Project: “Monitoring Sea-water intrusion in coastal aquifers and Testing pilot projects for its mitigation” Interreg CBC Italy-Croatia 2014.-2020.

Priority Axis: Safety and resilience

Specific objective: Improve the climate change monitoring and planning of adaptation measures tackling specific effects, in the cooperation area

(D_5.1.2) Guidelines with the actions related to the salt water intrusion mitigation developed

Work Package 5: Transferring

Activity 1: Neretva plan of adaptation

Partner in charge: PP4 (UNIST-FGAG)

Partners involved: PP4 (UNIST-FGAG), PP5 (CROATIAN WATERS), PP6 (DUNEA)

Final version

Public report

September, 2022

Contents

Analysed scenarios and synthesis

To ensure capability for the sustainable management of the water bodies within the Neretva project area and reliable “cause – solution” decision making, hereby we ensure insight to processes led towards the data base which enabled relevant and up to date conclusion on the sea water intrusion and its mitigation along the Neretva study area.

After starting MODFLOW simulation preliminary results were obtained. Figure 1 shows head values on surface layer and there is possible to see great impact of drain channels on lowering head values on the surface of the model in the middle of River Neretva Valley and southeast from Mala Neretva. Head values are in interval between 0.52 and -2.8 m.

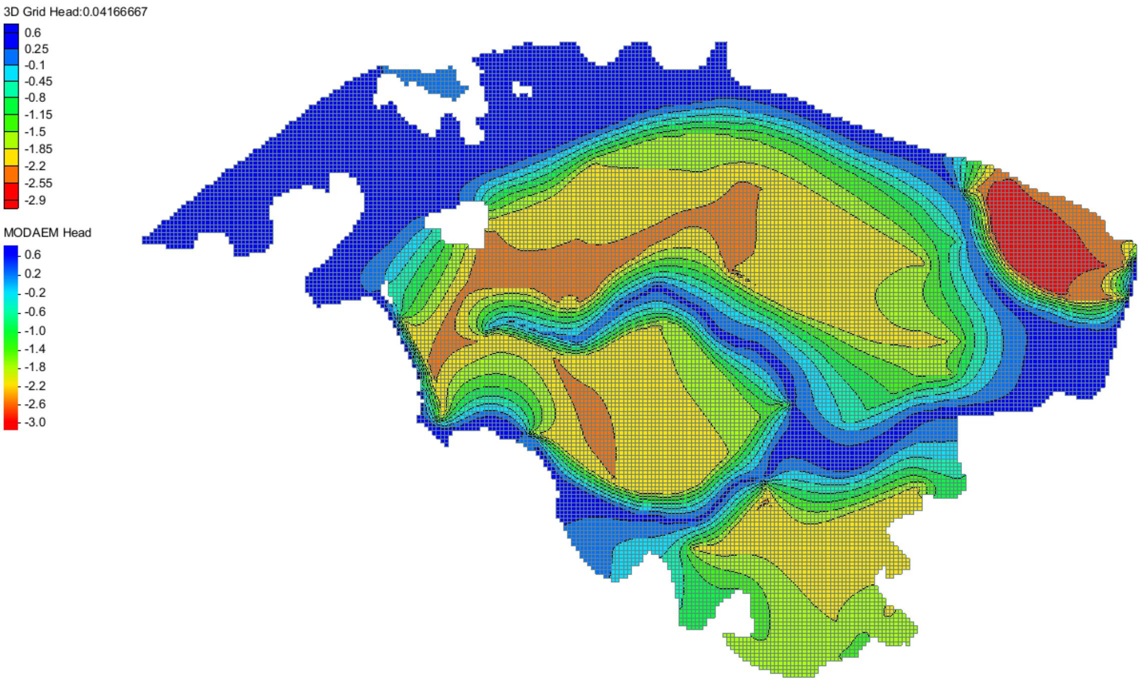


Figure 1 MODFLOW results for surface layer

Figure 2 shows head values in gravel layer on depth around 40 m. There is no influence of drain channels in layers below clay on depth around 10 m. Head values are in interval between 0.5

and 0.3 m and are under influence of CHD sea boundary condition and specified flow (Opuzen boundary condition).

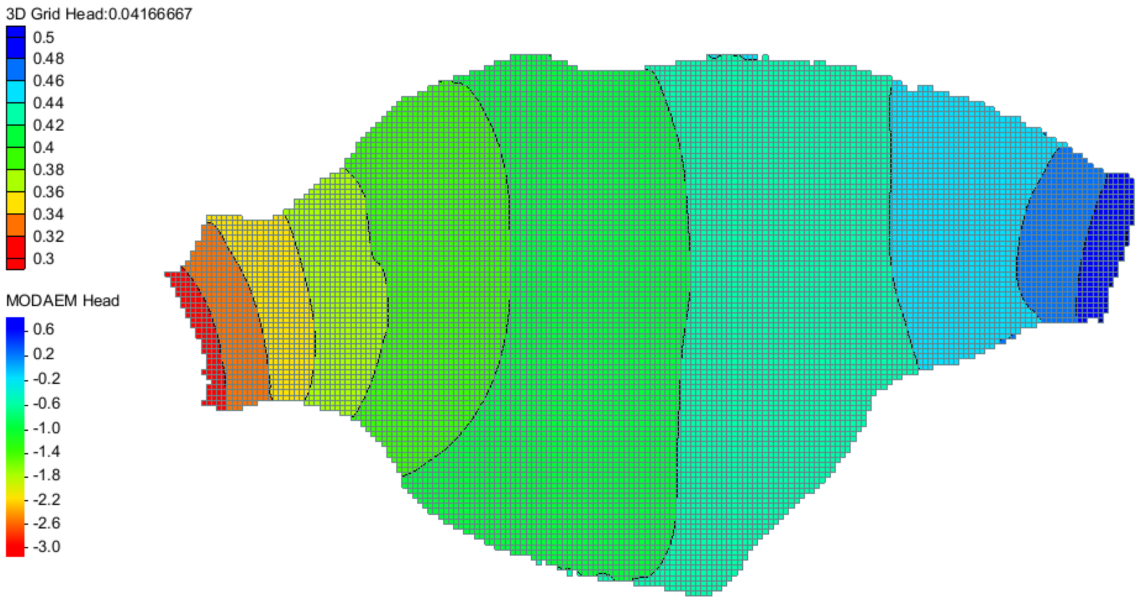


Figure 2 MODFLOW head results for gravel layer

Transient flow results

Measurements from tide gauge and limnigraph were taken as time variant head boundary condition for seawater and River Neretva. Opuzen boundary condition was defined as time variant specified flow. Head values from pumping stations Prag-Vidrice and Modrič were taken as time variant head boundary for Mala Neretva and channels.

Next figures are showing head results in specified times of simulation. Data range is the same for all figures.

