

# Are Croatian Official Registers complying with the LADM Fiscal/Valuation Extension?

Hrvoje TOMIĆ, Siniša MASTELIĆ IVIĆ, Miodrag ROIĆ, Goran JURAKIĆ



RAZVOJ VIŠENAMJENSKOG SUSTAVA UPRAVLJANJA ZEMLJIŠTEM  
DEVELOPMENT OF MULTIPURPOSE LAND ADMINISTRATION SYSTEM

# Contents

- Introduction
- Problem and methodology
- Overview of Croatian official registers/examples
- Methodology: Croatian LADM profile + LADM\_FM
- Data classification
- Schema matching
- Results
- Conclusion



# Introduction

- Valuation is a process of assigning values to land/real property
  - individual valuation, mass valuation
- Land Administration System – land/real property valuation for taxation purposes
  - Use of mass valuation methods: statistical analysis of valuation indicators to assess values of many real properties at the same time
  - Croatian Science Foundation funded project Development of Multipurpose Land Administration System – DEMLAS (increase of efficiency and usability of LAS through development of improved data process models for detected new LAS users: proposed models based on well-known international standard, LADM)



DEMLAS

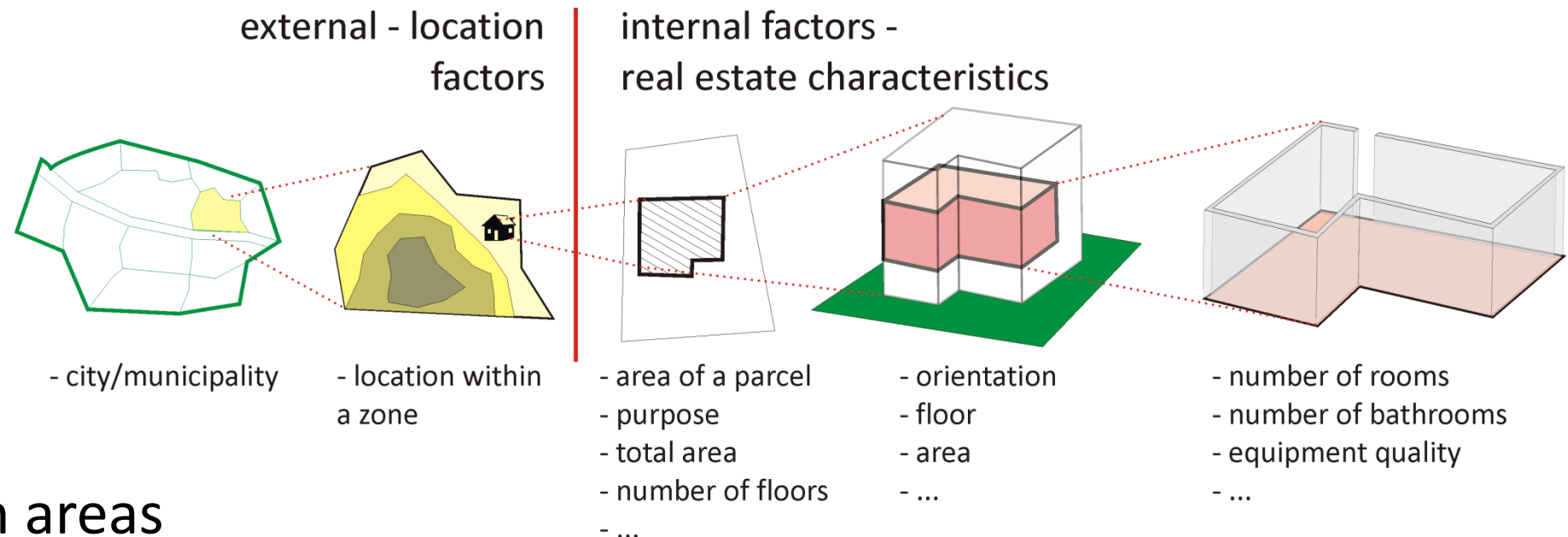
# Problem/goal

- Non existing taxation (and other purposes) mass real property valuation system – valuation of real properties using automatized procedures (Automatized Valuation Models - AVM)
- Development of mass valuation system:
  - Selection of valuation model
  - Classification of real property / identification of valuation indicators
  - Identification and assessment of appropriate official datasets (data completeness and whether data are up-to-date)
- **Complex geoinformation system which uses datasets distributed across different authorities**



# Problem - valuation attributes (indicators)

- Could required valuation attributes be found in official registers??
- External / Internal factors:



- Rural / urban areas

# Methodology

- International best practices + Use of existing Croatian LADM country profile (Vučić et al. 2012) + LADM fiscal/valuation extension (Çağdaş et al. 2016)
- Compliance analysis using manual schema matching of needed real property attributes – valuation indicators.



