



UNWTO SUSTAINABLE DEVELOPMENT OF TOURISM DEPARTMENT

TECHNICAL INSTO WEBINAR ON:

## SOLID WASTE MANAGEMENT

THURSDAY, 24 MARCH 2022, TIME: 12PM (CET)

# DPSIR waste management framework and monitoring approach

Izidora Marković Vukadin, PhD



godina / anniversary

## CROSTO at glance

- CROatian Sustainable Tourism Observatory
- Established in 2016
- Member of INSTO from 2016
- NUTS 2 level Adriatic Croatia
- 15 core indicators (ETIS+UNWTO)
- NUTS 2 level measurements from 2017
- Destination level measurements from 2018 (12 destinations)



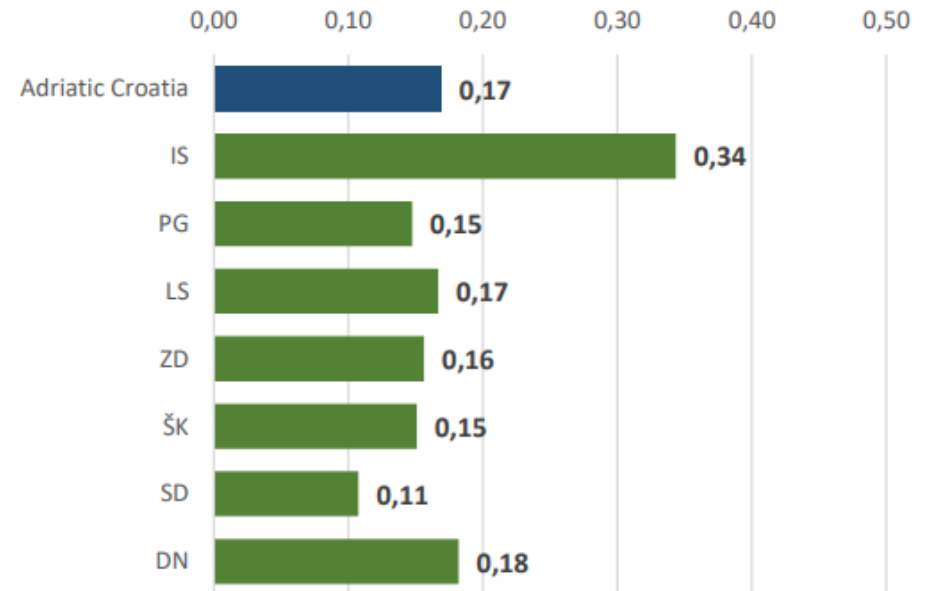
# CROSTO indicator list

## CROSTO core indicators

	UNWTO mandatory issue	ETIS section
Percentage of residents who are satisfied with tourism	Local satisfaction with tourism	C Social and cultural impact
Number of tourist nights per 100 residents		
Percentage of tourists who are satisfied with overall experience		A Destination management
Percentage of repeat/return tourists		
Percentage of tourism enterprises using voluntary certification/labelling for environmental CSR		
Number of tourist nights	Destination economic benefits	B Economic value
Daily spending per tourist overnight		
Direct tourism employment as percentage of total employment	Employment	
Gross annual occupancy rate in commercial accommodation	Tourism seasonality	
Energy consumption per tourist night compared to general population energy consumption per resident night	Energy management	D Environmental impact
Water consumption per tourist night compared to general population water consumption per resident night	Water management	
Percentage of sewage from a destination treated to at least secondary level prior to discharge	Waste water (sewage) management	
Waste production per tourist night compared to general population waste production per resident night	Solid waste management	
Percentage of destination area out of the settlement's boundaries built for tourist purposes	Governance	
Percentage of the destination area within the construction zone of the settlement where the facilities of catering and tourist purposes	Governance	

