

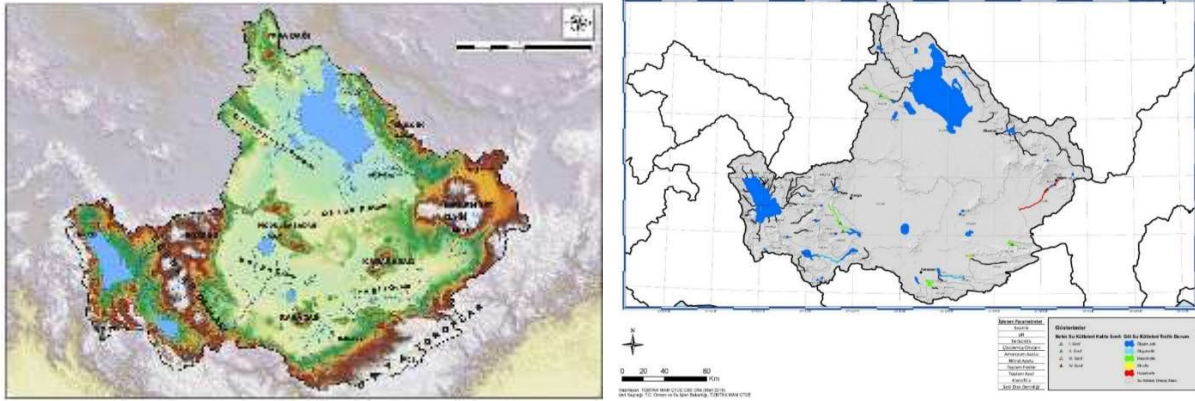
KONYA CLOSED RIVER BASIN



KONYA CLOSED RIVER BASIN

Konya Closed River Basin is located in the Central Anatolian Region of Türkiye. Its area is approximately 4.980.534 hectares accounting to 7% of the overall area of Türkiye.

Konya closed river basin is surrounded by Sakarya and Kızılırmak River Basins in the north, Kızılırmak and Seyhan River Basins in the east, Eastern Mediterranean Basin in the south and Antalya and Akarçay River Basins in the west.

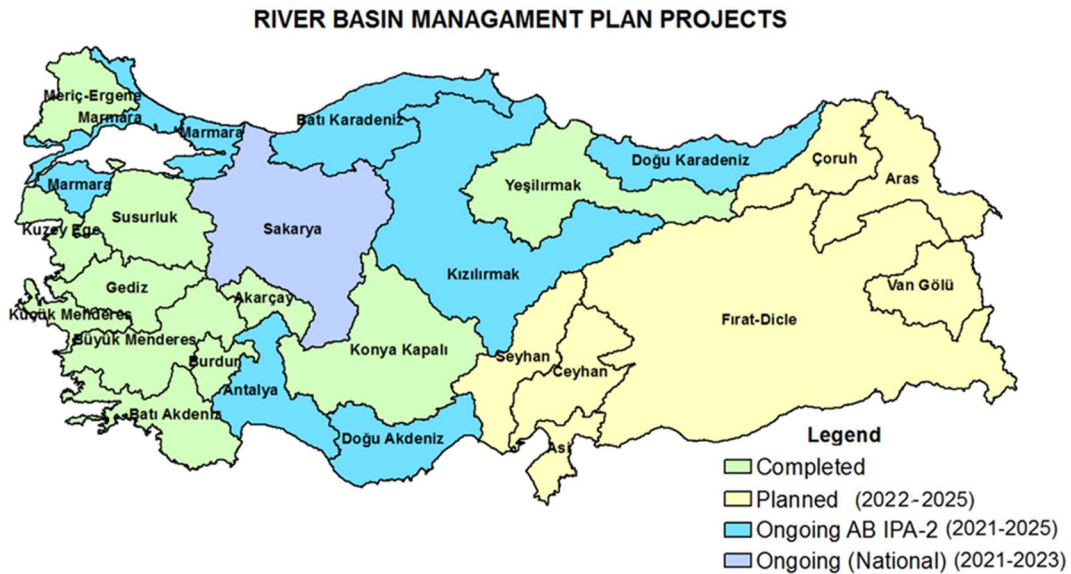


There are 9 provinces within the Konya Closed Basin, namely, Aksaray, Ankara, Antalya, Isparta, İçel, Konya, Kahramanmaraş, Nevşehir and Niğde. The spatial information of the provinces within the borders of the basin is given in the table below.

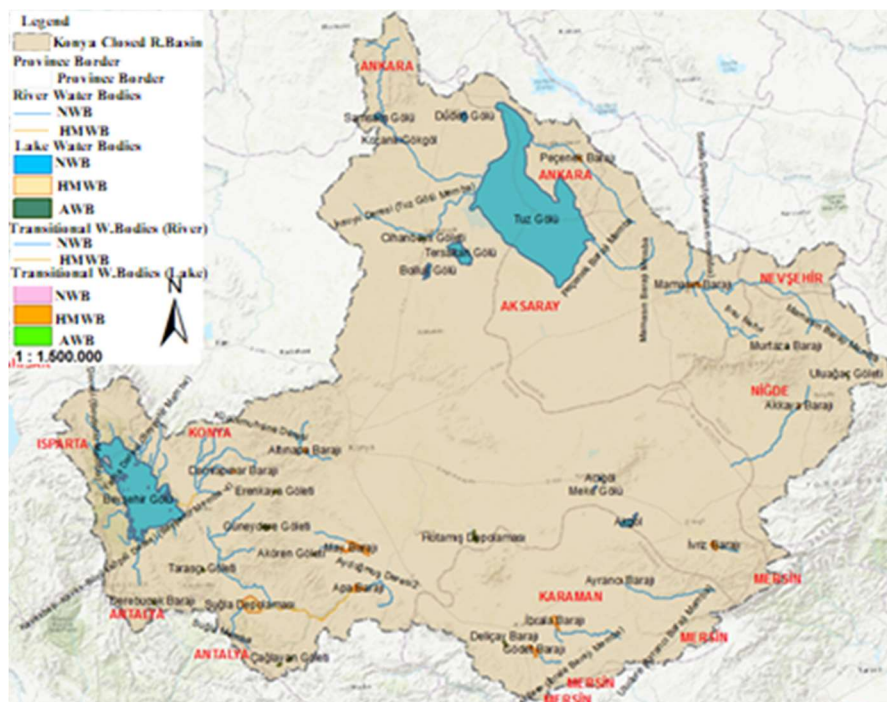
The Name of Province	Total Area (km ²)	Area of the Province in the Basin (km ²)	Part of the Province Entering the Basin	The Name of Province
Aksaray	799.700	682.879	14%	85%
Ankara	3.071.500	213.963	4%	7%
Antalya	2.072.300	33.690	1%	2%
Isparta	893.300	123.978	2%	14%
İçel	1.585.300	35.405	1%	2%
Konya	3.825.700	2.810.988	56%	73%
Karaman	959.000	572.668	12%	60%
Nevşehir	546.700	64.619	1%	12%
Niğde	1.429.400	440.467	9%	31%

RIVER BASIN MANAGEMENT PLAN

Konya Closed Basin River Basin Management Plan (RBMP) was prepared in 2018. Determined measures within the scope of RBMG are monitored through the National Water Information System (NWIS).