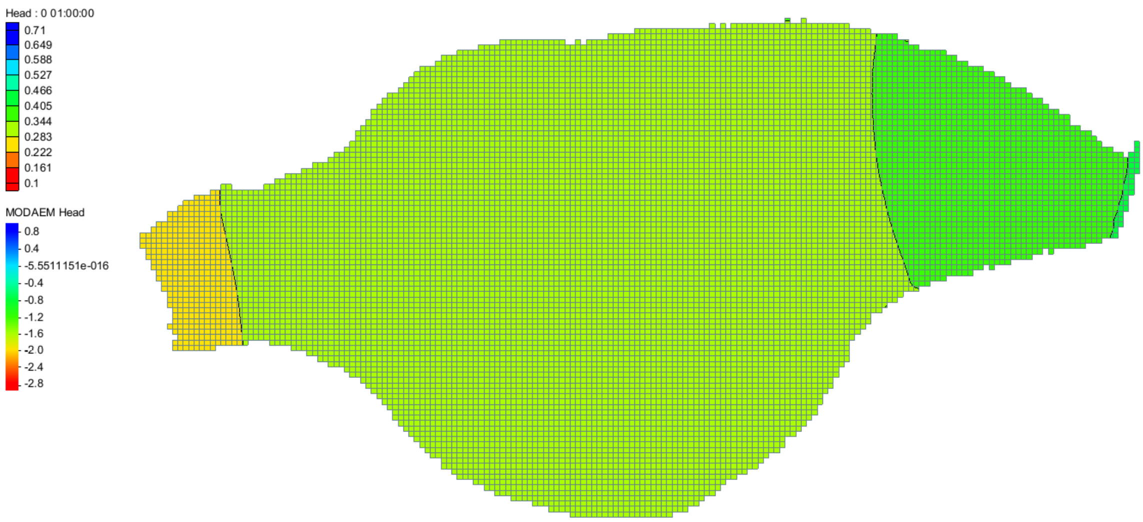


Figure 3 Transient flow head results after 1 h

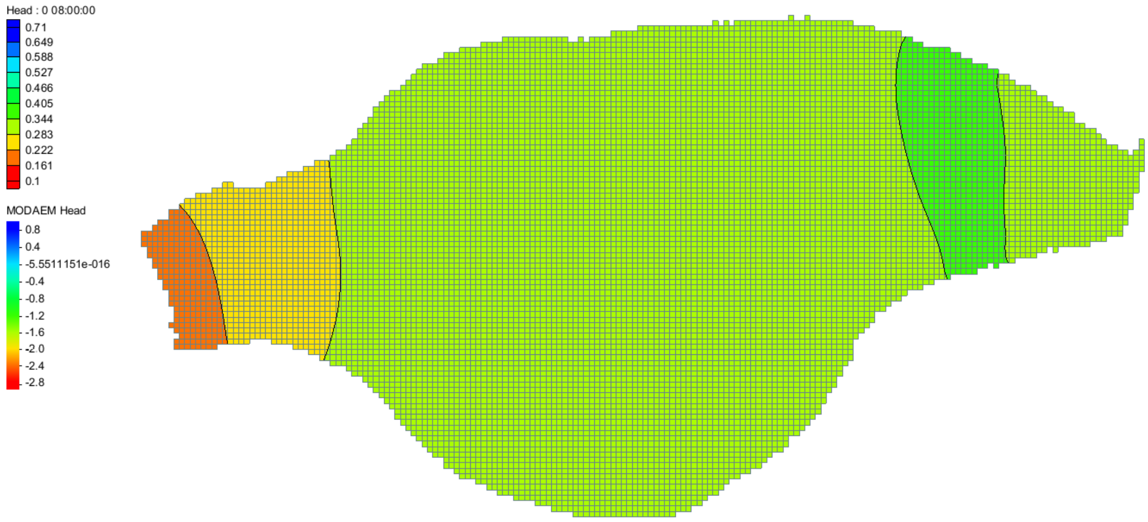


Figure 4 Transient flow head results after 8 h

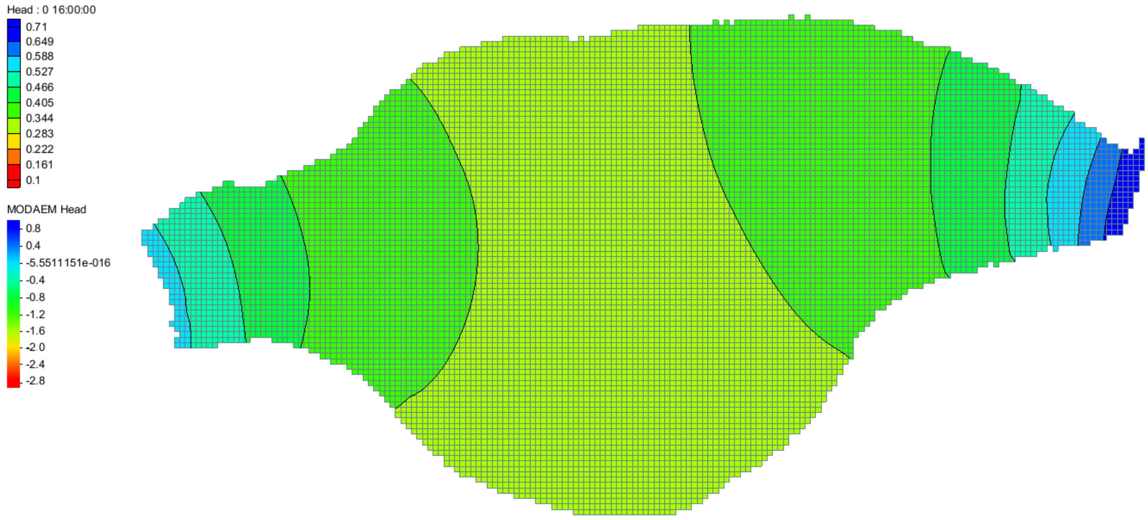


Figure 5 Transient flow head results after 16 h

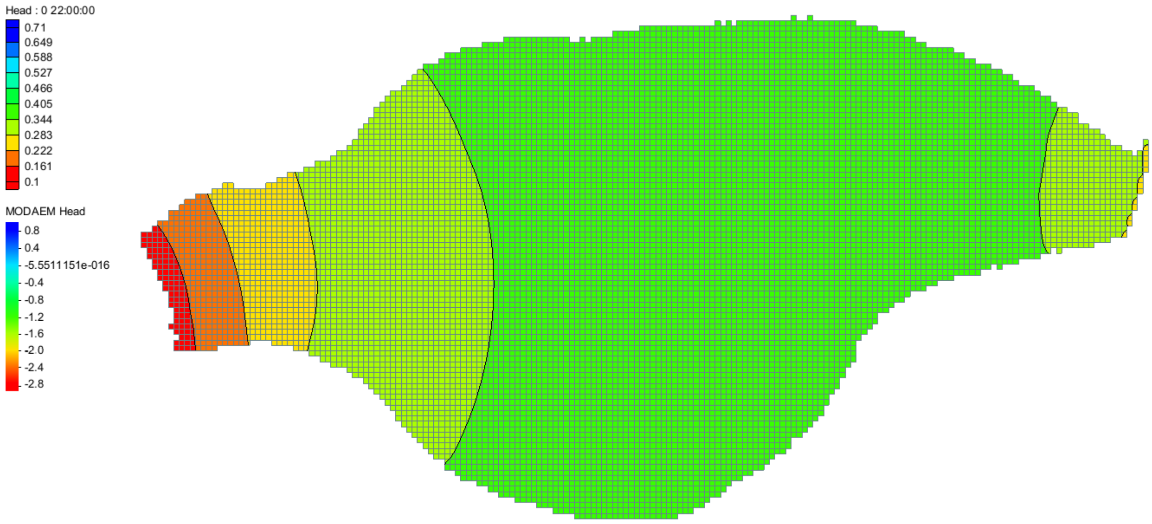


Figure 6 Transient flow head results after 22 h

Flow and transport steady state results

Figure 7 to Figure 9 show transport steady state results for winter period. The only source of salt water is a sea with concentration 36 g/l. Impact of channel Jasenska and Mala Neretva in mitigation of salt water intrusion is noticed in surface layer.

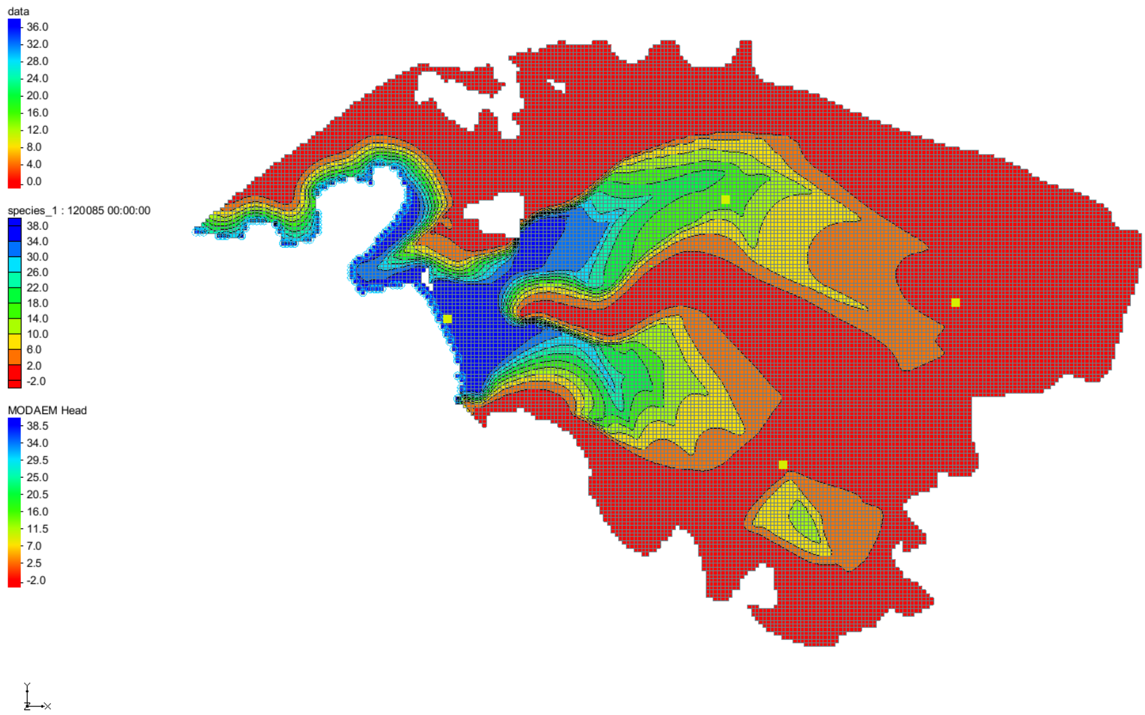


Figure 7 Transport steady state results for winter period in surface layer

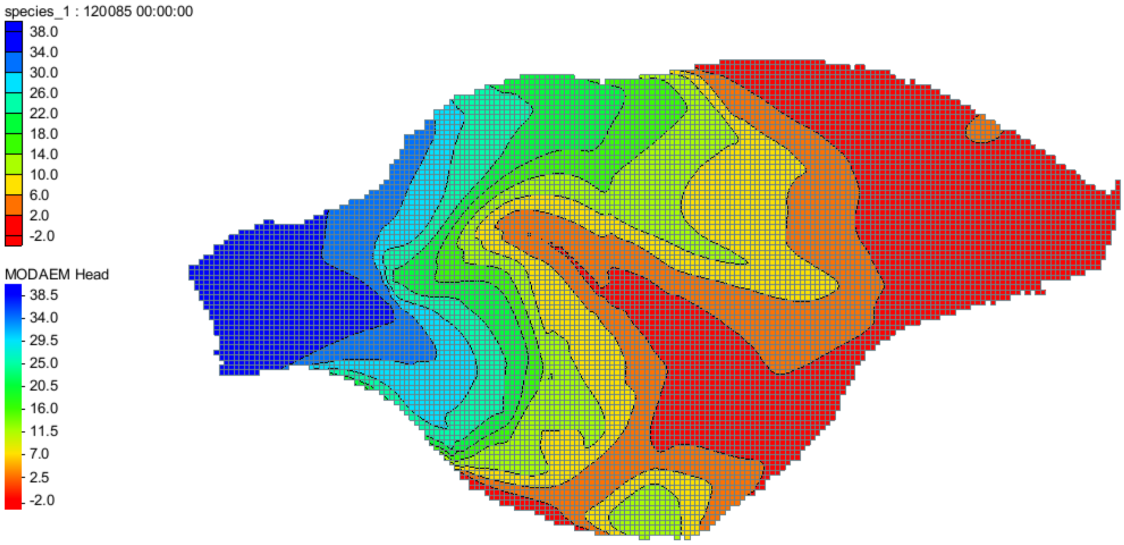


Figure 8 Transport steady state results for winter period in gravel layer

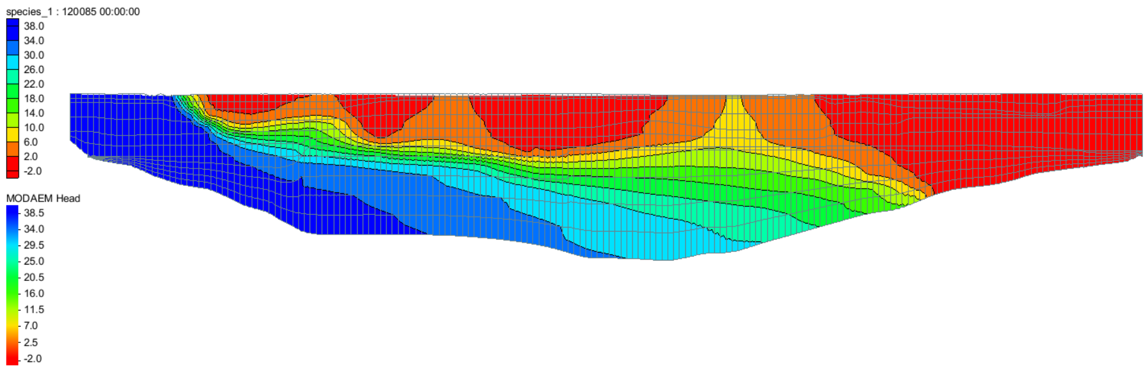


Figure 9 Transport steady state results – cross-section for winter period

Figure 10 to Figure 12 show transport steady state results for summer period. Sources of salt water are sea and River Neretva up to Opuzen with concentration 36 g/l. Impact of channel Jasenska and Mala Neretva in mitigation of salt water intrusion is noticed in surface layer.