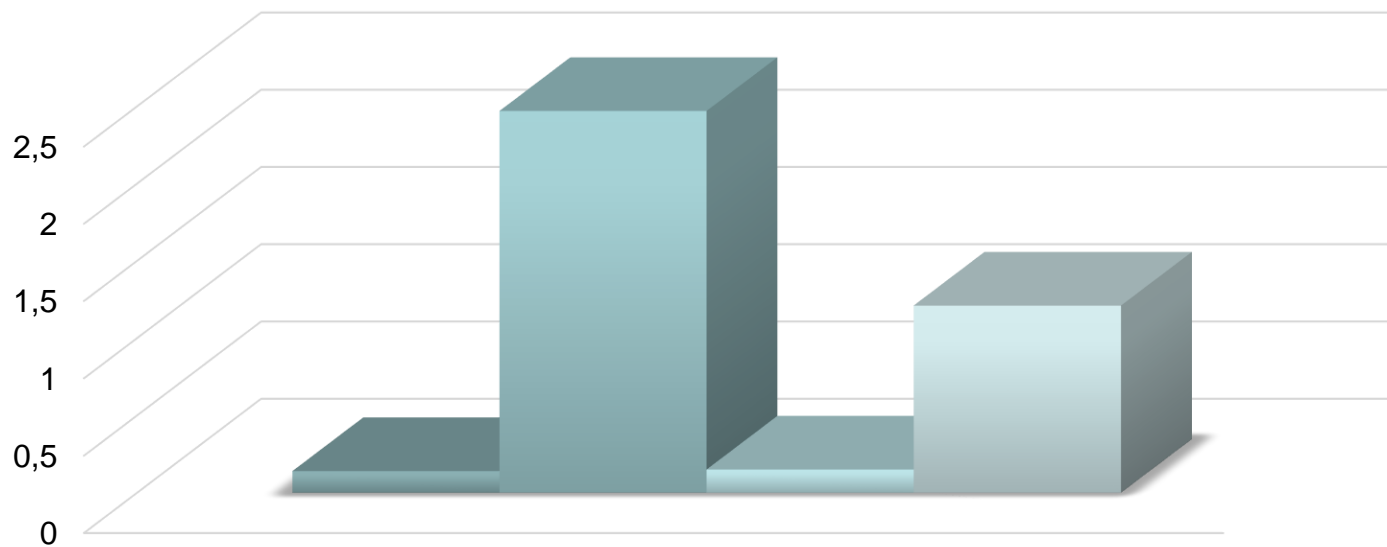
## Waste production by tourists in relation to residents' waste production

- Based on total amount of solid waste produced in 2019, number of residents and number of tourists overnights in 2019
- Limitations:
  - Includes only commercial accommodation
  - Patterns of consumption



Counties: IS Istria, PG Primorje-Gorski Kotar, LS Lika-Senj, ZD Zadar, ŠK Šibenik-Knin, SD Split-Dalmatia, DN Dubrovnik-Neretva