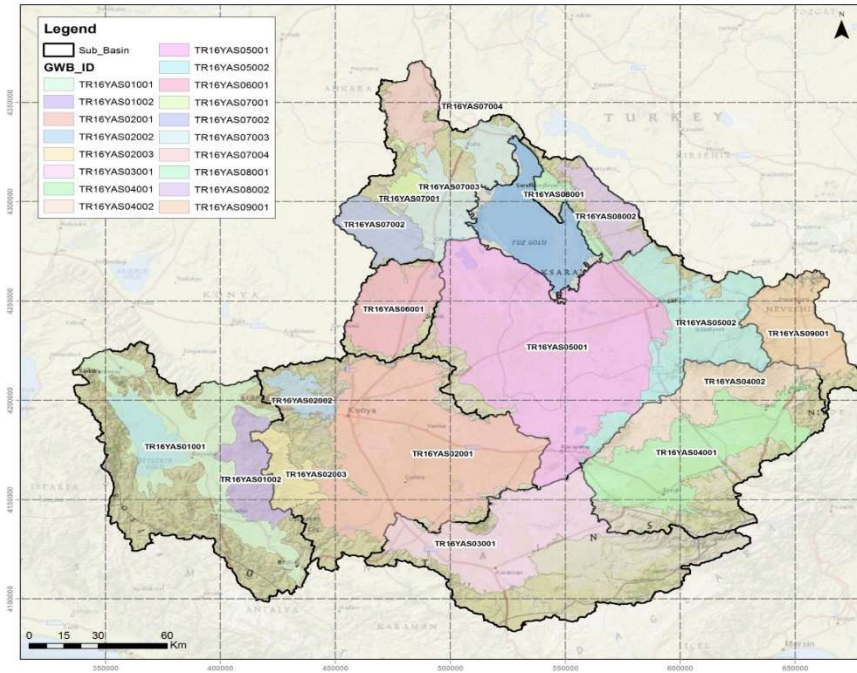


There are 58 river water bodies and 34 lake water bodies among the total 92 surface water bodies in the Konya Closed Basin. 66 surface water bodies are natural, 12 surface water bodies are artificial and the rest of surface water bodies are heavily modified.



Surface Water Bodies in the Konya Closed Basin

In addition the total number of groundwater bodies is 18.



Groundwater Bodies in the Konya Closed Basin

817 measures have been determined in order to ensure that all water bodies in the Konya Closed Basin are in good condition and that the ones that are in good condition are protected. The main measures group are given below:

- Combating Desertification, Erosion control and Afforestation
- Control and Management of Sewage Sludge in WWTPs
- Maintenance and Repair of WWTPs
- Improvement of WWTPs
- Atıksu Arıtma Tesislerinin İyileştirilmesi
- Construction of WWTPs with Nitrogen and Phosphorus Removal
- Preparing guidelines for good practices for the fish farms in the basin
- Enacting legislation for discharge limits of fish farms.
- Making a GIS based inventory of all fish farms in the basin
- Construction of fish ladder
- Implementation of Environmental Flow Regime
- To determine the pressures on water bodies with pollutant parameters above the EQS and for which pressures that could cause failure in the own water body or upstream water bodies are not identified.
- Construction of industrial wastewater treatment plant in other industrial facilities
- Rehabilitation Work of the Sanitary Landfill
- Construction of new sanitary landfills
- Removal of unsanitary landfills
- Terracing of lands in those irrigated areas where slope is higher than 20%
- Construction of new WWTPs in biodegradable industries (food and beverages sectors)
- Construction of Animal Manure Storage Tank in Animal Farm/Facility

- Training activities in the scope of Codes of Good Practices for livestock.
- Renewal of 50% of the city DW network
- Follow-up of the measures determined in drinking water basins
- Review and Monitoring of Drinking Water Monitoring Points
- Construction of WWTPs with Secondary Treatment
- Reducing loss/leakage rates by reducing pressure on transmission lines
- Installation of water meters in geothermal wells and facilities
- Treatment of geothermal water after being used for heating, sanitary hot water purposes
- Coastal Area Restoration
- Konya Drinking Water transmission and distribution network water loss prevention project (Kosova Mah., Sancak Mah., Pilot Bölge)
- Preparation of Konya Closed Basin Flood Management Plan
- Operational revision of the protection of habitats and species in areas designated for the protection of habitats or species
- Coordination of the Protection Plan and Special Provision Determination Studies and the plans prepared by the DKMP
- Construction of Non-Permeable Tailing Dams and Interception Channels to collect rainwater, leachate management and treatment in Mine Sites.
- Construction of new WWTPs for Mining Industry Wastewater
- Application of the Best Available Techniques (BATs)
- Control of Existing Industrial Wastewater Treatment Plants and improvement of treatment if necessary
- Identification of Nitrate Sensitive Areas and Creation of Action Plans
- Construction of Industrial Wastewater Treatment Plants in Organize Industrial Zones.
- Implementation and monitoring of Special Provisions.
- Control network in areas designated as recreational and bathing waters.
- Restriction of bathing when episodes of short-term contamination take place
- Water meters installation
- Construction, improvement or repair of septic tanks
- Delimitation of Green Buffer Strips in the Water Body Along the Line Where Water Bodies Intersect
- Establishing an inventory of water body shore uses
- Transferring the discharge standards to be determined for certain pollutants and priority substances for industries in the water body to national legislation
- Establishing an inventory of discharges to the water body
- Wetland and Groundwater Dependent Terrestrial Ecosystem Management Plans
- Providing Training to Farmers within the Scope of Good Agricultural Practices Code Communiqué on the Prevention of Nitrate Pollution in Waters Caused by Agricultural Activities
- Implementation of the Good Agricultural Practices Code Communiqué on the Prevention of Nitrate Pollution in Waters Caused by Agricultural Activities
- Reduction of the use of Pesticides in irrigation areas.
- Rehabilitation of abandoned or not in service mining sites.
- Construction of WWTPs with appropriate treatment. .
- Determination of Price Policy.
- Characterisation and the improve the knowledge about the relationship between Groundwater and the Groundwater Associated Aquatic Ecosystem (GWAAE)
- Hydrogeological studies to improve the knowledge of the hydrochemistry and the

- geochemical evolution of groundwater
- Carrying out appropriate monitoring studies in groundwater protection areas.
- Identification and Improvement of Groundwater Protection Areas
- Establishment of Groundwater User Communities
- Preparation of Groundwater Body Extraction Management Plan in Groundwater Bodies.
- Development of Groundwater Operational Monitoring Networks and Improvement of Existing Monitoring Networks, Monitoring and Supervision of Groundwater Chemistry
- Development of Groundwater Level Monitoring Network and Groundwater Quality Control Network and Improvement of Existing Monitoring Networks, Monitoring and Inspection of Groundwater Levels and Groundwater Chemistry
- Surface water extractions inventory in the basin.
- Monitoring of water quality in the surface waters

