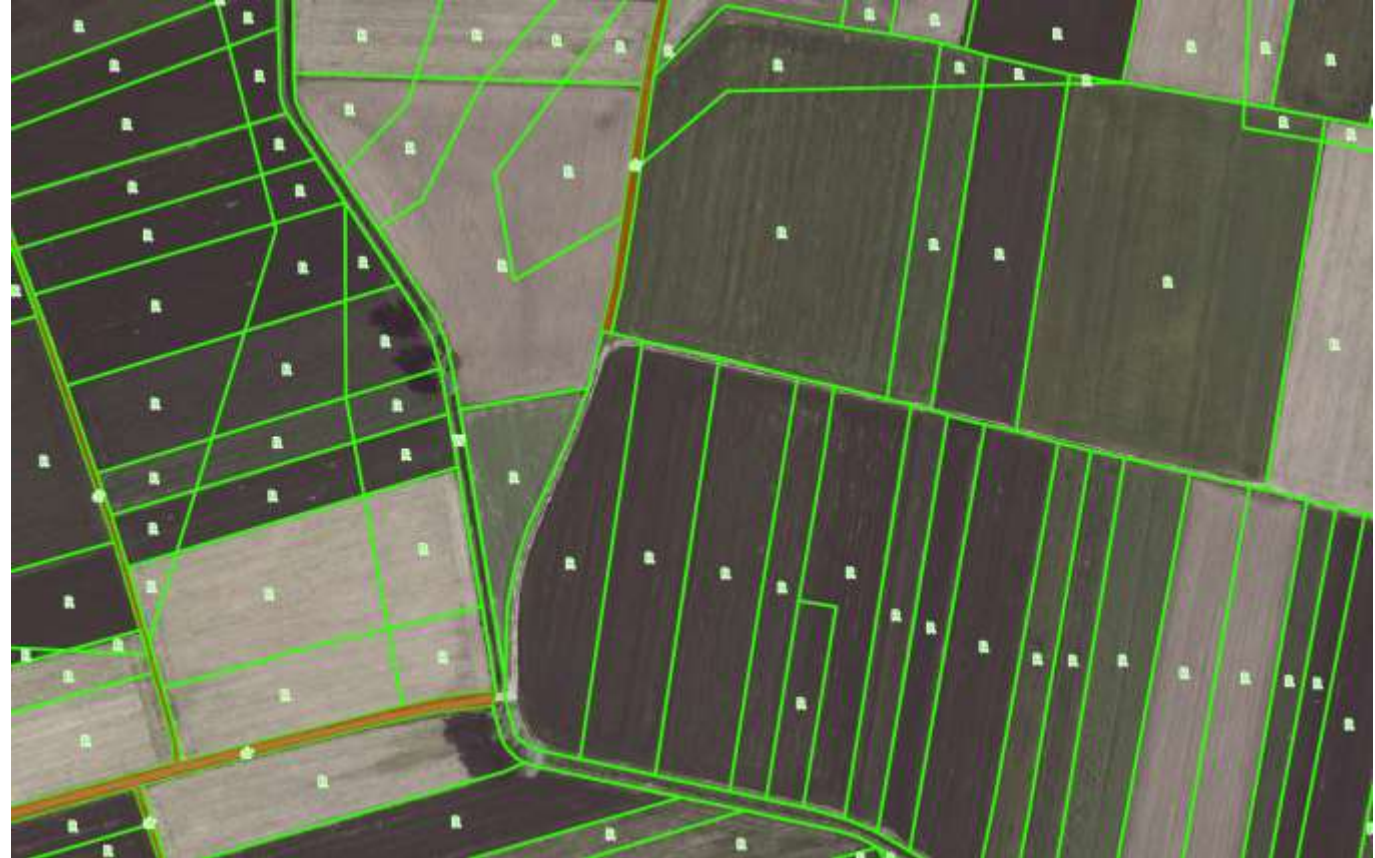
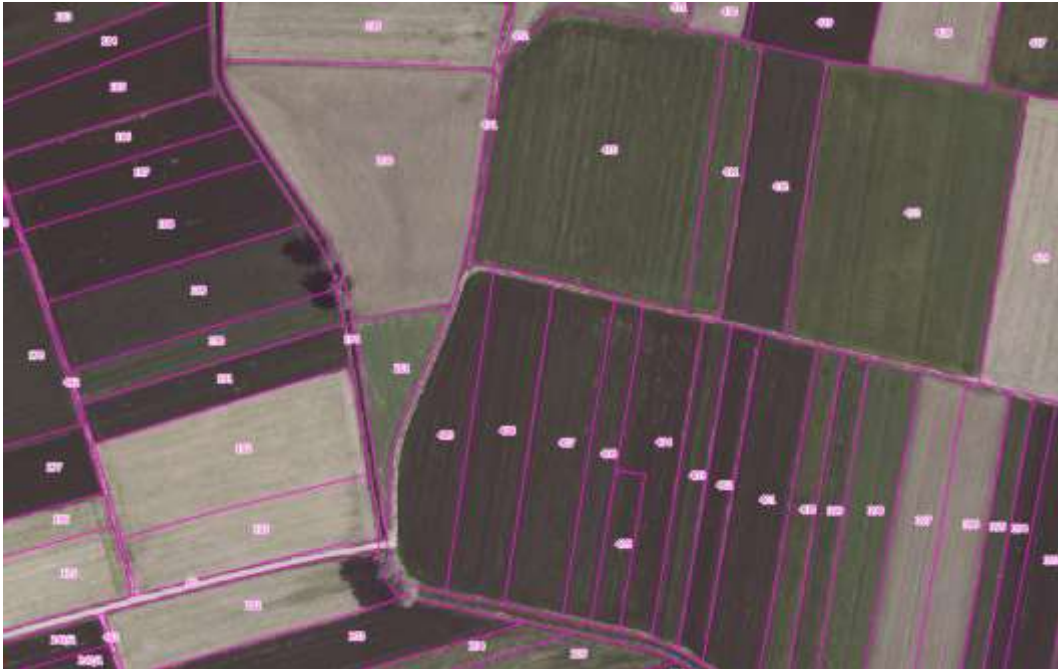
RESULTS - Differences between EGiB and orthophotomap

