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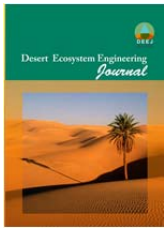

Investigating the Potentials and Limitations of Establishing Windbreaks in Agricultural Lands: A Case Study of Shiraz Plain

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Extended Abstract

Introduction: Reducing the adverse effects of wind on the field, biotic and abiotic windbreaks help increase the crop yield. Moreover, by lowering wind speed and controlling wind erosion, windbreaks reduce and control local dust, increase water consumption efficiency, decrease annual evaporation and transpiration, and meet the plants' water needs. Therefore, this study sought to investigate the potential and limitations of providing windbreaks for the agricultural lands of Shiraz Plain.

Materials and Methods: This developmental applied study was carried out based on a descriptive-analytical method using field, library, and document studies to collect the required data. To do so, the strengths, weaknesses, opportunities, and threats were identified by attending the farms, collecting the intended data by interviewing the farmers, and administering a questionnaire. Then, the matrix of internal and external factors was prepared and presented to 20 experts working in Jihad Agriculture and Natural Resources of Shiraz for scoring (based on the Likert scale of 5).

To prioritize the criteria and indicators involved in providing windbreaks for the farms, a 20-item questionnaire was developed to get the opinions of relevant experts and managers using the AHP method to create comparative matrices and determine their compatibility. In addition, the range of all comparisons' compatibility was calculated via the compatibility rate formula, the results of which confirmed the acceptable compatibility of the pairwise comparisons.

Results and Discussion: seeking to take advantage of the opportunities by using the strengths, the study selected an aggressive strategy which comprises a combination of opportunities and strengths after determining the final coefficient based on experts' opinions.

As for the strengths of the option of reducing evaporation, the study found that increasing the yield and the irrigation intervals offered the greatest score (0.367), indicating the positive influence of a windbreak on water consumption. On the other hand, in terms of weaknesses, windbreak shading was found to achieve the highest score (0.358). Moreover, accessing financial facilities was found as the greatest opportunity, with its score being 0.364. Finally, financing the provision of a windbreak was reported as the greatest threat, the score of which was found to be 0.359.

Conclusions: Considering the special climatic conditions of Fars province which is characterized by dryness and improper distribution of precipitation in time and place, any sustainable agricultural and food production depends on the correct and rational application of the province's limited resources. Many studies have already investigated the rate of evaporation and transpiration and product efficiency for instance, Campi et al, 2012; Smith et al, 2021; Cochrane and de Vries, 2014; Thevs et al, 2021).

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Taking what was mentioned above into consideration, this study suggests that windbreaks be provided for the Shiraz Plain. To this end, some training courses can be organized for the farmers in windbreak advantages and how to provide it, so that they are encouraged to provide for biotic windbreaks and create a protective green belt around the farmlands.

In the second phase, the farmlands under cultivation should be identified, plotted, and prioritized. In the third phase, multipurpose native species suitable for planting biotic windbreaks and creating protective green belts should be identified and introduced throughout the areas covered by vegetation. It should be noted that offering financial and advisory facilities to farmers can help precipitate the implementation of the aforementioned strategy.

Keywords: Windbreak, Agricultural Land, SWOT, Construction Strategies.