WATER QUALITY

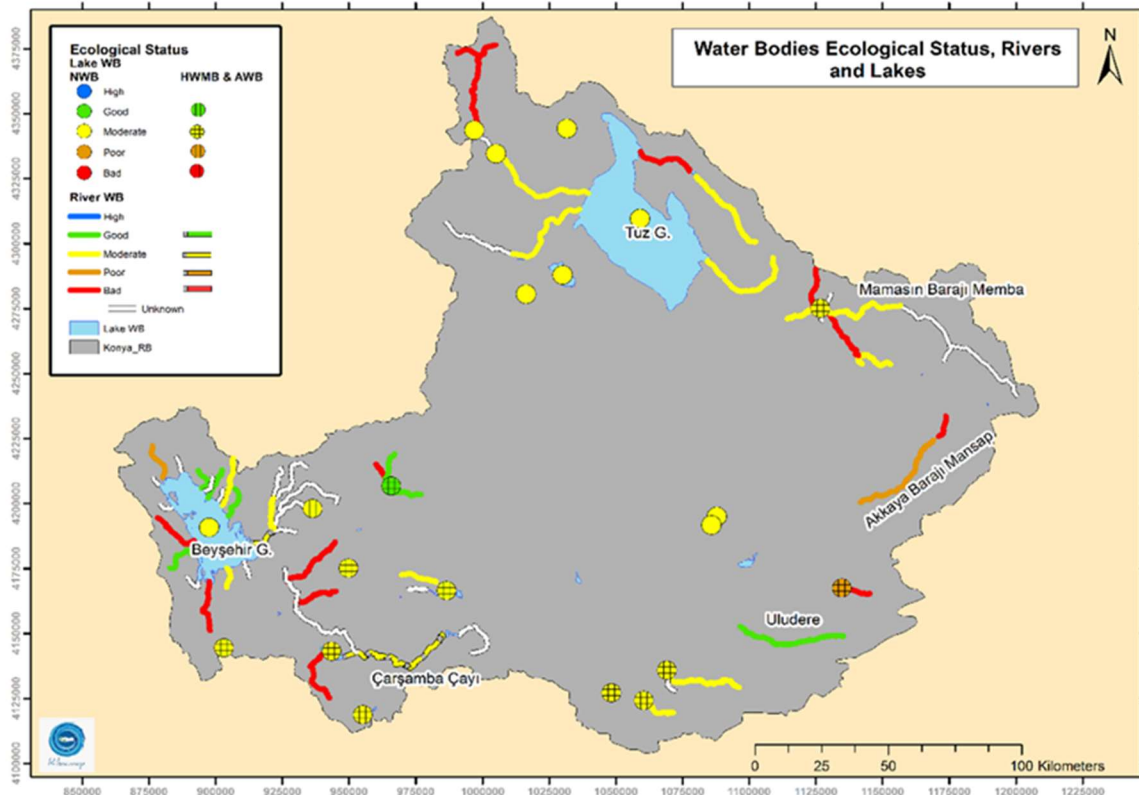
Surface Water Status

Tables and figures showing ecological and chemical status of all surface water bodies in the Konya Closed Basin are given below.

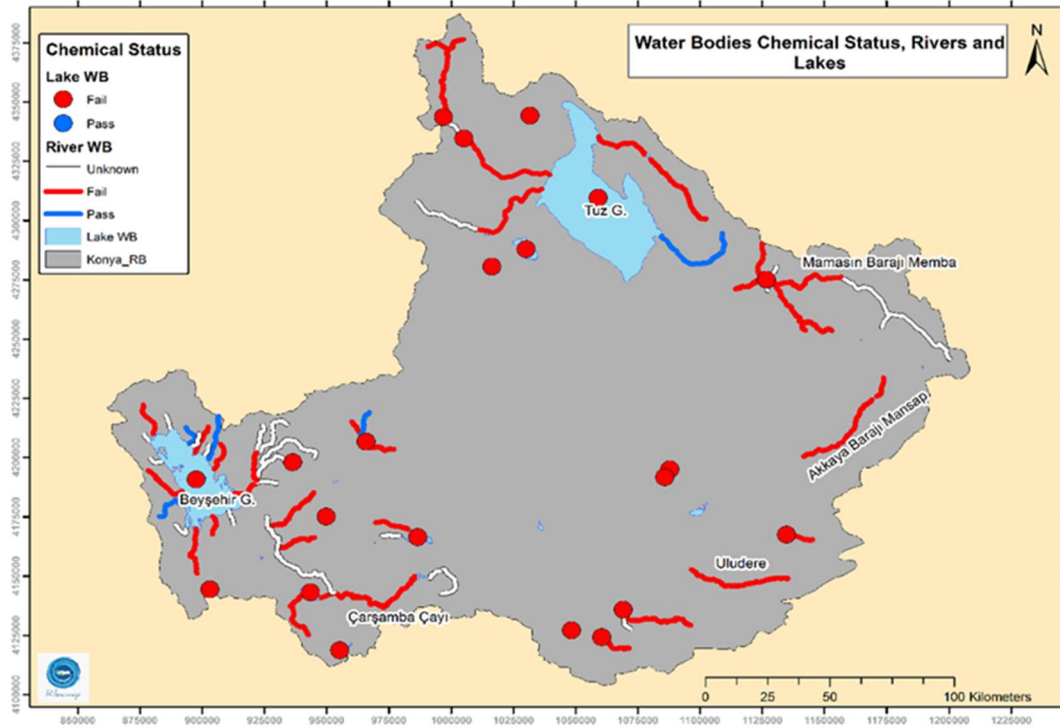
Ecological Status of Surface Water	Number of Surface Bodies	of Water	Percentage of Surface Water Bodies
High	-		-
Good	18		20%
Moderate	34		37%
Poor	3		3%
Bad	12		13%
Unknown	25		27%
Total	92		100%

Final Status of Surface Water	Number of Surface Bodies	of Water	Percentage of Surface Water Bodies
High	-		0%
Good	8		8.7%
Moderate	34		37%
Poor	3		3.3%
Bad	12		13%
Unknown	35		38%
Total	92		100%

Final Status Of Surface Water Bodies in the Konya Closed Basin



Ecological Status Of Surface Water Bodies in the Konya Closed River Basin.



Chemical Status Of Surface Water Bodies in the Konya Closed Basin.

Groundwater Status

The figures for all groundwater bodies in the Konya Closed Basin in terms of quantity and quality are shown below. In general 3 groundwater bodies are in “good status” and 15 groundwater bodies are in “poor status” among the total 18 groundwater bodies in the basin.

