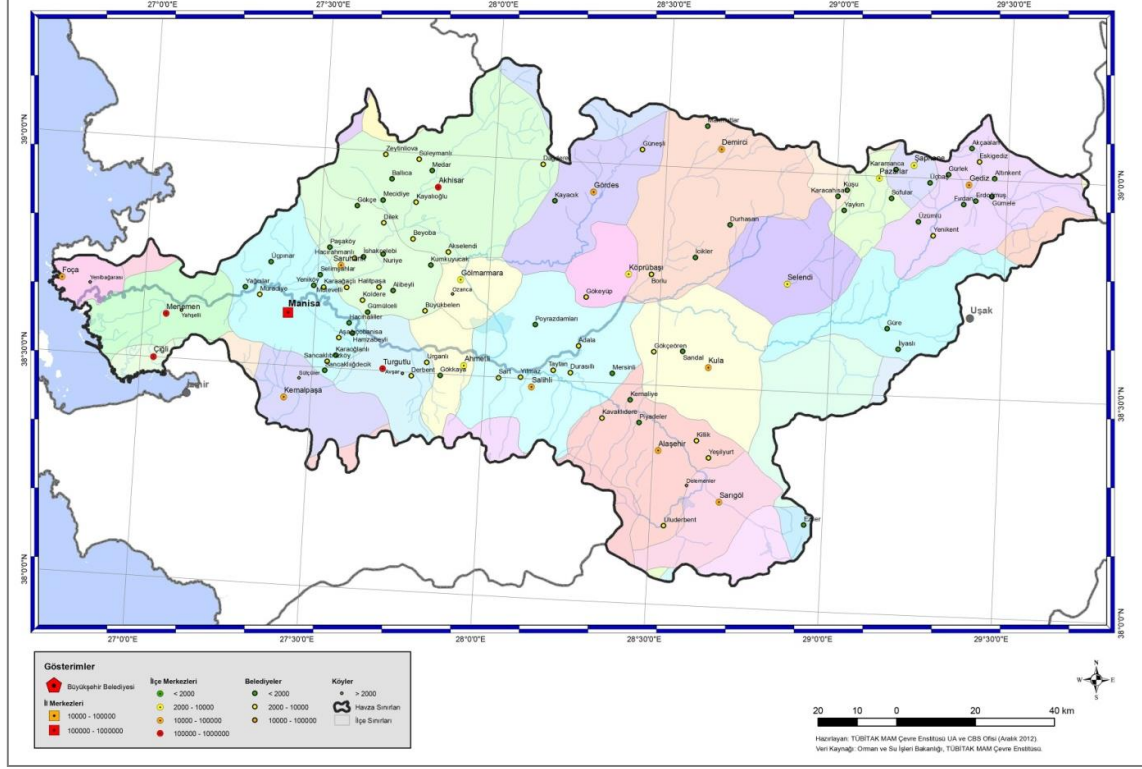


GEDİZ RIVER BASIN



GEDİZ RIVER BASIN

Gediz River Basin is in the westernmost point of Türkiye, flows into the Aegean Sea and located between Kuzey Ege, Susurluk ve Küçük Menderes Basins.



Gediz River Basin

Gediz River Basin includes 4 different provinces as mentioned below:

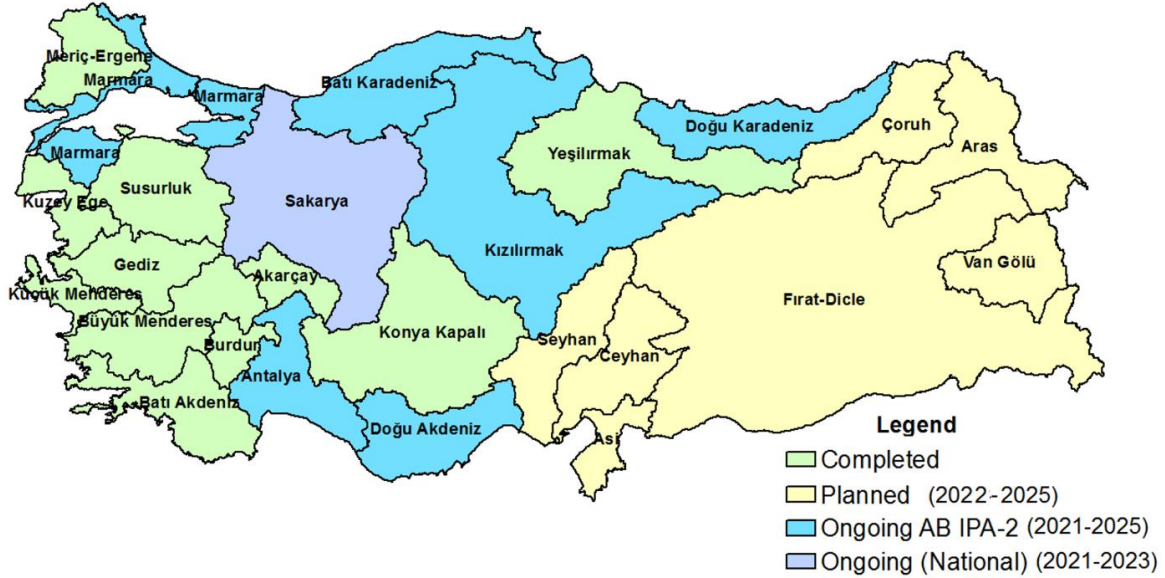
Havzada yer alan iller ve alanları

<i>Provinces</i>	<i>Area of the Province (Ha)</i>	<i>Part of the Province in The Basin (Ha)</i>	<i>Ratio of the Part in The Basin to the Total Province Area (%)</i>	<i>Distribution of the Basin to the Provinces (%)</i>
İzmir	1.209.827	184.359	15	11
Kütahya	1.167.990	153.495	13	9
Manisa	1.331.517	1.096.555	82	64
Uşak	535.482	216.753	40	13
TOTAL	4.244.816	1.651.162		97

