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Water Recycling Toolbox

Water recycling strategy for Klaipėda Region

Association “Klaipėda Region”
Klaipėda University

Interreg
Baltic Sea Region

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Initial exchange

Water recycling strategy for Klaipėda Region

Association “Klaipėda Region”

Klaipėda University

9 November 2023

WaterMan partners meeting
Bornholm 2023 11 07-09

KLAIPĖDOS REGIONAS asociacija

Regional water reuse strategy

Klaipėda Region

EGLĖ STONKĖ
Association Klaipeda Region

ONLINE RESEARCH
MOST COMMON TOPICS

- Modernization of existing infrastructure
- Installation of new infrastructure
- Smells control
- Renewal of rainwater networks
- Drinking water quality

REGIONAL WATER REUSE STRATEGY PRIMARY THOUGHTS

Possible scope & format of the strategy

- Joint regional document (*AKR level?*)
- Agreement on the directions and principles
- Identification of most relevant actions
- Engagement of the regional inhabitants

REGIONAL WATER REUSE STRATEGY PRIMARY THOUGHTS

Related strategic documents at local & regional level

- Local strategic development plans
- Local action plans

- Klaipeda region specialisation strategy 2030
- Klaipeda region development plan

REGIONAL WATER REUSE STRATEGY PRIMARY THOUGHTS

Stakeholders to be involved

- Municipal representatives
- Local water management companies
- Klaipeda University

- Representatives from Farmers Union (young farmers?)
- Ministry of environment
- Umbrella organisations:

- Lithuanian Water Suppliers Association
- responsible water management association
- Lithuanian Local Authorities Association
- Klaipeda Industry Association?
- NGOs?

REGIONAL WATER REUSE STRATEGY PRIMARY THOUGHTS

First steps

- Identification of regional action group (local perspectives, plans, ambitions)
- Preparatory survey for Status Quo
- Seminar on existing good practices
- Round table discussion with national/ umbrella representatives
- Workshop for strategy co-creation (developed methodology)
- Regional dialogue forum (working sessions)

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1st Peer-review session

Water recycling strategy for Klaipėda Region

Association “Klaipėda Region”
Klaipėda University

14 March 2024

WaterMan
All-partner Meeting
Klaipėda & Gargždai / LT
12-14 March 2024

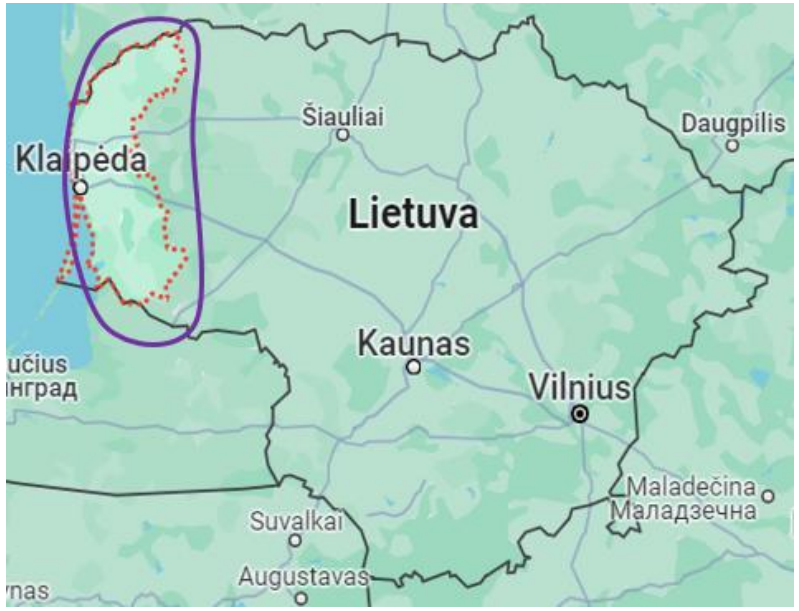
Approaches to a strategy for the reuse of treated wastewater and recirculation of stormwater in the Klaipeda region

Klaipeda University, Marine Research Institute
Association “Klaipėda Region”

Approaches to a strategy for the reuse of treated wastewater in the Klaipeda region

Geographical area: Klaipeda coastal Region with 7 municipalities:

1. Klaipėda City Municipality;
2. Palanga City Municipality;
3. Klaipėda District Municipality;
4. Kretinga District Municipality;
5. Šilutė District Municipality;
6. Skuodas District Municipality;
7. Municipality of Neringa



Strategy combine three main objectives/measures:

- **reuse of treated water**
- **recirculation of retained water**
- **promoting stakeholder & consumer acceptance for water reuse.**

2023 spring-summer drought emergency in the Klaipėda region

Three municipalities have declared a municipal-level 2023 spring-summer drought emergency

Kretinga district municipality:
Farmers in Kretinga District have suffered heavy losses due to drought. A state of emergency has been declared in Kretinga District for 13 June 2023. **55 farmers** in the district, who had suffered damage to an area of **1 840 ha**, contacted the Agriculture Department of the Kretinga District Municipality. The data provided by the farmers were assessed by the specialists of the Agriculture Department and 8 crop condition assessment reports were prepared, covering 1 840 ha of crops. However, no assistance/compensation was provided by the LT Ministry of Agriculture. Municipal Council of Kretinga District reduced land tax for 47 farmers.

Šilutė district municipality:
Summary information on the consequences of drought emergencies in summer 2023:
The impact of drought:
1. Crops - 11 596,5 ha;
2. Meadows - 25 811,0 ha;
3. 100,5 ha for gardens and berry orchard

Klaipeda district municipality: n.d.

2023 spring-summer drought emergency in the Klaipėda region

Approaches to a strategy for the reuse of treated wastewater in the Klaipeda region

Municipalities duties

According to the LT drinking water supply and wastewater treatment law, municipalities are responsible for the preparation and approval of:

1. The Infrastructure Development Plan for Drinking Water Supply and Wastewater Management (WW and DW Infrastructure Development Plan)

The WW and DW Infrastructure Development Plan It is a special spatial planning document, which defines the municipal agglomerations/areas of public drinking water supply and wastewater management, the infrastructure development directions, phases of the implementation (sequence) and the sources of funding.

and/or

2. The Infrastructure Development Plan for Stormwater Management

These plans can be prepared in accordance with regulations approved by the LT Minister for the Environment.

3. Operational plan for a drinking water supplier and a wastewater or stormwater manager

Approaches to a strategy for the reuse of treated water in the Klaipeda region

In total, there were 66 urban wastewater treatment plants in Lithuania in 2022, treating wastewater from agglomerations over 2000 PE,

In the strategy for assessing the treated wastewater reuse potential, we propose to include only WWTPs with a BOD5 load above 2000 PE, i.e. **7-9** WWTPs in Klaipeda region,

In agglomerations of less than 2000 GE, some treatment indicators/parameters are notlimeted and not measured, e.g. COD, and for some parameters the instantaneous and average daily or annual Maximum Allowable Concentrations (MACs) in the effluent are slightly higher than those specified in Directive 91/271/EEC (SS),

Due to the low capacity of these WWTPs, as well as the potentially disproportionate additional reclamation costs, further reuse of these < 2000 PE treated effluents should not be evaluated

Approaches to a strategy for the reuse of treated wastewater in the Klaipeda region

The following 7-9 WWTPs with > 2000 PE are proposed for further treated wastewater reuse assessment

Municipality	Number of WWTPs in operation	WWTPs with BOD5 pollution load > 2000 PE	WWTPs > 2000 PE
Klaipėda City Municipality	14	1-2?	Klaipeda city and Kretingalė settlement WWTPs?
Palanga Town Municipality	1	1	Palanga town WWTP
Klaipėda District Municipality	-*	-	-
Kretinga District Municipality	13	2	Kretinga town and Vydmantai settlement WWTPs
Šilutė District Municipality	19	1-2?	Šilutė town WWTP Kintai settlement WWTPs?
Skuodas District Municipality	6	1	Skuodas town WWTP
Municipality of Neringa	4	1	Nida settlement WWTPs
Total	**57**	**7-9?**	

*Klaipeda district 13th wastewater treatment plants are operated by Klaipėda city water company

Approaches to a strategy for the reuse of treated wastewater in the Klaipeda region

Capacity of WWTPs

			EPA 2022	EPA 2022	EPA 2022	Municipal data	Municipal data
	Water company name	WWTPs > 2 000 PE	Hydraulic capacity, thous. m3/year	Capacity PE of BDS7,	Actual load of BDS7, PE	Hydraulic capacity, m3/d	Actual load of BDS, PE
1	AB "Klaipedos vanduo"	Klaipėda city	28 200	305 333	340 669	80 000	270 944
2		Kretingale settlement	-	-	-	228	2075
3	UAB "Šilutės vandenys"	Silutė town	3 796	58 982	37 143	10 400	41 806
4		Kintai settlement	-	-	-	200	2 032
5	UAB "Kretingos vandenys"	Kretinga town	1 878	31 697	34 660	5 160	36 627
6		Vydmantai settlement	314	5 529	3 148	440	10 642
7	UAB "Palangos vandenys"	Palanga town	7 665	22 000	26 137	21 000	36 000
8	UAB "Skuodo vandenys"	Skuodas town	463	10 000	4 987	1 270	2 036
9	UAB "Neringos vanduo"	Nida town	621	6 700	2 188	2 200	2 311

It can be preliminarily stated that we have nine agglomerations with more than 2000 PE for the further evaluation of the reuse of treated municipal wastewater in Klaipeda region. We will make a final decision when EPA summarizes the water use statistics for 2023.

Approaches to a strategy for the reuse of treated wastewater in the Klaipeda region

Status of infrastructure planning

Municipality	Infrastructure Development Plan for Drinking Water (DW) Supply and Wastewater (WW) Management	Infrastructure Development Plan for Stormwater (SW) Management	Water company operational (activity) plan
Klaipėda City Municipality	DW, WW and SW city plan is being revised and is scheduled to end in 2024	SW management measures will also be provided in the city plan	Currently under review
Palanga Town Municipality			2023-2027 operational/activity plan approved in 2023
Klaipėda District Municipality	Drinking water (DW) supply and wastewater (WW) management infrastructure in Klaipėda District is operated by Klaipėda City Water Company	Stormwater infrastructure is in operation in 22 settlements. District SW management plan is under preparation. Completion in 2024	Stormwater management 2024-2028 activity plan approved in 2023
Kretinga District Municipality	District plan currently under review. Completion in 2025	Kretinga town stormwater management plan, 2013	DW, WW and SW 2023-2027 operational plan
Šilutė District Municipality	Amended and approved in 2022	Šilutė town SW management plan are provided in the special engineering infrastructure plan, 2013	
Skuodas District Municipality	Amended and approved in 2022	not available	2022-2026 operational plan
Municipality of Neringa	Amended DW, WW and SW plan approved in 2022	Amended DW, WW and SW plan approved in 2022	Infrastructure development measures provided in the amended DW, WW and SW plan

DW and WW infrastructure development prepared by 3 municipalities, being prepared in 2 municipalities (Klaipeda city and Kretinga district). SW management plans only for Kretinga, Šilute towns. SW infrastructure plan currently being updated for Klaipeda city and prepared for Klaipeda district municipality.