Classification	Quantity Status	
Good Status	8	%44
Poor Status	10	%56
Classification	Quality Status	
Good Status	10	%56
Poor Status	8	%44
Classification	Final Status	
Good Status	3	%17
Poor Status	15	%83

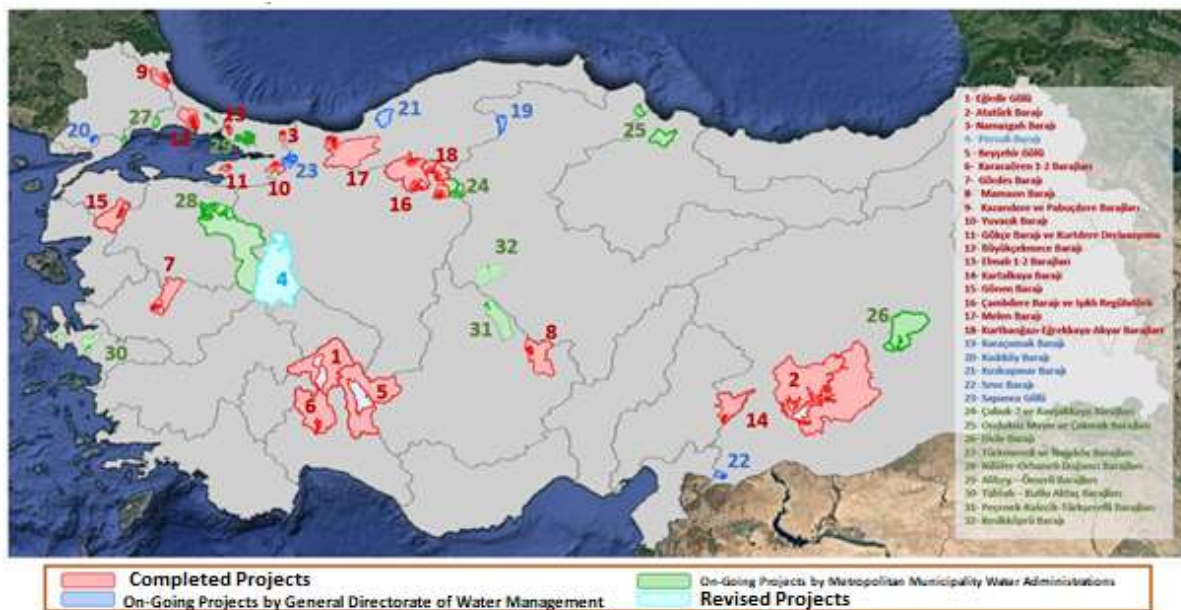
Final Status of Groundwater Bodies in the Konya Closed Basin

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.

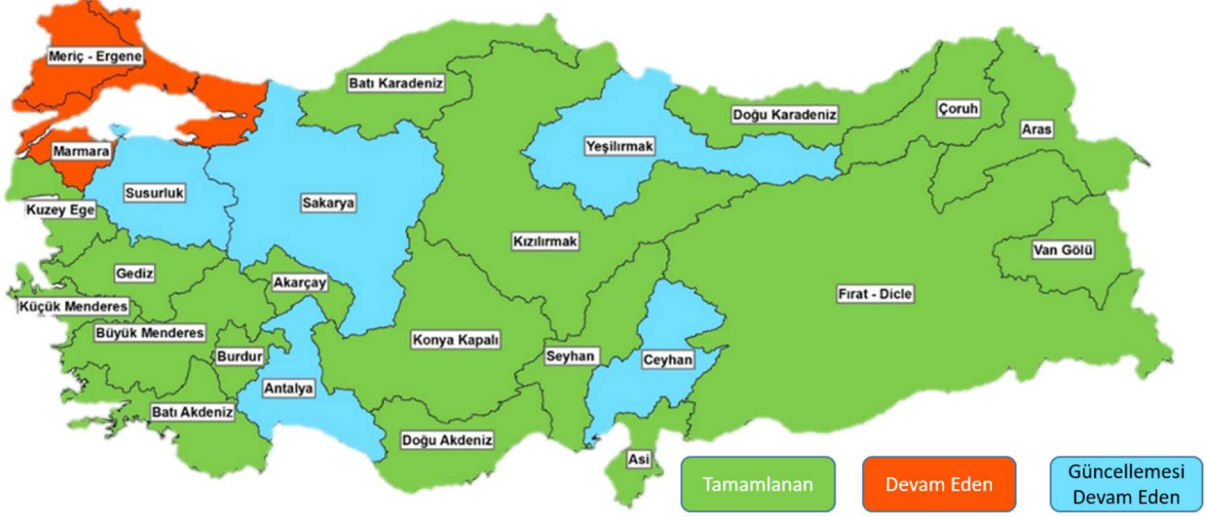
According to the Regulation on the Protection of Drinking-Water Basins:

- 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.