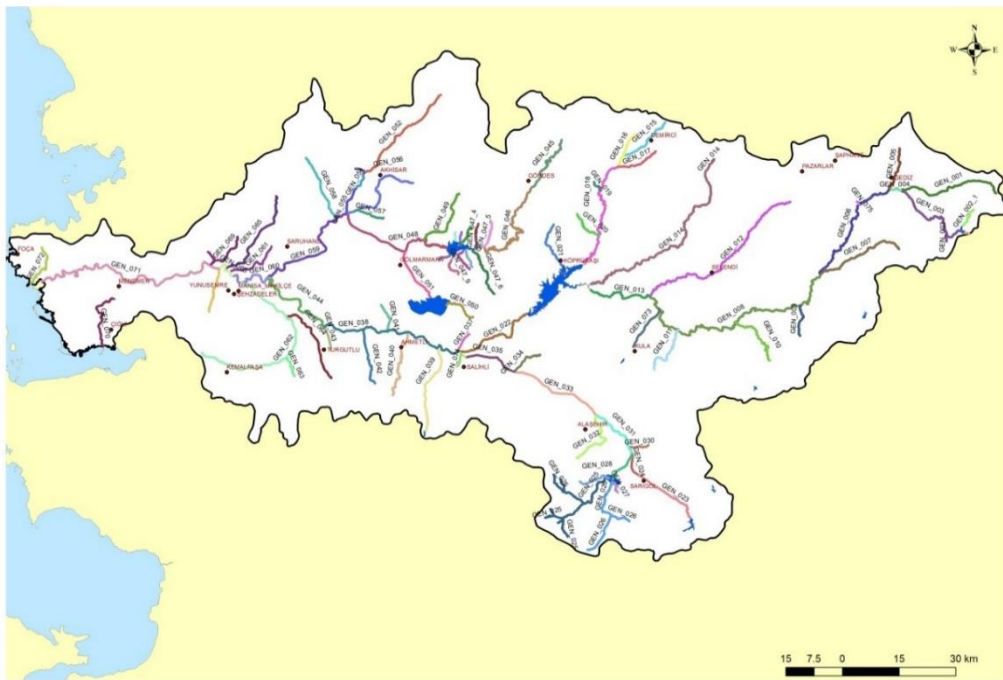
RIVER BASIN MANAGEMENT PLAN

The Gediz Basin River Basin Management Plan (RBMP) was prepared in 2019 and is followed through the National Water Information System (NWIS).

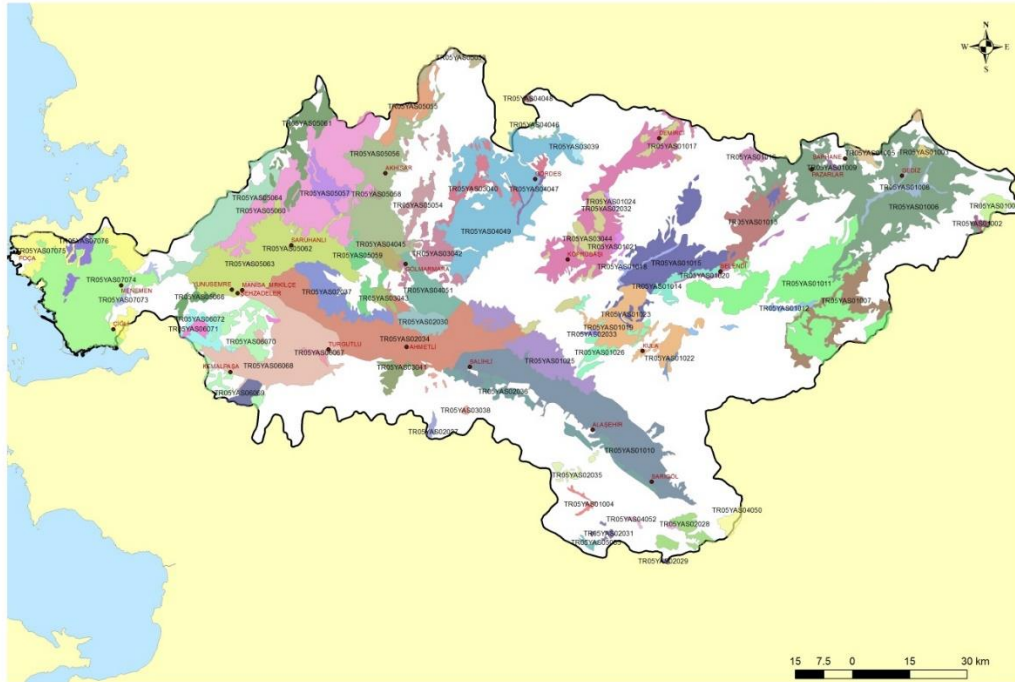
RIVER BASIN MANAGEMENT PLAN PROJECTS



In Gediz River Basin, there are 76 groundwater bodies, 85 river water bodies and 11 lake water bodies.



Gediz Basin River and Lake Water Bodies



Gediz Basin Groundwater Bodies

In Gediz Basin, 3152 measures were determined in order to achieve good water status for all water bodies and to protect the water status of the water bodies that are already at good status. The main groups of measures are listed below:

- Construction of a Sanitary Landfill
- Construction of Animal Manure Storage Tank in Animal Farm/Facility
- Implementation of the Good Agricultural Practices Code Communiqué on the Prevention of Nitrate Pollution in Waters Caused by Agricultural Activities
- Detection of existing unregistered wells and prevention of opening new ones
- Improvement of Wastewater Treatment Plants
- Transfer of olive oil factories from 3-phase system to 2-phase system
- Closure of unsanitary landfills
- Combating Invasive Species and Control of Fishing
- Modernization of irrigation
- Crop rotation in agricultural areas
- Implementation of Environmental Flow Regime
- Construction of Fish Passes
- Reducing loss/leakage rates by reducing pressure on transmission lines
- Construction of Wastewater Treatment Plants with Appropriate Treatment
- Construction of sewer infrastructure
- Construction of Secondary Treatment and Wastewater Treatment Plant
- Construction of gasification facility for liquid and solid wastes from Table Olive and Olive Oil Production activities