# Comparison of regional and local level



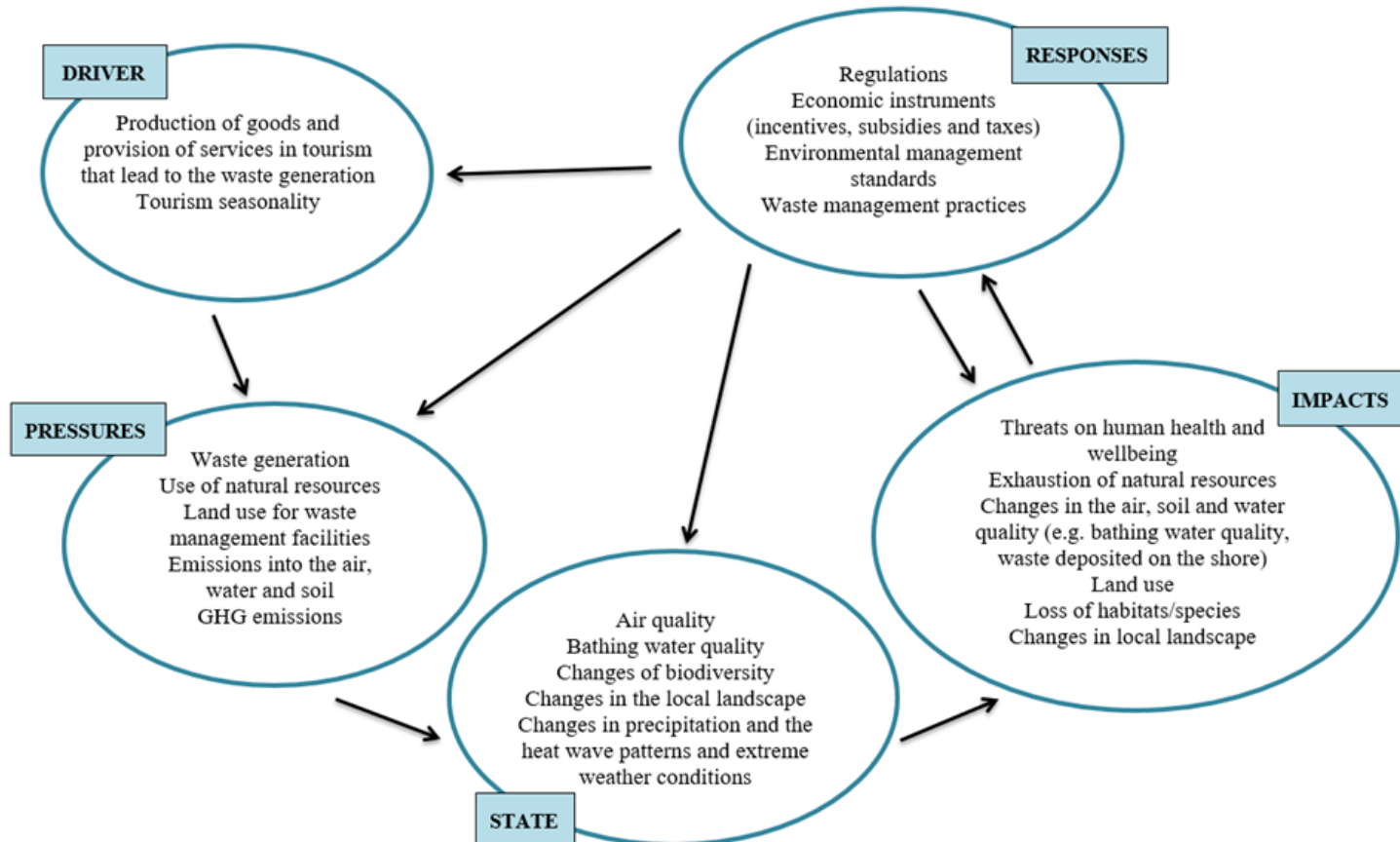
The production of municipal waste by tourists compared to the production of municipal waste by permanent residents

■ LSŽ ■ Novalja ■ DNŽ ■ Dubrovnik

# Waste management DPSIR framework

- When selecting DPSIR elements, some of the basic issues from which their selection arises were:
  - Who produces waste?