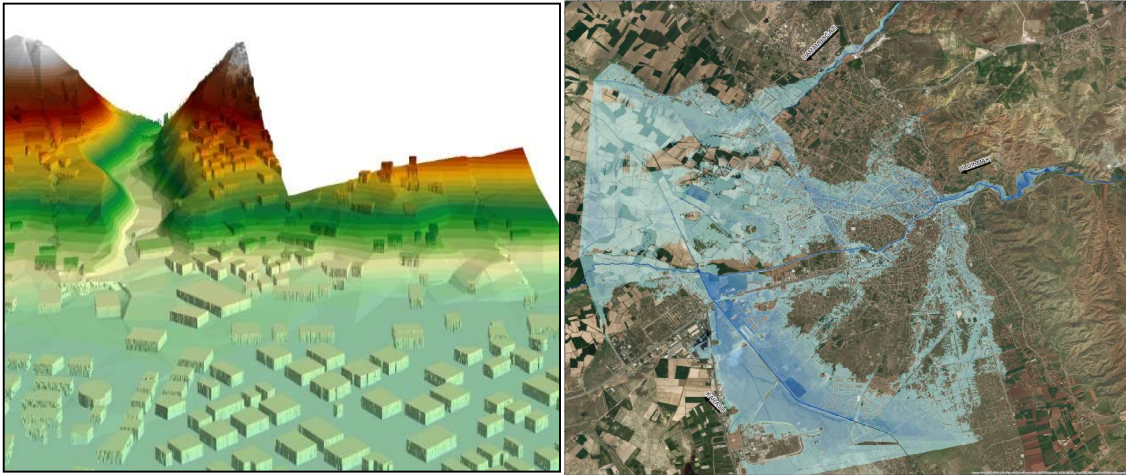


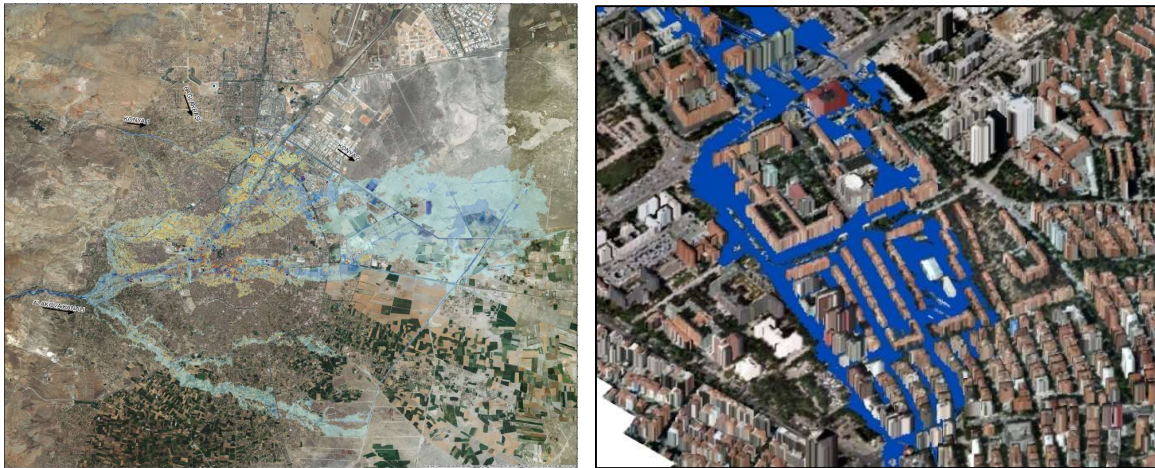
FLOOD MANAGEMENT PLAN

Konya River Basin Flood Management Plan (FMP) was completed in 2020.



Flood Hazard and Flood Risk maps are generated within the scope of Konya 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 Konya Basin, 396 measures have been identified under the following groups of mitigation measures within the scope of the Flood Management Plan.

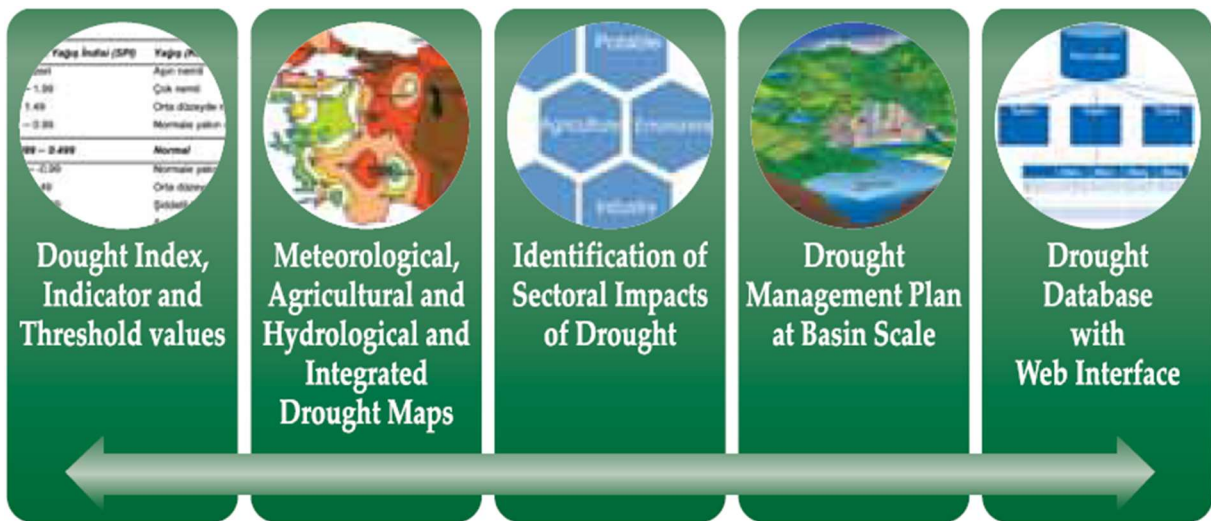
- Improvement of bridges
- Cleaning of stream beds
- Improvement of banks well
- Improvement of culverts
- Improvement of walls
- Data-Information Collection/ Production
- Education/ Informing/ Raising Awareness
- Stream rehabilitation

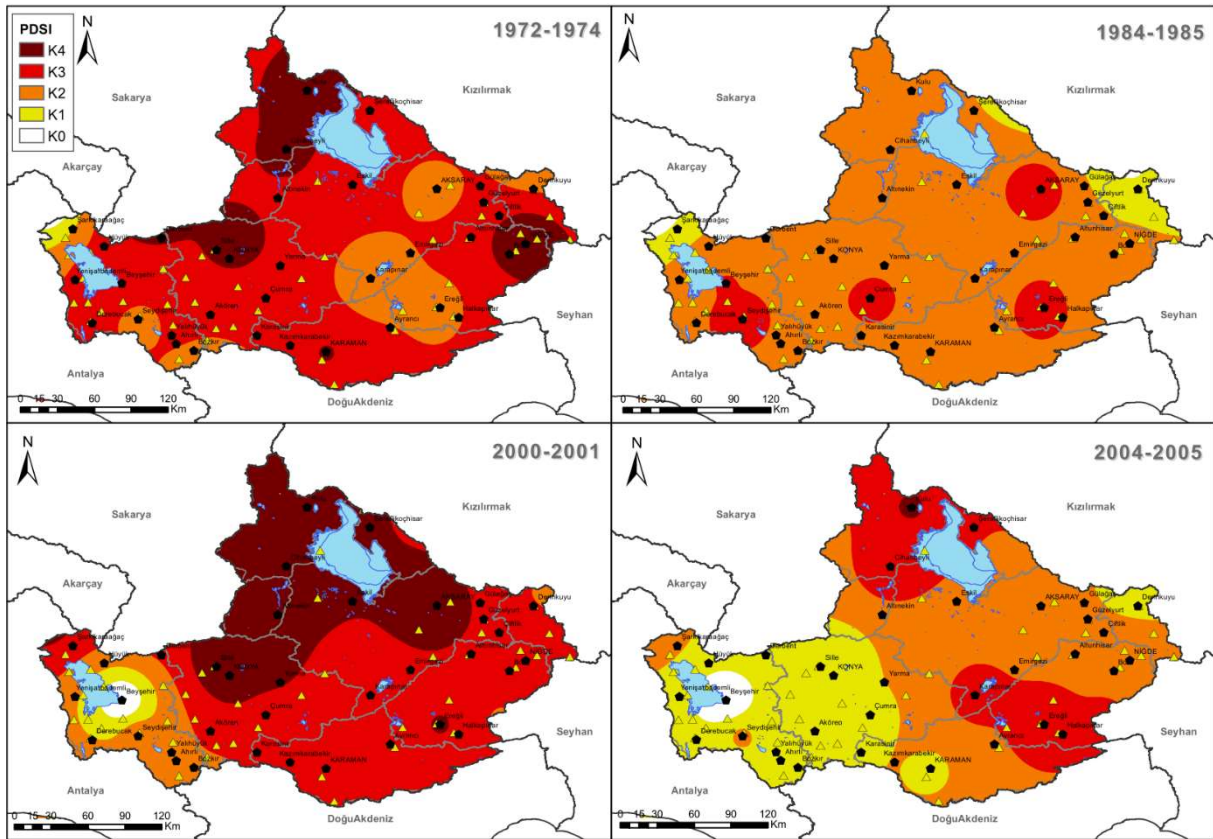
DROUGHT MANAGEMENT PLAN

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. Konya Closed Basin DMP was started at 2013 and completed 2015. The follow-up of the implementation of the measures included in the completed Drought Management Plans is carried out in 6-month periods and 6 years after the completion of the project, the update project of the same basin is made. Because of this reason, Konya Close Basin Revision Project was started at 2021 and will be completed at 2023.