**O E M L A S**

RAZVOJ VIŠENAMJENSKOG SUSTAVA UPRAVLJANJA ZEMLJIŠTEM  
DEVELOPMENT OF MULTIPURPOSE LAND ADMINISTRATION SYSTEM

# Current state of valuation and taxation

- Land tax based on agricultural income was abandoned in 1997
- There is no flat property tax for all real property types
- It was planned to introduce property tax in 2017
  
- Legislation: Property Valuation Act (2015) – defines authorized persons, choice of methods...

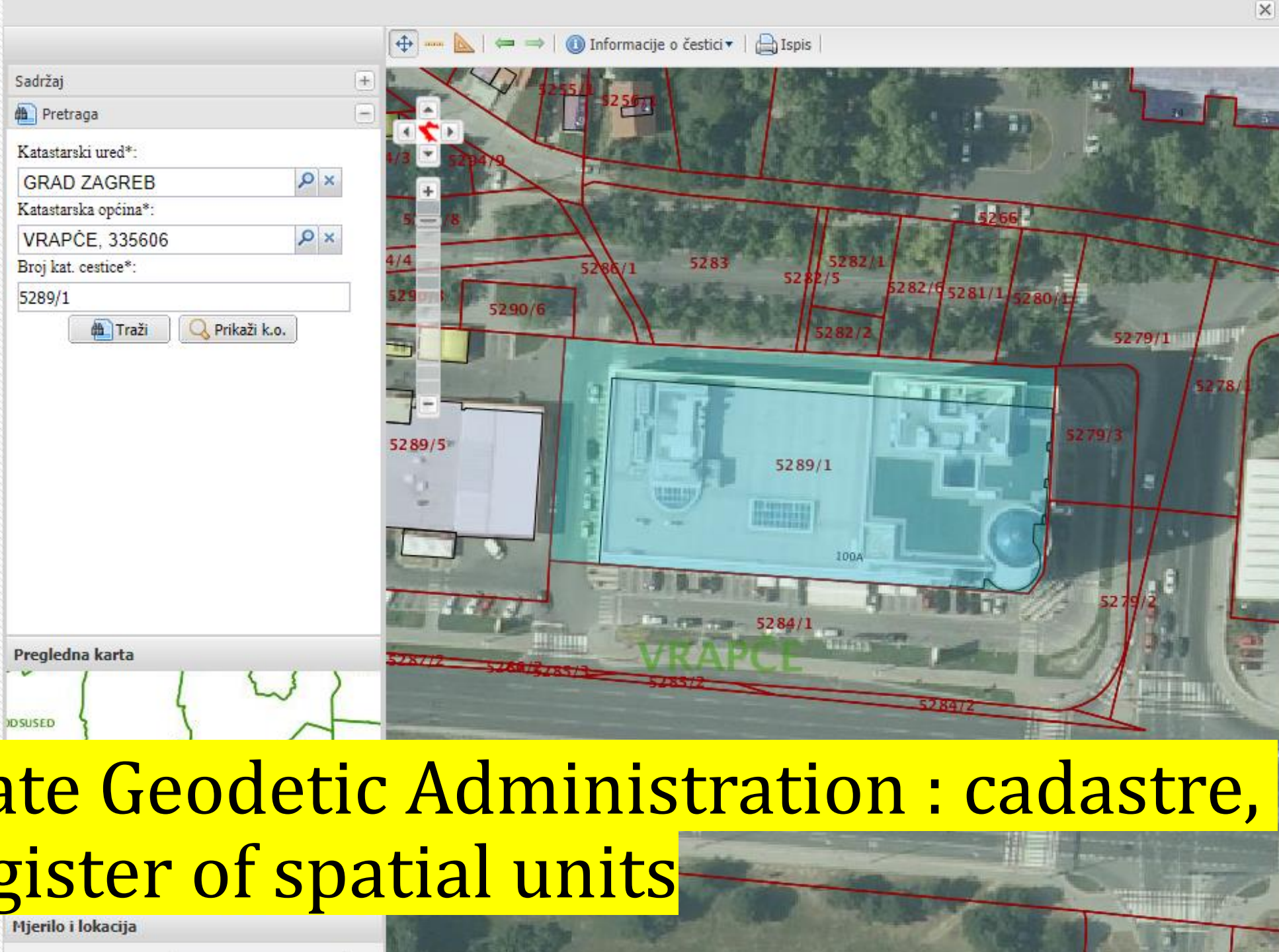


# Analysed official registers / data sources

<b>Authority</b>	<b>Register/data source</b>
State Geodetic Administration (SGA)	<ul style="list-style-type: none"> <li>– Cadastre (Land Book)</li> <li>– Register of spatial units</li> <li>– Utility cadastre</li> </ul>
Judicial Authority/Ministry of Justice	<ul style="list-style-type: none"> <li>– (Cadastre) Land Book</li> <li>– Register of non-natural persons</li> </ul>
Tax Administration (TA)	<ul style="list-style-type: none"> <li>– Register of personal identification numbers</li> <li>– Collection of real property purchase prices</li> </ul>
Ministry of Public Administration	<ul style="list-style-type: none"> <li>– Register of natural persons</li> </ul>
Ministry of Construction and Physical Planning	<ul style="list-style-type: none"> <li>– Physical Planning Information System (Register of physical planning documentation)</li> <li>– Register of buildings energy certificates</li> <li>– Real Estate Market Information System</li> </ul>
Ministry of Agriculture	<ul style="list-style-type: none"> <li>– Register of agricultural land parcels: Land Parcel Information System (LPIS, Croatian abbrev.: ARKOD)</li> </ul>
Local authorities	<ul style="list-style-type: none"> <li>– Communal fee data</li> </ul>
Croatian Bureau of Statistics	<ul style="list-style-type: none"> <li>– Price trends and indexes, regional development index (RDI)</li> </ul>