  - Who manages waste?
  - What quantities of waste are generated?
  - In what way is tourism, especially seasonality, a driver?
  - What are successful responses in waste management?

# The DPSIR framework for waste management issues in tourism





## Additional waste indicators-

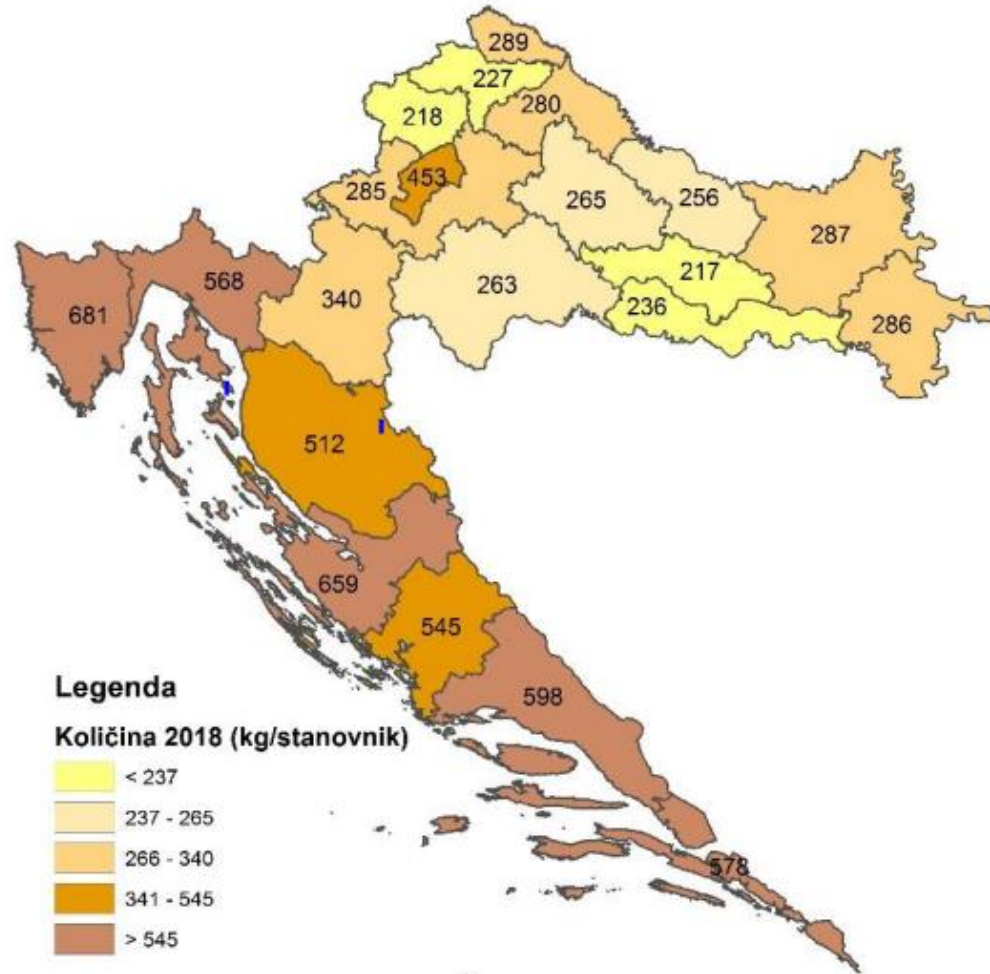
### *Municipal waste from stationary tourism in Adriatic Croatian counties*