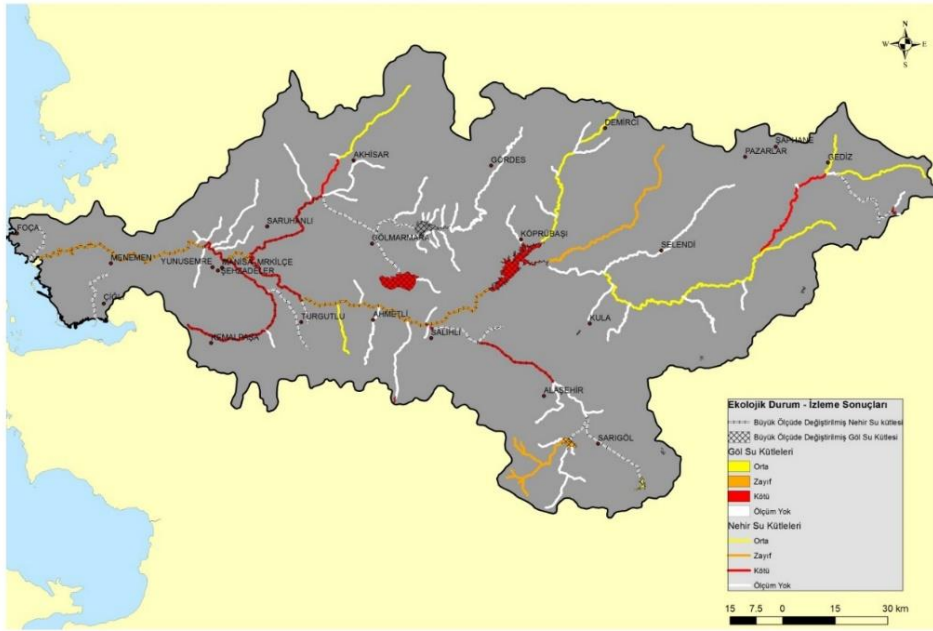
WATER QUALITY

Surface Water Status

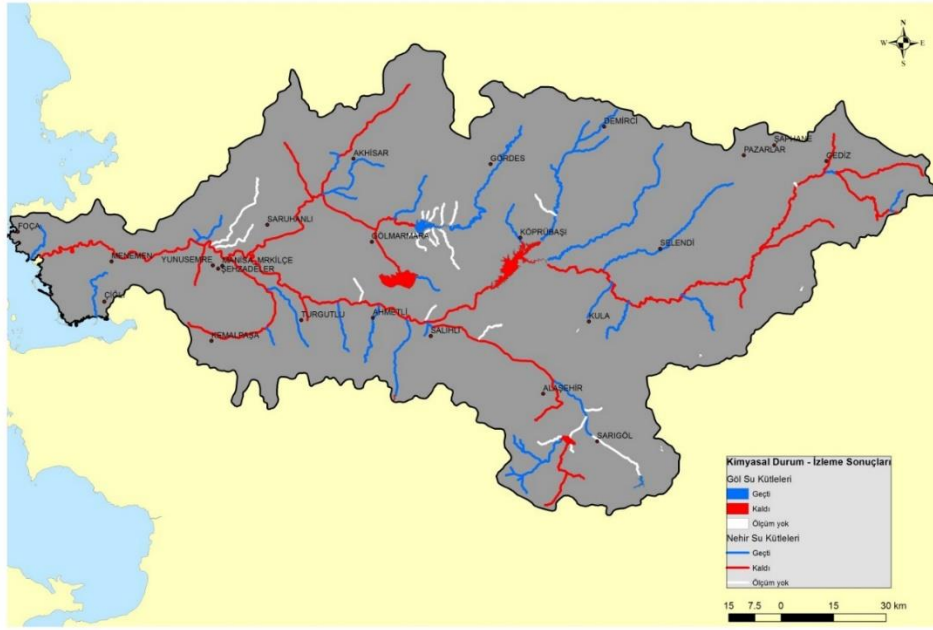
In the basin, 35 inland surface water bodies and transitional water bodies and 1 coastal water body are under significant point source pressure. %54 of water bodies are under significant diffuse source pressure.

Gediz Basin Surface Water Bodies Final Water Status

Final Water Status	Number of Water Bodies	Percentage of Water Bodies
High	-	-
Good	-	-
Moderate	9	%9,4
Poor	7	%7,3
Bad	14	%14,6
No Monitoring	66	%68,7
Total	96	%100



Gediz Basin Surface Water Bodies Ecological Status

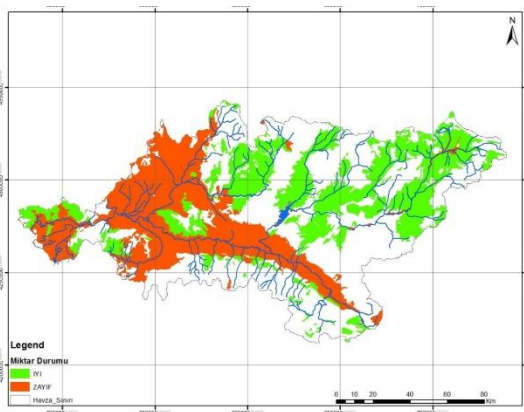


Gediz Basin Surface Water Bodies Chemical Status

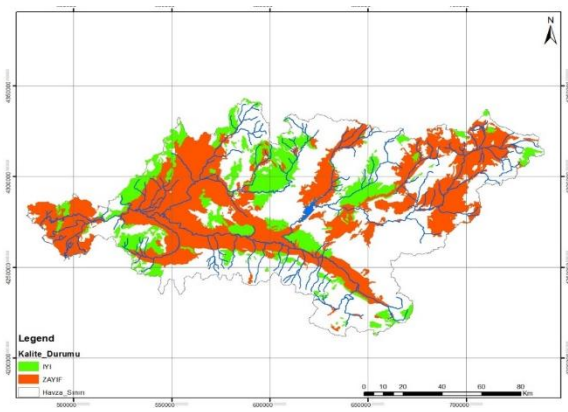
About half of the groundwater bodies are currently in good status.

Groundwater Bodies Water Status

Classification	Quantity Status		Quality Status		Final Status	
	Count	Percentage	Count	Percentage	Count	Percentage
Good Status	51	67%	42	55%	34	45%
Poor Status	25	33%	34	45%	42	55%



Groundwater Bodies Quantity Status



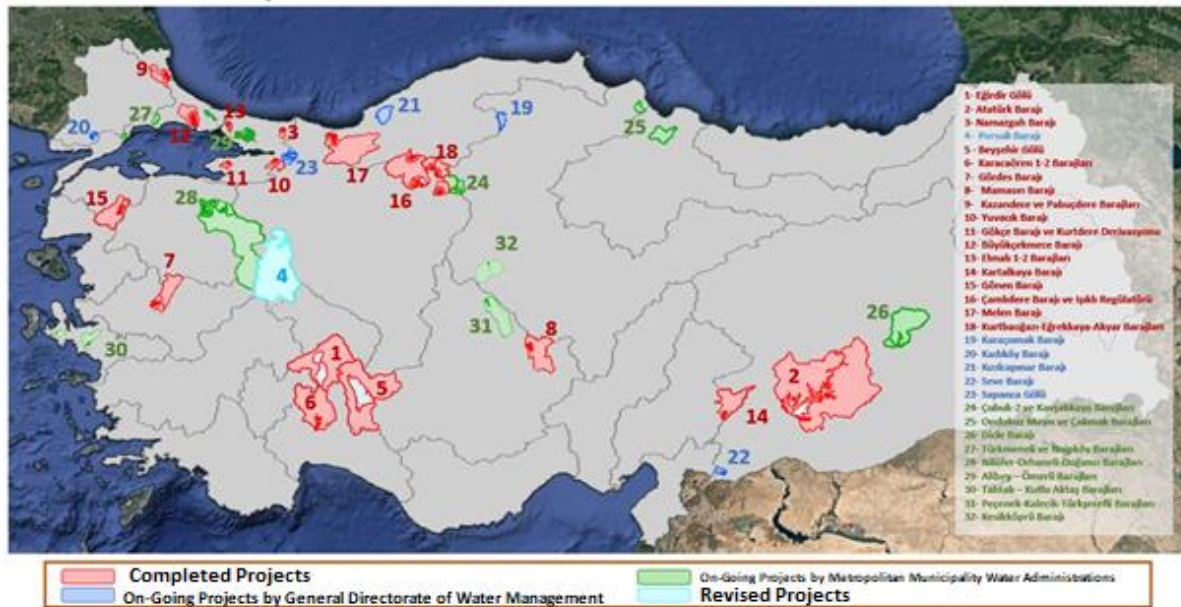
Groundwater Bodies Quality Status

DRINKING WATER PROTECTION PLANS

The purpose of drinking water protection plans is to determine basin-specific protection areas and principles based on scientific data to improve and sustainably manage the quality and quantity of drinking water sources.

According to the Regulation on the Protection of Drinking-Water Basins:

- Protection plans for surface water sources that provide drinking water to metropolitan municipalities are prepared by the general directorates of water and sewage administrations of metropolitan municipalities in coordination with Ministry;
- Protection plans for surface water sources that provide drinking water to settlements outside of metropolitan municipalities are prepared by Ministry.