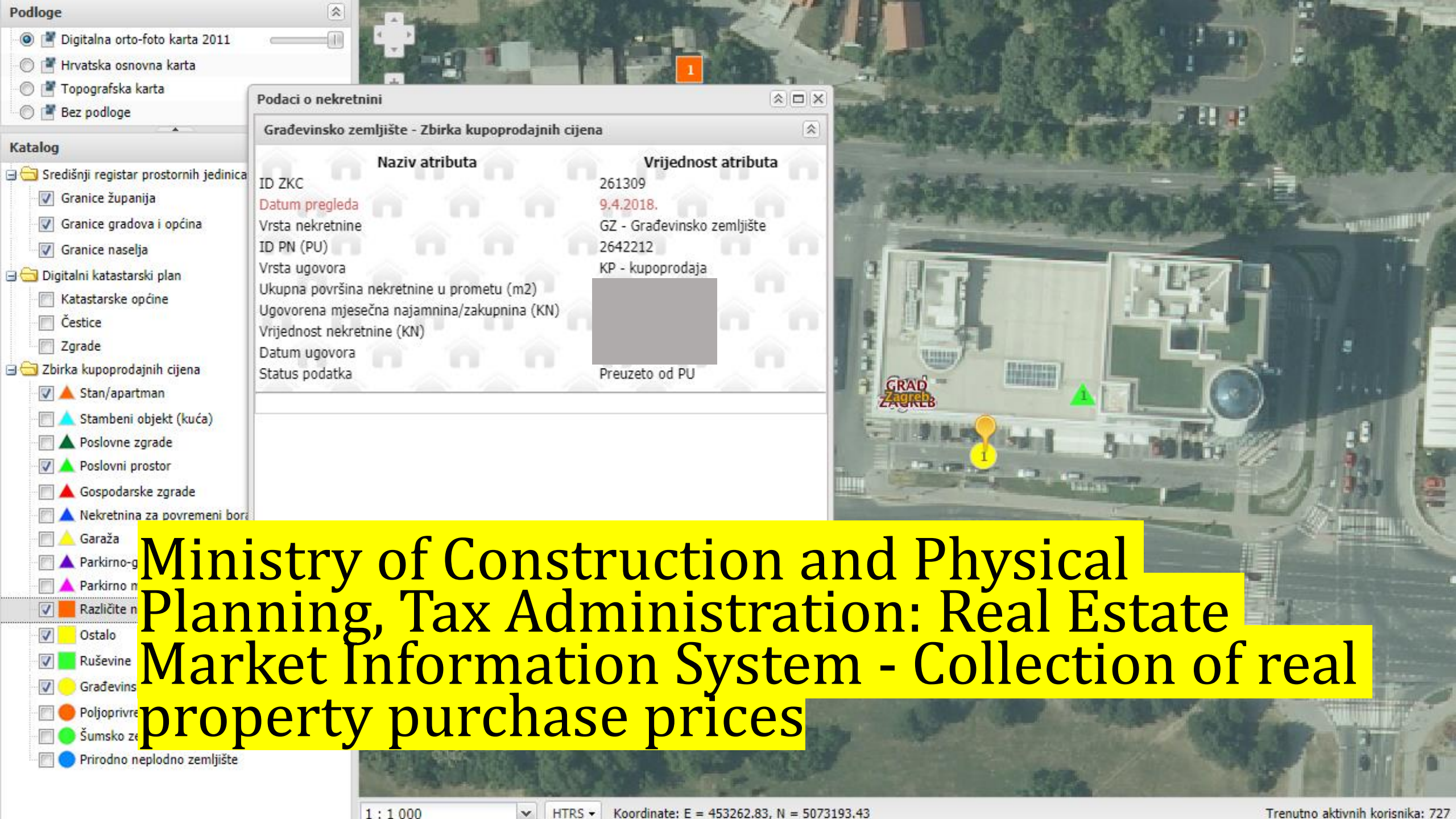


State Geodetic Administration : cadastre,  
register of spatial units



State Geodetic Administration : cadastre, register of spatial units








Ministry of Construction and Physical Planning, Tax Administration: Real Estate Market Information System - Collection of real property purchase prices

# TUMAČ PLANSKOG ZNAKOVLJA










## I. POVRŠINE ZA RAZVOJ I UREĐENJE

### GRABEVINSKO PODRUČJE NASELJA

	Izgrađeni dio građevinskog područja
	neizgrađeni dio građevinskog područja
	neuređeni dio građevinskog područja

neuređeni dio

### GOSPODARSKA NAMJENA

		mješovita gospodarska namjena*
		proizvodne namjene
		poslovna namjena (K1-prelažito uslužna, K2-prelažito trgovačka, K3-komunalno servišna)
		ugodila/ska turistička namjena
		poljoprivredno gospodarski kompleks

Ministry of Construction and Physical Planning, Tax Administration: Physical Planning Information System