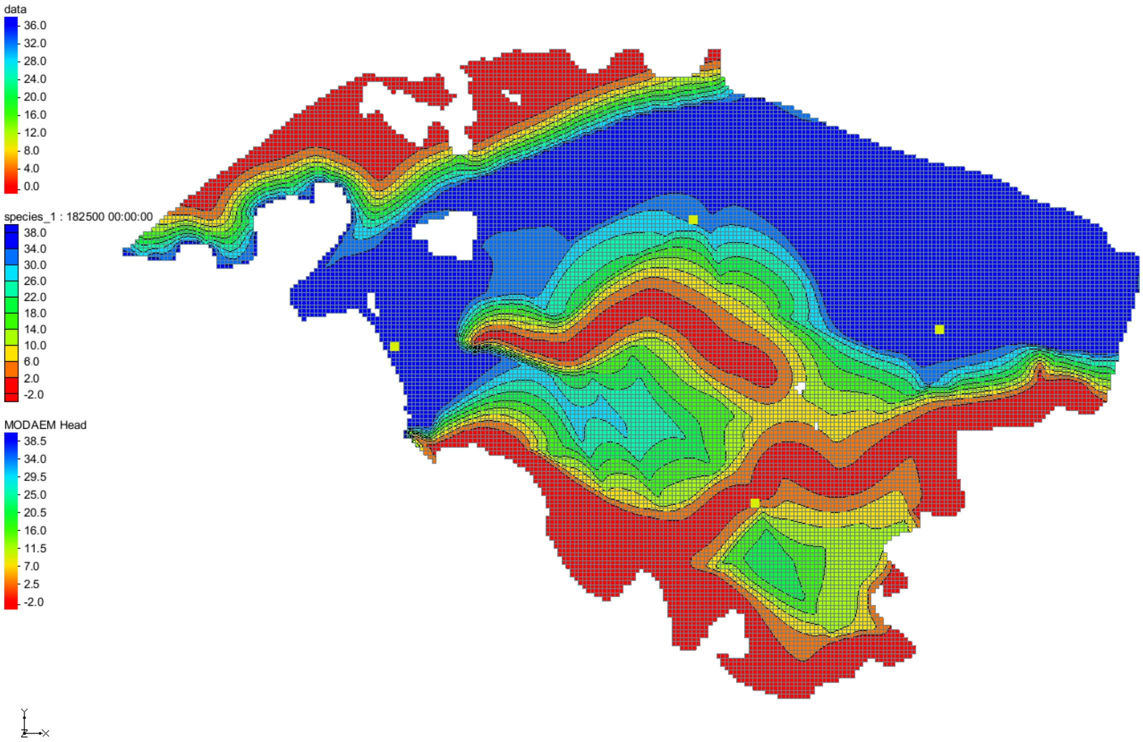


Figure 10 Transport steady state results for summer period in surface layer

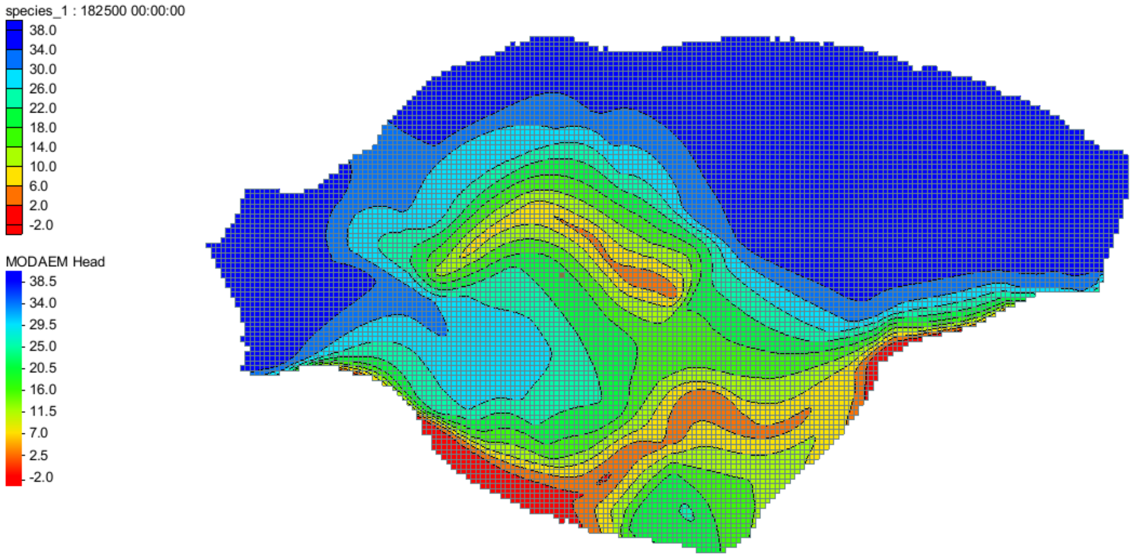


Figure 11 Transport steady state results for summer period in gravel layer

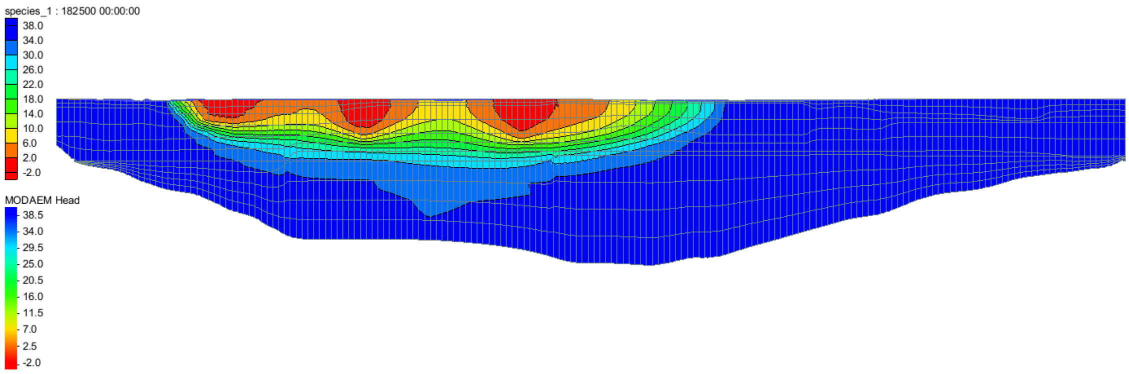


Figure 12 Transport steady state results – cross-section for summer period

Figure 13 to Figure 15 show transport steady state results for summer period with barrier 2 km downstream from Opuzen. Sources of salt water are sea and River Neretva up to barrier with concentration 36 g/l. Impact of channel Jasenska and Mala Neretva in mitigation of salt water intrusion is noticed in surface layer.

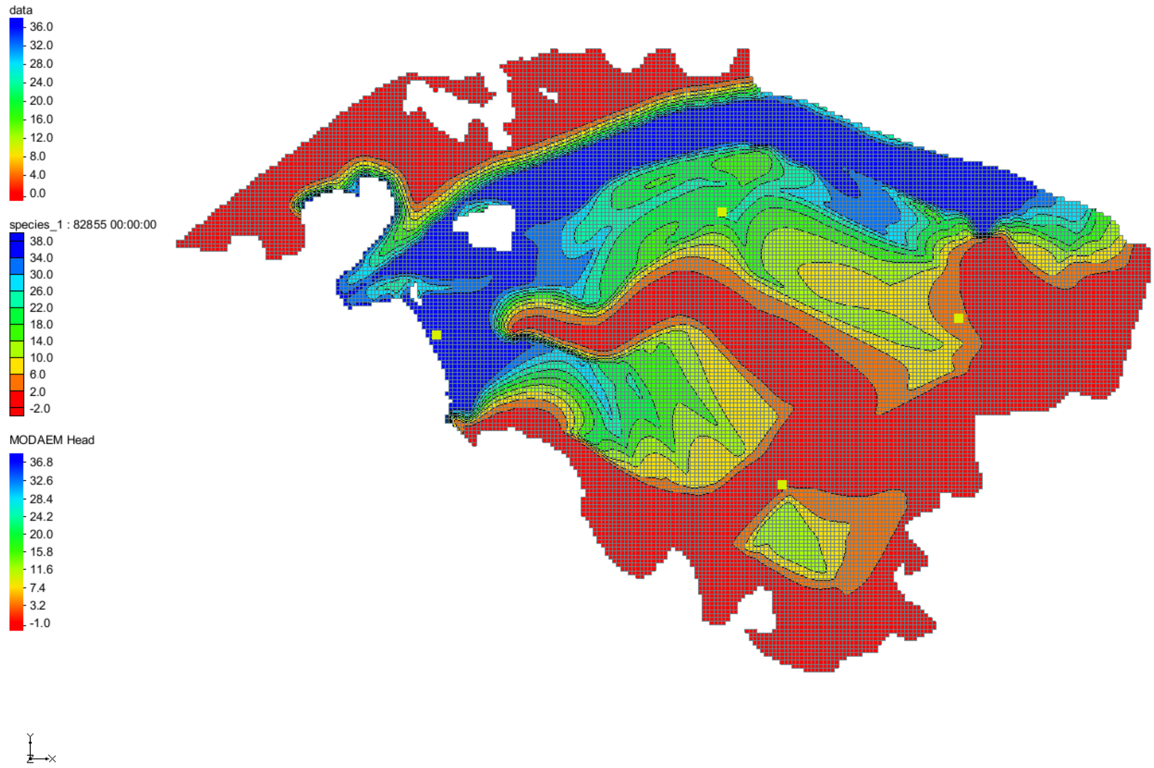


Figure 13 Transport steady state results for summer period with barrier in surface layer

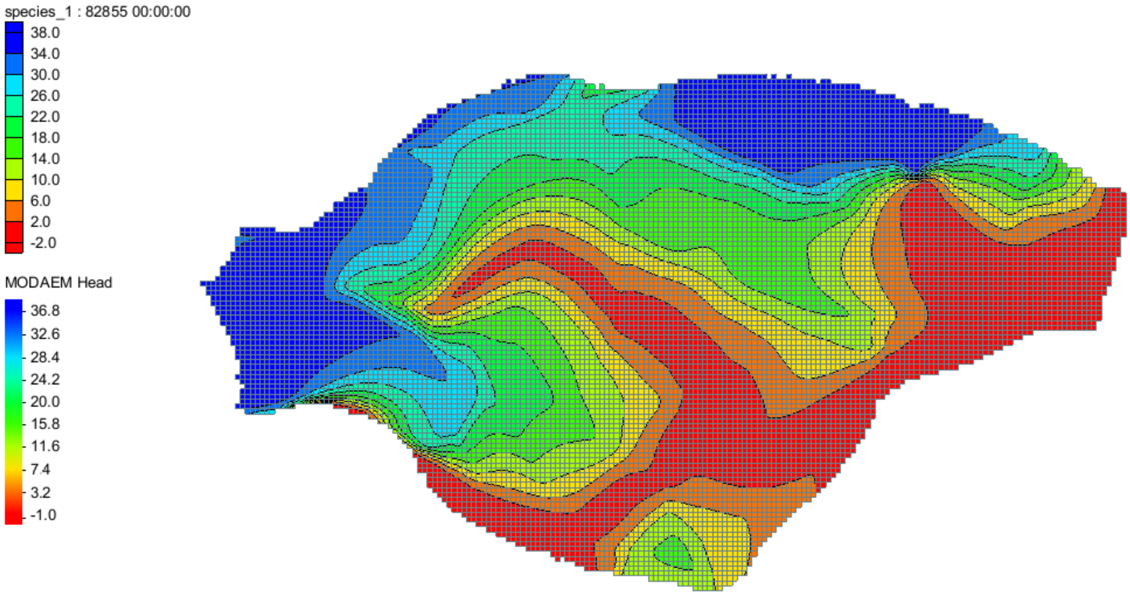


Figure 14 Transport steady state results for summer period with barrier in gravel layer

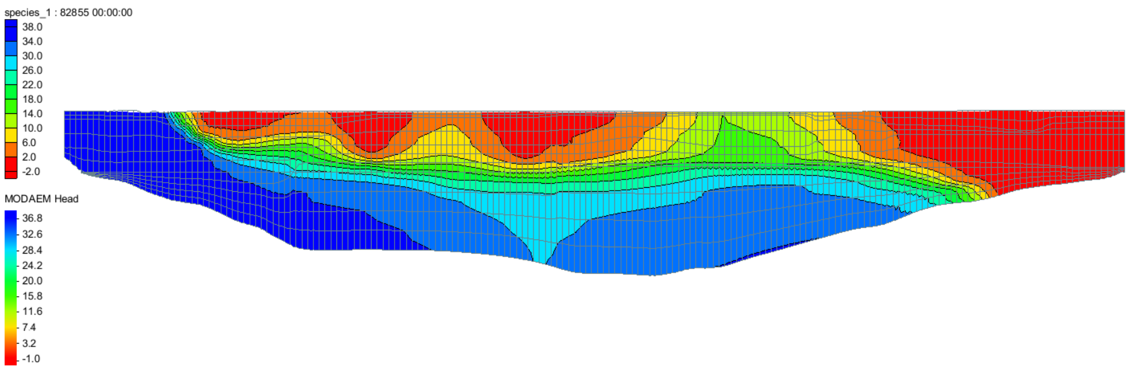


Figure 15 Transport steady state results – cross-section for summer period with barrier

Mitigation criteria analysis and effectiveness

Mean sea level rise

In assessing the climate changes effects to saltwater intrusion in lower Neretva river aquifer, two climate change scenarios were simulated based on IPCC (The Intergovernmental Panel on Climate Change) predictions that by 2100 mean sea level will rise between:

- 0.43 m (0.29–0.59 m, RCP2.6) and
- 0.84 m (0.61–1.10 m, RCP8.5).

Sea level rise will directly impact Height of the Groundwater Level above Sea Level GALDIT L indicator and thickness of the (saturated) aquifer GALDIT T indicator.

Modified ranges for GALDIT L indicator were implemented in assessment of climate changes. A substantial increase of low, moderate and high vulnerability area and decrease of very low vulnerability area, that disappears in the less optimistic scenario (Figure 16).