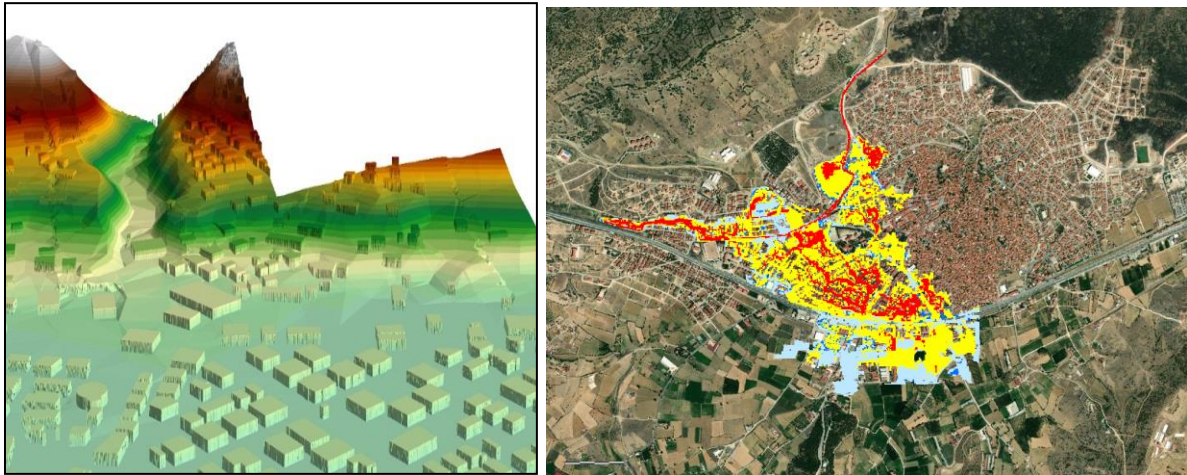


FLOOD MANAGEMENT PLAN

Gediz River Basin Flood Management Plan (FMP) was completed in 2019.



Flood Hazard and Flood Risk maps are generated within the scope of Gediz River Basin Flood Management Plan. The necessary measures to be taken to prevent risks before, during, and after floods have been determined using these maps, as have the responsible institutions and the time of implementation of the measures.





To mitigate the effects of potential flood events in the Gediz River Basin, 246 measures have been identified under the following groups of mitigation measures within the scope of the Flood Management Plan.

- Improvement of bridges
- Cleaning of stream beds
- Improvement of culverts
- Upper basin measures
- Data-Information Collection/ Production
- Education/ Informing/ Raising Awareness
- Stream rehabilitation
- Flood forecasting and early warning system

Mitigation measures determined within the scope of the plan are still being tracked via the Flood and Drought Plans Tracking Web Application in 2019 and the National Water Information System (USBS) in 2020.

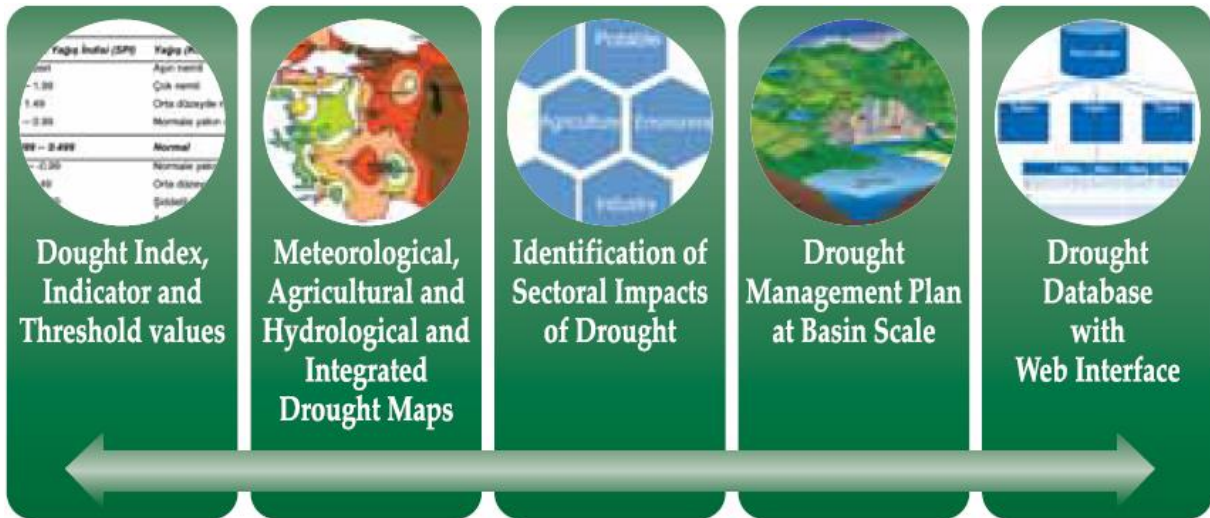
DROUGHT MANAGEMENT PLAN

Drought Management Plans (DMPs) are being prepared at the basin level for all of the water user sectors, including agriculture, in order to minimize the negative effects of possible drought risks and be prepared for drought. The aim of DMPs is to mitigate and prevent the negative impacts of possible droughts by determining the measures to be taken during water scarcity and the measures to be taken before, during, and after the drought periods in order to solve the drought problem as quickly as possible. Drought analyses, climatic and hydrological studies, sectoral vulnerability analyses, and drought maps are used to plan and direct studies such as recovery and intervention.

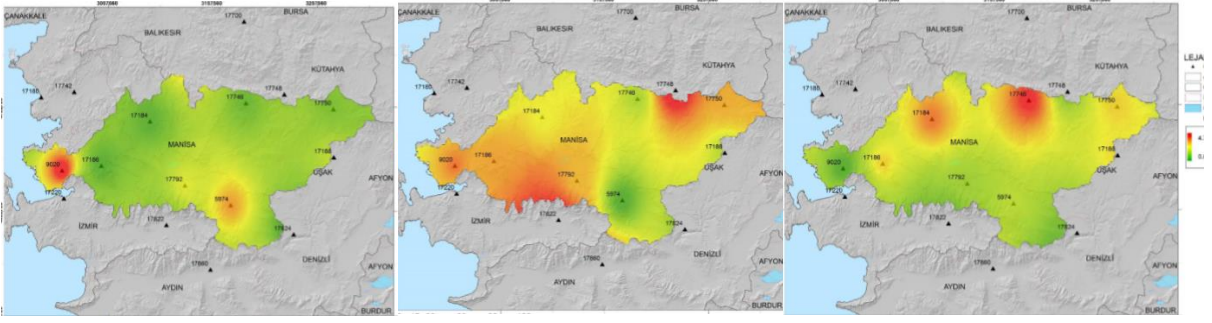


Gediz Basin DMP was started at 2017 and completed at 2019.