Rezultati **ARKOD: 1999393**

ARKOD: 1999393

ARKOD ID: 1999393

Šifra: 200

Uporaba zemljišta: Oranica

Domaće ime: VRT

Površina: 0.19 ha

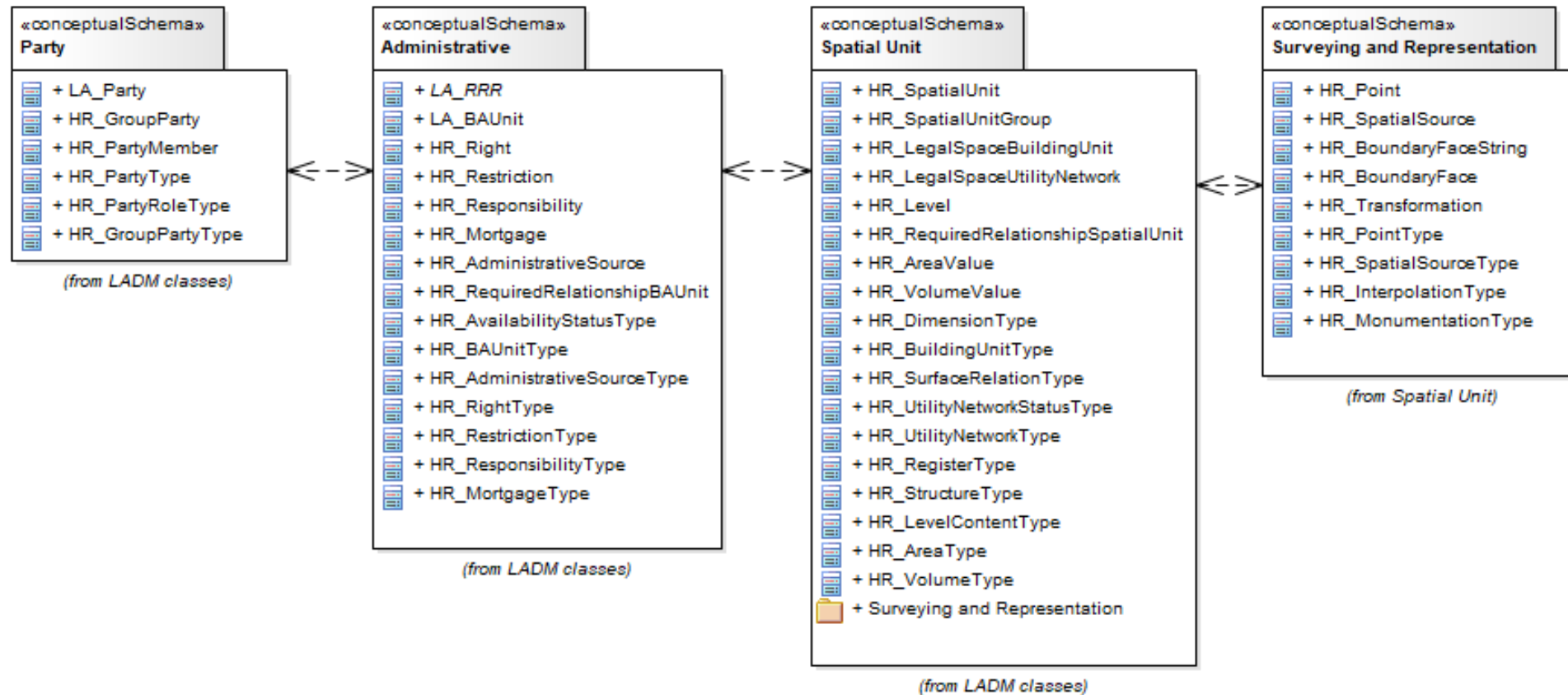