Year	Quantities of municipal waste from stationary tourism in coastal Croatian counties (t)	Share of municipal waste from stationary tourism in coastal counties in total municipal waste generated in Croatia (%)	Equivalent to No. of residents
2014	99.149	5,4	259.552
2015	112.111	6,0	290.444
2016	135.396	8,3	345.848
2017	148.432	9,1	356.807
2018	159.332	9,3	368.823



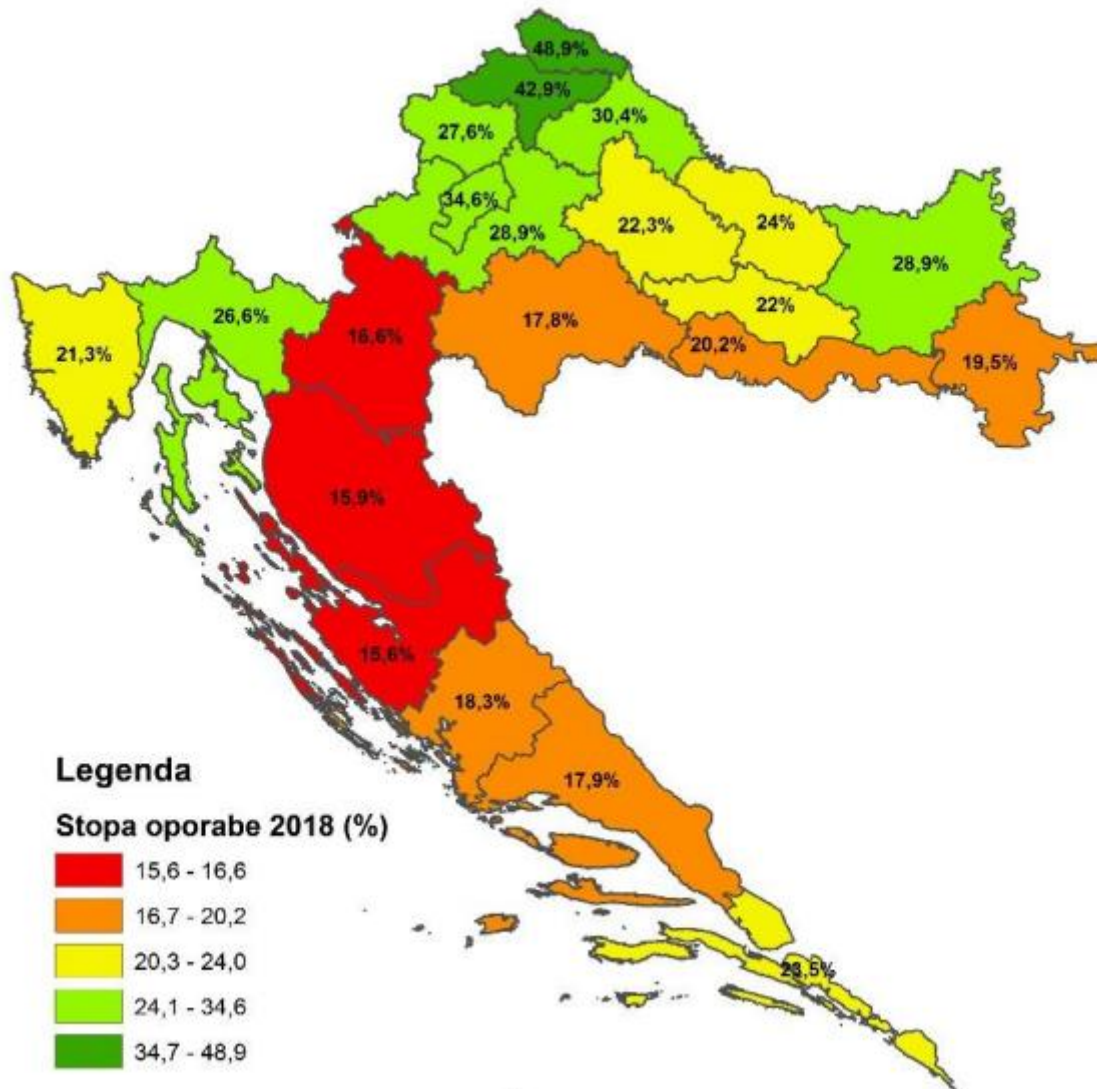
# Generated waste per County

Specific quantities of generated municipal waste in 2018 by counties, kg / inhabitant