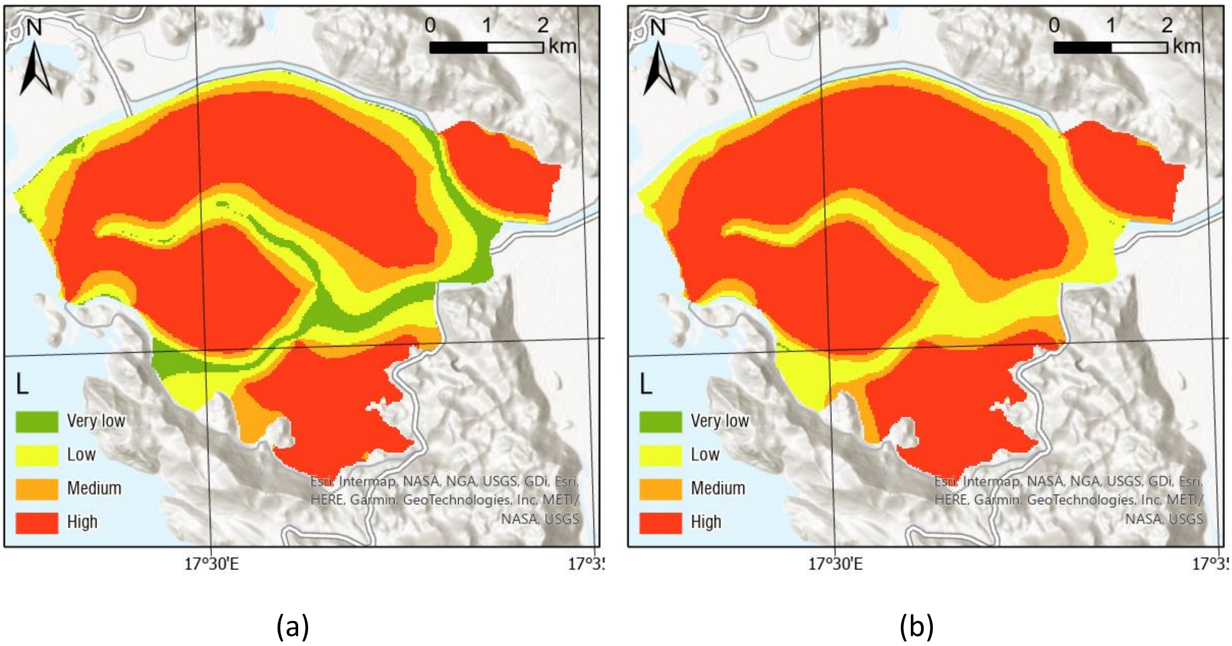
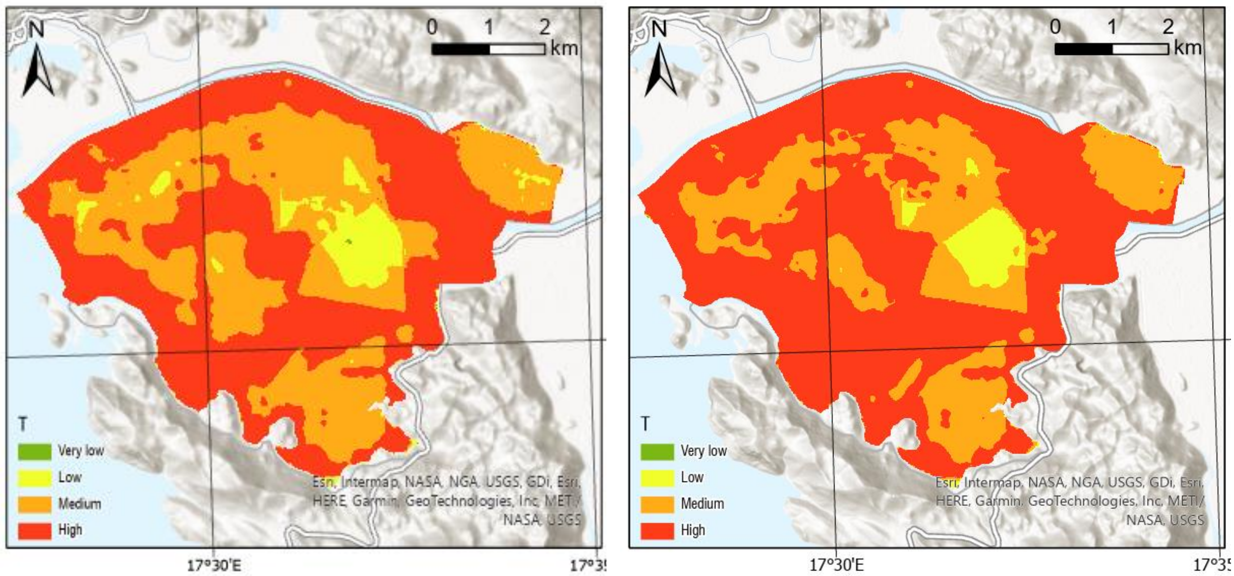


Figure 16 Height of Groundwater Level above Sea Level (L) GALDIT indicator for lower river Neretva aquifer: result for RCP 2.6 sea level rise scenario of 0.43 m (a), result for RCP 8.5 sea level rise scenario of 0.84 m (b).

Modified ranges for GALDIT T indicator were also implemented in assessment of climate changes. A substantial increase of moderate and high vulnerability area and decrease of very low vulnerability area, that completely disappears in the RCP8.5 scenario (Figure 17).



(a) (b)

Figure 17 Thickness of the aquifer (T) GALDIT indicator for lower river Neretva aquifer: result for RCP 2.6 sea level rise scenario of 0.43 m (a), result for RCP 8.5 sea level rise scenario of 0.84 m (b).

Modified GALDIT vulnerability index for two selected climate change scenarios is presented on Figure 18**Error! Reference source not found.** (RCP 2.6) and Figure 19**Error! Reference source not found.** (RCP 8.5). It was determined as weighted average of the seven modified GALDIT vulnerability indices.

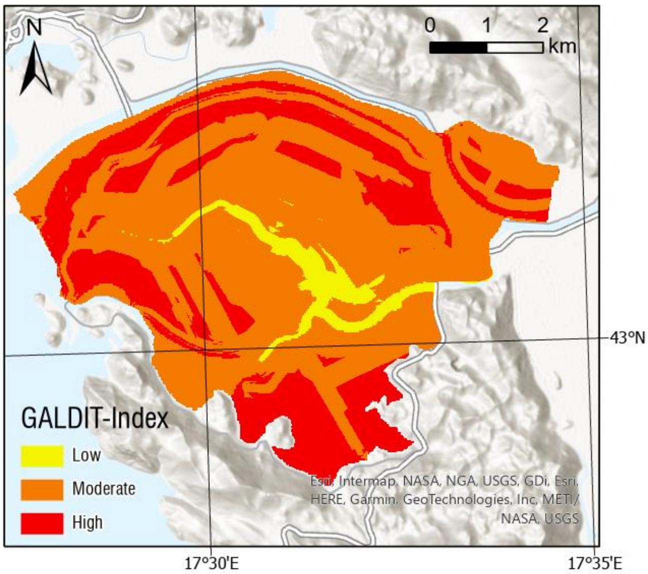


Figure 18 GALDIT index calculated using the weights and indicator ratings and classified by the GALDIT-Index vulnerability categories for RCP 2.6 sea level rise scenario of 0.43 m.

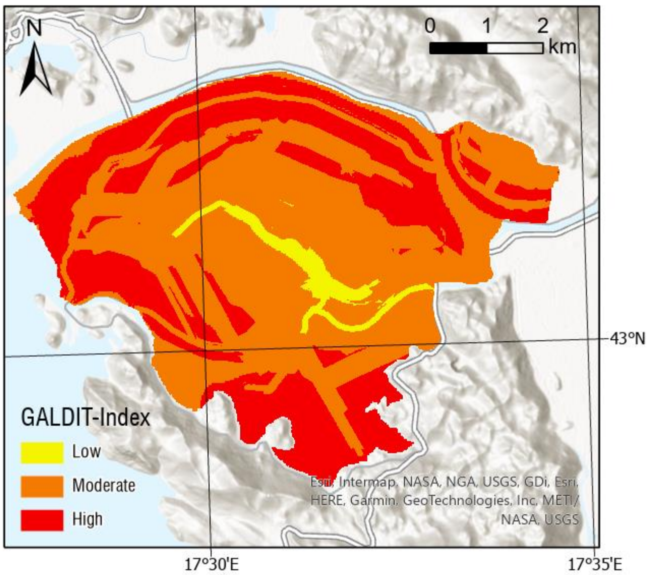


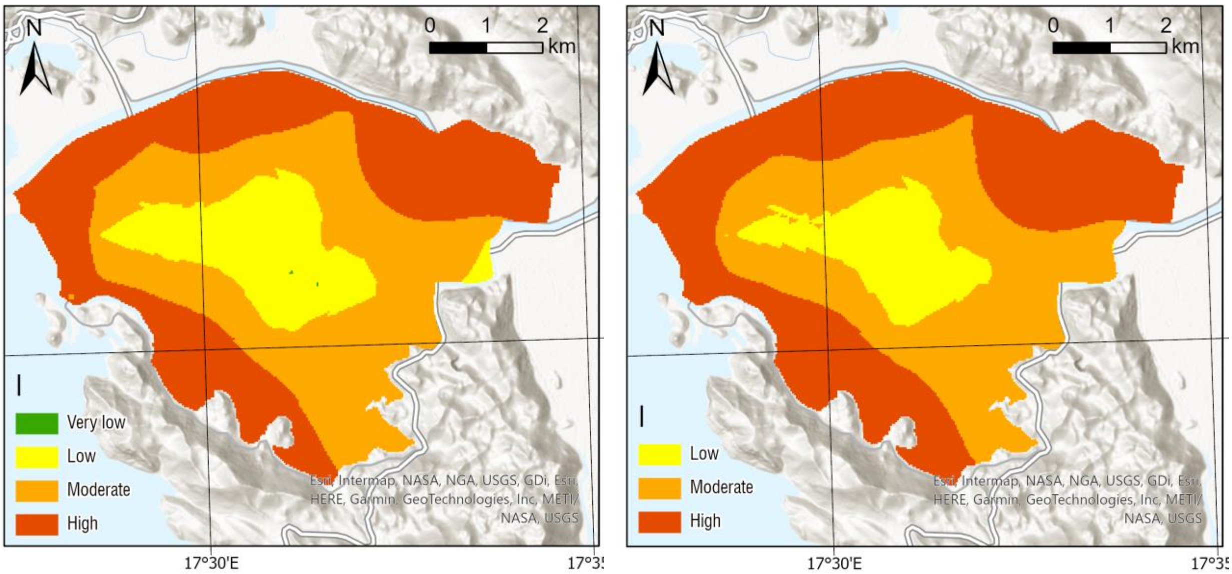
Figure 19 GALDIT index calculated using the weights and indicator ratings and classified by the GALDIT-Index vulnerability categories for RCP 8.5 sea level rise scenario of 0.84 m

Reduction in annual precipitation

Reduction in annual precipitation was assessed by the GALDIT Impact of existing status of seawater intrusion (I) indicator. In this work, a TDS water quality parameter was selected as GALDIT I indicator. In order to simulate the effects of precipitation reduction, two scenarios were determined:

- 10% increase in TDS and
- 30% increase in TDS.

An increase of moderate and high vulnerability area and decrease of very low vulnerability area is exhibited. In Figure 20 very low vulnerability area completely disappears and three higher vulnerability classes are seen.



(a) (b)

Figure 20 Impact of existing status of seawater intrusion (I) GALDIT indicator for lower river Neretva aquifer: result for 10% increase in TDS (a), result for 30% increase in TDS (b).

Modified GALDIT vulnerability index for two precipitation reduction scenarios is shown on Figure 21 It was determined as weighted average of the seven modified GALDIT vulnerability indices.