Trajni travnjaci 2015: Ne

Naziv gospodarstva: ?



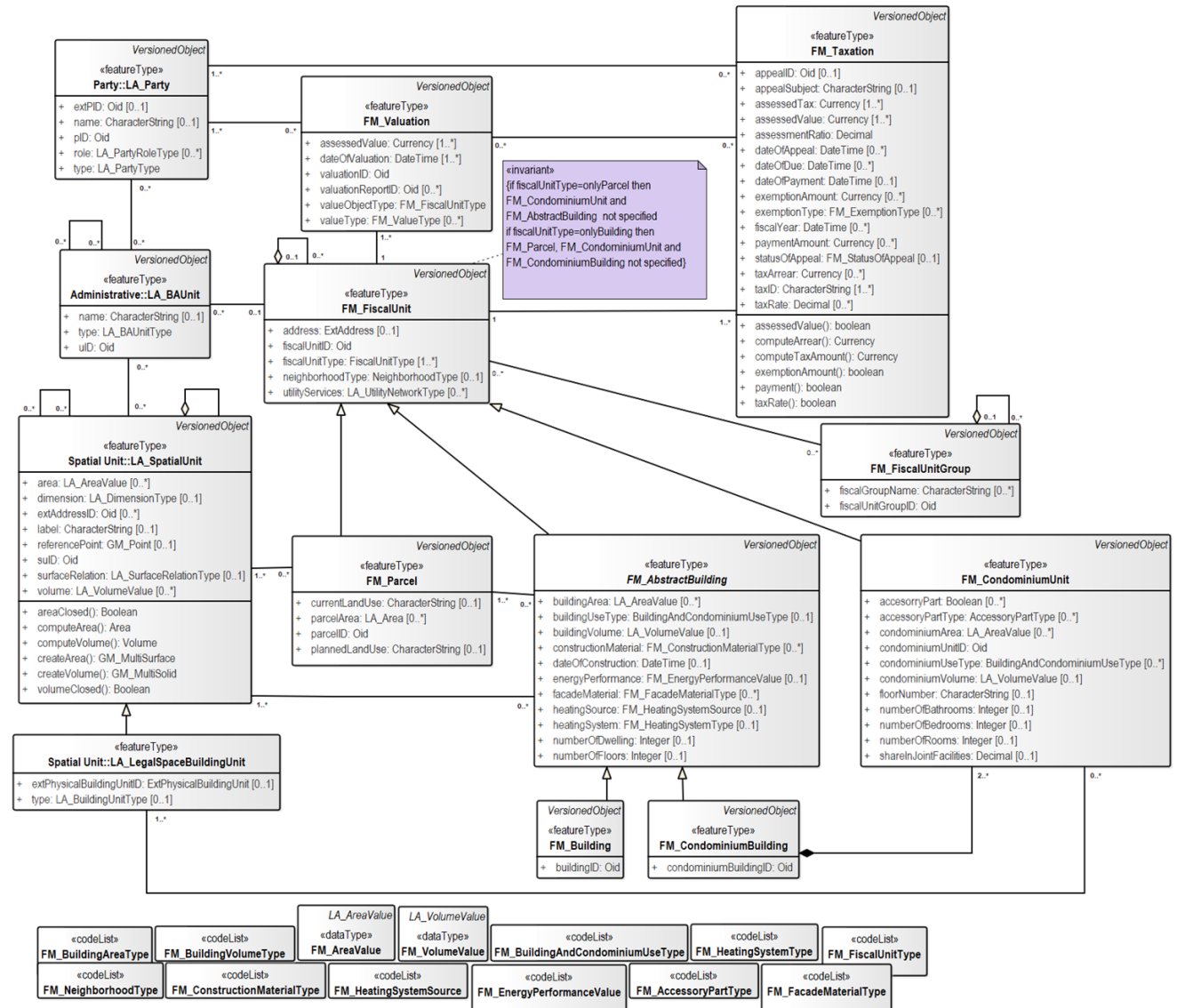
Ministry of Agriculture (agricultural land parcels): Land Parcel Information system LPIS – Croatian abbrev.: ARKOD