Studies During the Preparation of Drought Management Plans:



Drought Risk Maps



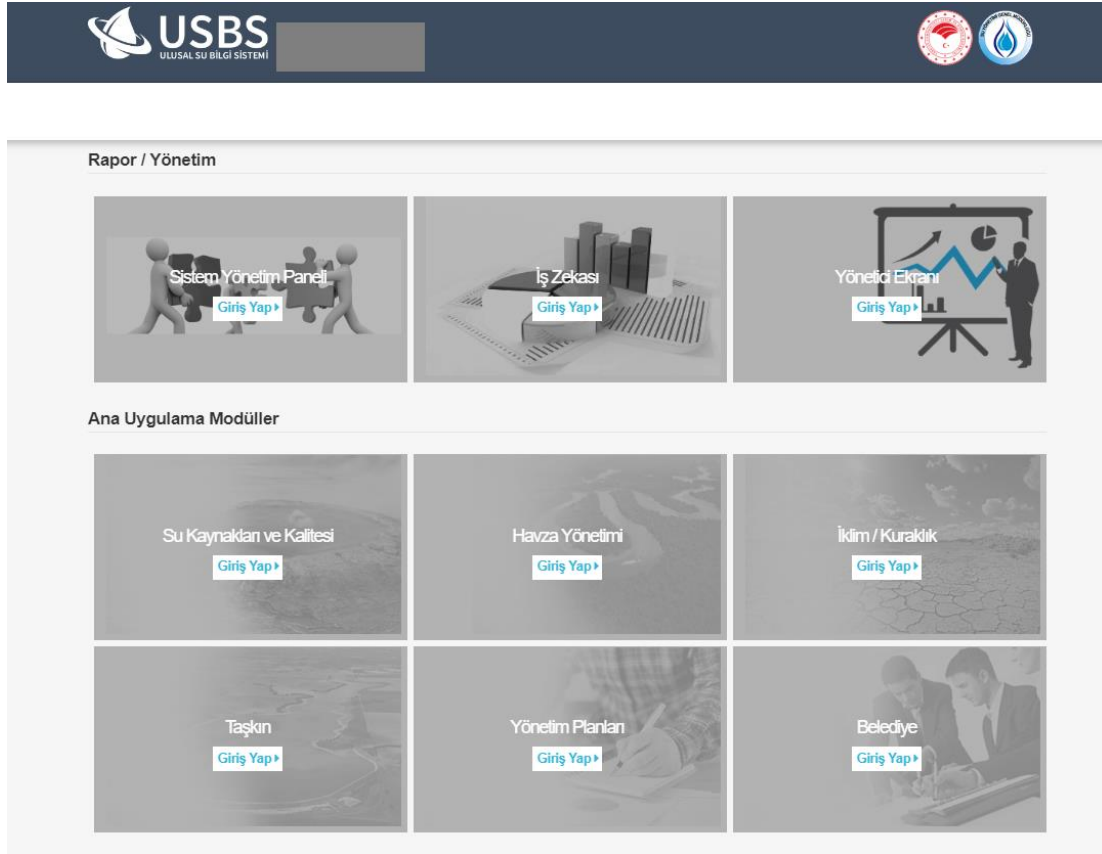
In order to prevent damage caused by possible droughts in the Gediz Basin, 34 measures have been determined under the measure groups of reducing water use/loss and Improving the Monitoring and Measurement Network within the scope of the Drought Management Plan.

Measures determined within the scope of the plan started to be followed via the Flood and Drought Plans Tracking Web Application as of 2019, and the National Water Information System (USBS) as of 2020.

MONITORING, INVENTORY and WATER INFORMATION SYSTEM

Actions that are taken about water quality and quantity as follows:

- ❖ To acquire the data that has been produced for various purposes by different organizations,
- ❖ To enhance the quality of data,
- ❖ To prevent the production of data repeatedly,
- ❖ To enhance the accessibility of data,
- ❖ To determine and complete the missing/incomplete data,
- ❖ To set and apply a watershed-scale and sustainable monitoring system.



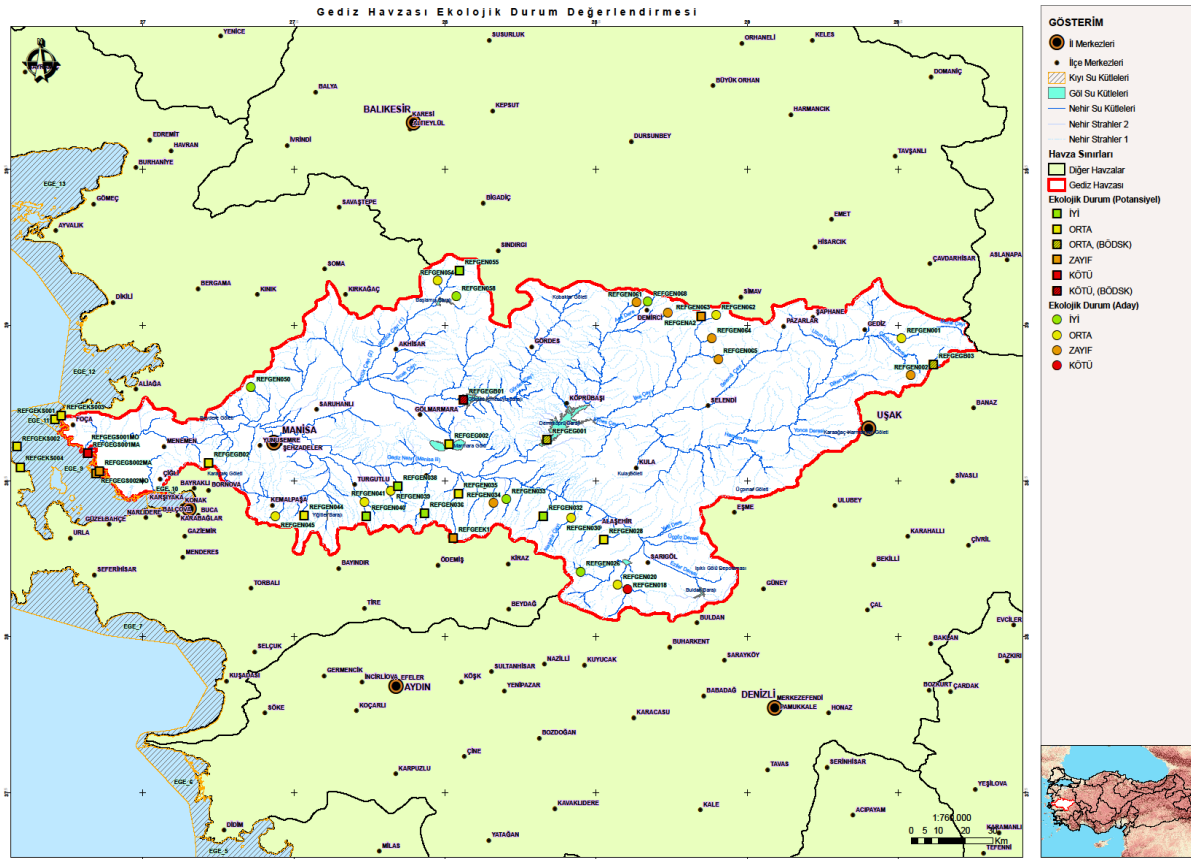
Graphical User Interface of National Water Information System (TRNWIS)

For the purpose of ecological-based assessment of water quality; biological, physicochemical, and hydromorphological monitoring studies were conducted in 25 basins across the country as part of the Project for the Establishment of a Reference Monitoring Network in Türkiye to identify natural and/or near-natural reference (unpolluted) sites that were not or minimally impacted by anthropogenic activities, and pristine water sources were identified.

