

# Comparison of Land Suitability for Three Different Irrigation Methods Determined through a Parametric Approach

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The suitability of a given piece of land is its natural ability to support a specific purpose. The main aim of this research was to compare land suitability for three different irrigation methods using a parametric approach. This study covering about 972.2 ha was carried out on arable lands located at the Sefalı and Böldeminar village of the Çarşamba district in the Samsun province of northern Turkey. This research was performed in two steps. In the first step, a digital soil map scaled at 1:25,000 was produced then, in the second step after determination of some soil characteristics such as texture, soil depth, lime, electrical conductivity, drainage and slope for each land mapping unit, we generated GIS land suitability maps for drip, surface and sprinkler irrigation techniques. To evaluate the land suitability for sprinkler irrigation methods, the parametric evaluation system of Sys et al. (1991) and Rees and Laffan (2004) were applied, using the soil characteristics. The characteristics of concern were rated and used to calculate the capability index for irrigation ( $C_i$ ) according to the equation:

$$C_i = A * \frac{B}{100} * \frac{C}{100} * \frac{D}{100} * \frac{E}{100} * \frac{F}{100} * \frac{G}{100} * \frac{H}{100}$$

where  $C_i$  = Capability index for irrigation,  $A$  = soil texture rating,  $B$  = soil depth rating,  $C$  =  $\text{CaCO}_3$  status,  $D$  = electrical conductivity rating,  $E$  = drainage rating,  $F$  = slope rating,  $G$  = Rock and stoniness rating, and  $H$  = Flooding rating.

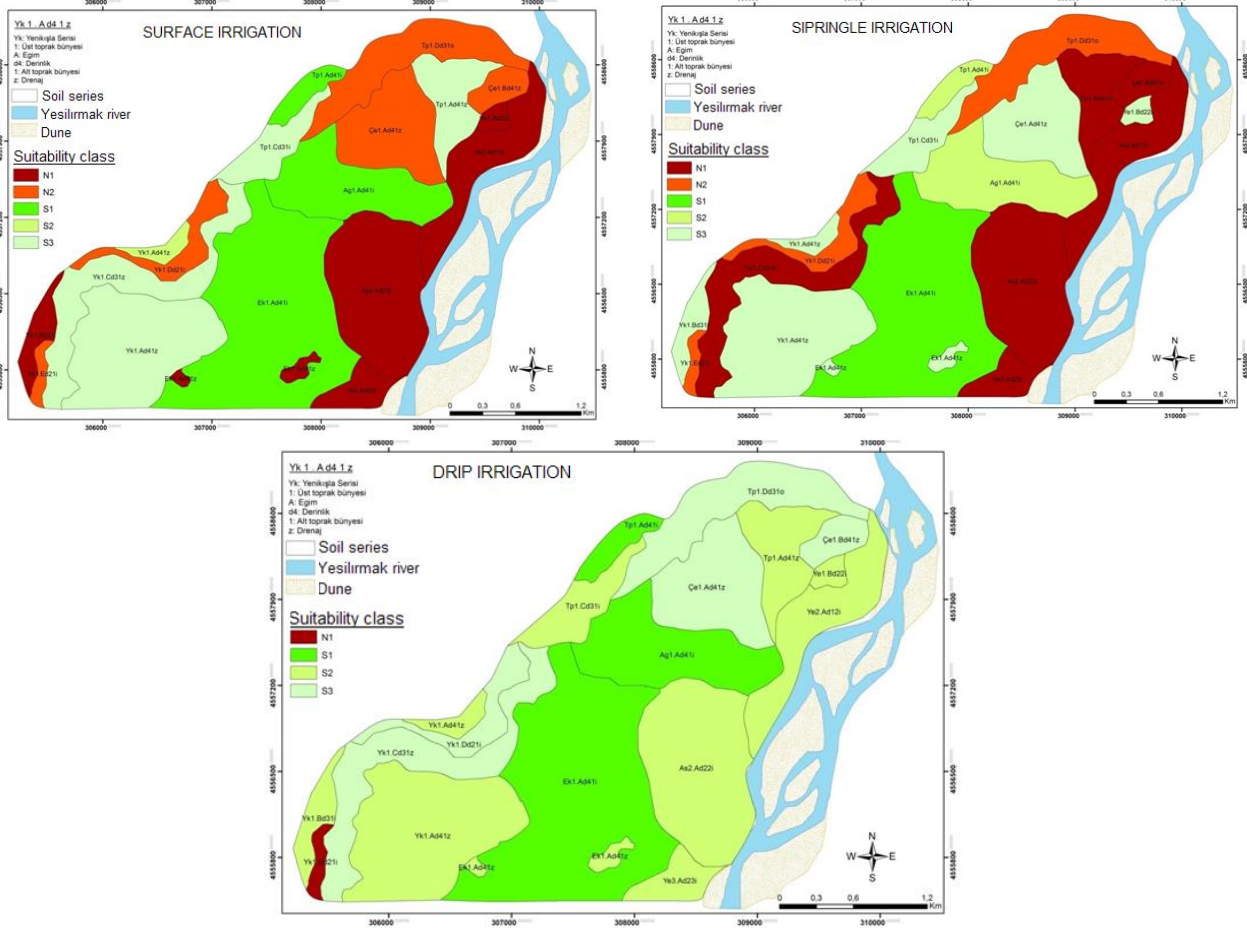
Suitability classes were defined considering the value of the capability indices and are presented in Table 1. Each of the land and soil characteristics associated with the attribute data were digitally encoded in a GIS database to eventually generate eight thematic layers.

**Table 1.** Suitability classes for the irrigation capability indices ( $C_i$ ).

Capability index	Definition	Symbol
> 80	Highly suitable	S1
60-80	Moderately suitable	S2
50-59	Marginally suitable	S3
< 49	Non-suitable	N1

Study results showed that 73.9% of the total area was highly and moderately (S1 and S2) suitable for drip irrigation, while 32.3% and 31.5% were determined to be suitable for surface and sprinkler irrigation methods in the same classes (Figure 1). In addition the mapping results indicated areas with possible problem soils in the study region (Figure 1).

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**Figure 1.** Land suitability maps for surface, sprinkler, and drip irrigation techniques.

### References

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