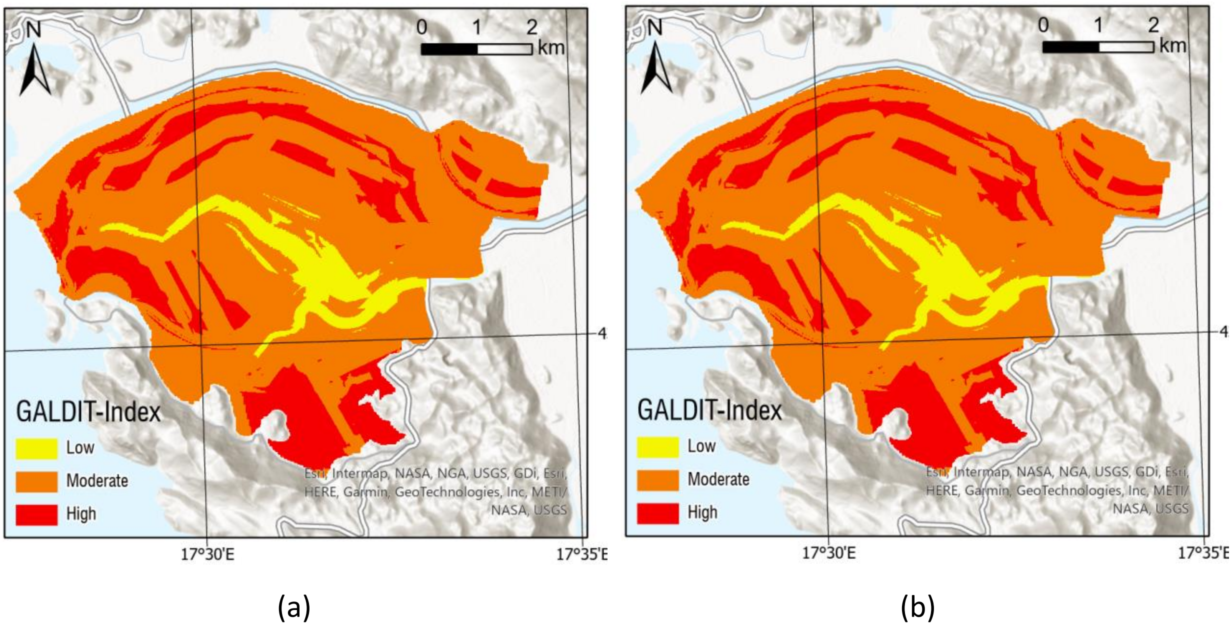


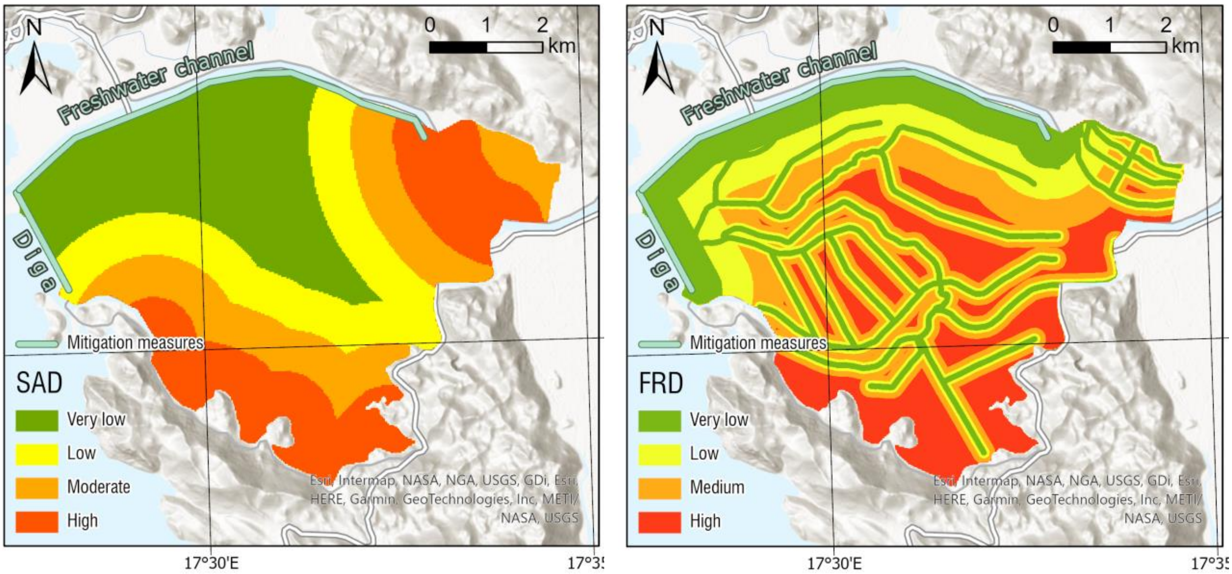
Figure 21 GALDIT index calculated using the weights and indicator ratings and classified by the GALDIT-Index vulnerability categories for: 10% increase in TDS (a), 30% increase in TDS (b).

Mitigation measures

Suggested mitigation measures for saltwater intrusion in the lower river Neretva delta include:

- an eight km long channel filled with freshwater alongside the left bank of river Neretva, starting at Galicak hill at the river Neretva mouth and
- a freshwater injection at the 2 km long Diga embankment.

These mitigation measures would influence SAD and FRD indicators of the applied Modified GALDIT methodology. SAD source lines are basically removed in neighbourhood of the suggested mitigation measures (Figure 22). The spatial influence of these measures on saltwater intrusion mitigation will be much larger than the ranges suggested for existing drainage/irrigation channels. A more suitable ranges are the ones suggested for SAD but importance rating is used in reverse order, therefore, two intermediate FRD layers were created, one corresponding to the original FRD layer and one based on new channels. The final FRD indicator was determined as minimum cell value of the two intermediate layers.



(a) (b)

Figure 22 Distance from saltwater (SAD) GALDIT indicator for lower river Neretva aquifer: classified 2D field by ranges and indicator ratings listed in modified numerical ranking system (a), distance from freshwater source (FRD) modified GALDIT indicator for lower river Neretva aquifer: classified 2D field by ranges and indicator ratings listed in modified numerical ranking system (b).

Three GALDIT index vulnerability maps including mitigation measures are presented on Figure 23 and Figure 24. Figure 23 represents the impact of mitigation measures on the existing situation, while the Figure 24 incorporates climate change scenarios. The more optimistic scenario can be seen of Figure 24a, while scenario with higher TDS increase and sea level rise is depicted on Figure 24b.

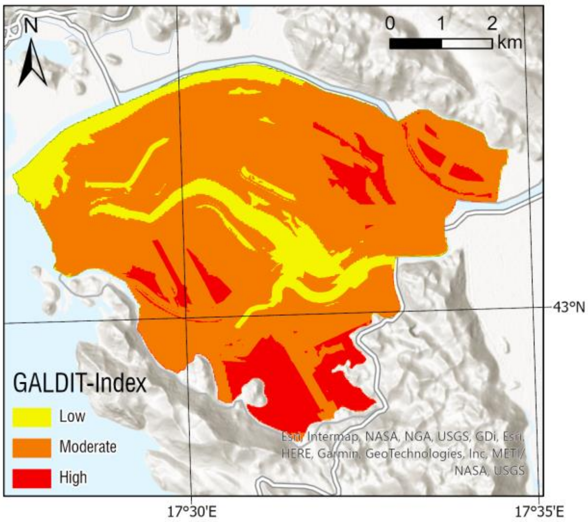
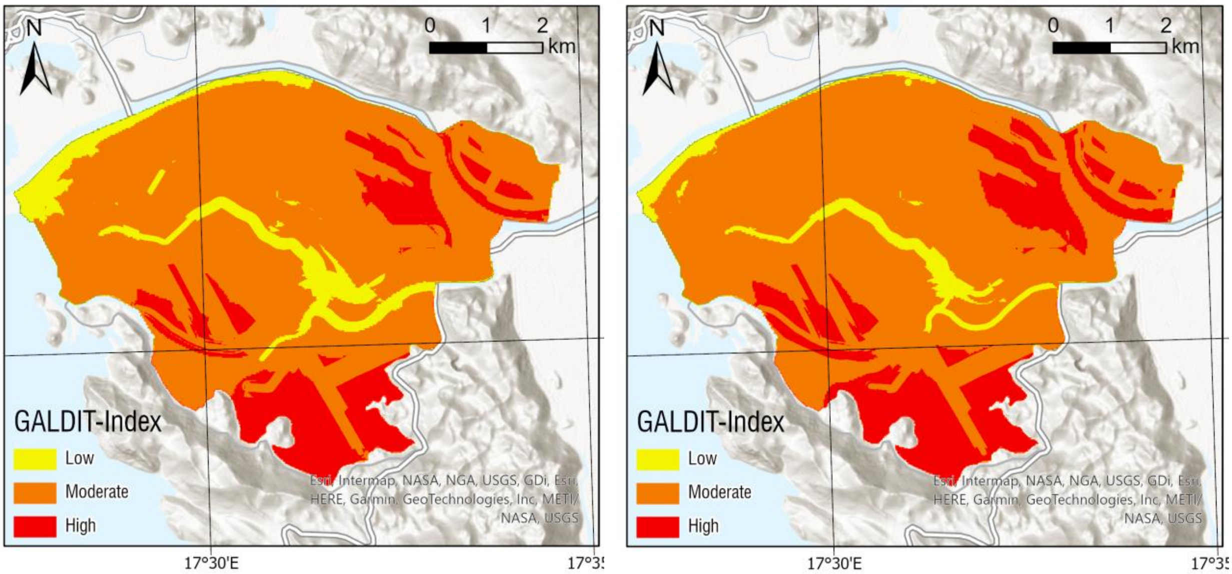


Figure 23 GALDIT index calculated using the weights and indicator ratings and classified by the GALDIT-Index vulnerability categories for suggested mitigation measures.



(a) (b)

Figure 24 GALDIT index calculated using the weights and indicator ratings and classified by the GALDIT-Index vulnerability categories for suggested mitigation measures and climate change scenarios: RCP 2.6 sea level rise of 0.43 m and TDS increase of 10% (a), RCP 8.5 sea level rise of 0.84 m and TDS increase of 30% (b).

Conclusions and guidelines for the adaptation plan

Based on projected changes in ground air temperature, precipitation and mean sea level shown for global, European and Croatian area it is possible to conclude that changes are inevitable but values of changes vary based on projected scenarios (SSP2 – SSP5).

Based on EEA, ground air temperatures in Europe are projected to increase by 1.2 to 3.4° under the SSP1-2.6 scenario and by 4.1 to 8.5°C under the SSP5-8.5 scenario (by 2071-2100, compared to 1981–2010).

Based on DHMZ ground air temperatures in Croatia in the first period (2011-2040), are expected to rise up to 0.6 ° C for winter and up to 1 ° C for summer period. In the second period (2041-2070), the expected growth of the ground air temperature in Croatia is up to 2 ° C in the continental part and up to 1.6 ° C in the south for the winter period, and up to 2.4 ° C in the continental part of Croatia, and up to 3 ° C in the coastal zone for the summer period.

CCKP data show monthly mean temperature changes increasing by 1.36°C by the 2030s to more than 4°C by the 2090s.

EEA models project an increase in annual precipitation in large parts of central and northern Europe (of up to about 30 %) and a decrease in southern Europe (of up to 40 %) from 1971–2000 to 2071–2100. In summer, the precipitation decrease extends northwards. Values of projected change in annual precipitation for Croatian area based on Figure 10 is -5 to 5% and values od projected change in summer precipitation is -30 to -20%.

Based on DHMZ regional climate model, changes in precipitation in the near future (2011-2040) are very small and vary depending on the season. The largest change in precipitation can be expected in the Adriatic in the autumn with a decrease in precipitation with a maximum of approximately 45-50 mm. In the second period (2041-2070), change in precipitation in mountainous Croatia and in the coastal area will reach a value of 45 - 50 mm.

Based on EEA, global mean se level will rise by 0.28-0.55 m under a very low emissions scenario (SSP1-1.9) and 0.63-1.02 m under a very high emissions scenario (SSP5-8.5) by 2100, relative to the 1995-2014 average. Projected rise in sea level during 21st century in Croatian area will be 0.4 to 0.5 m.

Based on IPCC, global mean sea level will rise between 0.43 m (0.29–0.59 m, RCP2.6) and 0.84 m (0.61–1.10 m, RCP8.5) by 2100 relative to 1986–2005.

Based on DHMZ predictions, mean sea level in central and southern Adriatic will increase around 40 cm over the next hundred years, which is in line with IPCC and EEA forecasts.