Recirculation of retained stormwater

Preliminary data on stormwater sub-catchment drainage areas in the Klaipėda region

Municipality	Number of stormwater sub-catchment areas	Remarks
Klaipėda City Municipality	**75**	Revision of the Klaipeda city DW, WW and SW infrastructure management plan is planned to be completed in 2024
Palanga Town Municipality	**n.d.**	
Klaipėda District Municipality:	**n.d.**	A special plan for the development of SW management infrastructure in Klaipėda District is under preparation and is expected to be completed in 2024
Gargždai town	17	According to the 2012 Gargždai town SW management special plan
Priekule town	n.d.	
Kretinga District Municipality:	**n.d.**	
Kretinga town	32	According to the 2013 Kretinga town SW management special plan
Šilutė District Municipality	**n.d.**	
Skuodas District Municipality	**n.d.**	
Municipality of Neringa:	**21**	
Juodkrantė	12	
Nida	8	
Preila	0	
Pervalka	1	

According to the available statistics, almost 150 sub-catchment areas/outfalls have already been counted

Further steps

Reus of treated wastewater

More in-depth treated wastewater reuse assessment of the 7 and/or 9 agglomerations with more than 2000 PE in the Klaipeda region:

- Stakeholder analysis (water use statistics (water demand vs. ground water availability), mapping of WWTPs, outfalls, consumers
- Overview of potential ground water sources in the Klaipeda region.
- Local strategies (e.g. local water supply and wastewater/stormwater operational plans, climate adaption strategies etc.)
- Preparatory surveys / questionnaire on local consumer acceptance (located in 5-6 km distance from WWTP),

i. e. collect information on what water is used and for what purposes.

- Planned local dialogue events – meetings with stakeholder (WWTPs operators and potential consumers)
- Communication / preparation information on WaterMan pilot measures, water reuse practice in other EU countries

Recirculated of storm water – two reuse assessment options:

1. **in-depth assessment of the 7 and/or 9 agglomerations with more than 2000 PE, or**
2. **assess only those urban areas that have SW infrastructure development plans (according to municipal information, the following plans are not available: Palanga, Skuodas towns**

- **primary task** - to assess the possibilities of reuse of stormwater together with the Klaipėda city and Klaipėda district municipality SW special plans developers (potential local water users, distances, qualitative and quantitative water use statistics, etc.)

Decision analysis

Potential water reusers

- Irrigation for small-scale landscaping such as parks and gardening applications)
- Irrigation for agriculture
- Process water for power plants, refineries and factories, commercial sites
- Dust control or surface cleaning of roads, construction sites, and other trafficked areas
- Concrete mixing and other construction processes, etc.

Application of Sustainable Drainage Systems components

- Site selection for retention/detention ponds, filter strips, filter drains, attenuation storage tanks, infiltration systems, treatment structures

THANK YOU

1st Peer & expert review session: Recommendations & conclusions

Comments from the peer & expert review:

- Focus on the consumers' needs regarding water quality and quantity:
  - For which uses shall the cleaned waste water be used for? Different uses need different qualities. It would be good to consider other end-users beyond agriculture – e.g. technical water for industry. This will also determine which investments need to be made in the treatment processes to reach the necessary quality. Also remember that bigger WWTPs will have to implement removal of trace organic compounds, which will make the further water treatment steps (after WWTP) also less costly.
  - Analyse supply, demand & seasonality: What is the total amount of reuse water that can be produced during all times? Are there fluctuations in demand (e.g. more in summer)? How you cope with that? Are intermediate storage tanks required as investments?
  - Consider analysing where the water comes from to the particular WWTPs. It determines the risks to be considered for re-use (e.g. water from hospitals, etc. can be other than water from industries or households).
- Map the stakeholders and decide who needs to be informed or to be involved:
  - Cost of the reused water: The EU-level regulations may make it easier to communicate the costs of infrastructure upgrades. A good way to communicate the investment is that giving the fit-for-purpose (lower quality) water to industries, leaves the resources of ground water intact for the agriculture (which needs very clean water).
  - Plan a "roadmap for change management": the farmers who suffer of droughts could be a good starting group for raising awareness on the possibilities of water reuse and to demand introducing water reuse into local water-related documents (bottom-up).
- Consider to add an overview of potential water sources in the region to your strategy.

Related project examples:

- B-WaterSmart: https://b-watersmart.eu/results-downloads/
- Use of production water from a sugar factory for irrigation: https://www.interregeurope.eu/good-practices/alternative-resources-for-agricultural-irrigation
- TOPSOIL Project, pilot action: https://northsearegion.eu/topsoil/pilot-areas/ge-4/ *Pilot project to develop a stakeholder integrated groundwater monitoring system and to identify measures to adapt to climate change by allowing increased groundwater extraction for agricultural irrigation.*
- Blue Transition: https://www.interregnorthsea.eu/blue-transition/
  - Pilot action: WaterFarmers – Uelzen: Securing groundwater supply for field irrigation in the county of Uelzen: https://www.interregnorthsea.eu/blue-transition/pilots/ge4-waterfarmers-uelzen

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2nd Peer-review session

Water recycling strategy for Klaipėda Region

Association “Klaipėda Region”

Klaipėda University

3 April 2025

WaterMan
All-partner Meeting
Liepāja & Saldus / LV
1-3 April 2025

Current status of the regional water recycling strategy for Klaipėda Region

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Approaches to a strategy for the reuse of water in the Klaipeda region

Geographical area: Klaipeda coastal Region with 7 municipalities:

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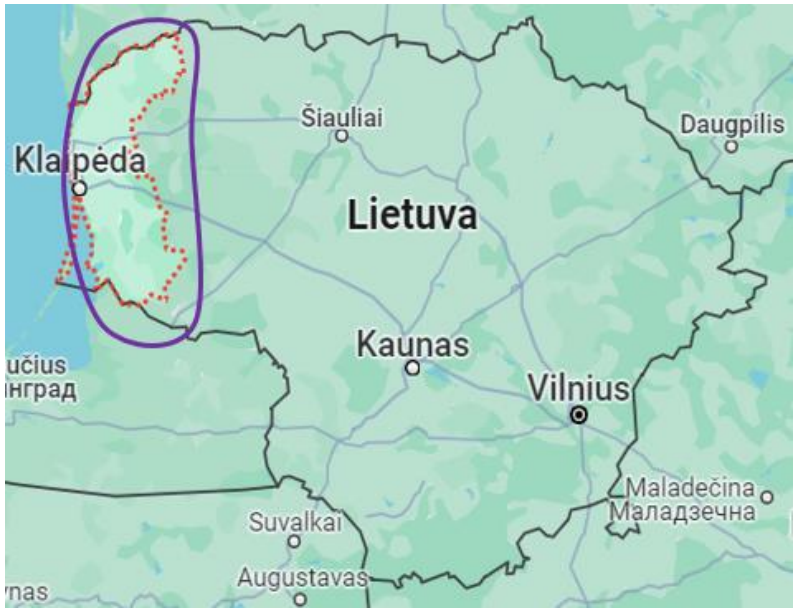

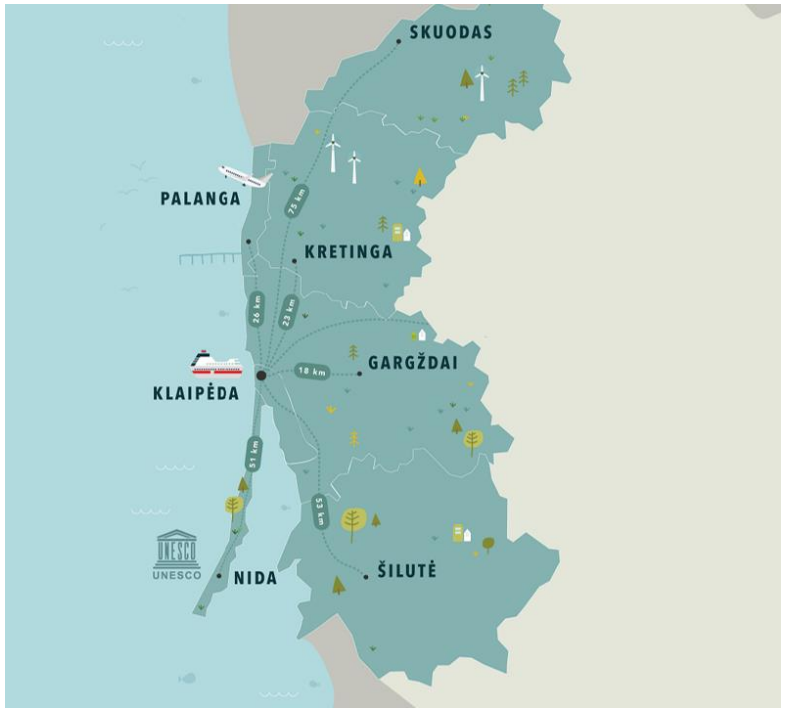

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Content of the strategy

1	Climate scenario (local situation)
2	Analysis of water demand vs. water availability (local data)
3	Overview of potential water sources in the region, incl. groundwater, surface water, recirculated storm water & reused wastewater
4	Stakeholder analysis (incl. mapping / needs / positions) & visualization
5	Surveys / appraisals on local consumer acceptance
6	Roadmap for change management & related communication
7	Mapping of related local strategies and national regulations (adaption EU Water Reuse Regulation and new Urban Wastewater Treatment Directive
8	List of concrete local / regional use cases for water reuse (Water Recycling Toolbox, good practices in Europe, etc.)
9	Horizontal actions, awareness raising

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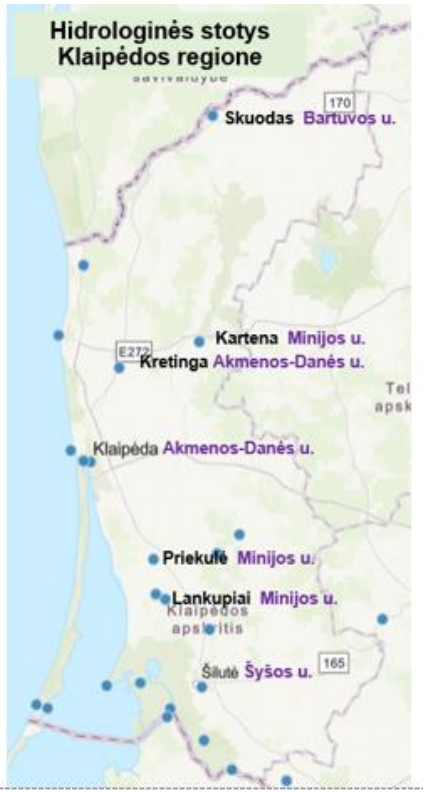
1. Climate scenario in the Klaipėda region

Key climate change indicators with major impacts on water resources and agriculture
(Climatological standard normals were used according to the recommendations of the WMO: Averages of climatological data for the following consecutive periods of 30 years: 1 January 1981 to 31 December 2010, 1 January 1991 to 31 December 2020, etc.)

