Qualitative Land Suitability Classification For Barley Crop Products In Tabriz Plain, Eastern Azerbaijan Province, Iran

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ABSTRACT: According to the uncontrolled use of land and their destroying the one hand, and the increasing needs to increase the yield per unit area on the other hand, better exploitation of land is need more than before. One way of achieving to this objective is qualitative assessment of land suitability for a specific crop. The Tabriz plain located in North East of Lake Uremia in East Azerbaijan Province. The area is of over 92,000 hectares and Major part of this land dedicated to irrigated crops. But rain-fed crops are also common in parts of this area. Classification of land suitability for irrigated barley was performed by parametric method (square root). Soil research and land classification report was prepared by Yekkom Consulting Engineers, and after reexamination, is base for the present research. In this study, 24 different soil series and 142 separate units have been identified. The results showed that the climate for efficiency of irrigated barley is suitable. Land evaluation was conducted in three stages, the first stage information on land characteristics, including climate, topography, hydrology and soils were collected and processed. Secondly, the needs of the growing irrigated barley were determined land in thirdly, land characteristics with plant requirements irrigated barley were corresponded. The results showed that the main factors limiting the production area is land slope and topography and on soil texture is the amount of lime, gravel, pH, salinity and alkalinity. At this stage suitability classes and subclasses were determined using parametric constraints. The most important limitation that reduces the degree of land suitability limitations are related to salinity and alkalinity.

Keywords: Tabriz plain, barley, land, suitability.

INTRODUCTION

Population growth and rising living standards has caused a food demand. This issue has caused humans to think more desirable use of the land and increasing agricultural and horticultural production is concentrated.

But a lot suitable land to increase the area under cultivation has not remained and thus land must grain yield per acre the amount of available increase. For achieve this goal, knowledge of production capacity of the land and the selection of appropriate use of special importance is the capacity of the position, this approach to "land evaluation" is said. Tabriz Plain of Iran in East Azerbaijan province is located in the North West.

The plain to the north slopes - South of Moro the mountains, on the south by northern slopes of Sahand, Tabriz, of the East at the east end the city limits and salt marsh lands of the West Urmia Lake is restricted. This Plain is part of the Urmia Lake catchments. According to the data meteorological and climatological features based on cold, dry climate emerge calculated. Red sandstone conglomerate and siltstone containing among the sediments that has the most extensive and in northeast and east of Tabriz the highlands have outcrop. These sediments highly erodible and in the degree of degradation of water quality significantly influences. A total can be said that the existing formations in the East and the North East regions predominantly from evaporate sediments of marl and chalky-salt layers of consist has more erodible and in degradation of soil quality, and water resources to wonderful effect.

MATERIALS AND METHODS

The vast of Tabriz plain in North East Lake Urmia is located in the Lower basin Aji-chay From the north and North East to North Highlands region of Tabriz, Sufian and the mountains of Sahand south of the northern scope mountains of Sahand is limited.
Between latitude 37.56 to 38.17 and Longitude 45.30 to 46.15 and an area of about 92,000 hectares, is encompasses. Characteristics of land, plant the physical environment parameters that are involved in the performance of the product. Depending on the land characteristics to what extent able to be cultivated crops respond to the needs. The suitability of land for the desired product will be different. Therefore is special importance to evaluate land features. In this study, evaluation of land features parametric method (square root) has been made. Distance the properties of matter how land is more appropriate condition to crop cultivation limits them for of that product would be higher.

Evaluation of soil properties for five-level limitations is done as follows

- **No limitations**: in this case, land features quite favorable for crop production and maximum production.
- **Low limitations**: land characteristics to produce suitable the desired product is almost and these limitations, the production rate decreases to less than 20 percent.
- **Moderate limitations**: a moderate effect in reducing crop land features are but still is profitable crop in the land.

**Severe limitations**

land features are such effective in reducing product profitability almost “reach zero.

**Extremely severe limitations**

limitations too many land enough to that really loss the production and use of land for the desired product is not recommended.

In the FAO approach land classification system, lands are classified at different levels. These levels include category class, subclass, and unit. In this system, there are two classes: suitable (S) and unsuitable (N) where.

**Suitable land (S)**

This type of benefits from sustainable use of land for a particular type of productivity justifies the costs without damaging effect in the land use or land is around.

**Unsuitable land (N)**

The land characteristics prevent this type of land characteristics for sustainable use and land productivity or the conservation and corrective action required by demanding an unacceptable cost.

Land suitability class,The appropriate category includes three classes: S1 (very suitable) S2 (moderately suitable) and S3 (suitable but less profitable ones).

**Unsuitable class (N) contains two classes**

N1 (Unsuitable but after removing limitations would be suitable) and N2 (Unsuitable). Constraint type or types of corrective action as needed in a class shows by subclass.

**Subclass is shown in lower case are defined as follows**

- c: constraints related to climate
- w: the limitations of wet soil
- s: limitations related to soil physical properties.
- f: limitations related to fertility factors that are not easy to amend.
- n: the limits of salinity and alkalinity

**RESULTS AND DISCUSSION**

To determine the growth period of the plants and determine the limitations of existing climate for the cultivation of crops in the region, the meteorological data should be examined the For this purpose of the period of climatic data (2012-1987) station used to Tabriz synoptic weather.

