



Piran Coastal City Living Lab (CCLL): Challenges and Opportunities

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Introduction

PIRAN Coastal City Living Lab (CCLL) is located on the Slovenian coast in the southwest of the country. The town of Piran has roughly 3,800 inhabitants. The population of the entire municipality of Piran that extends into the hinterland is 18,500. Since it is located right next to Mediterranean Sea, the town is popular among tourists and many apartments are owned by non-permanent residents (from other parts of Slovenia or abroad) and the town population substantially differs between off season in winter and high season in summer.

Piran, known as “the city of salt”, is a relatively small town with a rich cross-cultural history along the Adriatic coast. For more than 500 years Piran was part of the Republic of Venice, which is pronounced in the town’s architecture. The city’s coastal position in combination with its cultural heritage are the main attraction for tourism.



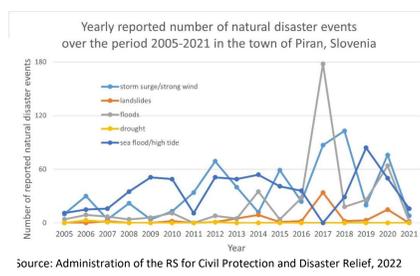
Author: Jasna Kumer, 2022

MAIN CLIMATE CHANGE RELATED ISSUES

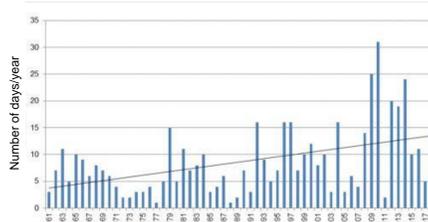
Water scarcity

The Slovenian coastal area has always faced the water scarcity. Particularly problematic is the summer tourist season when a rise in the demand for fresh water is evident. The main source of fresh water for the entire Slovenian coast including Piran, is from the river Rižana (since 2012 in combination with water source Sečovlje), which is characterized by low water level in summer (due to climate change critically low water levels have been identified over the past decades). Rižana originates in the geological intersection between flysch and limestone. This source of fresh water is threatened by risks of pollution along the main transport routes through old railway as well as motorway infrastructure, and there is no reliable alternative source of fresh water for the area.

The operator managing the public water system (Rižanski vodovod Koper) tries to replace the missing seasonal capacities with buying water from neighboring water systems (from Karst and from Croatian Istria). In the future due to increasing frequency of heatwaves and droughts neighboring water systems won’t be able to provide the missing water supplies. They will face their own rising demands and the influence of climate change.



Source: Administration of the RS for Civil Protection and Disaster Relief, 2022



Frequencies of extreme sea water level (in blue) and the trend (in black) in period 1961-2018 at Koper tide gauge
 Source: Slovenian Environment Agency, 2022

Extreme coastal floods

Extreme water level at the Slovenian coast mostly affects the cultural and historical town of Piran and the saltpan regions, while difficulties may also occur in the port infrastructure and in the marinas.

Along the Slovenian coast, the sea floods an average of 8 to 31 times a year. Between 1961 and 2016, this happened 482 times. The sea mostly floods in autumn and winter, occasionally also in spring.

These events are the consequence of a storm surge (a combination of: the rise of the sea level as a result of southern wind, heavy rain and atmospheric pressure changes associated with a cyclone) and especially in combination with a full moon cause an exceptionally high tide.

However, the rise in frequencies of extreme heights of sea water levels is most likely the consequence of the global sea level rise which has likely an anthropogenic influence (Steffen, Crutzen and McNeil 2007; Spannring and Hawke 2021). On the basis of studies of observed trends in extreme coastal high water levels it is very likely that mean sea level rise will contribute to upward trends in the future. It is expected that the sea on the Slovenian coast will rise by 40 centimeters by the middle of this century, and by 60 to 110 centimeters by the end of the century.

1961



1970



2018



2019



First three photos are part of the archival collection by Igor Štiblj. The author of the last photo is Franjo Kravos

POSSIBLE SOLUTIONS

Solutions mitigating water scarcity

- Drilling for other drinking water sources (water source Malni at Planinsko polje or Klariči at Brestovica), delivering water from Italian water systems, and building new accumulation dams (Pinjevec on river Dragonja or dam on river Padež/Suhorca) are outdated solutions which are not aligned with ecosystem-based approaches (EbA) and do not represent eco-friendly or sustainable option. They also don’t help the citizens become responsible for their own water use.
- Replacing the back-up water sources with seawater desalination is high-end and ill-favoured solution. There is no suitable location to build it. The technologies used in water desalination are also accompanied by adverse environmental effects (see i.e. Sadhwani et al, 2005).
- **SCORE solutions for (grey) water reuse (such as hand basin to toilet bowl) represent the best EbA so far introduced.**

Solutions mitigating extreme coastal floods

- The 14 million euros worth flood prevention barrier that should prevent the intrusion of sea water during high tides has not been approved by a certain part of the local community. They strongly oppose the plan because it can supposedly harm the waterscape of Piran and affect its tourist attractiveness, and besides block the outflow of the groundwater rising from below Piran.
- **SCORE’s CCLL-proposed EbA is the most appropriate, locally suitable and selected through SCORE’s socio-economic assessment of adaptation measures to climate change.**