- Air temperature
- Number of hot days
- Precipitation
- Number of days with snow cover
- Dangerous and severe droughts according to the TPI index (precipitation/temperature ratio)
- Frost on the soil surface
- Natural and catastrophic hydrological phenomena (very high and very low water levels in rivers - flows below the ecological threshold)
- Agricultural emergencies (droughts and heavy rainfall)



For the projection, two Representative Concentration Pathways (RCPs) used to describe different climate futures depending on greenhouse gas emissions in the coming years (based on the results of different prediction models):

- A high-emissions "worst-case" scenario (**RCP8.5**), which corresponds to a future without climate change mitigation, and
- An intermediate scenario (**RCP4.5**).

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2. Analysis of water demand vs. water availability

The regionalised water exploitation index (WEI+) measures total water consumption as a percentage of the renewable freshwater resources (groundwater aquifers and surface water) available for a given territory and period. It quantifies how much water is abstracted monthly or seasonally and how much water is returned before or after use to the environment via river basins

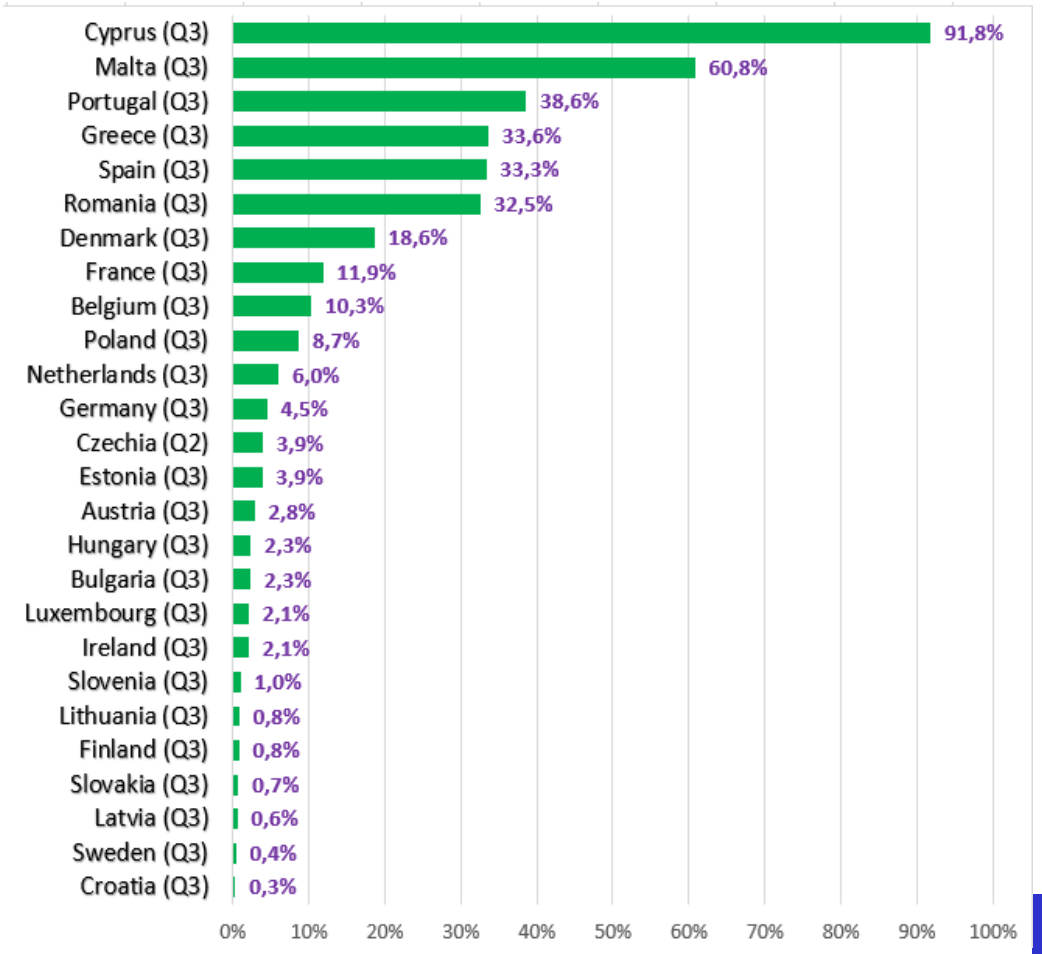
This figure gives an overview of the worst quarterly water scarcity conditions (maximum WEI+ in a consecutive 3-month period) of 2022 across countries in Europe. Seasonal WEI+ values are estimated as quarterly averages per country.

WEI+ values:

- Values > 20% = water resources under stress and water scarcity conditions prevail;
- Values > 40% = stress is severe and freshwater use unsustainable.

Annual quarters are: Q1 (January-March), Q2 (April-June), Q3 (July-September), Q4 (October-December).

https://www.eea.europa.eu/en/analysis/indicators/use-of-freshwater-resources-in-europe-1/worst-seasonal-water-scarcity



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3. Overview of potential water sources in the region

The Water Framework Directive is the main water protection legislation in Europe. It applies to inland, transitional and coastal surface waters as well as groundwater and ensures an integrated approach to water management.
It is based on a river basin approach, including assessment of the quality and quantity of groundwater and the quality of surface water.
Based on LT river basin management plans and other information sources, the following information is collected:

- Water abstraction from river basins,
- Water abstraction and consumption in seven municipalities
- Groundwater abstraction in groundwater basins
- Groundwater abstraction in each municipality

The overall quantitative status of groundwater basins is in good condition if they should not exceed 10% of the basin resources.

Share of municipal area in the main coastal rivers basins, %

Municipalities	Bartuva River Basin	Lithuanian coastal river basin (Akmena-Danė river basin)	Minija River Basin	Šyša River Basin
Skuodas District	76		3,4	
Kretinga District	4	41,7	31,5	
Palanga City		49,0		
Klaipėda City		89,9		
Klaipėda District		31,4	58,0	
Šilutė District		2,9	29,9	100
Neringa Municipality		99,4		

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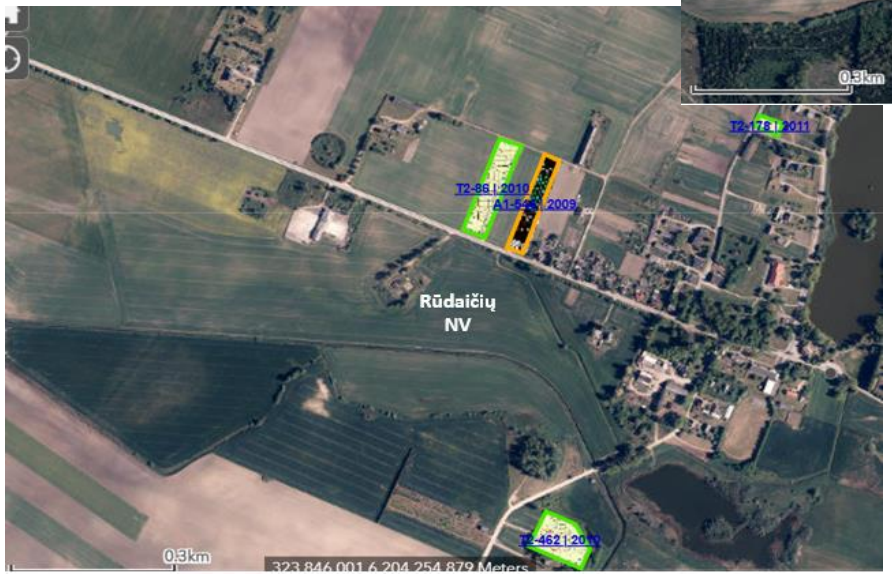
4. Stakeholder analysis (incl. mapping / needs / positions) & visualization

Main stakeholders to be involved:
- Municipal representatives
- Local water management companies
- Representatives from Farmers Union

Cooperation with institutions
(water quantitative data, legislation, statistics, etc.)
- Ministry of Environment
- EPA
- Hydrometeorological Service
- State Data Agency
- Agricultural data center

Associated organizations:
- Lithuanian Water Suppliers Association
- Lithuanian Local Authorities Association

For the purpose of wastewater reuse, information about the main characteristics of the 13 WWTs in Kretinga Municipality collected and mapped in orthophoto maps.



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5. Surveys / appraisals on local consumer acceptance

1. General questions

A questionnaire was prepared and discussions were held in the municipalities of Kretinga district and Klaipėda district. The following questions were asked to be answered:

1.1 Do you recognise the need for water reuse in your region and in Lithuania?

1.2 Do the Klaipėda Municipality's action plans and other documents include water reuse and water saving measures?

1.3 Approximately how much and what kind of water was used per year (e.g. in 2024) for the following purposes?

- Irrigation of common areas, landscape features such as green spaces, parks and trees, planted trees, shrubs, flowers, gardens, as well as irrigation of football and golf courses, cemeteries,
- Dust control - surface cleaning/wetting of roads, construction sites and other heavily trafficked areas,
- For fire fighting purposes.

1.4. Does the Municipal Infrastructure Development Plan for Stormwater Management include measures for stormwater storage (detention and/or retention basins, attenuation basins, underground reservoirs, etc.) with a view to reuse? If not, in which cities/towns could they be installed in the future?

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5. Surveys / appraisals on local consumer acceptance
1. General questions

1.5 What water source is used for industrial purposes? Are there any potential industrial/commercial sites in the agglomeration within 3 km of stormwater and/or treated municipal wastewater sources?

1.6. Would you support new changes to the design/construction standards for buildings, especially private houses, to require the collection and use of rainwater for your own needs?

1.7. Which listed water sector legislation would you propose to amend / revise in order to promote water reuse?

1.8. What measures should be implemented for your water reuse project/idea?
a. Additional advanced treatment of municipal waste water,
b. Development of guidelines, regulations (e.g. for safe water reuse, taking into account the type of use, health risk management and prevention measures, etc.),
c. Monitoring and control of reused water
d. Scientific research, feasibility studies
e. Pilot reuse measures
f. Other

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5. Surveys / appraisals on local consumer acceptance

1. General questions

1.9. Is there any existing infrastructure for water reuse (e.g. treatment, sewers, storage tanks, rainwater retention ponds)?
If so, what are they?