The growth cycle one year plants from germination to complete puberty plants and new growth for perennial plants during the year. Growth cycle should be long enough to be able to the growth of plant the chlorophyll production is to gain sufficient underwrites.

Climatic suitability for a specific plant, it is necessary to determine some variables such as at least during the growing season, the period of solar radiation, air temperature, rainfalls, throughout the day, relative humidity, and others should be measured. Growth period is defined to the period in which sufficient moisture and The absence of thermal constraints, make agricultural production possible.

1 October is the beginning of the growth period in Tabriz Plain First and end of the growth period is May 26.
Evaluation of land and climatic characteristics for irrigated barley for different states soil families using parametric method (square root) were performed and the results are as follows:

37710 hectares of barley for a proper suitability and 16830 hectares of relatively proper suitability and 3250 hectares of critical fit and 31540 hectares are suitability unsuitable. (fig.1).

Figure 1. Land use maps for barley crop for Tabriz plain region

Table 1. Numerical values for different classes of fitness

<table>
<thead>
<tr>
<th>Suitability class</th>
<th>Land index</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁ (very appropriate)</td>
<td>75-100</td>
</tr>
<tr>
<td>S₂ (relatively appropriate)</td>
<td>50-75</td>
</tr>
<tr>
<td>S₃ (critical proportion)</td>
<td>25-50</td>
</tr>
<tr>
<td>N (unsuitable)</td>
<td>0-25</td>
</tr>
</tbody>
</table>

Table 2. Climatic data synoptic stations of Tabriz (1987-2012)

<table>
<thead>
<tr>
<th>Month</th>
<th>Climates Parameters</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>The average monthly temperature (°C)</td>
<td>-2.3</td>
<td>-0.2</td>
<td>5</td>
<td>11.2</td>
<td>16.4</td>
<td>21.8</td>
<td>25.6</td>
<td>25.4</td>
<td>21</td>
<td>13.8</td>
<td>6.4</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Mean absolute maximum (°C)</td>
<td>2.3</td>
<td>4.7</td>
<td>10.3</td>
<td>16.9</td>
<td>22.7</td>
<td>28.7</td>
<td>32.7</td>
<td>32.6</td>
<td>28.2</td>
<td>20.5</td>
<td>11.9</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>Mean absolute minimum temperature (°C)</td>
<td>-5.7</td>
<td>-4.1</td>
<td>0.4</td>
<td>5.9</td>
<td>10.6</td>
<td>15.2</td>
<td>19.3</td>
<td>19</td>
<td>14.4</td>
<td>8.2</td>
<td>2.1</td>
<td>-2.8</td>
<td></td>
</tr>
<tr>
<td>Relative humidity (%)</td>
<td>72</td>
<td>69</td>
<td>62</td>
<td>56</td>
<td>51</td>
<td>41</td>
<td>36</td>
<td>36</td>
<td>39</td>
<td>51</td>
<td>65</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Rainfall (mm)</td>
<td>22.3</td>
<td>24.2</td>
<td>40.6</td>
<td>52.7</td>
<td>42.6</td>
<td>16.9</td>
<td>5.8</td>
<td>3.2</td>
<td>7.6</td>
<td>21.9</td>
<td>27.9</td>
<td>23.2</td>
<td></td>
</tr>
<tr>
<td>Evapotranspiration</td>
<td>0.0</td>
<td>0.0</td>
<td>31.2</td>
<td>64</td>
<td>119.6</td>
<td>193</td>
<td>211</td>
<td>158.2</td>
<td>104.8</td>
<td>36.2</td>
<td>9.8</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Half the potential evapotranspiration temperature difference between day and night.</td>
<td>0.0</td>
<td>0.0</td>
<td>15.6</td>
<td>32</td>
<td>59.8</td>
<td>96.5</td>
<td>105.5</td>
<td>79.1</td>
<td>52.4</td>
<td>18.1</td>
<td>4.9</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

Legend
- S1: Very appropriate
- S2: Relatively appropriate
- S3: Critical proportion
- N: Unsuitable

Urban
River
Sand Hill

2093
Table 3. Classes and sub classes area of land suitability for barley

<table>
<thead>
<tr>
<th>classes</th>
<th>Sub classes</th>
<th>Barley Ha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>37710</td>
<td>40.7</td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>16830</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>1620</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>nt</td>
<td>1190</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>s</td>
<td>5750</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>4010</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>w</td>
<td>4260</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>S3</td>
<td>3250</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>2470</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>780</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>31540</td>
<td>34.1</td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSION

Evaluation results showed that the highest and most important limitation that reduces the degree of land suitability, limitations related to is salinity and alkalinity.

Due to the impact of the receding Urmia Lake and increased salinity of water resources in agriculture Qualitative classification of land suitability for crops in Tabriz plain rapidly changing and ability production in this plains will be significantly reduced.

Tabriz plains of geomorphological and due to its proximity to the lake, the greatest impact will be receding Urmia Lake.

Agricultural situation in Tabriz plains due to the extraordinary impact of the receding Urmia Lake Critical and the scope of is tighter every day life.

Managers and senior managers attempt the agricultural system for planning cropping pattern and orientation towards the establishment the agricultural ecological.

REFERENCES


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