Web App for real time monitoring of surface and ground water gudelines

During the project period, Croatian project partners developed and released a web and mobile phone application to enable the real time insight of the surface and groundwater parameters as:

- Piezometric head;
- Temperature;
- Electrical conductivity

The idea of App development relies on the fact to make those data accessible to land users, farmers, citizens, stakeholders and other target groups interested in this product. In general, App can be used in both ways, as a web and mobile application and does not require any kind of login, thus making those data public.

App can be found at the Faculty of Civil engineering, Architecture and Geodesy, University of Split (PP4) institutional webpage: https://neretva.gradst.hr/dashboard.

Initially, it can be either used as a web tool which provides information on sensor locations and available data sets. Otherwise, it can be downloaded to smart phones and operated as a mobile App.

App is developed to be used in either English and Croatian language so the user has to pick between those two options.

Below in Figure 25 to Figure 28 Web app is shown with its front end and interface for end users in English language.

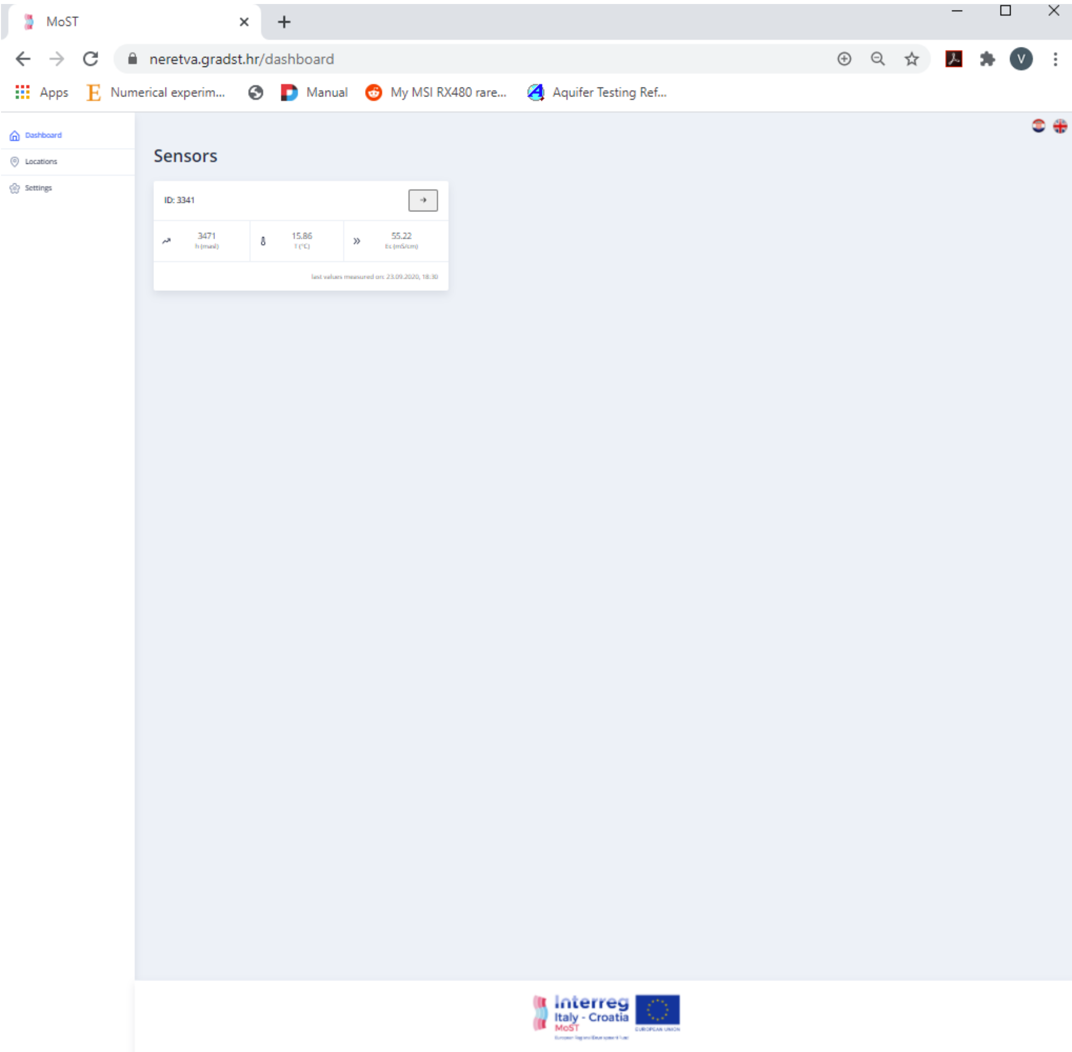


Figure 25 User interface of the MoST Web App

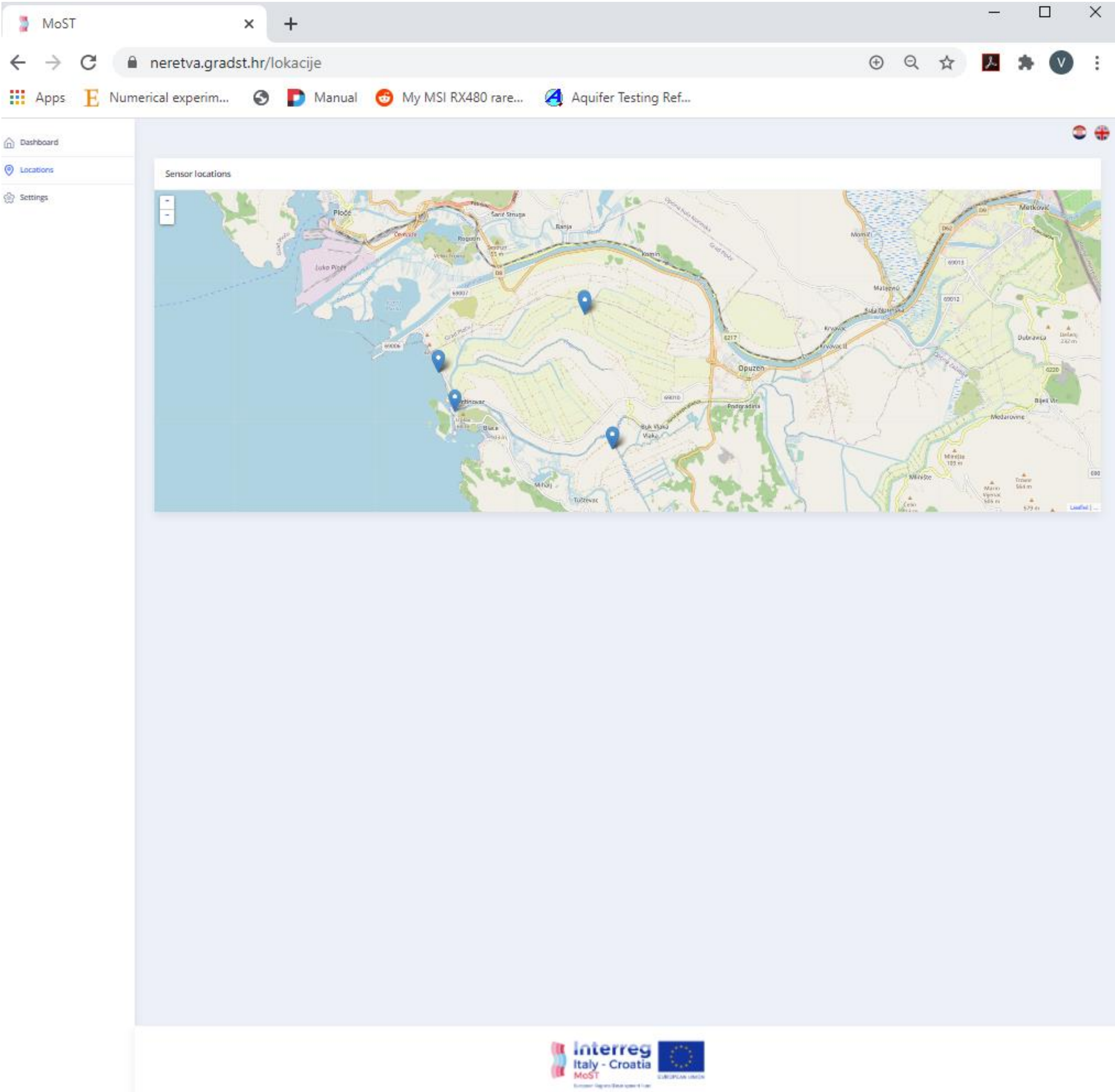


Figure 26 User interface of the MoST Web App – selection of the probes and sensor location/s

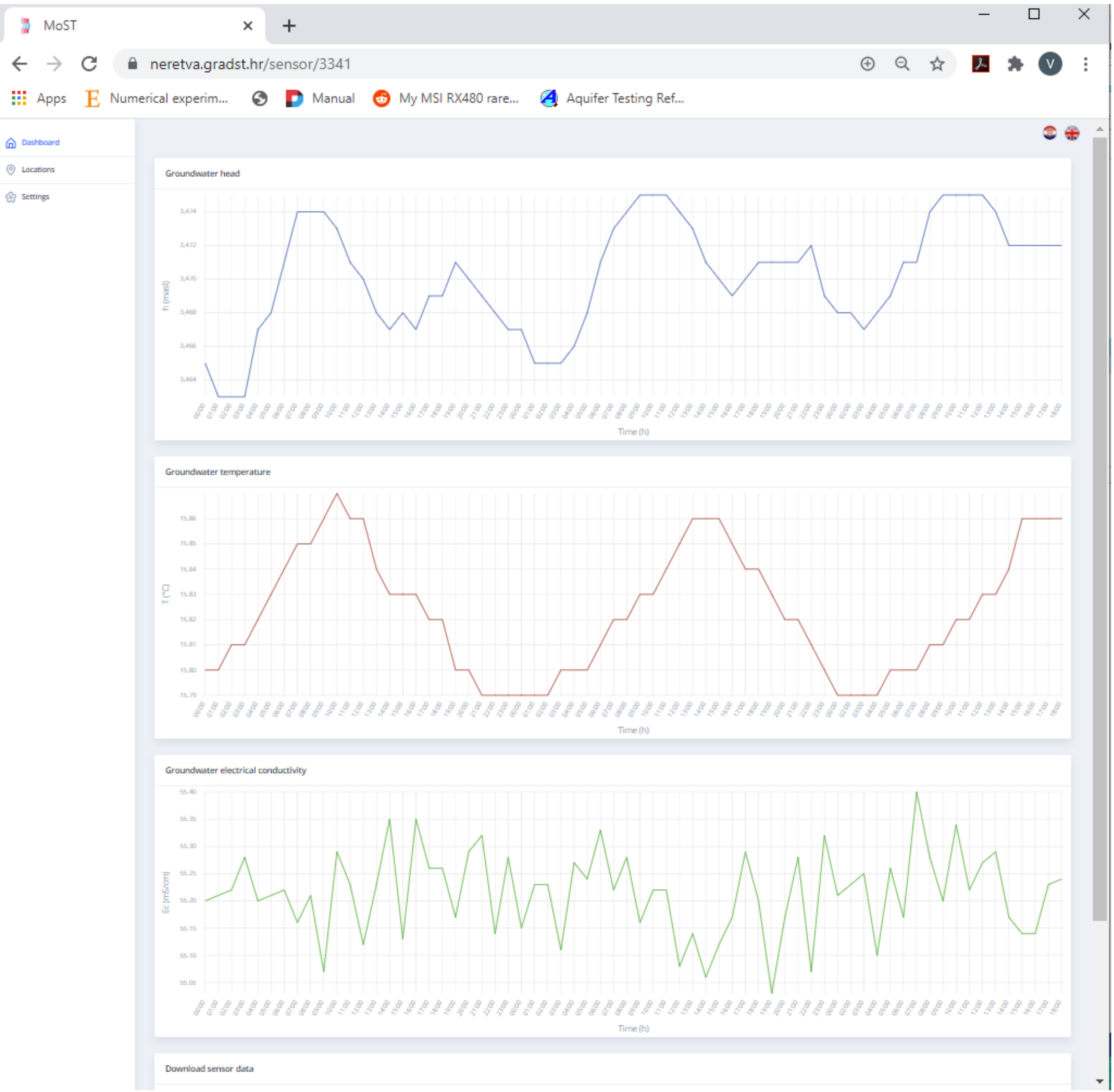


Figure 27 User interface of the MoST Web App – insight to real time values of piezometric head, temperature and electrical conductivity from selected sensor