1.10. Which stakeholders (organisations, professionals) should be involved in promoting water reuse in the city, industry, agriculture?

1.11. Would it be appropriate to invite foreign experts to share their experiences on water reuse, and if so, which topics would you be most interested in?

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5. Surveys / appraisals on local consumer acceptance

2. Agriculture

2.1 Do the statistics presented in the text for the year 2020 correspond to the real situation of irrigated agriculture, for example, in the municipality of Klaipeda district?

- There were 1141 farms with potential irrigated areas,
- The total area of irrigated land in the municipality was 561 ha,
- Surface irrigation was the most common method.

2.2. From which water sources do farmers in the municipality use water for irrigation of agricultural crops?

- Artificial surface water bodies (installed on their own land),
- Groundwater from own well(s)
- Water from surface water bodies (rivers, lakes and ponds)
- From water supply networks of other economic units
- Other sources.

2.3 Which crops are prioritised for irrigation?

2.4. During what period is water most needed for irrigation - during plant vegetation, during droughts, or throughout the entire crop growing period?

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5. Surveys / appraisals on local consumer acceptance
2. Agriculture

2.5 Should permitting, registration and other procedures for water used for irrigation purposes be simplified, e.g. permitting only for larger quantities of water, etc.?

2.6 Does the Common Agricultural Policy (CAP) in Lithuania support sustainable agriculture by linking various payments (direct payments, product-specific support, voluntary coupled support, rural development funds, cross-sectoral support, etc.) to sustainable/ efficient use of water for irrigated agriculture, i. e:

- Stormwater retention and storage measures,
- Investment in new water-saving irrigation infrastructure,
- Reuse of treated and reclaimed wastewater from WWTPs,
- Reuse of treated wastewater from the food industry (e.g. dairies, breweries, meat processing, fruit and vegetable processing, etc.), etc.

2.7 Are there any irrigated agricultural areas within a distance of 0.1 to 2 km from the listed WWTPs where it could be used for further treatment and irrigation purposes, if considered economically feasible?

2.8 Are there any food processing plants in the municipality (e.g. dairies, breweries, fruit and vegetable processing plants) whose effluent could be used for irrigation? if so, please list them.

5. Surveys / appraisals on local consumer acceptance
2. Agriculture

2.9. Could there be a case for cooperation between farmers, e.g. using groundwater for irrigation, based on experiences in Germany or other countries? - see project examples

2.10. What priority should be given to drought insurance for crops, or to finding ways to reuse water, or to a balanced application of both?

2.11. Does the current pricing and licensing system for water abstracted for irrigation encourage or discourage more efficient use of surface or groundwater?

2.12. What should be done to make the system more effective?

- Removing the requirement to pay for the abstraction of a certain quantity of water if it is sufficient and does not affect the ecological status of surface water bodies or the quantity of groundwater, etc.?

2.13. Do farmers in municipality have information about groundwater resources in the area?

2.14. What other reasons hinder the use of water for irrigation purposes (cost of irrigation infrastructure - long distances to surface water bodies, cost of surface water, groundwater, limited resources, large irrigation areas, other)?

2.15. Other observations, suggestions for the development of irrigated agriculture.

7. Mapping of related local strategies and national regulations

According to the LT drinking water supply and wastewater treatment law, municipalities are responsible for the preparation and approval of:

1. The Infrastructure Development Plan for Drinking Water Supply and Wastewater Management (WW and DW Infrastructure Development Plan)

The WW and DW Infrastructure Development Plan It is a special spatial planning document, which defines the municipal agglomerations/areas of public drinking water supply and wastewater management, the infrastructure development directions, phases of the implementation (sequence) and the sources of funding.

and/or

2. The Infrastructure Development Plan for Stormwater Management

These plans can be prepared in accordance with regulations approved by the LT Minister for the Environment.

3. Operational plan for a drinking water, wastewater and stormwater operators

7. Mapping of related local strategies and national regulations

EU Regulation 2020/741

Article 2

Scope

1.This Regulation applies whenever treated urban waste water is reused, in accordance with Article 12(1) of Directive 91/271/EEC, for agricultural irrigation as specified in Section 1 of Annex I to this Regulation.

2. A Member State may decide that it is not appropriate to reuse water for agricultural irrigation in one or more of its river basin districts or parts thereof, taking into account the following criteria:

(a) the geographic and climatic conditions of the district or parts thereof;

(b) the pressures on and the status of other water resources, including the quantitative status of groundwater bodies as referred to in Directive 2000/60/EC;

(c) the pressures on and the status of the surface water bodies in which treated urban waste water is discharged; (d) the environmental and resource costs of reclaimed water and of other water resources.

LT position

- The LT Minister for the Environment by 2022-10-11 order determined that, taking into account the criteria set out in Article 2, paragraph 2 of EU Regulation 2020/741, wastewater collected by centralized wastewater collection systems is not reused in agriculture for the purpose of irrigation, as specified in Section 1 of Annex I of Regulation (EU) 2020/741;
- The decision above must be reviewed according to the criteria set out in Article 2, paragraph 2 of EU Regulation 2020/741 at least every 6 years from the entry into force of this order.
- To authorize the Environmental Protection Agency, at the request of the responsible authorities of the member states, to perform the cooperation functions established in Article 8 of EU Regulation 2020/741 on the use of wastewater collected by centralized wastewater collection systems in agriculture for the purpose of irrigation (cross-border water reuse relevance)

Klaipeda University

Article 15

Water reuse and discharges of urban wastewater

Member States shall systematically promote the reuse of treated wastewater from all urban wastewater treatment plants where appropriate, especially in water-stressed areas, and for all appropriate purposes. The potential for the reuse of treated wastewater shall be assessed in a manner that takes into account the river basin management plans established under Directive 2000/60/EC ….

LT position is still unclear

- Consultations have been initiated with the Ministry of the Environment on the transposition of the provisions of this article into national law.
- We propose that LT legislation should provide for the reuse of both urban wastewater and stormwater.

Closing Remarks

Initial observations on water reuse opportunities

- Water reuse is not foreseen in municipal spatial planning documents, various action plans,
- The most promising area for water recycling is the irrigation of urban green spaces, dust control or surface cleaning of roads, construction sites, and other trafficked areas with accumulated stormwater,
- The use of treated and additional reclaimed urban wastewater is complicated by limited economic feasibilities and lack of regulatory requirements to reuse.

Remaining tasks:

- Mapping of remaining 40+ WWTPs in six municipalities,
- Complete groundwater and surface water resource assessment, finalize remaining chapters of the strategy.
- Further communication with Ministry of Environment regarding transposition of new Urban Wastewater Directive,
- Surveys/assessments of local consumer acceptance in remaining five municipalities,
- Contributions to preparation of Water Recycling Toolbox, translation into LT language,
- Preparation of an article on water reuse pilot measures, practices in other EU countries for the journal Water Management,
- Together with LT partners, organize meeting with Klaipeda region stakeholders with pilot site visit in Gargzdai.

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2nd Peer & expert review session: Recommendations & conclusions

- Think about who will be working with the strategy in the future? Think also who will adopt the strategy? How you will ensure that the strategy is in use by municipalities?
- The way how you plan to introduce the strategy to future stakeholders is very good: first the survey questionnaire, then meeting with the municipalities & utility companies. Then next steps would be to consult the draft with these stakeholders and to invite them for the demonstration event of the “real world” pilot, which is a good practice example, especially that now it is decided that Klaipeda District Municipality will enhance it with additional cleaning and recycling infrastructure after the project has ended.
- When you make the list of measures, concentrate on those where there is commitment (stress the things that are likely to be implemented – where there is willingness to implement – like you already propose to e.g. to substitute watering flowerbeds not with drinking water, but to use pond water/river water instead.)
- Also: think if you can indicate or make suggestion on financing the actions of the strategy (who could finance it? Are there external funds? Are there any model approaches to financing?)

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SUSTAINABLE WATERS
WaterMan

Final review

Water recycling strategy for Klaipėda Region

Association “Klaipėda Region”
Klaipėda University

26 September 2025

General data on the Klaipėda region

- The territory of the **Republic of Lithuania** is divided into 10 counties/regions and 60 municipalities.
- **Klaipėda Region** only Lithuanian region with access to the sea; population ~335k (12% of Lithuania).
- Third largest city **Klaipėda** (161,000 residents, 47% of region population), major ice-free seaport
- **Neringa Municipality** on the UNESCO-listed Curonian Spit; smallest population but high cultural landscape value.

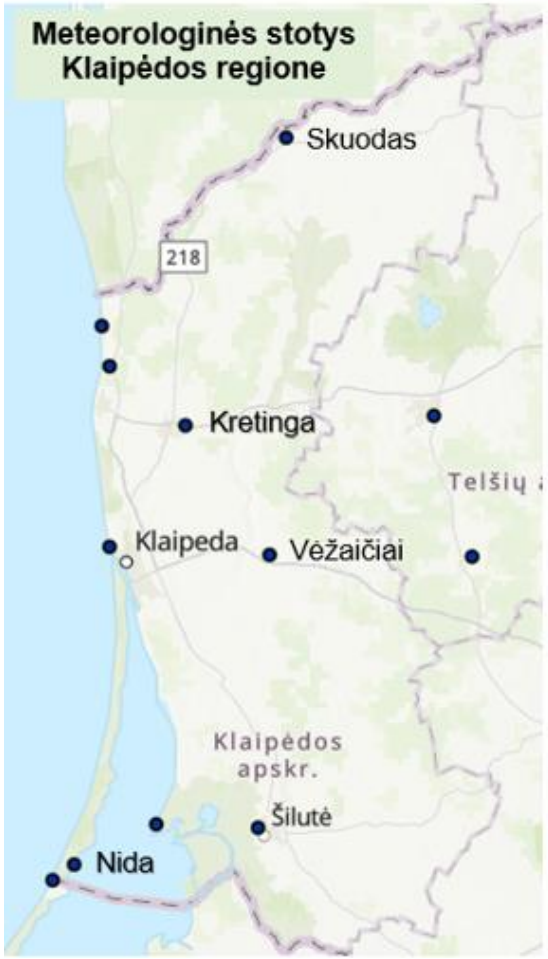
Municipality	Population, 2025	% of Klaipėda region population	Area of the territory, km ^{2}	% of Klaipėda region territory
1. Klaipėda city	160 979	4.8	98	1.9
2. Palanga city	18 556	5.4	79	1.5
3. Klaipeda district	69 256	20.1	1 336	25.6
4. Kretinga district	37 426	10.9	989	19.0
5. Šilutės district	38 181	11.1	1 706	32.8
6. Skuodas district	15 011	4.4	911	17.5
7. Neringa Municipality	4 453	1.3	90	1.7
Total	343 862	100	5 209	100
Lithuania	2 890 664	11.9	65 300	8.0