Studies During the Preparation of Drought Management Plans:





In order to prevent damage caused by possible droughts in the Konya Close Basin, 158 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.

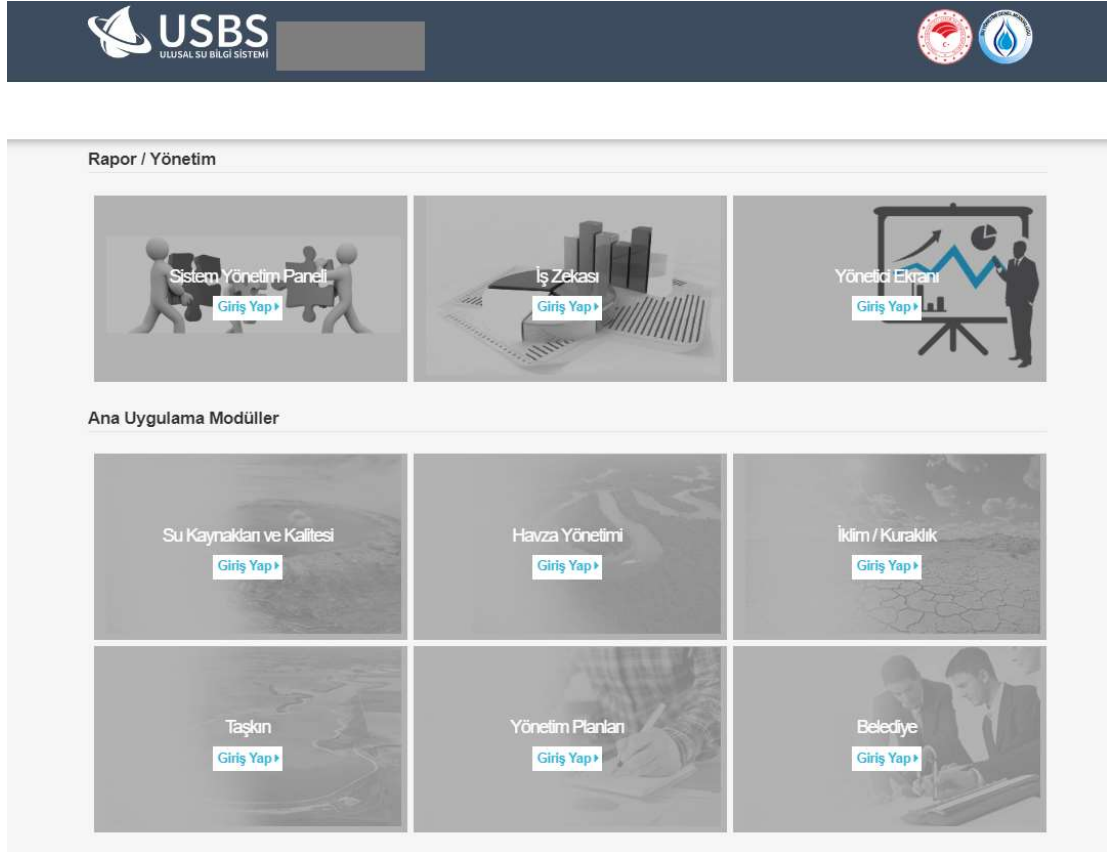
Measures determined within the scope of the plan started to be followed via the Flood and Drought Plans Tracking Web Application as of 2015, and the National Water Information System (USBS) as of 2020.

<ul style="list-style-type: none"> • Land Use • Dam Operation • Combating Desertification and Erosion • Nature Conservation Studies • Education/Information/Awareness Raising • Farming • Climate Change • Development of monitoring and measurement network • Capacity Building/ Technical Support 	<ul style="list-style-type: none"> • Planning • Insurance System • Water Supply • Protection of Water Resources • Reducing water use/loss • Irrigation Management/Improvement • Agricultural Applications • Incentive/Compensation Mechanisms • Data-Information Collection/Production • Upper Basin Studies
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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)

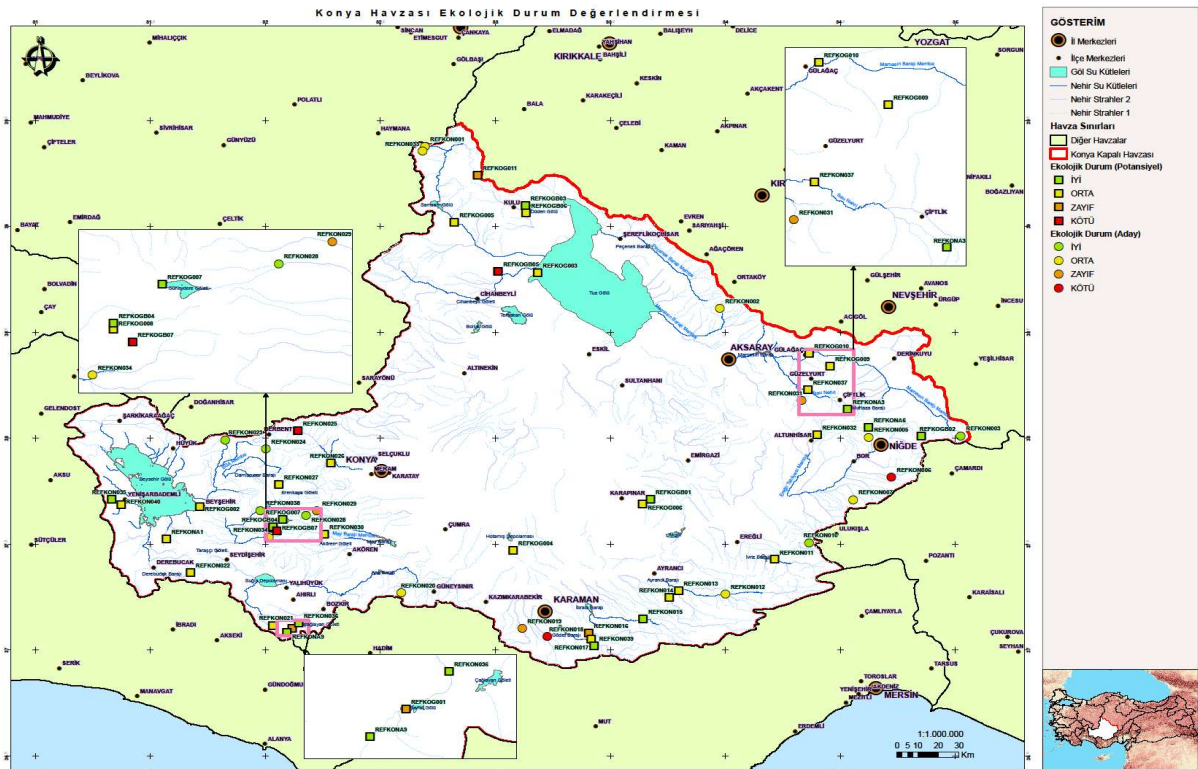
For the purpose of ecological-based assessment of water quality; biological, physicochemical, and hydromorphological monitoring studies were conducted in 25 basins across the country as part of the Project for the Establishment of a Reference Monitoring Network in Türkiye to

