NIĞDE ÖMER HALİSDEMİR UNIVERSITY

2025

ISO 14046:2016

and

Water Footprint Network

WATER FOOTPRINT AND RISK ASSESSMENT REPORT

(Report Summary)

Reporting Period	2025
Base Year	2025
Scope	Central Campus Water Management Activities
System Boundary	Gate-to-gate
Relevant Standards and Frameworks	ISO 14046:2016 and the Water Footprint Network
Target Users / Audience	University stakeholders

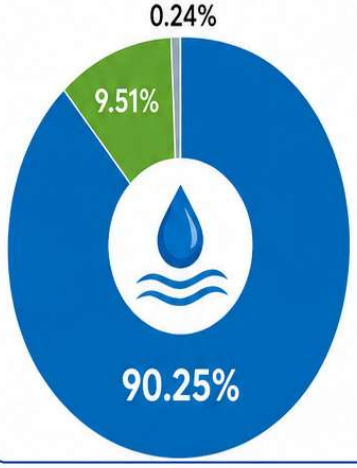
Niğde Ömer Halisdemir University

2025 Water Footprint and Risk Assessment

1 SCOPE AND METHOD

- ISO 14046:2016 and Water Footprint Network (WFN) approach
- Reporting period: 2025
- System boundary: gate-to-gate
- Scope: campus water supply, water use, green area irrigation and wastewater generation

2 WATER FOOTPRINT COMPONENTS



- Blue Water %90.25
- Green Water %9.51
- Gray Water %0.24

3 KEY FINDINGS

- The dominant component of the water footprint is **blue water.**
- The main pressure on water use is associated with dependence on **municipal supply and groundwater.**
- Irrigation of **green areas** is one of the priority areas in water management.
- Water quality-related pressure is at a **limited level.**

4 WATER RISK

According to WRI Aqueduct data, Niğde is under **'Extremely High Water Stress'**.

Regional water risk is associated with drought trends, groundwater dependency and increasing water demand.

Source: NOHU 2025 Water Footprint and Risk Assessment Report

1. Executive Summary

This study was prepared to assess water use, wastewater-related impacts and regional water risk at the campus scale of Niğde Ömer Halisdemir University using the internationally recognized ISO 14046:2016 standard and the Water Footprint Network approach. The report covers direct operational processes from water supply and on campus use to discharge from the system as wastewater. Approximately 90.25% of the total impact is associated with the blue water footprint, approximately 9.51% with the green water footprint and approximately 0.24% with the grey water footprint. This distribution indicates that the main priorities in water management are reducing consumption, improving irrigation efficiency and increasing the use of alternative water resources. According to WRI Aqueduct assessments, Niğde is located in an area of extremely high water stress. This transforms campus-scale water use from a purely operational consumption issue into a strategic matter of climate adaptation and resource security. Accordingly, the report presents an integrated improvement framework focusing on strengthened monitoring infrastructure, rainwater harvesting, drought-tolerant landscaping, water-efficient equipment and awareness-raising activities.

2. Purpose, Scope and System Boundaries

The main purpose of the report is to present the University's pressure on local water resources and its water management performance within a comparable, monitorable and reportable framework. The study covers direct water uses arising from educational and administrative buildings, laboratories, social facilities, infrastructure services, green area irrigation and on campus support activities. The system boundary was defined using a gate-to-gate approach. Therefore, water supply, use and discharge processes under the University's direct operational control were included in the inventory, while indirect impacts such as the supply chain and the embedded water use of purchased goods and services were excluded. The functional unit was considered as daily water consumption per capita in order to normalize campus water performance. In addition, indicators such as the campus physical area and green area management were evaluated for decision-support purposes.

3. Methodology and Data Approach

The study was based on the ISO 14046:2016 principles of relevance, completeness, consistency, transparency and accuracy. Invoice records and institutional records were used as primary data. Where direct measurements were not available, field observations, technical assumptions and engineering estimates were applied. A conservative approach was adopted in the calculations, with particular attention paid to avoiding any underestimation of water consumption. Data quality was evaluated in terms of reliability, completeness, temporal appropriateness, geographical representativeness and technological representativeness. In this way, the results were interpreted not only to show total water consumption, but also to support data traceability and usability in decision-making processes.

4. Water Footprint Findings and Impact Assessment

The inventory results show that the campus water footprint is predominantly driven by blue water use. The blue water component accounts for approximately 90.25% of the total impact. This result

indicates the need to reduce the use of groundwater and municipal/network water, particularly within campus water management.

The green water footprint corresponds to approximately 9.5% of the total impact. This component is associated with the retention of precipitation falling on campus green areas in the soil and its use by vegetation. Although green areas provide ecosystem services, landscape management is a critical area for improvement because irrigation needs may increase pressure on blue water resources.

The grey water footprint was calculated as 0.24% of the total impact. This relatively low share indicates that the grey water component is not the dominant contributor within the overall water footprint profile. Nevertheless, regular monitoring of wastewater quality remains important, particularly for laboratories, cleaning activities and social facilities.

In this report, the functional unit was defined as annual and daily water consumption per capita in order to normalize campus-scale water use. Based on the population served by the campus, annual water use was calculated as 6.59 m^3/person-year, corresponding to approximately 18 L/person-day. This indicator provides a practical basis for monitoring campus water efficiency performance and comparing future improvements in water management.

5. Water Risk and Spatial Assessment

The Central Campus of Niğde Ömer Halisdemir University is located under the semi-arid climatic conditions of Central Anatolia and within an area of multi-basin hydrological interaction. The regional water stress classification was evaluated with reference to the WRI Aqueduct Water Risk Atlas, which identifies the Niğde region as an area exposed to extremely high baseline water stress. This situation requires campus water management to evaluate not only the amount of water consumed, but also the water source, use efficiency, seasonal variability and drought risks associated with climate change. The presence of extensive green areas on campus is valuable in terms of biodiversity, microclimate and quality of life; however, it also increases water demand due to irrigation needs. The existence of rainwater collection and reuse practices at the University is a positive infrastructure component for reducing the blue water footprint. Expanding this infrastructure, especially for landscape irrigation and technical uses, will strengthen institutional resilience in a region with high water stress.

6. Conclusion

The water footprint profile of Niğde Ömer Halisdemir University shows that the most critical component is blue water use. The fact that the campus is located in a region with extremely high water stress increases the strategic importance of water efficiency practices and alternative water resources. In the upcoming period, the highest impact potential will be achieved through improving irrigation management, strengthening rainwater harvesting infrastructure, expanding sub-metering and digital monitoring systems, using water-efficient equipment and institutionalizing awareness-raising activities across the campus. The report is not only a technical inventory, but also a decision-support tool for monitoring campus water management performance. This approach will contribute both to the improvement of environmental performance and to increasing the University's visibility in international assessment systems such as GreenMetric and sustainability reporting.