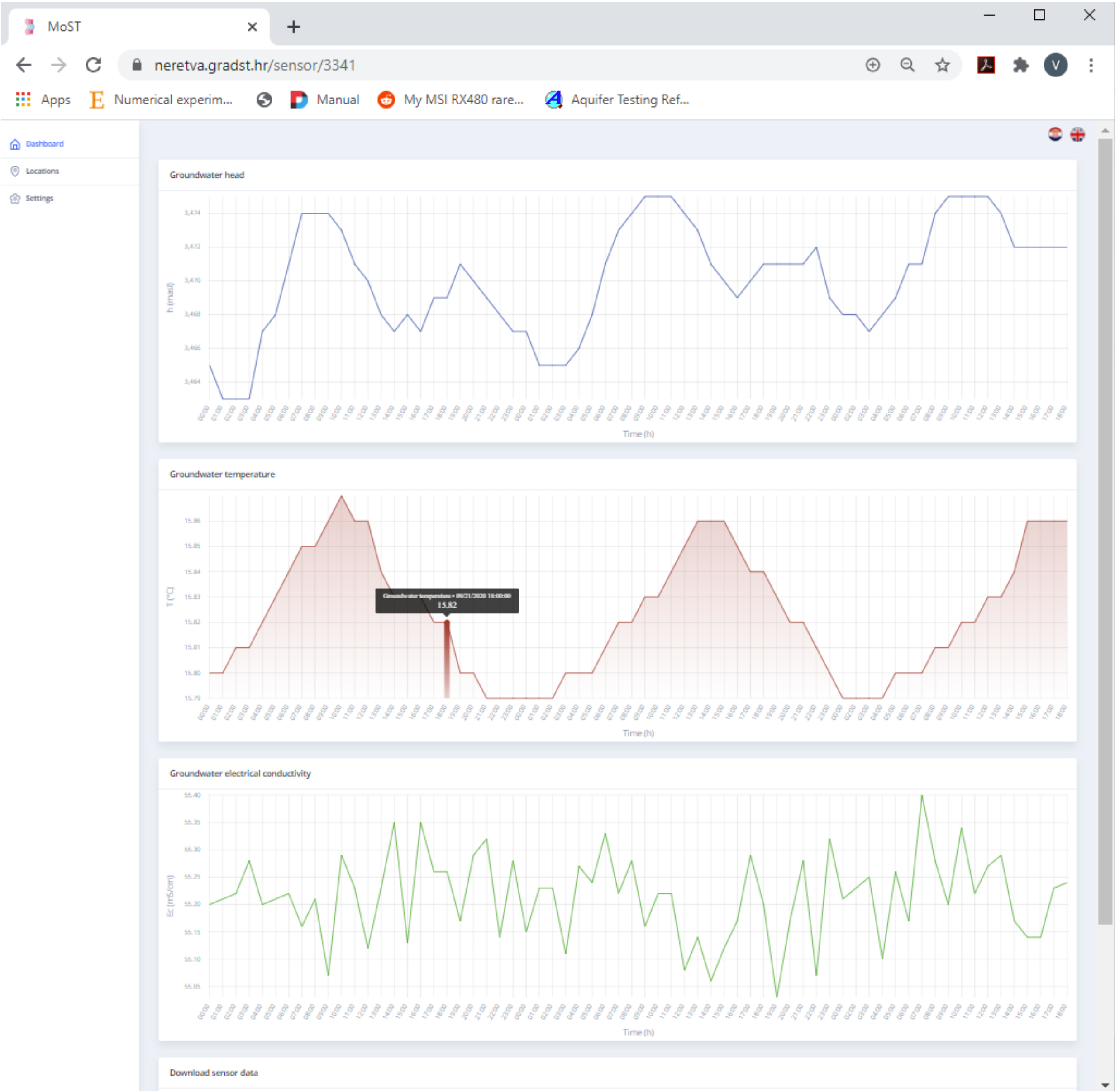


Figure 28 User interface of the MoST Web App – insight to real time values of piezometric head, temperature and electrical conductivity from selected sensor with notification of selected value

Mobile (Smart phone) App can be downloaded and installed at smart phone once the user opened Web App in web browser. Below In Figure 29 to Figure 32 Web app is shown with its front end and interface for end users in Croatian language

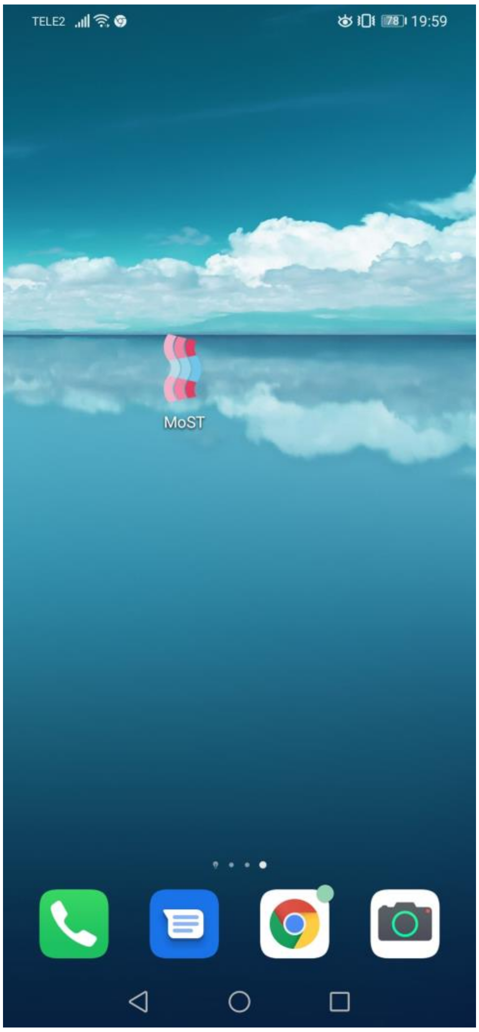


Figure 29 Visual identity of MoST mobile App

Figure 30 Visual identity of MoST mobile App

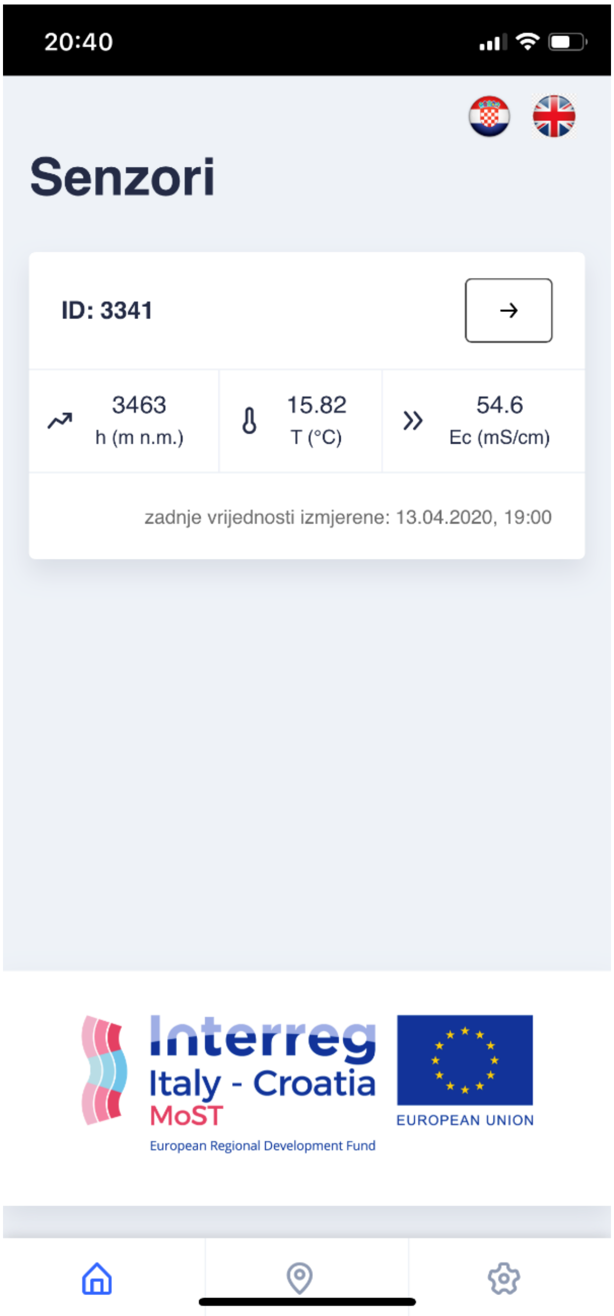


Figure 31 User interface of the MoST Mobile App

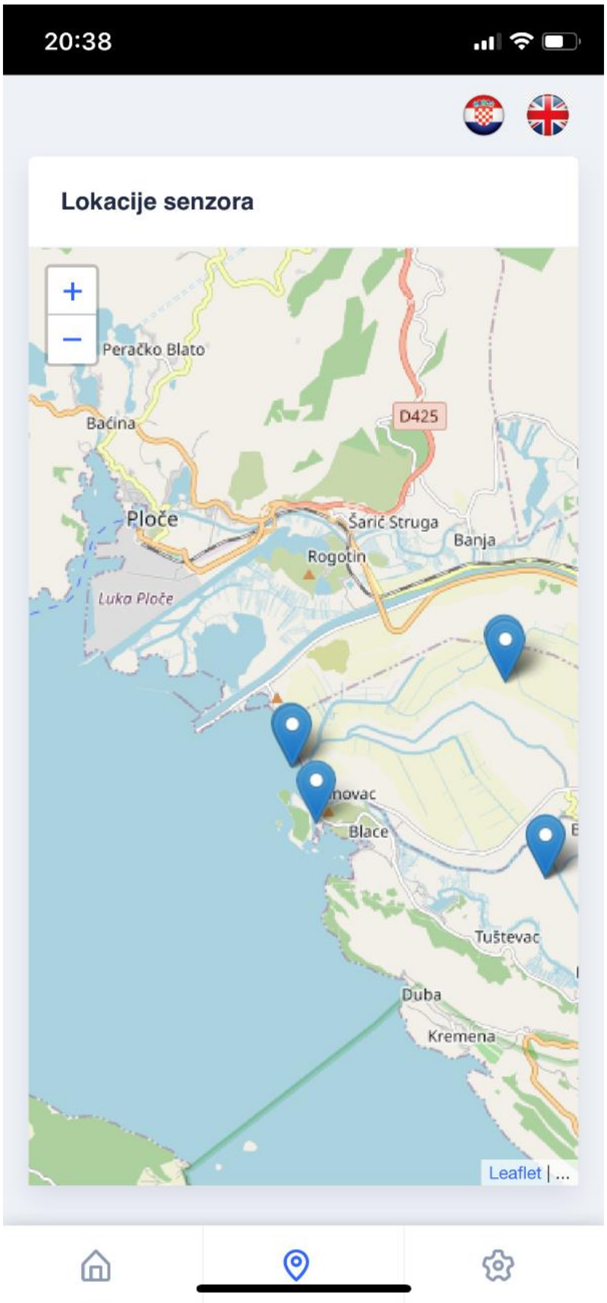


Figure 32 User interface of the MoST Mobile App – selection of the probes and sensor location/s

Recommendations for financing future activities

This chapter presents the possibilities of financing the future projects, i.e. multiplication of project activities, from various financial instruments.