Within the scope of the study, monitoring studies were carried out in a total of 43 locations in the Gediz River Basin, including 29 rivers, 6 lakes (3 natural, 3 heavily modified), 4 transitional waters, and 4 coastal waters, and 31 reference (unpolluted) water sources were identified. In addition, the ecological status of the monitored water bodies in the Gediz River Basin was determined as a result of the monitoring activities.

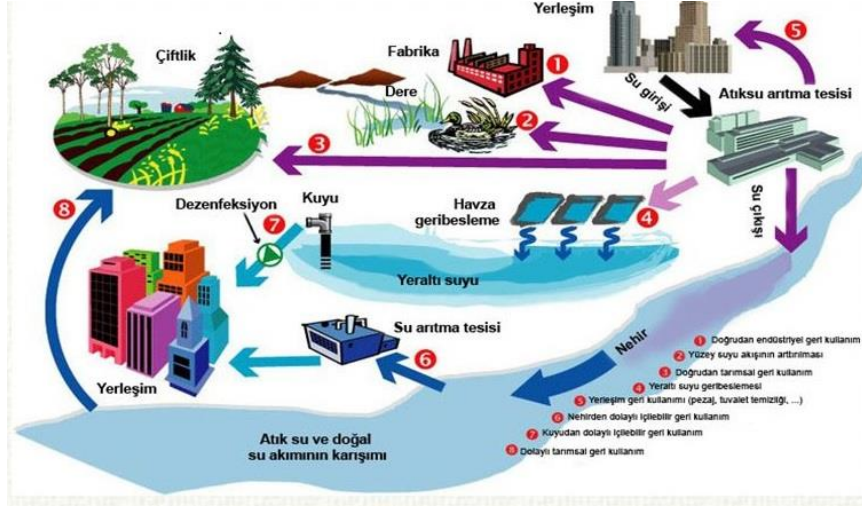
In the scope of monitoring activities, the smallest possible taxonomic level of all biological quality elements was identified and in this context 32 fish, 242 phytobenthos, 188 phytoplankton, 588 macroinvertebrate, 49 macroalgae/angiosperm and 39 macrophyte species were identified in the Gediz River Basin.

Additionally, for each biological quality element, the Reference Monitoring Network and Reference Monitoring Programs have been established, which include the monitoring stations determined in the reference sites, the parameters to be monitored at these stations, and the monitoring frequencies. In line with these monitoring programs, monitoring activities will be carried out regularly.



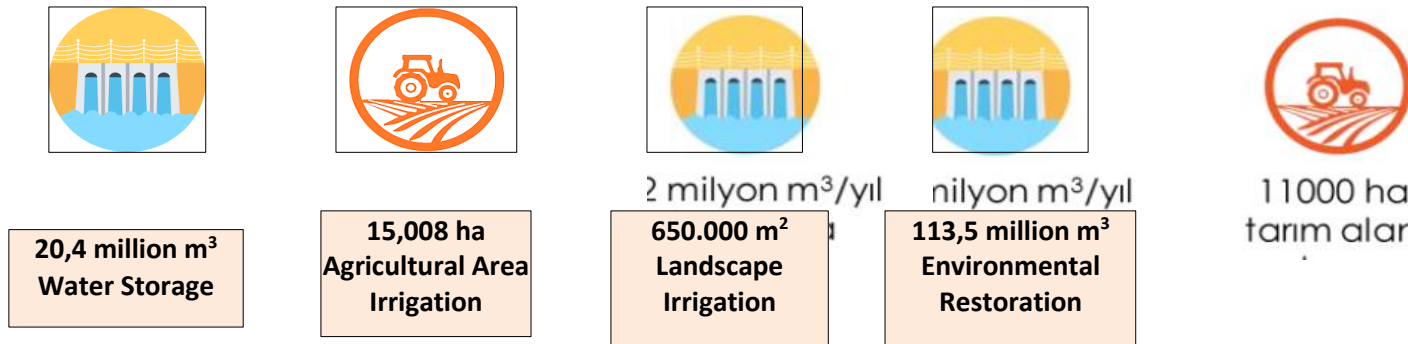
Ecological Status Assessment Results in the Gediz River Basin

WATER REUSE



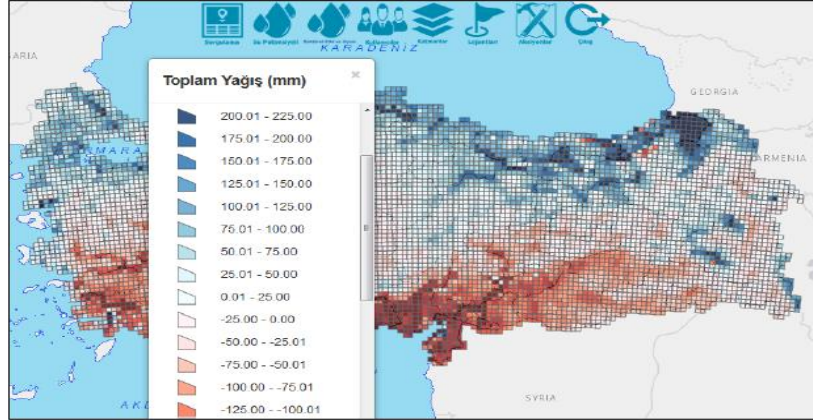
In the fight against possible water scarcity in our country in the future, it is necessary to develop practices related to the economical and planned use of existing water resources. One of these strategies, the option of reusing used water, is one of the most important methods of using water sparingly. With the recovery and use of used water, it is planned to reduce the need for existing water resources and to provide significant water savings. In the "Project for the Evaluation of Reuse Alternatives of Used Water", which was prepared specifically for 25 river basins in our country, both the reuse of wastewater treated in wastewater treatment plants and the water returned from agriculture were evaluated. With the evaluation, used water resources and reuse alternatives were determined. Used water resources was determined as waste water treated in wastewater treatment plants, drainage water returning from agriculture, cooling water and rain water. In the light of all this information, in the evaluation made specifically for the Gediz Basin, the wastewater treated in the wastewater treatment plants and the water returned from agriculture were determined as used water resources.

As a result of the calculations, the reuse potential, usage areas and gains of the used waters in the Gediz basin are given below.



IMPACTS OF CLIMATE CHANGE

The project on impacts of climate change on water resources was finalized in 2016.



According to the climate change projections made for 2015-2100 period:

According to the climate change projections made for 2015-2100 period, it is expected that there will be a continuous increase in average temperatures. It is expected that the average temperature of the basin, which was **14,6°C** according to 1971-2000 observations, will **increase** by **at least 1,7°C**, **maximum 4,9°C** in 2071-2100 period.

