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Research Article

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Water Delivery Performance of Irrigation Scheme in Turkey

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Abstract Irrigation is the extremely important input to meet the growing demand for food through increase productivity in agriculture. Attention must be paid to the protection of existing water resources while ensuring food safety in where water resources are limited and there is increasing pollution.

In this study, water distribution performances of irrigation schemes which developed by State Hydraulic Works (SHW) were evaluated with used 2017-year data. As a result of this study, it was determined that excessive water supplied especially to three SHW region by using Relative Water Supply indicator.

Keywords Relative water supply, SHW, irrigation, TURKEY

1. Introduction

SHW already is the largest enterprise engaged in irrigation investments in Turkey. As of the end of 2017, there are 3 185 842 ha irrigation areas that are constructed and operated by DSİ [1]. Nevertheless, many of these irrigation schemes did not perform up to expectations or achieve the goals [2]. There is also a transformation program for effective use of irrigation water in 10th development program. Among the targets set out in the aforementioned program. It was aimed to increase the net irrigation area to 3.75 million hectares and increase the irrigation efficiency from 42 percent to 50 percent [3].

In order to fully benefit from irrigation schemes, it is necessary to determine the infrastructure, the economic, environmental, organizational and agricultural status of irrigation schemes so can determine potential development.

Performance evaluation has two main objectives. First objective is to improve the level of service or operation between irrigation related institutions; and second is to improve the efficiency with which resources are being used [4].

Hydrological efficiency and the performance of water delivery networks and irrigation systems are important components of water saving practices in the Mediterranean region [5].

Water delivery performance refers to the delivery of water to users or to specific points in the irrigation system in the correct amounts and at the correct times [6]. To investigate the performance of irrigation Systems, in the different DSİ region, RWS indicator selected.

In this study, it was tried to determine the water delivery performance of the irrigation schemes which developed by SHW.

2. Method

RWS as the water delivery performance indicator was calculated with the formula below [7].

$$\text{RWS}=\frac{Irrigation\ \ water\ \ supply\ \ (m^3/ha)}{Irrigation\ \ water\ \ requirement\ \ (m^3/ha)}$$

Where, irrigation water supply is discharge at the head of the canal and irrigation water requirement is the sum of potential evapotranspiration, leaching requirement, and special practices. The water delivery performance of

irrigation schemes which were developed by SHW was examined in 25 basins. Data on Irrigation water supply and Irrigation water requirements were supplied from SHW [1].

3. Results and Discussion

Amount of Irrigation water requirements and irrigation water supply in irrigation schemes by developed by SHW were given in Figure 1.

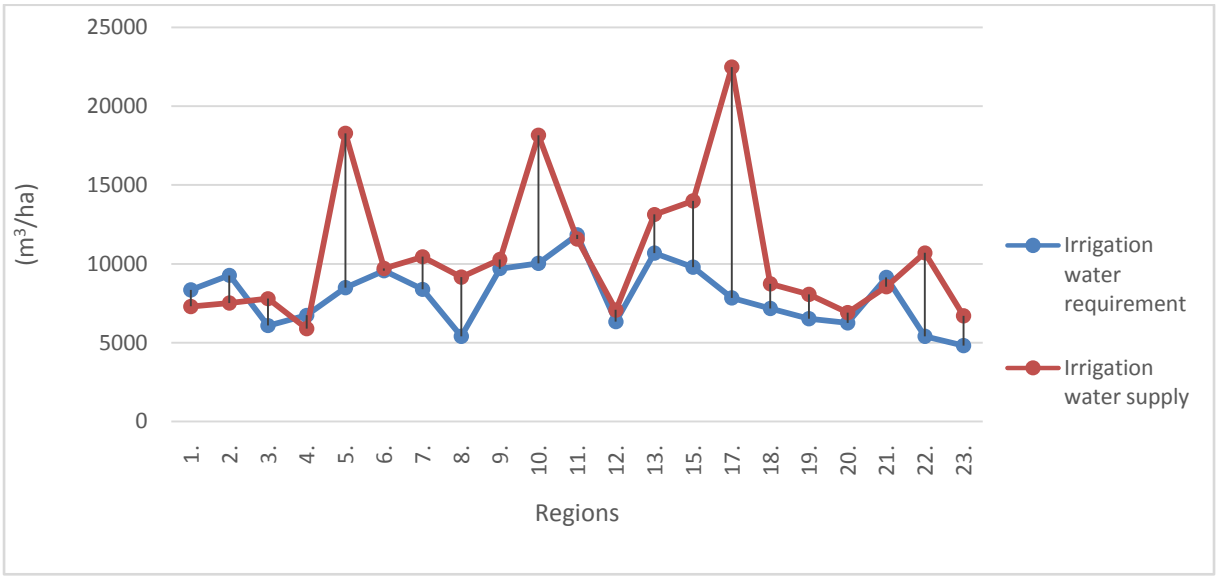

Figure 1: Regional change of irrigation water supply and irrigation water requirement in irrigation schemes developed by SHW in 2017

When Figure 1 is examined, it can be seen that the highest water is used in the 5, 10 and 17th regions. In these regions, it was thought that water losses are very high due to the preference surface irrigation methods and poor water distribution systems. [1] stated irrigation efficiency in these regions is 25%, 30%, and 19% respectively in these regions. These values remain below the 65% which is the average of Turkey. RWS values realized in SHW in 2017 are given in Figure 2.