Climate changes

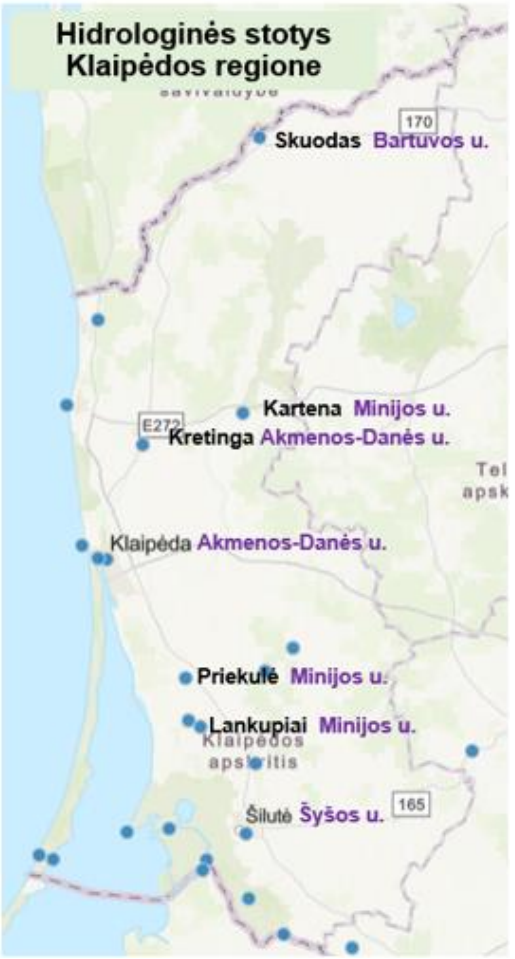
The climate change assessment used multi-year observation data from 6 meteorological and 7 water measurement - hydrological stations

	Weather stations		Water measuring stations		
	Station location	Year of establishment	Station location	River	Year of establishment
1	Skuodas	2009	Skuodas	Bartuva	1945
2	Kretinga	2009	Kretinga	Akmena-Danė	1991
3	Klaipėda	1881	Klaipėda	Akmena-Danė	2007
4	Vėžaičiai	1974	Kartena	Minija	1924
5	Šilutė	1949	Priekulė	Minija	2008
6	Nida	1898	Lankupiai	Minija	1905
7			Šilutė	Šyša	2006

Weather stations



Hydrological stations



Climate changes

Temperature

Climate changes according to standard climate normals in the Klaipėda region

WMO Climatological Standard Normals (CSN) are 30-year averages of a location's climate data, calculated and updated every decade.

These standard periods, like 1971-2000 1981–2010, 1991-2020, serve as a baseline to monitor climate change.

Meteorological stations	Average monthly and annual air temperature in the Klaipėda region according to CSN 1981–2010 and 1991–2020 Green colour marks the largest monthly increases, blue - decreases.													
	CSN/month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Year**
Klaipėda	1981–2010, °C	-1.1	-1.4	1.3	6.2	11.4	14.5	17.7	17.8	13.6	9	3.8	0.5	7.8
	1991–2020, °C	-0.9	-0.9	1.7	6.7	11.6	15.3	18.3	18.3	14.2	8.9	4.4	1.1	8.2
	Difference, °C	0.2	0.5	0.4	0.5	0.2	**0.8**	0.6	0.5	0.6	**-0.1**	0.6	0.6	0.4
Šilutė	1981–2010, °C	-2.1	-1.9	1.2	6.9	12.3	15.2	17.8	17.3	12.7	8	2.8	-0.9	7.4
	1991–2020, °C	-1.8	-1.4	1.6	7.4	12.4	15.7	18.3	17.8	13.3	8	3.5	-0.1	7.9
	Difference, °C	0.3	0.5	0.4	0.5	0.1	0.5	0.5	0.5	0.6	**0.0**	0.7	**0.8**	0.5
Nida	1981–2010, °C	-1.3	-1.5	1.1	6.2	11.9	15.2	18.4	18.4	14.2	9.2	3.9	0.3	8
	1991–2020, °C	-1	-1	1.7	6.9	12.2	16	18.9	19	14.8	9.2	4.4	0.9	8.5
	Difference, °C	0.3	0.5	0.6	0.7	0.3	**0.8**	0.5	0.6	0.6	**0.0**	0.5	0.6	0.5
														Lithuania
Klaipeda region	1981–2010, °C	-1.5	-1.6	1.2	6.4	11.9	15.0	18.0	17.8	13.5	8.7	3.5	0.0	**7.7**	**6.7**
	1991–2020, °C	-1.2	-1.1	1.7	7.0	12.1	15.7	18.5	18.4	14.1	8.7	4.1	0.6	**8.2**	**7.4**
	Difference, °C	0.3	0.5	0.5	0.6	0.2	**0.7**	0.5	0.5	0.6	**0.0**	0.6	**0.7**	**0.5**	**0.5**

Climate changes

Temperature

The table below presents the available measurements for a longer period, i.e. **the average temperatures of five decades (1961–2010) and standard three decades (1991–2020),** at two stations in the region, Šilutė and Nida.

A more significant average annual temperature increase of 1.1 and 1.3 °C is also observed, determined by the cooler temperatures of the previous years over a longer period.

Average monthly and annual air temperature in the Klaipėda region according to CSN 1961–2010 and 1991–2020.

	SKN/month	1	2	3	4	5	6	7	8	9	10	11	12	Year
Šilutė	1961–2010, °C	-3.8	-3.3	0.3	5.7	11.7	15.3	16.7	16.3	12.4	8	2.9	-1.1	6.8
	1991–2020, °C	-1.8	-1.4	1.6	7.4	12.4	15.7	18.3	17.8	13.3	8	3.5	-0.1	7.9
	Difference, °C	**2.0**	1.9	1.3	1.7	0.7	0.4	1.6	1.5	0.9	**0.0**	0.6	1.0	1.1
Nida	1961–2010, °C	-3.2	-2.9	-0.1	4.9	11	15.3	17.2	17.3	13.7	9.2	3.9	-0.1	7.2
	1991–2020, °C	-1	-1	1.7	6.9	12.2	16	18.9	19	14.8	9.2	4.4	0.9	8.5
	Difference, °C	**2.2**	1.9	1.8	2.0	1.2	0.7	1.7	1.7	1.1	**0.0**	0.5	1.0	1.3

2024 became a crucial year for Lithuania, highlighting the impact of climate change. It was the warmest year in the entire history of almost 250 years of meteorological observations. The average annual air temperature rose to 9.5 °C, even 2.1 °C above the multi-year average. Almost all months of the year, except January, were warmer than normal, and natural disasters became increasingly frequent and intense.

Climate changes

Hot days

The table below shows the number of hot days at three meteorological stations in the Klaipėda region when the maximum temperature (T_(max)) reaches or exceeds 30 °C during four standard periods.

The largest increase in hot days was recorded at the Klaipėda station. In the period 1961–1990, the number of hot days was 14; then, from 1991 to 2020, it increased to 96 days — almost seven times more than in the 1961–1990 period. However, the highest number of hot days was recorded in Šilutė.

In the Klaipėda region, the average number of hot days increased by 3.4 times, from 27 to 93 days.

Number of hot days (Tmax >=30 °C) in the Klaipėda region over four standard periods					
	CSN	**1961-1990**	**1971-2000**	**1981-2010**	**1991-2020**
Klaipeda	Number of hot days (Tmax>=30 °C)	14	20	43	96
	Growing number of hot days since 1961-1990		6	29	82
	Increased in times since 1961-1990		1.4	3.1	6.9
Šilutė	Number of hot days (Tmax>=30 °C)	60	76	101	**144**
	Growing number of hot days since 1961-1990		16	41	84
	Increased in times since 1961-1990		1.3	1.7	2.4
Nida	Number of hot days (Tmax>=30 °C)	8	13	25	**40**
	Growing number of hot days since 1961-1990		5	17	32
	Increased in times since 1961-1990		1.6	3.1	5.0
Klaipeda region	Number of hot days (Tmax>=30 °C)	27	36	56	**93**
	Growing number of hot days since 1961-1990		9	29	**66**
	Increased in times since 1961-1990		1.3	2.1	3.4

Climate changes

Precipitation

The table below compares the average monthly and annual precipitation data from six meteorological stations (Skuodas, Kretinga, Klaipėda, Vėžaičiai, Šilutė and Nida) over two CSN periods (1981–2010 and 1991–2020).

Although the annual amount of precipitation in the coastal area exceeds the Lithuanian average by more than 100 mm, it decreased almost three times faster than in Lithuania, from 14 to 5 mm.

	CSN/month	1	2	3	4	5	6	7	8	9	10	11	12	Year	Lithuania
Klaipėda region	1981–2010, mm	67	44	49	33	43	66	72	**93**	**88**	**96**	**91**	74	**817**	**700**
	1991–2020, mm	69	50	43	33	42	59	77	**90**	**81**	**98**	**83**	78	**804**	**695**
	Difference, mm	2	**6**	-6	0	-1	**-8**	5	-3	-7	2	**-8**	4	**-14**	**-5**

The average number of days per year with snow cover >5 cm in three meteorological stations in Klaipeda region (Klaipėda, Šilutė and Nida) and Lithuania over four CSN periods

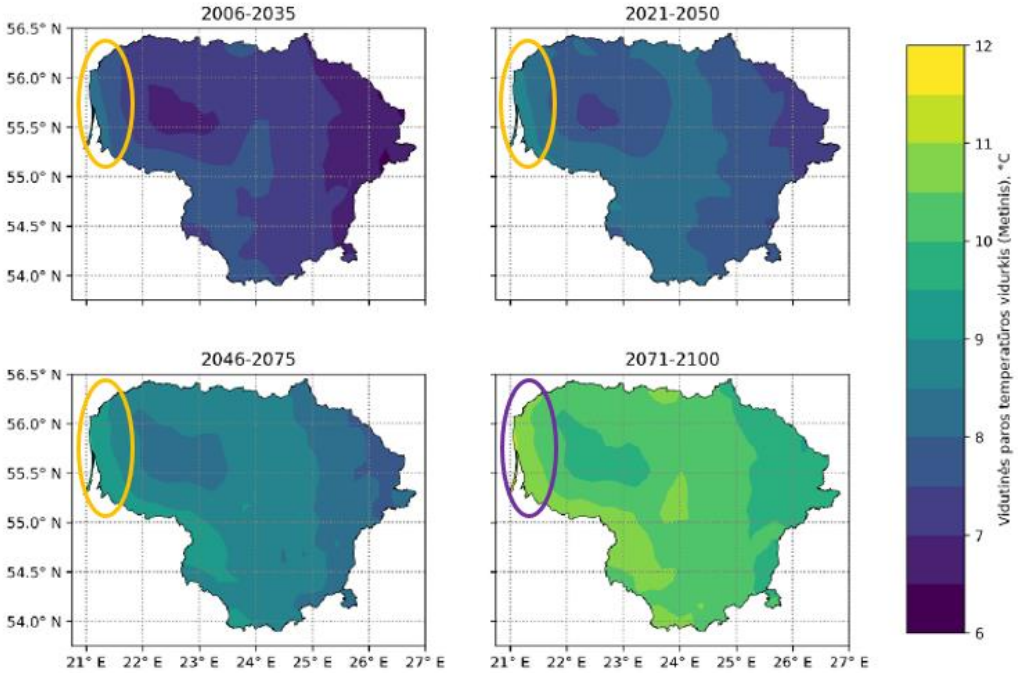
When comparing the 1961–1990 and 1991–2020 periods, it is evident that there has been a significant decrease in the number of days on which the snow thickness exceeds 5 cm. This decrease is as high as 16 days in the Klaipėda region and 21 days in Lithuania.