# Croatian LADM profile (Vučić et al. 2012)



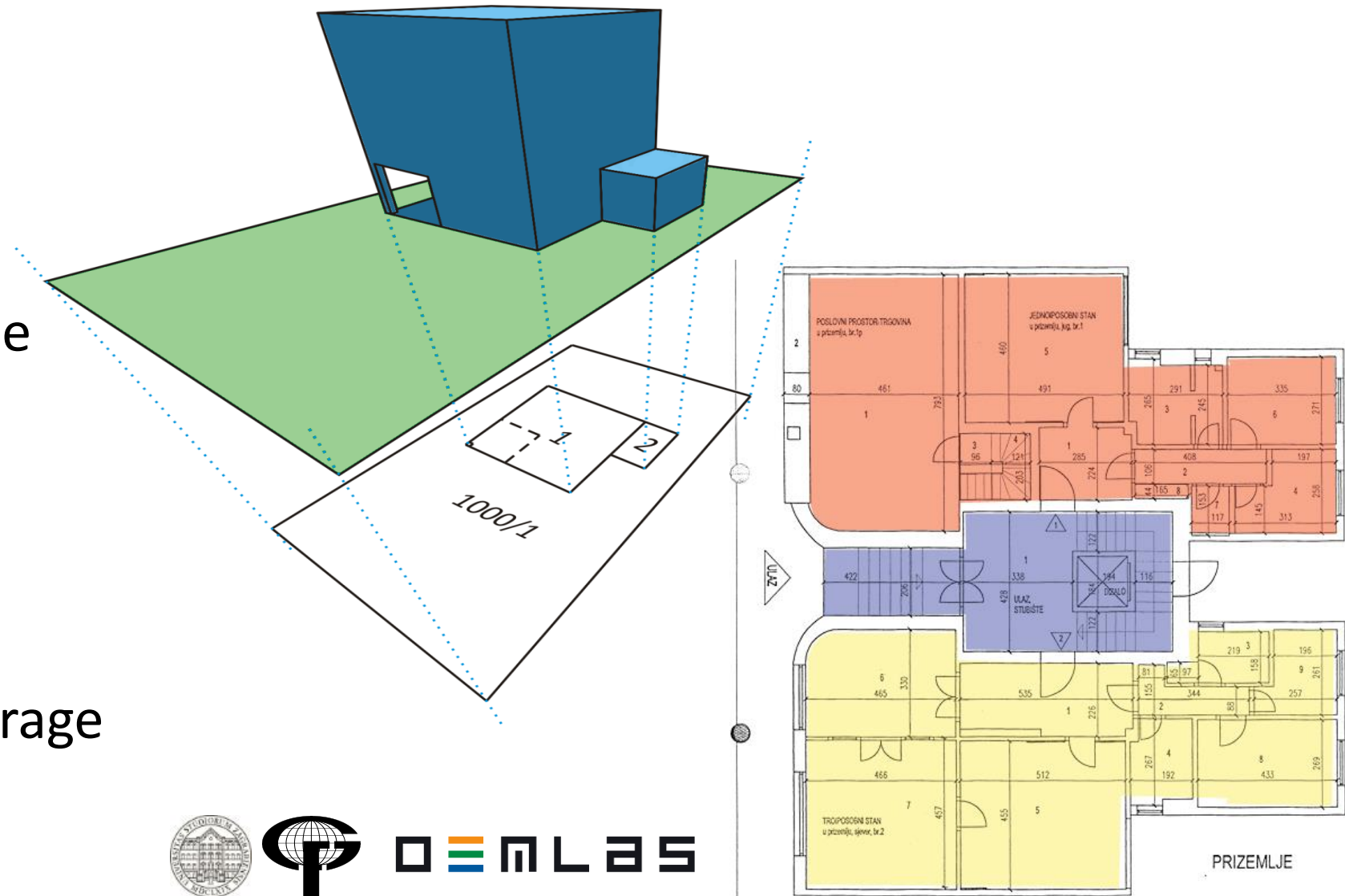
# LADM valuation/taxation fiscal extension (Çağdaş et al. 2016)

