

Sustainable coastal groundwater management and pollution reduction through innovative governance in a changing climate



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Demonstration site factsheet 📕 Erdemli- Turkey





Description

The Erdemli coastal aquifer is located about 30 km west of the Mersin city center, covering an area 455 km2. The population of the Erdemli district is 140,331 people, majority of which is primarily engaged in agricultural activities. A sizeable portion of the region consists of agricultural areas such as greenhouses and citrus orchards. In the district, all kinds of fruits and vegetables are grown; especially lemon, banana and tomato. The southern part of the demo site area, which is very close to the Mediterranean coast, is mainly composed of alluvial deposits, while the northern highlands are composed of carbonate rocks with many karstic features. The rivers within the study area are mostly ephemeral in nature and flow during the wet season in response to seasonal rains and snowmelt. In the Mediterranean coastal areas, groundwater is used extensively to meet domestic and agricultural irrigation water demands.

Stakeholder mapping



• The main problems in the region are the intensive use of groundwater, decrease in quantity and quality of surface and groundwater due to increasing droughts, agricultural activities and untreated wastewater discharges

Water governance system in Malia



SUSTAIN-COAST results

Groundwater Vulnerability Index values



The Groundwater Vulnerability Index values of Erdemli Coastal Aquifer range from 0.055 to 0.240. The GVI values of the karst areas in the northwest of the ECA and the areas along the coastline are quite high. Groundwater in these areas is more vulnerable to contamination. The coastal area is mostly occupied by residential houses and more than half of the population of the study area is concentrated in this area. According to the Pearson correlation analysis between ECA's

groundwater sensitivity index and groundwater chemistry, a positive correlation was observed between nitrate, phosphate and sulfate contents and the vulnerability index.

Variability of groundwater in terms of water equivalent thickness



The global database from the GRACE mission was used to present the variability of groundwater in terms of water equivalent thickness and implement the cost benefit analysis.

Cost- benefit analysis



Aquifer recharge/% of	81%±9	75% ±11	72%±12
groundwater use			
Financial benefit compared to	25%	21%	23%
groundwater use only			

Considering the available information and applying the proposed cost benefit analysis methodology the over-pumping violations were compared to costs of the mitigation measures. Results show that, beyond 16 overpumping violations, mitigation measures are more affordable compared to intensive groundwater use. The proposed mitigation measures consist of a balanced use of available water resources according to the calculated values presented in the table. In addition, the projected water use balance for the next decades is presented.

Climate change analysis









Regional Climate Model (RCM) #1

Regional Climate Model (RCM) #9











'CNRM_CERFACS_CNRM_CM5_CCLM4_8_17'

'IPSL-INERIS_WRF381P_IPSL-CM5A-MR'

RCP 8.5_RCM#9

73

68

63

Hydraulic Head (m)

48

43

38

RCP 8.5_RCM#9

RCP 8.5_RCM#9