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 62 locations in the Konya Closed River Basin, including 44 rivers, 18 lakes (natural), and 41 reference (unpolluted) water sources were identified. In addition, the ecological status of the monitored water bodies in the Konya Closed River Basin was determined as a result of the monitoring activities.

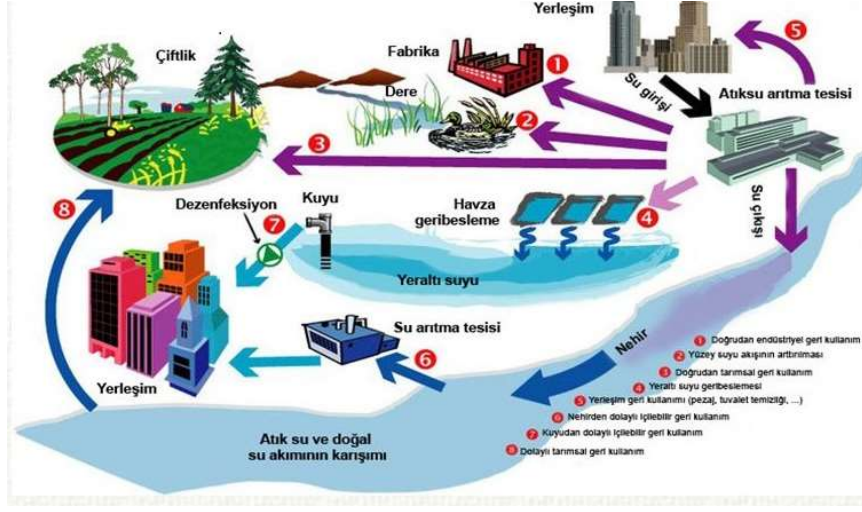
In the scope of monitoring activities, the smallest possible taxonomic level of all biological quality elements was identified and in this context 27 fish, 387 phytobenthos, 300 phytoplankton, 261 macroinvertebrate, and 145 macrophyte species were identified in the Konya Closed River Basin.

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 Konya Closed River Basin

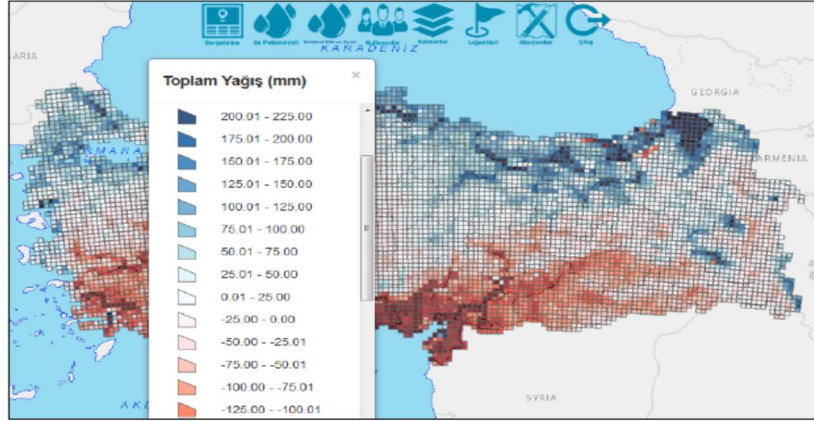
WATER REUSE



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.

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:

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 **11,1°C** according to 1971-2000 observations, will **increase by at least 1,9°C, maximum 5,2°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 **397,6 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 **16% less** rainfall compared to the reference period in **2071-2100**. It is expected that rainfall decreases for this period will predominate in the **southwestern** parts of the basin.

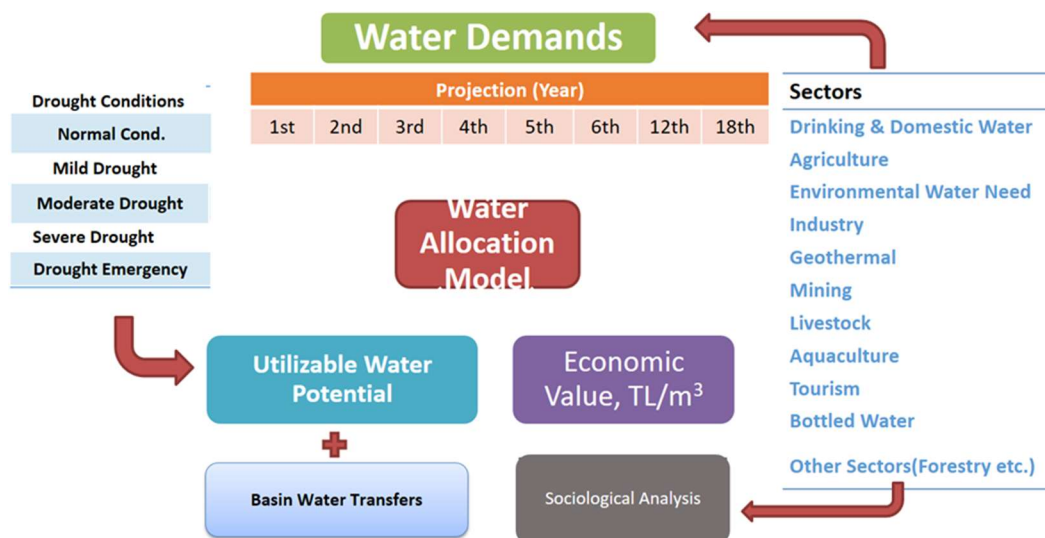
DSİ (Directorate General for State Hydraulic Works) data were used for hydrological model studies and the mean gross water potential of the basin for the reference period was determined to be **6.532 million m³/year**. With the effect of climate change, it is predicted that in the period **2071-2100**, the gross water potential of the basin could **decrease up to 70%**. 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 **4.490 million m³/year**.

As a result of the hydrogeological studies carried out, the hydrogeological reserve of groundwater of the basin was determined to be **518 km³**. The technically and economically usable amount of this reserve, the possible reserve is calculated to be **306 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 **3%** and possible reserve by **6%**.