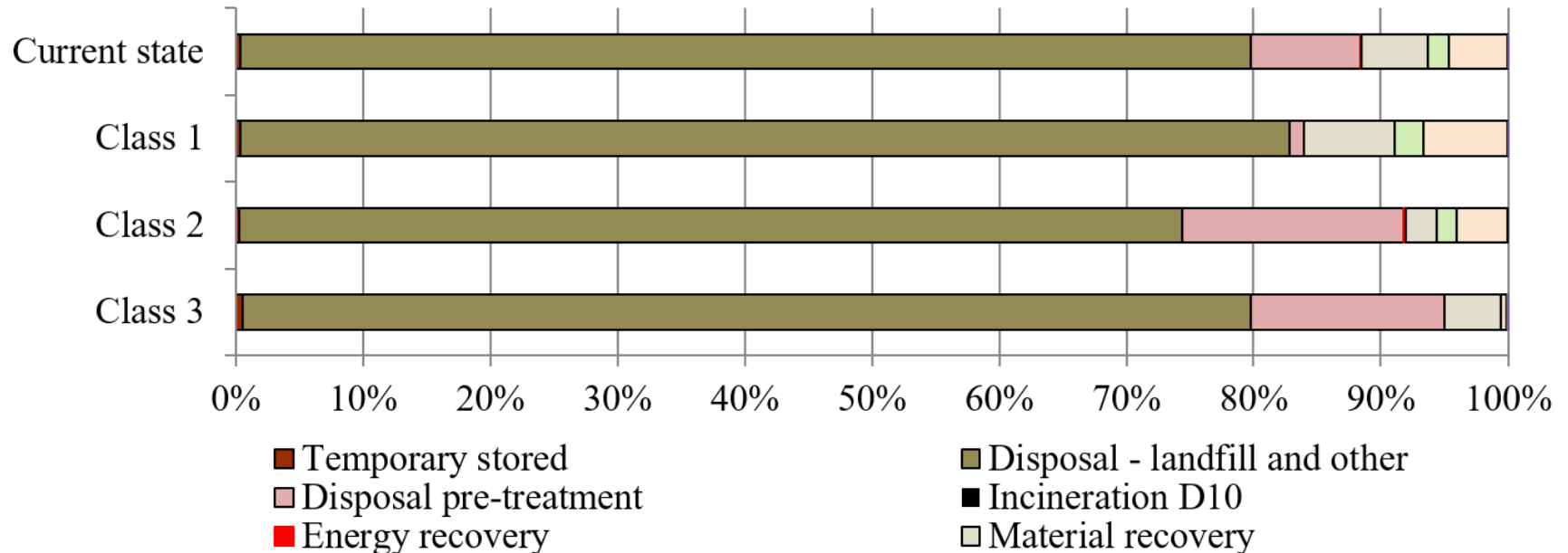


# Waste recovery

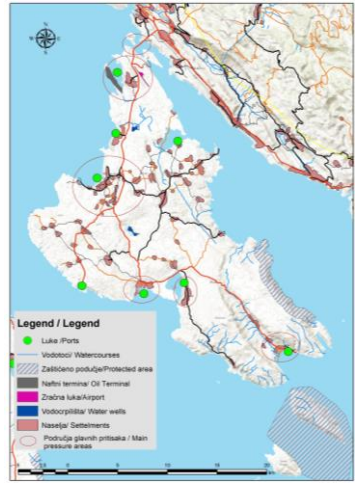
Municipal waste recovery rate by counties with additionally determined quantities in 2018



# Municipal waste management scenarios in Adriatic Croatian counties in 2019



# The DPSIR framework for environmental issues on the Island of Krk



## DRIVERS

Industry & development  
 Tourism seasonality & Recognized weekend destination  
 Concentration of the overall Croatian tourist demand  
 Littoralisation – Apartmentizations, Urbanization & Touristification  
 Facilities and infrastructure demand  
 Transport & Transit Island (nautical tourism, public roads)  
 Critical zones: Omišalj Port and Economics Zone (petrochemistry, pipeline), Airport Rijeka, Valbiska Port, country road and Krk bridge

## RESPONSES

Regulations  
 Cooperation between local authorities  
 Economic Instruments (incentives, subsidies, taxes)  
 Environmental management standards  
 Waste management practices  
 Sustainable management plans and programmes Innovative sustainable /  
 Education and reporting  
 Awareness and behavior  
 Long-term vision and programmes: Energy Independent and Smart Island

## PRESSURES

Tourism, construction & infrastructure intensity  
 Tourism activities concentrated on the coast  
 Pollution – Emission into the air, water and soil  
 Waste management & water supply and drainage & electricity system load (abstractions of resources)  
 Excessive use of recreational resources  
 Diffuse source pollution (high car traffic)  
 Land use for waste management facilities

## IMPACTS

Threats on human health and well-being  
 Wildlife, biodiversity and forests  
 Exhaustion of natural resources