Example 22



RESULTS - Differences between EGiB and orthophotomap

Example 27



CONCLUSIONS

The present research was aiming at analyzing the road network and demonstrating the discrepancies between public roads indication in the land and buildings register and the actual usage of the area. The study was carried out with the use of modern geomatic tools. As a result of the analysis, it was stated:

1. The land and buildings records often contain data that is out of date and inconsistent with the actual use. Current EGiB data is the base for many surveying activities.
2. Modern digital techniques and geomatic tools enable to carry out in a short time accurate and reliable area analyses depending on the thematic context, they are very helpful in undertaking all the project duties of land consolidation.

CONCLUSIONS

3. The cost of land consolidation under RDP 2014-2020 for land in south-eastern Poland is:

- Carrying out consolidation works 800 EUR / 1 ha of land
- Post-merger management 2000 EUR / 1ha [Regulation 2015].

These are high amounts, therefore it is even more necessary to thoroughly prepare the data for the design of the agricultural transport road network in the land consolidation project.

The rational shaping of the agricultural transport road network and the improvement of their technical condition contribute to the achievement of a number of benefits:

- The easement roads have been liquidated and the agricultural transport roads have been constructed, securing the access of each agricultural plot to the public road;
- Saving time, people, equipment and cargo transportation thanks to increased driving speed,
- Savings on transport costs resulting from the use of the nominal load capacity of vehicles;
- Reducing crop losses by eliminating permanent or temporary detours impassable roads;
- Increasing the intensity of agricultural production in hard-to-reach areas.

Thank you for attention

Artur WARCHOŁ

assistant professor

Kielce University of Technology
(Poland)

awarchol@tu.kielce.pl

ORCID: [0000-0002-2248-1357](https://orcid.org/0000-0002-2248-1357)

Monika BALAWEJDER

assistant professor

The Bronisław Markiewicz State University of Technology and Economics in Jarosław
(Poland)

monika.balawejder@pwste.edu.pl

ORCID: [0000-0001-7515-1557](https://orcid.org/0000-0001-7515-1557)