The European Structural and Investment Funds (ESIF) are a financial instrument set up to implement European Union (EU) policies in all Member States. In the 2021-2027 financial period, the funds available to the Member States are comprised of the **Multiannual Financial Framework** adopted for the seven years and the **Next-generation EU** or the European Union Recovery Instrument. The EU budget is the largest so far, amounting to 1,824.3 billion euros, and more than 25 billion euros in current prices are available for the Republic of Croatia. Also, by joining the EU, Croatia has been granted the right to fully participate in the activities of the **European Union Programmes**, which represent an integrated set of activities adopted by the EU to promote cooperation between the Member States in various areas related to common EU policies.

Multiannual Financial Framework

The Multiannual Financial Framework (MFF) represents an investment budget that pools Member States' resources to finance activities that the Member States can finance more effectively jointly. The allocation for Croatia amounts to more than 14 billion euros and is divided between Cohesion Policy, the Just Transition Fund (JTF), the European Agricultural Fund for Rural Development (EAFRD), and the European Agricultural Guarantee Fund (EAGF).

The Cohesion Policy is the EU's main investment policy that promotes and supports the balanced development of the Member States and their regions. The overarching objective of the cohesion policy is to promote the economic, social, and territorial cohesion of the EU by fostering the competitiveness of the economy and reducing the disparities in social and economic development between EU countries and regions.

Cohesion policy is delivered through seven funds: the European Maritime and Fisheries Fund (EMFF), the European Regional Development Fund (ERDF), the European Social Fund Plus (ESF+), the Asylum, Migration and Integration Fund (AMIF), the Internal Security Fund (ISF), the Border Management and Visa Instrument (BMVI), and the Cohesion Fund (CF).

Moreover, the objectives of the cohesion policy are:

1. A smarter Europe (ERDF)
2. Greener Europe (ERDF/CF)
3. A more connected Europe (ERDF/CF)
4. A more social and inclusive Europe (ERDF and ESF+)
5. Europe closer to citizens (ERDF).

For this financial period under the cohesion policy in Croatia, the following Operational programs have been established.

- Competitiveness and cohesion 2021-2027 (cro. *Operativni program Konkurentnost i kohezija* - OPKK)

- Efficient Human Resources 2021-2027 (cro. *Operativni program Učinkoviti ljudski potencijali* - OPULJP)
- Integrated Territorial Programme 2021-2027 (cro. *Integrirani teritorijalni program* - ITP)

The Operational Programmes documents of the cohesion policy for the Republic of Croatia under this programming period were not finalized at the time of writing this document.

The relevant operational programmes, in the context of this Project, are OPKK and ITP. The **OPKK** sets priorities and objectives for the efficient use of ERDF and CF and allows funds usage throughout all areas of the Republic of Croatia. On the other hand, the **ITP** sets objectives and priorities for the efficient use of ERDF, CF, and JTF, and focuses on areas with territorial specificities (islands, mountainous areas and assisted areas) and urban areas. OPKK and ITP, in this programming period, cover six priorities each responding to different development challenges. Each priority contains specific objectives with the related activities to be co-financed. The tables below list the priorities of the two programmes with the corresponding allocations for Croatia. The relevant specific objectives of those priorities for which applicability in the field of water protection and climate change has been identified have been pointed out. Moreover, for each of the selected specific objectives, related activities to be financed, that have applicability in this area are also presented. Such activities include concrete infrastructure and soft investments, as well as research activities.

Table 1 OPKK priorities with highlighted relevant specific objectives and related activities

OPKK		Allocation (Billions HRK)
Priority 1	Strengthening the economy by investing in research and innovation, supporting business competitiveness, digitalisation and developing skills for smart specialisation	8,7
Specific objective 1.i	**Developing and strengthening research and innovation capacities and applying advanced technologies**	**4,7**
Activities	✓ Development of new products, services and business processes in S3 thematic areas ✓ Investment in strategic research, technology and innovation infrastructure in line with S3 areas and the green and digital transitions ✓ Collaborative research and development projects ✓ Support for projects at an early stage of development	
Priority 2	Strengthening digital connectivity	1,2
Priority 3	Promoting energy efficiency and renewables, adapting to climate change, preventing risks, protecting the environment and resource sustainability	11,7
Specific objective 2.iv	**Promoting climate change adaptation, risk prevention and disaster resilience, taking into account ecosystem-based approaches**	**0,7761**
Activities	✓ Strengthening climate change monitoring and assessment systems ✓ Investment activities in applied research for developing solutions for adaptation to climate change and disaster risk management ✓ Adapting and increasing the resilience of existing water infrastructure to increasing flood risks caused by climate change including flooding sources (river spills, flash floods and floods caused by high sea levels) ✓ Activities that contribute to a significant reduction in the risk of major disasters through prevention and mitigation activities	
Specific Objective 2.v	**Promoting access to water and sustainable water management**	**5,3**
Activities	✓ Investments in water conditioning devices for human consumption and desalination ✓ Non-structural measures that contribute to improving the overall management of waters (preparation of project-study documentation, monitoring, capacity building for the preparation and implementation of projects, etc.) including measures set out in the River Basin Management Plan to achieve the requirements of the objectives of the WFD	
Priority 4	Developing sustainable intermodal urban mobility as part of the transition to a low-carbon economy	1,5
Priority 5	Developing sustainable, smart and secure mobility	7,6
Priority 6	Strengthening the health system, promoting social inclusion, education and lifelong learning	3,9
	Sum	34,6

Table 2 ITP priorities with highlighted relevant specific objectives and related activities

ITP		Allocation (Billions HRK)
Priority 1	Sustainable regional economy	4
Priority 2	Fostering the green transition of assisted and mountainous areas	0,4636
Priority 3	Improving cycling infrastructure in assisted areas	0,1216
Priority 4	Increasing accessibility of social and educational infrastructure with tourist revitalization of assisted and mountainous areas	2,6
Priority 5	Development of urban areas as drivers of regional development and development of their functional areas and the development of sustainable and green islands	6,7
Specific objective 5.i	**Fostering integrated and inclusive social and economic development, development in the fields of environment, culture, natural heritage, sustainable tourism and security in urban areas**	**5,6**
Activities	✓ Investment in the development of the smart cities concept (e.g. digital infrastructure, efficient, transparent and smart urban administration, smart energy and utility management, education, economy and sustainable urban mobility)	
Specific objective 5.ii	**Fostering integrated and inclusive local social and economic development, local development in the fields of environment, culture, natural heritage, sustainable tourism and security in non-urban areas**	**1,1**
Activities	✓ Investments in disaster risk reduction and adaptation to climate change with a focus on investing in capacity building and operational readiness of firefighting ✓ Investments in surveillance and monitoring other climate-related risks	
Priority 6	Just transition	1,4
	Sum	15,2852

Each member state or its region faces various development challenges, that are often compatible with the problems faced by other Member States or non-Member States or their regions. Therefore, European Territorial Cooperation programmes have been established. The programmes are aiming to reduce the negative impact of borders as well as strengthening social, economic and territorial cohesion through a common approach at the appropriate administrative and territorial level supported by foreign policy instruments.

In this context, the most interesting programs are cross-border (Interreg A) and transnational cooperation programme (Interreg B). In the new programming period, only adopted transnational programmes are Central Europe and EuroMED, while cross-border cooperation programmes Interreg Italy-Croatia, and Interreg Croatia-BiH-Montenegro are in the preparation phase or have been send for adoption to the European Commission.

Next-generation EU

As the coronavirus pandemic has affected the whole world, the EU, to mitigate its consequences, has responded with its mechanisms and provided a financial package aimed at creating the foundations for an accelerated recovery and for the digital and green transformation to increase the resilience of society and the economy to the future crises. Therefore, the European Commission has put forward a Europe recovery instrument called the Next-generation EU (NGEU), adopted in July 2020. The NGEU allocations for Croatia amount to just over 11 billion euros and are distributed between the Recovery and Resilience Facility (RRF), REACT-EU (Recovery Assistance for Cohesion and the Territories of Europe), EAFRD and JTF.

National Recovery and Resilience Plan 2021-2026

A 6.3 billion euros in grants and 3.6 billion euros in favorable loans are available to EU member states through their national recovery and resilience plans under the RRF. In Croatia, the National Recovery and Resilience Plan 2021-2026 (cro. *Nacionalni plan oporavka i otpornosti* - NPOO) is aligned with all key strategic documents and as such contains the necessary reforms and investments that are essential for a faster recovery and greater resilience of society to crises. The NPOO has been adopted in July 2021, and it contains five components and one initiative:

1. Economy
2. Public administration, judiciary and state assets
3. Education, science and research
4. Labor market and social protection
5. Health
6. initiative: Renovation of buildings.

For each component, the NPOO defines the overall development objective and foresees the concrete reforms (R) and investments (I) needed for the improvement of individual areas. In the context of future projects related to water protection and climate change, the components *Economy* and *Education, science and research* are most relevant.

The following table shows the RRF-funded components and their estimated value. The NPOO has an estimated investment value of HRK 25,703,728,389 for the Economy component which accounts 53% share of the entire plan. The estimated investment value for the *Education, Science and Research* component is HRK 7,500,000,000 (16% of the NPOO). The aforementioned highlighted components put forward relevant sub-components, reforms and investments for which is the applicability in the field of water protection and climate change recognized.

Table 3 NPOO components with prominent relevant sub-components, reforms and investments

Component/reform/investment		Implementation Period	Estimated Value (HRK)
The total estimated value of investments in the Republic of Croatia			48.174.045.351
C1	Economy		25,703,728,389
C1.1	**Resilient, green and digital economy**		**5,565,450,000**
C1.3	**Improving water and waste management**		**6,500,116,802**
C2	Public administration, judiciary and state assets		4,378,453,262
C3	Education, science and research		7,500,000,000
C3.2	**Boosting research and innovation capacity**		**2,400,000,000**
C3.2 R3	Improving the efficiency of public investments in research, development and innovation	1/2021–7/2026	550,000,000
C3.2 R3-I1	Introducing a more functional programming framework for project funding of research, development and innovation	1/2021–6/2026	550,000,000
C4	Labour market and social protection		2,083,160,000
C5	Health		2,563,703,700
C6	Initiative: Renovation of buildings		5,945,000,000

European Union Programmes

Most of the European Union Programmes (EUP) are implemented according to a centralized implementation model in which financial management and implementation are the responsibility of the European Commission's programe-specific bodies, which decide on the type and duration of the programme, the budget available and call for proposals to be submitted. The Government of the Republic of Croatia establishes the body in charge of coordinating participation and the bodies responsible for the implementation of EUPs during the individual financial period. The Ministry of Regional Development and EU Funds (cro. *Ministarstvo regionalnoga razvoja i fondova EU* - MRRFEU) is the main national coordinator for activities related to the participation of Croatia in individual EUP.

In this programming period, 16[1] programmes are defined, and in the context of this Project, future activities can be co-financed within LIFE and Horizon Europe programmes. **LIFE** is a centralized EU programme dedicated entirely to environmental policies, nature conservation and climate action. LIFE-approved projects aim to develop, demonstrate and promote innovative techniques, methods and approaches to achieve the objectives that can be reproduced and upgraded. The Programme is divided into four subprogrammes, two of which focus on climate action (Climate change mitigation and adaptation strands, Clean Energy Transition). Eligible applicants are public and private institutions and NGOs. The allocation of the LIFE programme in the programming period 2021-2027 amounts to 5,432 billion euros. On the other hand, for co-financing research and innovation projects and coordination and support activities in various fields, the most prestigious EUP is **Horizon Europe.** Eligible beneficiaries are all legal entities, regardless of the place of establishment, as well as legal entities from unrelated third countries or an international organization (including an international European research organization), that met the provided conditions laid down in the rules for participation and other specific conditions set out in the invitation. Horizon Europe's allocation amount is 94,076 billion euros.

[1] Customs programme, Digital Europe programme, Erasmus+, European Solidarity Corps, EU4Health, Fiscalis, Citizens, Equality, Rights and Values programme, Creative Europe, LIFE, Union Civil Protection Mechanism, Horizon Europe, Pericles IV programme, Single Market Programme, Justice Programme, Union Anti-Fraud Programme, Union Space Programme

List of figures

List of tables