## STATE

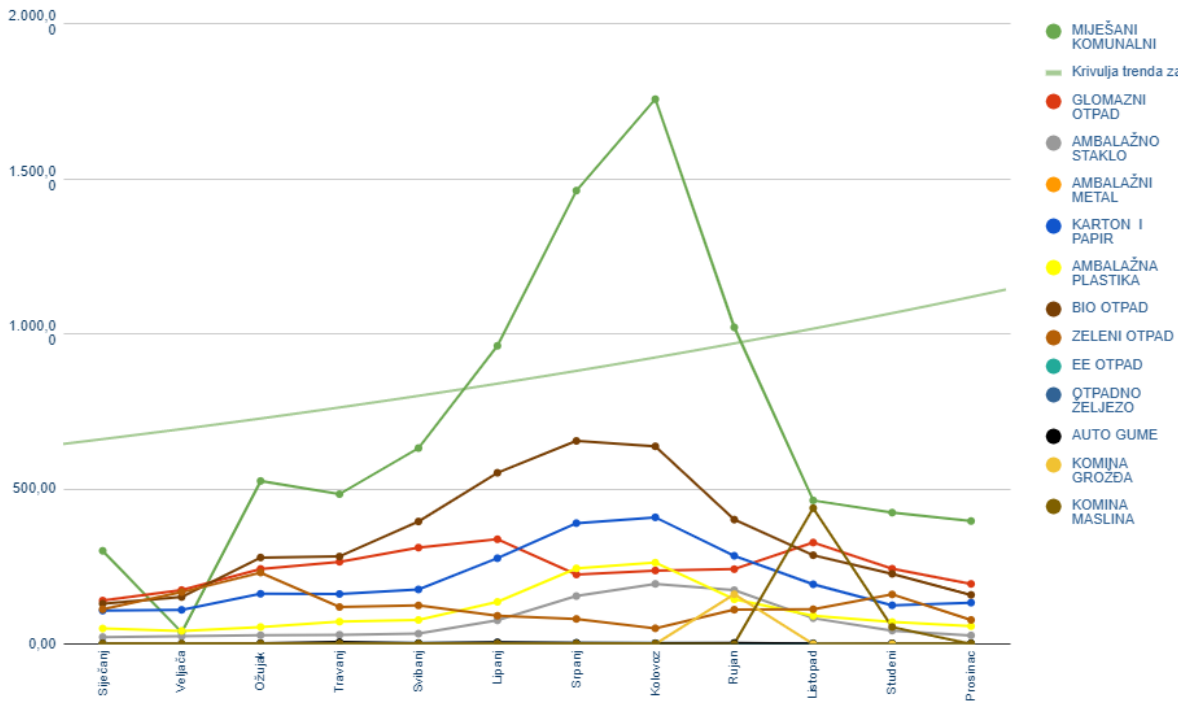
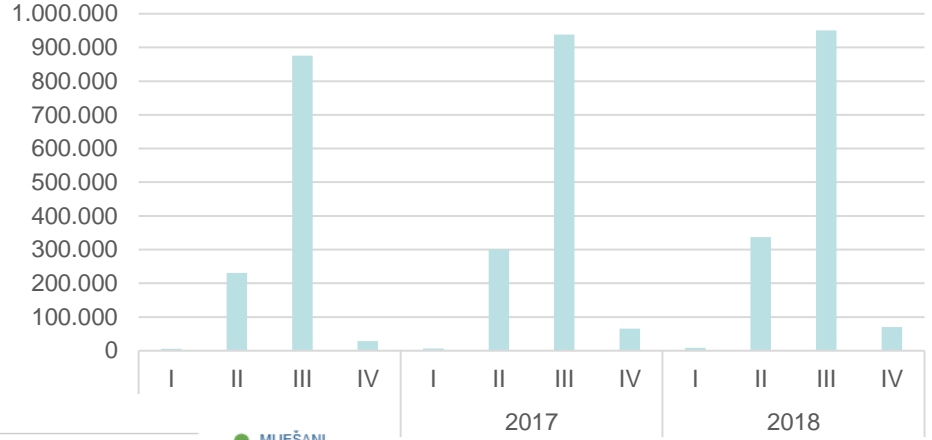
Air, sea, soil, bathing water quality  
 Noise and light pollution  
 Accidents  
 Lack of sewer connection  
 Limited wated supply  
 Changes in the water quality  
 Coastal erosion & CO<sub>2</sub> emission

Source: Zovko et al., 2021

# Krk example

One of the 10 best European eco-islands with the plan to become the first energy-independent green Mediterranean island with 'zero CO2 emission'

No. of commercial overnights on the Island of Krk



Quantities of separately collected waste in tons, in 2021 (by months and by types)

## Krk example - Society responses

- In 2005 (company Ponikve d.o.o.) established an ecological waste management system on the entire island
- The project Door-to-Door has been implemented with the aim of increasing the level of recycling and separation of collected municipal waste
- In 2019 the share of the separated waste exceeded more than 55% of total quantities of municipal waste
- The success of the company Ponikve d.o.o. is the result of long-term quality cooperation with local leadership, municipal wardens, local associations, and the population



# Krk example - Society responses

- The almost zero waste vision of the Island of Krk is presented through various educational and incentive programs:
  - Island Flower
  - Donating compost to households
  - Sharing pocket waste bins
  - Eco workshops and cleaning activities
  - Promotional and educational materials on recycling
- The success of the program Eco Island of Krk can be attributed to the active and permanent participation and conscientious behavior and awareness of the business sector



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Vreću možete preuzeti besplatno u navedenim razdobljima **od 9:00 do 17:00 sati** na reciklažnom dvorištu Treskavac:  
**17.-19.3. | 6.-9.4. | 25.-30.4. | 26.-28.5. 2022. god.**

Analizu komposta možete pogledati na našoj web stranici [www.ekootokrkk.hr](http://www.ekootokrkk.hr) pod stavkom "Dokumenti"

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# CROSTO

**THANK YOU FOR YOUR ATTENTION**

Izidora Marković Vukadin,  
[Izidora.markovic@iztztg.hr](mailto:Izidora.markovic@iztztg.hr)

Institute for Tourism  
Vrhovec 5  
10 000 Zagreb  
CROATIA

[www.iztztg.hr](http://www.iztztg.hr)  
[www.crosto.hr](http://www.crosto.hr)