According to the observations of 1971-2000, the average annual precipitation amount of the reference period of the basin was determined to be **589,7 mm**. According to the results of the projection carried out, there is a **decrease tendency** in the total precipitation compared to the reference period (1971-2000), and it is predicted that the basin will receive **20% less** rainfall compared to the reference period in **2071-2100**. It is expected that rainfall decreases for this period will predominate in the **southwestern and northeastern** parts of the basin.

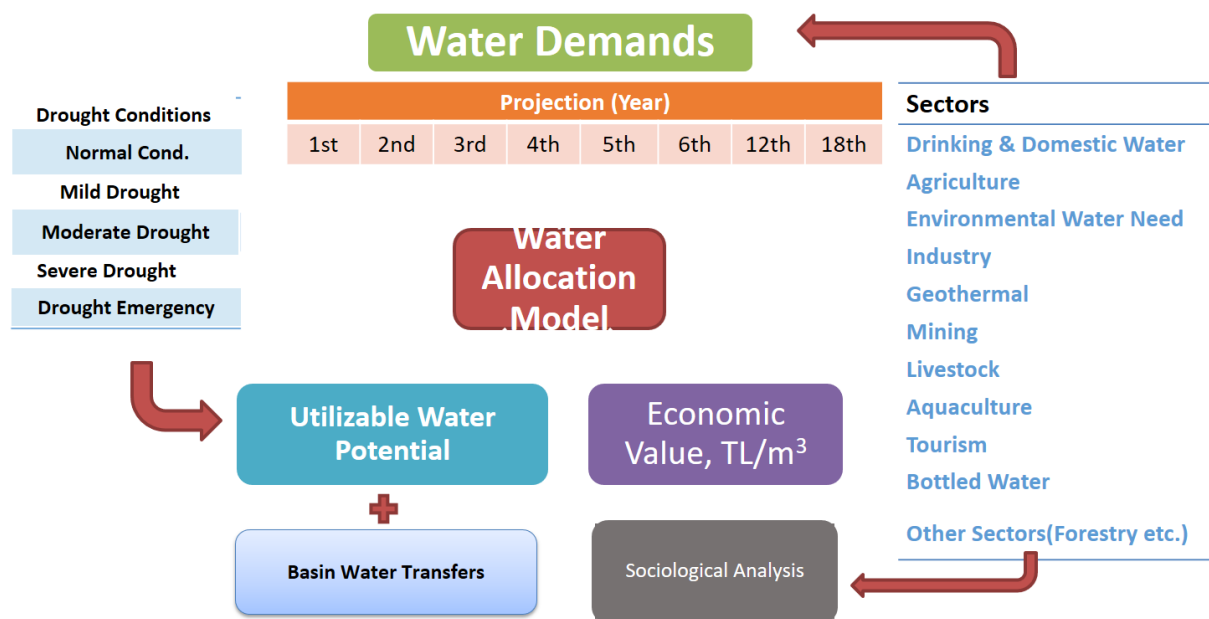
DSİ (Directorate General for State Hydraulic Works) data were used for hydrological model studies and the mean gross water potential of the basin for the reference period was determined to be **2.505 million ³/year**. With the effect of climate change, it is predicted that in the period **2041-2070**, the gross water potential of the basin could **decrease up to 75%**. However, in the same period, it is expected that the annual amount of water available will not meet the total water need, and the **water deficit** will be around **1.445 million m³/year**.

As a result of the hydrogeological studies carried out, the hydrogeological reserve of groundwater of the basin was determined to be **40 km³**. The technically and economically usable amount of this reserve, the possible reserve is calculated to be **21 km³**. It is estimated that at the end of the century under the effects of the climate change, the hydrogeological reserve of the basin will decrease by **11%** and possible reserve by **20%**.

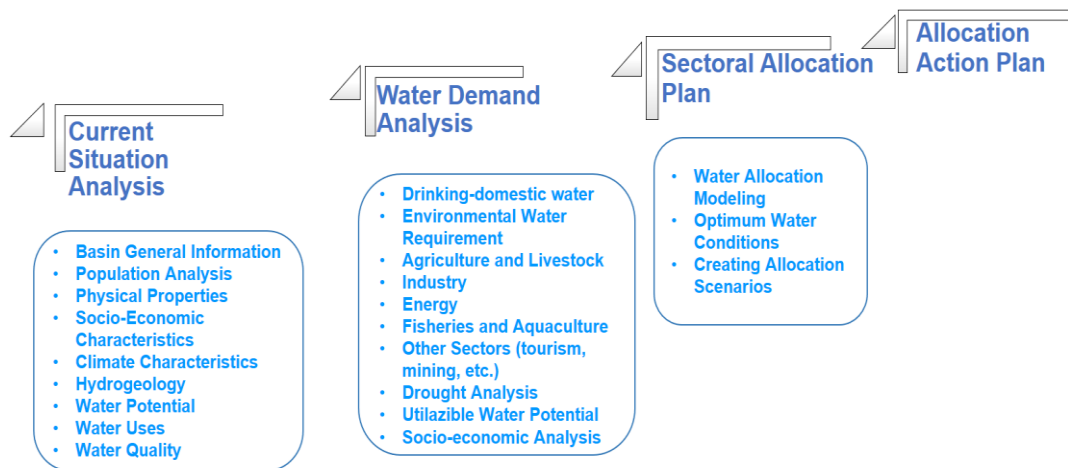
SECTORAL WATER ALLOCATION PLAN

The increasing need and demand for water resources and the lack of availability of them in the desired quantity and quality, both spatially and temporally, require the most efficient use of existing resources for economic, environmental, and social benefits. Sectoral Water Allocation Plans are prepared to ensure the sharing of water resources at the basin and sub-basin scale, to plan for the future and to meet the water needs of each sector in an efficient and sustainable way by taking into account all drought conditions (normal, mild, moderate, severe and drought emergency).