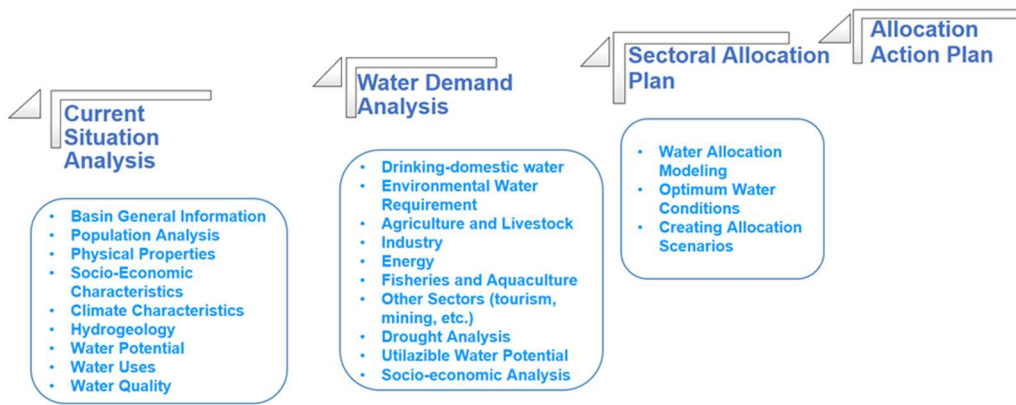
SECTORAL WATER ALLOCATION PLAN

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.

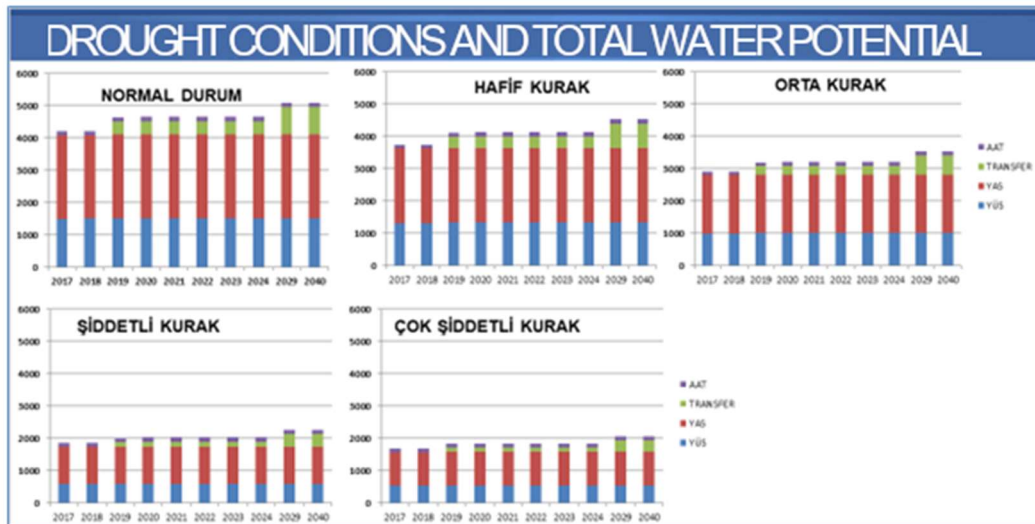


After calculating the water needs of each sector in all projection years; all physical, hydrological, socio-economic, and water quantity data obtained from the analysis studies are correlated with each other and sectoral water allocation plan scenarios are prepared through the model found appropriate. 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.



Konya Closed Basin Sectoral Water Allocation Plan was prepared in 2018 and Action Plan entered into force with the Ministry Circular No. 2019/09.

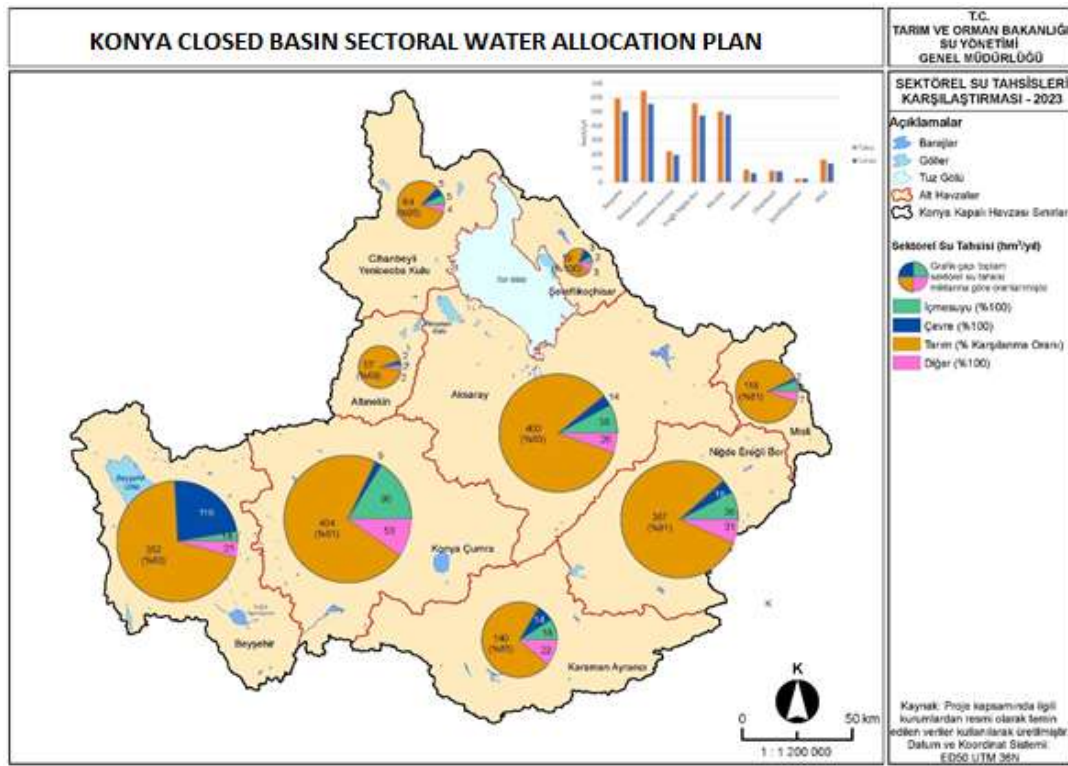
In the Konya Closed Basin, the total water potential in 2023 was determined as 4.653 hm³, including 1.505 hm³ surface water, 2,596 hm³ groundwater, 416 hm³ water transfer to the basin and 136,2 hm³ treated wastewater recovery, and 40 water allocation scenarios were studied. In the severe drought condition of 2023, the total water potential was determined as 2123 hm³, with 527 hm³ of surface water, 1,044 hm³ of groundwater, 416 hm³ of water transfer to the basin and 136.2 hm³ of treated wastewater recovery.



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.

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. Konya Closed Basin Sectoral Water Allocation Plan and Action Plan entered into force with the Ministry Circular No. 2019/09.