- Main classes:
  - FM\_Valuation
  - FM\_Taxation
  - FM\_FiscalUnit



# Real property classification (taxation purpose)

- Agricultural land
- Forest land
- Building land
- Single-family house
- Residential condominium
- Commercial condominium
- Parking space / garage





# Valuation indicators 1/2

Agricultural land	Forest land	Building land	Single-family house	Residential condominium	Commercial condominium	Parking space / garage	Attribute	Authority/Register
x	x	x	x	x	x	x	ID	Cadastre (HR_SpatialUnit: label)
x	x	x	x	x	x	x	Purchase price	Ta Administration
x							Land use	LPIS
x	x	x	x	x	x	x	Location	Cadastre (HR_SpatialUnit: referencePoint)
x		x					Shape	Cadastre (HR_SpatialUnit)
x	x	x	x			x	Surface area	Cadastre (HR_SpatialUnit: area)
x							Height above sea level	Cadastre
x							Slope	Cadastre
x							Orientation	Cadastre
x							Soil type	-
x	x						Land cover	Environmental information system (Corine Land Cover)
x							Precipitations	Croatian hydrometeorological institute
x							Number of sunny hours	Croatian hydrometeorological institute
x	x						Improvements	-
	x						Wood mass	-
		x	x				Utility infrastructure	Cadastre (Utility cadastre)
		x	x		x		Zone	Physical Planning Information System
		x	x				Buildable area	Physical Planning Information System
			x				Number of flats (1–2)	-
			x	x	x		Building surface area	Cadastre (HR_SpatialUnit:usageTypeBuilding)
			x	x	x		Net usable area	Local authorities (Communal fee data)
			x	x	x		Terrace, balcony and loggia area	-
			x	x	x		Surface area of parking space	Local authorities (Communal fee data)
			x	x	x		Surface area of garage	Local authorities (Communal fee data)
				x	x		Elevator	-

# Valuation indicators 2/2

					Land Cover)
x					Precipitations Croatian hydrometeorological institute
x					Number of sunny hours Croatian hydrometeorological institute
x	x				Improvements -
	x				Wood mass -
		x	x		Utility infrastructure Cadastre (Utility cadastre)
		x	x	x	Zone Physical Planning Information System
		x	x		Buildable area Physical Planning Information System
			x		Number of flats (1–2) -
			x	x	Building surface area Cadastre (HR_SpatialUnit:usageTypeBuilding)
			x	x	Net usable area Local authorities (Communal fee data)
			x	x	Terrace, balcony and loggia area -
			x	x	Surface area of parking space Local authorities (Communal fee data)
			x	x	Surface area of garage Local authorities (Communal fee data)
				x	Elevator -
			x	x	Date of construction -
			x	x	Date of last renovation -
			x	x	Energy class Register of buildings energy certificates
			x	x	Number of rooms -
			x	x	Number of bathrooms -
			x	x	Heating type -
				x	Number of flats in the building (3 and more) -
				x	Floor -
				x	Number of floors -
				x	Construction completeness -
				x	Commercial type -
				x	Structure type -
				x	Direct entrance -
				x	Street side -