Average number of days per year with snow cover >5 cm				
	1961-1990	**1971-2000**	**1981-2010**	**1991-2020**
Klaipeda region	47	42	40	31
Lithuania	60			39

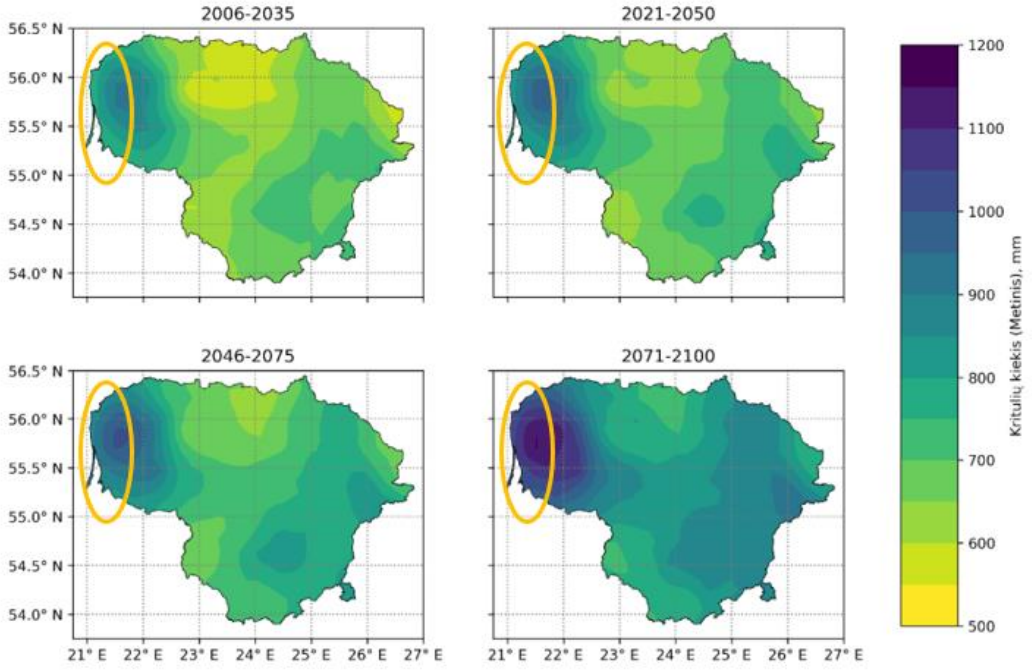
Climate changes

The forecast of key climate change indicators until 2100 in Lithuania under the 'worst case' RCP8.5 scenario of high emissions

ICHEC RCA rcp85



MPI RCA rcp85

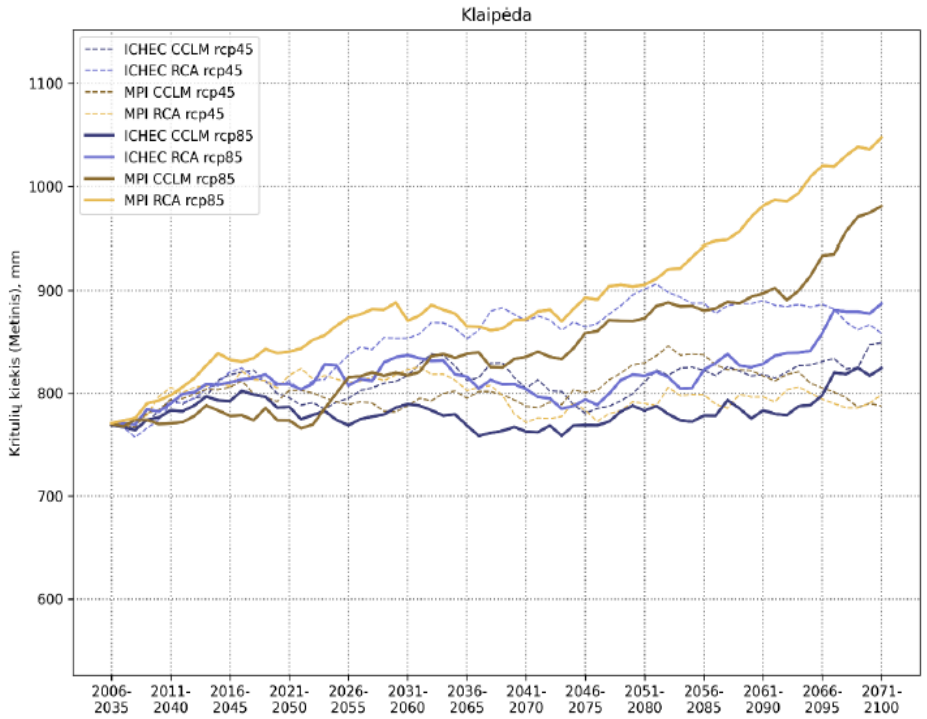


The average annual air temperature in Lithuania is expected to increase by between 1.2 and 2.8 °C compared to the current average of 7.4 °C.

Precipitation in Lithuania is projected to increase to 98 mm or 14% (RCP8.5). Annual precipitation will reach 782 mm. The highest precipitation will be recorded in the Samogitian Uplands, including the municipalities of the Klaipėda region.

Climate changes

Comparison of climatological standard normals (CSN) with modeling results

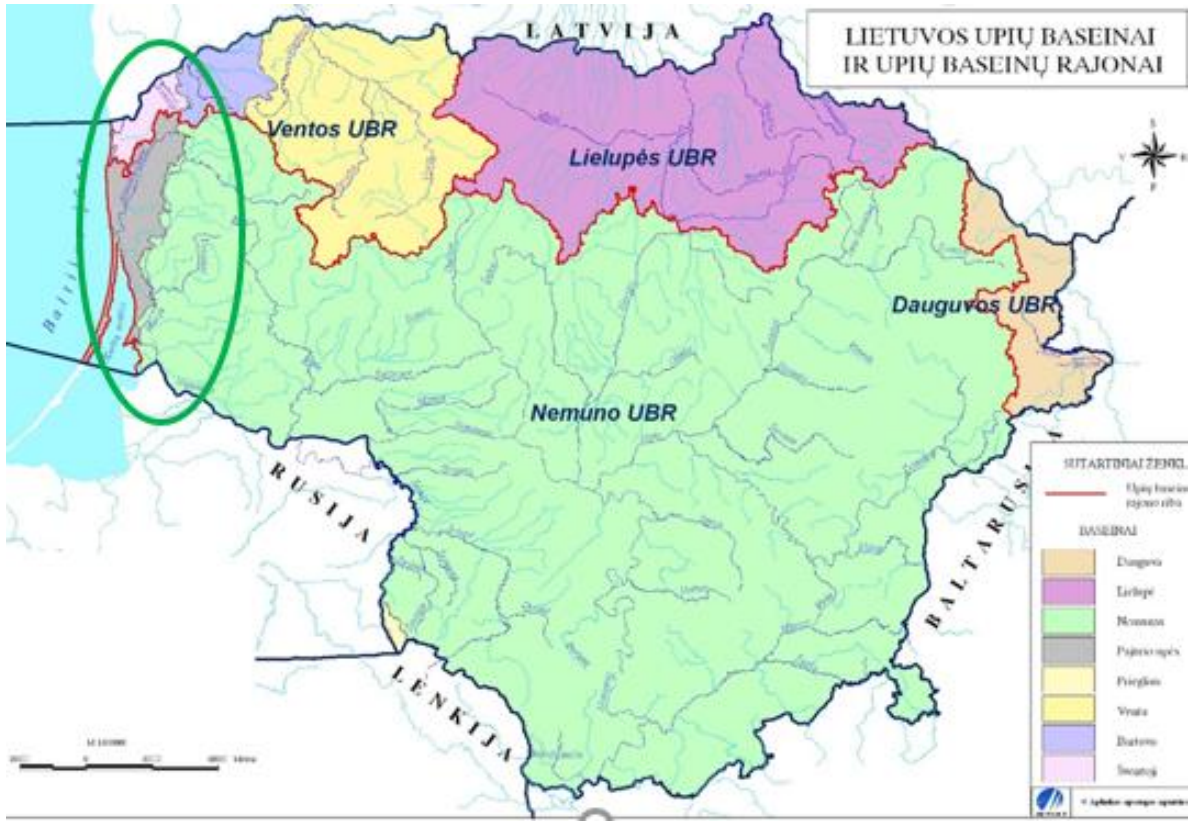


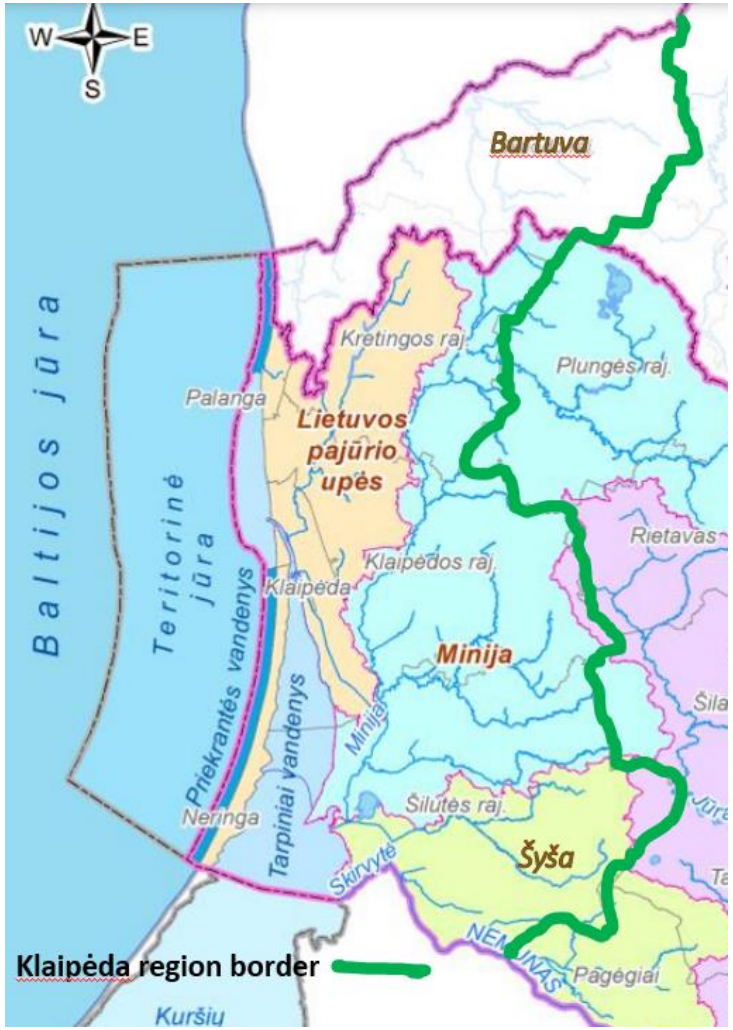
Global models show a faster increase in precipitation in Klaipeda only at the end of the century