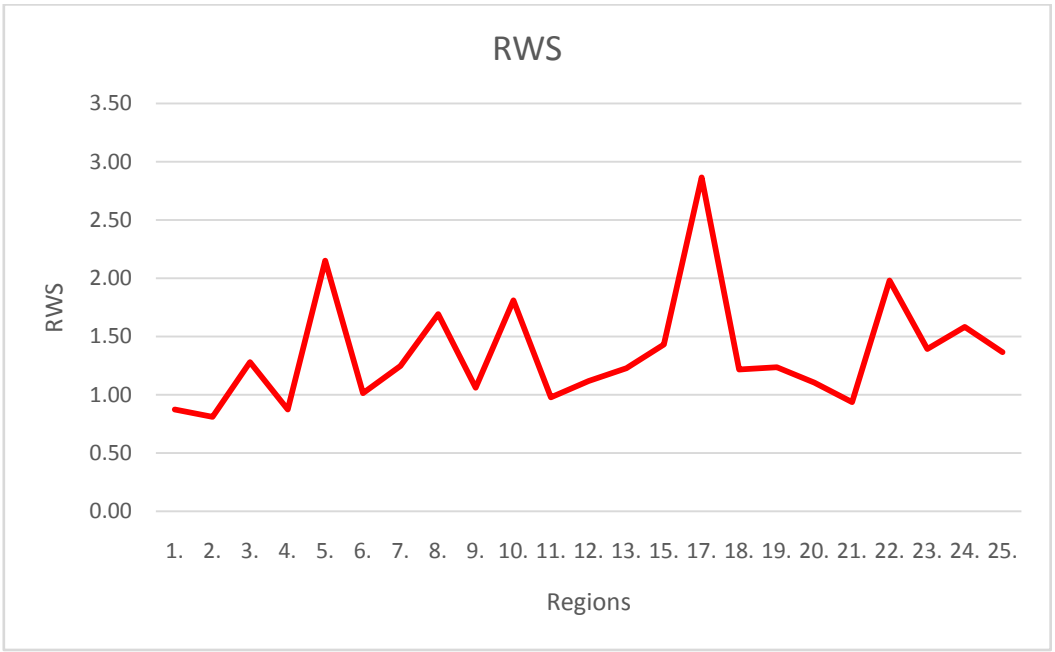

Figure 2: Changing of RWS in SHW Regions

Figure 2 shows that the RWS values range between 0.81 and 2.87. Two regions have been identified, where the RWS value is greater than 2, that is, excessive water distribution. These regions are 5th and 17th regions. In addition, the RWS value of the 22nd region was calculated 1.98 similar the other two regions. RWS values should be around 1. As far as the value of 1, an effective water distribution cannot be realized.
In some studies, which were carried out for the determination of RWS, 0.6-1.79 in 1996 [7]; 0.7-7.83 in Konya-Çumra for 1995-1999 [8]; 0.45-6.28 for 1996-2006 [9].

4. Conclusion

Watering is vital for ensuring food safety. With global warming, increasing population and industrialization, the current water resources are under tremendous pressure. In order to protect both underground and surface water resources, every drop of water should be optimally utilized. Irrigation water applied above the need arises as a serious threat to the protection of water resources. Rehabilitation of infrastructures in irrigation networks, modern irrigation methods and removal of farmers from traditional irrigation habits can help protect existing water resources.

References

[1]. SHW 2018, 2017 Assessment report of operated and transferred irrigation facilities. Republic of Turkey Ministry of Forestry and Water Affairs, General Directorate of State Hydraulic Works
[2]. Gorantiwar, S.D. and Smout, I.K. 2005. Performance assessment of irrigation water management of heterogeneous irrigation schemes: 1. A framework for evaluation. Irrigation and Drainage Systems (2005) 19: 1–36
[3]. SHW, 2018 Irrigation modernization, Republic of Turkey Ministry of Forestry and Water Affairs, General Directorate of State Hydraulic Works
[4]. Bos MG, Burton MA, Molden DJ. 2005. Irrigation and Drainage Perfor-mance Assessment: Practical Guidelines. CABI Publishing: UK
[5]. CIHEAM, 2005 Irrigation Systems Performance, Proceedings of 2nd WASAMED (Water Saving in Mediterranean Agriculture) Workshop, Tunisia, 24-28 June 2004. Series B: Studies and Research Number 52.
[6]. Brewer, J. D., R. Sakthivadivel, and K. V. Raju. 1997. Water distribution rules and water distribution performance: A case study in the Tambraparani Irrigation System. Research Report 12.Colombo, Sri Lanka: International Irrigation Management Institute
[7]. Levine G (1982) Relative water supply: an explanatory variable for irrigation systems. Technical Report. No.6, the Department of Irrigation Project Problems in Developing Countries. Cornell University, Ithaca
[8]. Cakmak, B. 1997. "Assessment of performance in transferredirrigation schemes: A case study in Konya." Journal ofFaculty of Agriculture 3, No. 1: 79-86 (in Turkish with English abstract)
[9]. ŞENER M., 2001. Evaluation of Water Use Performance: A Case Study for DSI XIth Regional Directorate, Journal of Tekirdag Agricultural Faculty, vol. 8, pp. 77-83, 2011