# FM\_FiscalUnits and related classes matching

Class	Attribute and code list/datatype class	Register
<b>FM_FiscalUnit</b>	fiscalUnitID	Cadastre
	fiscalUnitType: FiscalUnitType	Cadastre
	address	Cadastre
	neighborhoodType: NeighborhoodType	Cadastre
	utilityServices	Cadastre
<b>FM_FiscalUnitGroup</b>	fiscalUnitGroupID	Cadastre
	fiscalGroupName	Cadastre
<b>FM_Parcel</b>	parcelID	Cadastre
	parcelArea: LA_Area	Cadastre
	parcelVolume: LA_VolumeValue	Cadastre
	currentLandUse	Cadastre
	plannedLandUse	Physical Planning Information System
<b>FM_AbstractBuilding</b>	buildingarea: LA_AreaValue	Cadastre/Land Book
	buildingVolume: LA_VolumeValue	-
	buildingUseType: BuildingAndCondominiumUseType	Cadastre/Land Book
	numberOfDwelling	-
	numberOfFloors	-
	dateOfConstruction	-
	constructionMaterial: FM_ConstructionMatherial	-
	facadeMaterial: FM_FacadeMaterialType	-
	heatingSystem: FM_HeatingSystemType	-
	heatingSource: FM_HeatingSystemSource	-
	energyPerformance: FM_EnergyPerformance	Register of buildings' energy certificates
<b>FM_Building</b>	buildingID	Cadastre/Land Book
<b>FM_CondominiumBuilding</b>	condominiumBuildingID	Cadastre/Land Book
<b>FM_CondominiumUnit</b>	condominiumUnitID	Land Book
	condominiumArea: LA_AreaValue	Land Book
	condominiumUseType: BuildingAndCondominiumUseType	Land Book
	condominiumVolume: LA_VolumeValue	-
	floorNumber	-
	accessoryPartType: AccessoryPartType	-
	shareInJointFacilities	Land Book
	numberOfRooms	-
	numberOfBedrooms	-
	numberOfBathrooms	-

# FM\_Valuation and related classes matching

Class	Attribute and code list/datatype class	Register
<b>FM_Valuation</b>	valuationID	-
	valuationReportID	-
	dateOfValuation	-
	valueType: FM_ValueType	-
	valueObjectType: FM_FiscalUnitType	-
<b>FM_SinglePropertyAppraisal</b>	assessedValue	-
	valuationBySalesComparisonMethod: FM_SalesComparisonMethod	Tax Administration
	valuationByIncomeMethod: FM_IncomeMethod	Tax Administration
<b>FM_MassAppraisal</b>	valuationByCostMethod: FM_CostMethod	Tax Administration
	mathematicalModel	-
	sampleSize	-
	analysisType: MassAppraisalAnalysisType	-
	performanceIndicator: FM_MassAppraisalPerformanceIndicator	-
<b>FM_TimeSeriesData</b>	estimatedValueByMassAppraisal	-
	analysisID	-
	dateOfAnalysis	-
	averagePricePerSquareMeter	-
	basePriceIndex	-
	dateOfPriceIndex	-
	priceIndex	-
<b>FM_TransactionPrices</b>	dateOfPriceIndex	-
	contractOrDeclaration	Tax Administration
	dateOfContractOrDeclaration	Tax Administration
	transactionPrice	Tax Administration
	typeOfTransaction: FM_TypeOfTransaction	Tax Administration

# Conclusion

- Most of the LADM\_FM attributes were matched, only few are found to be missing:
  - valuation of agricultural land - height above sea level, slope, orientation, soil type, precipitations, number of sunny hours)
  - condominium and single-family houses characteristics - area of terrace, balcony and loggia, surface area of parking space, surface area of garage, elevators
- High level of compliance was confirmed



Thank you for your attention!

# Are Croatian Official Registers complying with the LADM Fiscal/Valuation Extension?

Hrvoje TOMIĆ, Siniša MASTELIĆ IVIĆ, Miodrag ROIĆ, Goran JURAKIĆ