Both the calculated data from the WMO Climatological Standard Normals (CSN) for the Klaipėda region and the modelled projections for Lithuania indicate rising average annual temperatures, an increase in the number of heat waves and a decrease in the number of days with snow cover. While models suggest an increase in national precipitation, the Klaipėda region has already experienced a decline over two CSN periods (1981–2010 and 1991–2020), highlighting regional differences and uncertainties that can only be verified over time.

Analysis of surface water demand vs. availability

Of the four RBDs identified in Lithuania, the Klaipėda region falls into two: the **Nemunas RBD** and the **Venta RBD** (picture below). These two RBDs contain four main river basins: The **Minija river,** the **Lithuanian coastal rivers**, the largest of which is the **Akmena-Danė river**, as well as the **Bartuva and Šyša rivers** (right). The Minija and the Lithuanian coastal river basins belong to the Nemunas RBD, while the Bartuva river basin belongs to the Venta RBD.





Analysis of surface water demand vs. availability

The **Bartuva River**, shared by Lithuania and Latvia, has a total length of 101.3 km and a basin of 2,020 km², with 37% of the basin in Lithuania, where it dominates the Skuodas district. The **Lithuanian coastal river basin**, largely within the coastal plain, is led by the ***Akmena-Danė River*** (580 km² basin, 7.6 m³/s discharge), alongside smaller streams and canals. Other key rivers include the **Minija River** (201.8 km, 2,940 km² basin, 38.5 m³/s discharge) and the **Šyša River** (57 km, 392 km² basin, 4.7 m³/s discharge), the entire basin of which falls within the Šilutė municipality

	Basin area (total/of which in Lithuania), km ²	River length (total/of which in Lithuania), km	Average annual flow rate m³/s	Share of the basin area in municipalities, %
Bartuva River	2020/749.54	101.3/55.3	12	Skuodas district – 92 Kretinga district - 5
Minija River	2939.97	201.8	38.5	Skuodas district – 3.4 Kretinga district – 31.5 Klaipėda district – 58 Šilutė district – 29.9
Lithuanian coastal river basin (AD -Akmena-Dane River-main river	Coastal - 902 AD - 580	62.5 Akmena-Danė	7.6 Akmena-Danė	**Area in coastal river basins , %** Neringa municipality - 99.4 Klaipėda city – 89.9 Palanga city - 49.0 Kretinga district – 41.7 Klaipėda district – 31.4 Šilutė district – 2.9
Šyša River	392	57	4,7	Šilutė district – 100

Analysis of surface water demand vs. availability

In Lithuania, the majority of surface water abstraction depends on energy needs, consuming 94–97 per cent of the total amount abstracted. The fisheries sector uses around 2 per cent and industry uses around 1 per cent of the total amount of surface water abstracted. Water used in the energy sector is returned to the water body after use with slightly altered properties. To better understand the proportions of water withdrawn for other economic needs, the water extraction statistics for the Klaipėda region are provided below, excluding the electricity sector. According to EPA data, no water users have been identified in the Bartuva and Šyša river basins

Surface water users in Klaipėda region					
River basin name, municipality	**Average annual flow, m^3/sec**	**Number of water users**	**Water users**	**Volume of water used**	
				m^3/day	**m^3/sec**
Akmena-Dane River Klaipeda city municipality	7.6	1	AB "Klaipėdos mediena" for production needs	329	0.004
Minija River Šilutė district municipality	38.5	2	1. Filling of UAB "Kintai" aquaculture ponds with water	Total volume: 4 000 000 m^3 or 133 m3/day per month	1.15 in spring in 1 month.
			2.Natural person	2 500	0.03
Klaipeda Strait	~ 850	8	Klaipėda port companies	23 272	0,3

Note: around 4,000,000 m^3 of water is used to fill the 'Kintai' ponds during the spring flood, when the river's flow rate increases severalfold. If the ponds were filled for a month in spring, for example, the water withdrawal would reach approximately 1.5 m^3/s, assuming an above-average river flow rate of 38.5 m^3/s.

No significant negative impact of surface water extraction on rivers ecosystems in the Klaipėda region has been identified.

Analysis of groundwater demand vs. availability

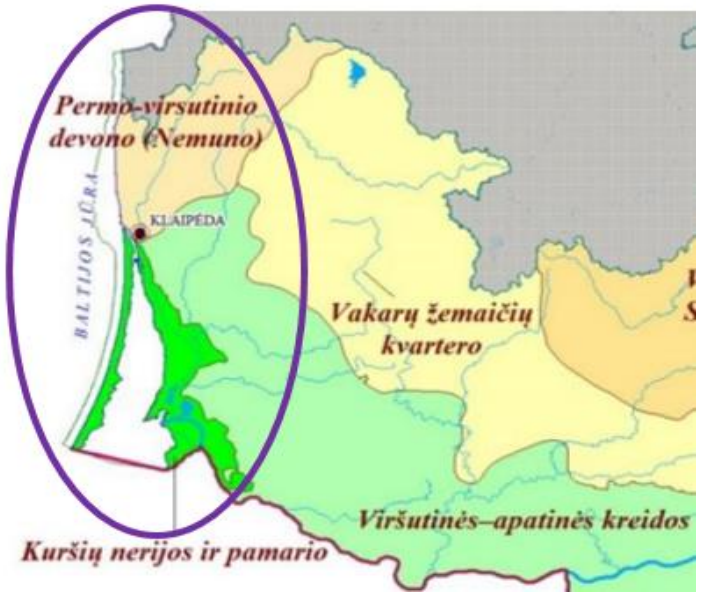
In Lithuania, 67–69% of all groundwater extracted is used for domestic purposes (i.e., households), 10–14% for industrial purposes, and a small proportion (2–4%) for agriculture and fisheries. Approximately 14–18% of the water extracted is lost in water supply networks due to leaking pipelines and accidents.

Similar levels of groundwater use from four groundwater basins should be observed in the Klaipėda region, where extraction accounts for around 12 per cent of the country's total.

Quantitative indicators of groundwater extraction :

- Annual production (m^3/d or $m^3/year$) compared to approved recoverable resources;
- Water level trends – assessed based on monitoring,
- Hydraulic connection with surface water/ecosystems;
- Quantitative risk is considered dangerous for further use if extraction is > 70–90% of the predicted resources.

Groundwater basins in the Klaipėda region	Available resources, thou. m3/d	Average amount of groundwater extracted in 2018-2019, thou. m3/d	Amount of water extracted as % of available resources
Permian - Upper Devonian (Nemunas RBD) 61 16.84	76.16	18.34	**24.1**
Western Samogitian Quaternary (Nemunas RBD)	207	11.76	**5.7**
Upper - Lower Cretaceous (Nemunas RBD)	102.95	13.15	**12.8**
Curonian Spit and Pomerania (Nemunas RBD)	84.3	20.51	**24.3**
Permian–Upper Devonian Venta (Venta RBD)	144.41	20.9	**14.5**



No threat to the region's groundwater resources, the 70–90% threshold is not exceeded.

Analysis of groundwater demand vs. availability

The largest amount of groundwater in the region is used in the Klaipėda city municipality. Extraction and use amount to around 60 per cent of the total in the region. Around 10 per cent is accounted for Palanga city and Klaipėda district municipalities, and around 8–9 per cent by the municipality of Šilutė. The amount of groundwater used depends mainly on the number of inhabitants and how much is needed for household and industrial purposes.

Municipalities of Klaipėda region	Groundwater extracted		Groundwater consumed	
	Thou. m^3 /2023	% in Klaipėda region	Thou. m^3 /2023	% in Klaipėda region
Klaipėda city municipality	10 559	58.4	9 484	57.8
Palanga city municipality	1 910	10.6	1 784	10.9
Klaipėda district municipality	1 702	9.4	1 948	11.9
Šilutė district municipality	1 584	8.8	1 392	8.5
Kretinga district municipality	1 548	8.6	1 217	7.4
Skuodas district municipality	515	2.8	340	2.1
Neringa municipality.	271	1.5	238	1.5
KLAIPĖDA REGION	18 089	100.0	16 405	100.0

Extreme hydrological phenomena in Klaipėda region

Over a period of 19 years (2005–2023), the Hydrometeorological Service's observations of the four main rivers in the Klaipėda region (Bartuva, Akmena-Danė, Minija, and Šyša) recorded 45 cases of extreme water levels (approximately 2.4 cases per year). Of these, nine cases of very low extreme water flows were recorded only in the Bartuva river. Only floods were observed in the remaining three rivers. All cases occurred twice as often during the period 2017-2023 than during the 2005 to 2012 period.

The extremely low water flow of the Bartuva River is caused by a mismatch between the flow of water from three hydropower plants turbines and the natural flow regime in the river's baisin.