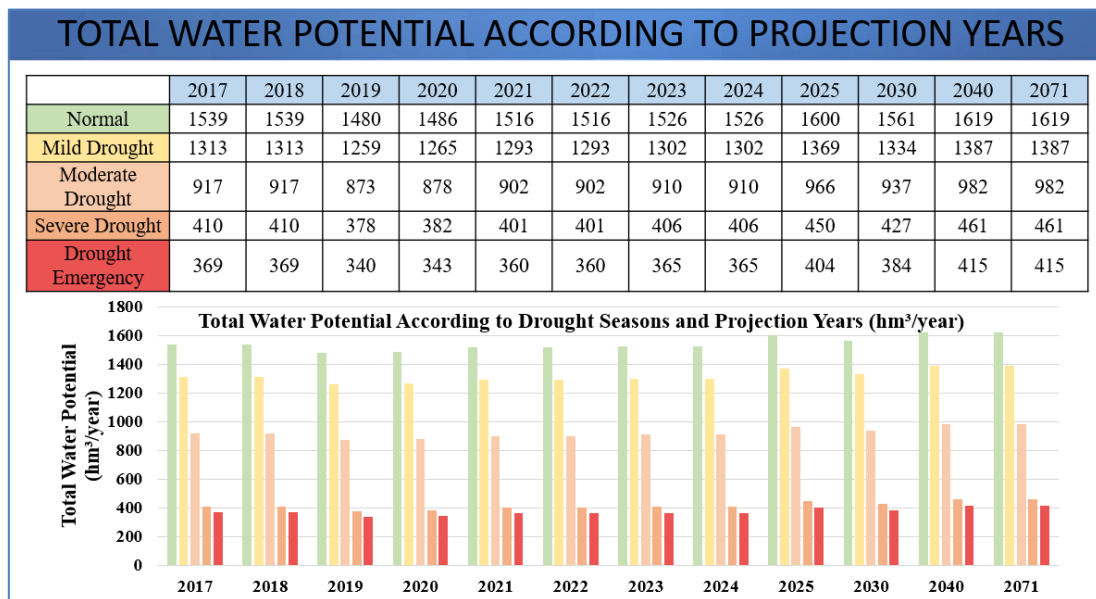
Within the scope of the Sectoral Water Allocation Plans, the current status of the water resources potential at the basin/sub-basin scale is determined. Afterward, based on the results of the drought and climate change adaptation studies; the normal, mild drought, moderate drought, severe drought, and drought emergency conditions and the temporal (the first 6 years, 12th, and 18th years following the end of the project) and sub-basin-wide sectoral changes of water potential are identified in the basin.



After calculating the water needs of each sector in all projection years; all physical, hydrological, socio-economic, and water quantity data obtained from the analysis studies are correlated with each other and sectoral water allocation plan scenarios are prepared through the model found appropriate. Moreover, in the water allocation model, sectoral prioritization is made by taking into account the socio-economic, hydrological structure, and water potential of the basin.



Sectoral Water Allocation Plan was prepared for the Gediz Basin in 2019. In the basin water allocation plan, 36 water allocation scenarios were created in the projection years for the 12 sector (drinking-domestic, environment, agriculture, industry, and energy etc.) in drought periods by using the water allocation model.

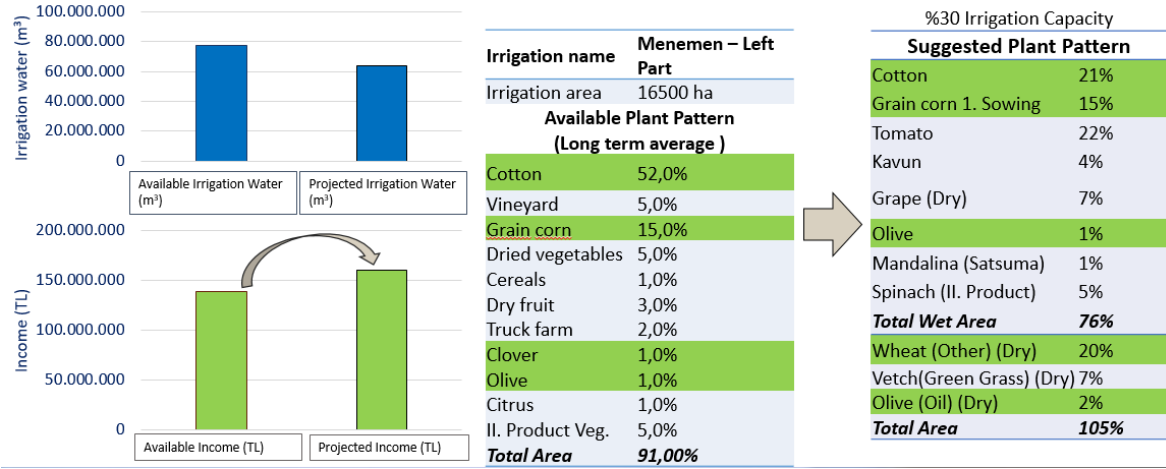


While prioritizing the sector in the water allocation model; criteria such as the hydrological structure of the basin, climatic conditions, drought situation, and socio-economic structure are taken into account. Therefore, sectoral prioritizations differ from basin to basin. However, the first priority is always given to drinking-domestic water and environmental water needs.

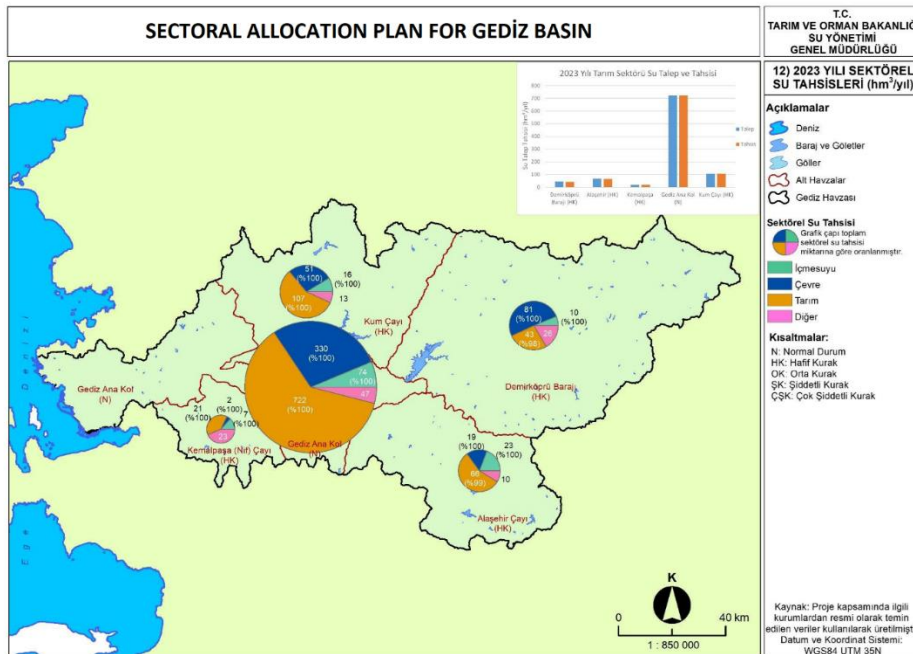
One of the most critical issues in Sectoral Water Allocation Plans is plant pattern optimization studies for different drought conditions in the agricultural sector, which uses a significant part of our country's water potential. By determining the water needs of the agricultural sector in advance and predicting possible droughts; optimum plant patterns are created that will enable the producers to continue production and increase their net income even they are faced with decreasing surface and groundwater resources.

AGRICULTURE SECTOR

Plant Pattern Optimization



In the plan, the economic added value of the currently allocated water in the sectors and the economic added values within the scope of the planned scenarios are calculated. By determining the optimization of the benefits of water allocation and taking into account all drought conditions, the allocation plan is created on a basin / sub-basin basis. By determining the potential of water resources, the changes, and sectoral developments; Optimum sectoral water usage conditions are decided by taking into account the social effects while maximizing the economic benefit.



Within the scope of Sectoral Water Allocation Plans, Action Plans are prepared in which all responsible/related institutions and organizations are determined for the measures and implementation of the measures. The measures determined in the Action Plan are followed up annually. Gediz Basin Sectoral Water Allocation Plan and Action Plan entered into force with the Ministry Circular No. 2020/09.