River flow	River name (number and location of hydrological stations)	2005-2012	2017-2023	Total
Flow rate below the established ecological limit (low flow)	**Bartuva** (one near Skuodas)	1	8	9
Very high water level (floods)	**Akmena Danė** (two water stations: in Kretinga and Klaipėda)	5	7	12
	Minija (three: in Kartena, Priekulė and Lankupiai)	6	6	12
	Šyša (one near Šilutė)	3	9	12
Klaipėda region	Low flow			9
	Floods			36

Three hydropower plants in the Bartuva river basin

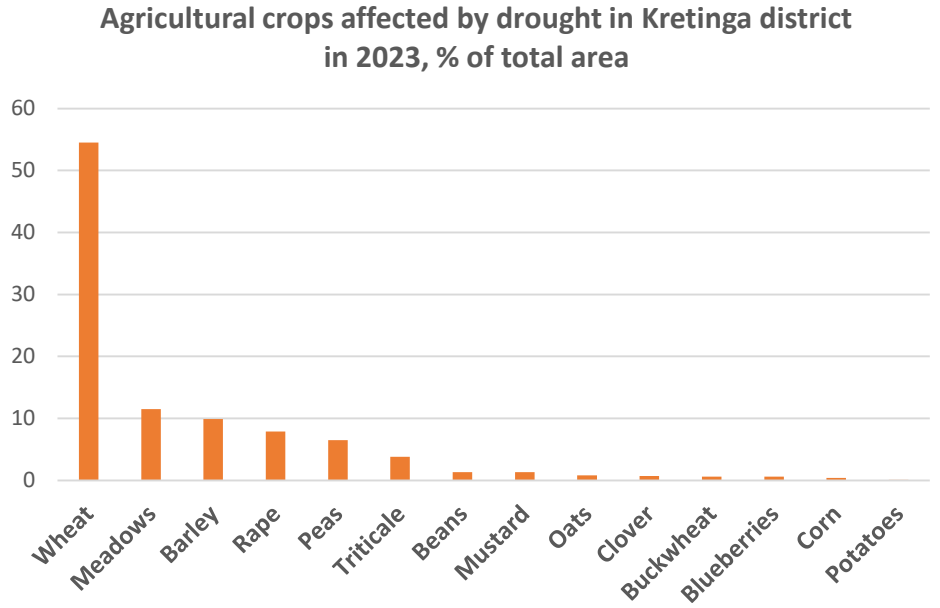
Emergency situations in agriculture

Loss of agricultural crops caused by droughts	Loss of agricultural crops caused by heavy rains
August 4, 2006 state emergency was declared	**September-October 2017** municipal and state level was declared: • Šilutė district 09-20), • Kretinga district (09-22), • Klaipėda district (10 03) • State (10-04)
June-July 2018 municipal and state emergency was declared: • Šilutė district (06-09), • Kretinga district (06-28) • State (07 04)	
July 3, 2019 state-level emergency was declared.	
June 2023 municipal emergency was declared: • Šilutė district (06-09), • Kretinga district (06-14)	

Four emergency situations have been declared in the agricultural sector in the Klaipėda region due to drought-related losses, while one was caused by heavy rainfall in the 2006-2023 period.

Summary of 2023 drought Impacts in Klaipėda Region

- **Klaipėda district**: 20 farmers affected, including fruit growers (5.35 ha of strawberries and quince) and 461 ha of various field crops.
- **Kretinga district**: 55 farmers reported drought damage across **1 840 ha**; likely most farmers in the district were impacted.
- **Šilutė district**: severe losses – **11 596 ha of crops**, **25 811 ha of meadows**, and **100.46 ha of orchards/berry plantations** affected.
- **Skuodas district**: no formal applications for drought damage assessment between 2018–2023.



Municipal survey: questionnaire scope

Focus Areas:
Urbanized areas – opportunities for water reuse
Agriculture – water use and reuse measures, irrigation, groundwater use legal framework

Included in questionnaire text:

- National Climate Change Management Agenda (short-, medium-, long-term goals)
- WaterMan project objectives, activities, pilot measures
- Municipal responsibilities in water management
- Stormmwater use in private households and urban green areas
- Preliminary assessment of water reuse in the industrial sector
- Potential funding sources for water reuse projects and research
- Drought-related emergencies in agriculture and impacts on crops
- Sources of irrigation water and regulations on their use
- EU Regulation 2020/741 main provisions
- Examples of water reuse in Northern European agriculture
- Irrigation of agricultural land in Lithuania (statistical data)
- Economic aspects of irrigation
- Municipal wastewater treatment plants (WWTPs), main characteristics and location map

Summary of the municipal survey: reuse in urban areas

1. Need for water reuse
Most municipalities recognize the need, mainly to save drinking water
2. Plans/strategies for reuse
Klaipėda city: yes, not specified, others – none.
3. Water sources & use
Kretinga: Public irrigation in relies on mixed water sources: Akmena – Danė river water (for parks, stadium, traffic roundabouts), municipal water supply (for cemeteries and city flowerbeds), and wells (for cemeteries). Municipal water use for irrigation costs around **€3,000–4,000 annually**, with consumption reaching over **1,800 m³/year**. Additionally, about **716 m³/year** of groundwater is used for dust suppression and **513 m³/year** of municipal water is provided free for firefighting.
Neringa: groundwater for flowerbeds, urban green areas. For fire-fighting - groundwater and from the Curonian Lagoon
Šilutė: some WWTPs treated wastewater for washing networks
4. Rainwater storage plans
Largely absent from current plans, but potential seen in reuse from ponds water – **Kretinga**.
5. Industrial water
Mainly drinking water or Curonian Lagoon. Potential for stormwater reuse: **Klaipėda city** - FEZ and two enterprises. Šilutė two enterprises (treated wastewater).
6. New building standards (rainwater use)
Consensus that water sector laws/construction standards should be updated to promote reuse in buildings, especially private homes.
7. Legislation to change
Consensus that water sector laws (wastewater, surface water, planning rules) should be updated to promote reuse.
8. Suggested measures
Guidelines & rules, demonstration projects, scientific studies, advanced treatment.
9. Flood/drought management
Support for integrated river basin-level planning to store flood water for later use during droughts. **Klaipėda district**: Priekulė town study ongoing.
10. Stakeholders
Municipalities, water suppliers, industry, utilities, schools, residents, planners.
11. Foreign expertise
Yes – on best practices, retention ponds, flood management, safe reuse of treated wastewater.
12. Groundwater availability
All: available for now.

Summary of the municipal survey – water use and reuse in agriculture

(four rural municipalities: Klaipėda, Kretinga, Šilute and Skuodas disticts)

1. Current irrigation practices

Klaipėda, Šilutė: Farmers mainly use artificial ponds, **surface water**. Priority crops –berries, vegetables, strawberries, fruit trees, greenhouse plants, potatoes.

2. Water demand

Highest need in **June–July vegetation period** and during droughts.

3. Water permits and policy

Klaipėda: Skeptical about groundwater use; suggests more reliance on surface water.

Šilutė: suggest simplifying permits. Current **taxes on water abstraction are too high**, discouraging irrigation, proposes exemptions if no ecological impact.

4. CAP and funding

Klaipėda highlights CAP 2023–2027 measures supporting **regulated drainage systems, not for efficient use of water or reuse for irrigated agriculture.**

5. Wastewater reuse potential

Šilutė: Minor potential. Only **milk processing company** was mentioned as a possible source.

6. Cooperation and monitoring

Klaipėda: Prefers surface water over groundwater for cooperation schemes.

Šilutė: Open to cooperation.

7. Obstacles

Main barriers: **high infrastructure costs, distance to water bodies,** large irrigated areas. Klaipėda stresses irrigation should focus on **strategic food crops** during droughts.

8. Other remarks

Klaipėda: irrigated agriculture in Western Lithuania has **low returns due to poor soils**, requiring external funding.

Šilutė: Crop insurance (up to 70% premium support) introduced in 2024 for drought losses compensation.

Stakeholder engagement and consultation process

Municipalities: Survey participants, local implementers, facilitators, end-users,

Ministry of Environment: Policy, regulation, EU 2020/741 implementation,

EPA: River basin & water resource management,

Hydrometeorological Service: Climate & hydrology data, rainfall measurements in Gargždai,

Civil Protection: Risk & disaster management, emergency data,

State Data Agency: Groundwater & water statistics,

Agricultural Data Center: Irrigated agriculture data,

Water Suppliers Association: Knowledge-sharing & awareness

Klaipeda city water company AB "Klaipėdos vanduo“: stormwater chemical tests,

National Public Health Laboratory Klaipėda Branch: stormwater microbiological tests

Main assumptions for promoting water saving and reuse

1. **Water Scarcity or Stress Exists (or is Expected)**

Currently, there is no water scarcity or stress, except during periods of drought in agriculture and significant increase drinking water use in large cities. LT water exploitation index values in LT is about 1 percent (total water use as a percentage of the renewable freshwater resources (groundwater aquifers and surface water).

2. Economic Viability

For example, the cost of water supply in Klaipėda city is approximately €1.20, while the cost of wastewater treatment is around €1.40. Therefore, accurate information on drinking water use and wastewater treatment would make it possible to compare the costs of alternatives for surface water, wastewater or stormwater use, including a technological assessment. This was one of our goals when we formulated questions for municipalities, and this information could be used to conduct preliminary feasibility studies.

3. Regulatory & Institutional Framework

When analysing Lithuanian water sector legislation, the concept of *water reuse* was not identified. We believe that refining legislation could be key to promoting water reuse in a country with abundant water resources. However, the Lithuanian authorities have postponed the implementation of wastewater reuse under EU Regulation 2020/741.

4. Stakeholder Awareness and Acceptance

All municipalities responded positively to the question "*Do you recognize the need for water reuse in your municipality, region, and Lithuania*?" Nevertheless, informing all stakeholders at various levels would help to promote water conservation and reuse.

Remaining main tasks

- Further communication with the Ministry of the Environment regarding the transposition of the new Urban Wastewater Directive, i.e. the incorporation of the concept of water reuse into LT law.
- Additional communication with municipalities, requesting answers to outstanding questions and comments on the final draft of the water reuse strategy.
- Contributions to the preparation of the Water Recycling Toolbox and its translation into Lithuanian.
- Preparation of an article on water reuse pilot measures and practices in other EU countries for the publication in the Lithuanian Water Supply Association journal, 'Water Management'.
- Together with Lithuanian partners, organise a meeting with Klaipėda region and other stakeholders to discuss the final draft of the strategy, including a pilot site visit in Gargždai.

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SUSTAINABLE WATERS
WaterMan

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SUSTAINABLE WATERS
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The „BSR Water Recycling Toolbox" was elaborated as part of the WaterMan project, which is co-financed by the European Union (European Regional Development Fund) and implemented within the Interreg Baltic Sea Region Programme. More information:

eurobalt.org/WaterRecyclingToolbox
interreg-baltic.eu/project/waterman

WaterMan promotes a Baltic Sea Region-specific approach to water recycling, which makes use of the alternation of too much and too little water that has become typical for humid areas in the EU to strengthen the resilience of local water supply. Building on this approach, the project supports municipalities and water companies in adapting their water supply strategies.