Article title: Effects of climate change and adaptation options on winter wheat yield under rainfed Mediterranean conditions in southern Portugal

Journal: Climatic Change

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Online Resource 2. Summary of observational yield data for model calibration and of input parameters for crop characteristics and local prevailing agronomic practices

Table OR2.1. Observational final grain yields of winter wheat over five consecutive seasons (1981–1986) in the experimental Farm of Almocreva at Beja used for STICS calibration (Carvalho and Basch 1995)

<table>
<thead>
<tr>
<th>N fertilization (equally split between sowing and beginning of stem elongation)</th>
<th>Years</th>
<th>Yield of cultivar Etole (kg ha⁻¹)</th>
<th>Yield of cultivar Mara (kg ha⁻¹)</th>
<th>Analysis of variance (Two-way ANOVA)</th>
<th>Average yield of two cultivars (kg ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1981–1982</td>
<td>2740</td>
<td>2618</td>
<td></td>
<td>2679</td>
</tr>
<tr>
<td>0 kg ha⁻¹</td>
<td>1982–1983</td>
<td>999</td>
<td>916</td>
<td></td>
<td>958</td>
</tr>
<tr>
<td></td>
<td>1983–1984</td>
<td>1712</td>
<td>1747</td>
<td>N fertilization &lt;0.05</td>
<td>1730</td>
</tr>
<tr>
<td></td>
<td>1984–1985</td>
<td>2015</td>
<td>1600</td>
<td></td>
<td>1808</td>
</tr>
<tr>
<td></td>
<td>1985–1986</td>
<td>1728</td>
<td>1342</td>
<td></td>
<td>1535</td>
</tr>
<tr>
<td></td>
<td>1981–1982</td>
<td>3830</td>
<td>3480</td>
<td></td>
<td>3655</td>
</tr>
<tr>
<td></td>
<td>1982–1983</td>
<td>906</td>
<td>1003</td>
<td></td>
<td>955</td>
</tr>
<tr>
<td></td>
<td>1983–1984</td>
<td>3254</td>
<td>3691</td>
<td>Cultivar 0.77</td>
<td>3473</td>
</tr>
<tr>
<td></td>
<td>1984–1985</td>
<td>3588</td>
<td>2967</td>
<td></td>
<td>3278</td>
</tr>
<tr>
<td></td>
<td>1985–1986</td>
<td>3620</td>
<td>3534</td>
<td></td>
<td>3577</td>
</tr>
<tr>
<td></td>
<td>1981–1982</td>
<td>3070</td>
<td>4862</td>
<td></td>
<td>3966</td>
</tr>
<tr>
<td></td>
<td>1982–1983</td>
<td>741</td>
<td>880</td>
<td>N</td>
<td>811</td>
</tr>
<tr>
<td>100 kg ha⁻¹</td>
<td>1983–1984</td>
<td>3234</td>
<td>3760</td>
<td>N fertilization 0.64</td>
<td>3497</td>
</tr>
<tr>
<td></td>
<td>1984–1985</td>
<td>3969</td>
<td>3760</td>
<td>X Cultivar</td>
<td>3865</td>
</tr>
<tr>
<td></td>
<td>1985–1986</td>
<td>3074</td>
<td>4146</td>
<td></td>
<td>3610</td>
</tr>
</tbody>
</table>

Note: measured yield was the average yield obtained between two common sowing dates (Nov 20th and Dec 10th), at which simulations were respectively performed to derive mean yield under individual growing season and N level.
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Table OR2.2. Summary of calibrated crop parameters and local prevailing agronomic practices (Carvalho and Basch 1995)

<table>
<thead>
<tr>
<th>General plant parameter</th>
<th>Cultivar parameters</th>
<th>Initial soil water content at sowing</th>
<th>Sowing dates</th>
<th>N Fertilization strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Built-in cultivar (No.7-Thetalent) with standard setting:</td>
<td>Mean</td>
<td>Two common sowing dates</td>
<td>Amount (kg/ha)</td>
</tr>
<tr>
<td>RUE&lt;sub&gt;veg&lt;/sub&gt;=RUE&lt;sub&gt;rep&lt;/sub&gt; =2.8 g MJ&lt;sup&gt;-1&lt;/sup&gt;</td>
<td>GDD&lt;sub&gt;emg-amf&lt;/sub&gt;=245 °C.d</td>
<td>50% field capacity + supplementary irrigation (20 mm)</td>
<td>Nov 20&lt;sup&gt;a&lt;/sup&gt;</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>GDD&lt;sub&gt;emg-lax&lt;/sub&gt;=505 °C.d</td>
<td></td>
<td>Nov 30&lt;sup&gt;b&lt;/sup&gt;</td>
<td>120 plants m&lt;sup&gt;-2&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>GDD&lt;sub&gt;emg-drp&lt;/sub&gt;=837 °C.d</td>
<td></td>
<td>Dec 10&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GDD&lt;sub&gt;drp-mat&lt;/sub&gt;=700 °C.d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P&lt;sub&gt;grain&lt;/sub&gt;=0.0521 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P&lt;sub&gt;num&lt;/sub&gt;=3000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: RUE<sub>veg</sub> and RUE<sub>rep</sub> are radiation use efficiency of winter wheat during vegetative and reproductive phases, respectively. Growing Degree Days (GDD) are calculated with base temperature at 0 °C. GDD<sub>emg-amf</sub>, GDD<sub>emg-lax</sub>, GDD<sub>emg-drp</sub> and GDD<sub>drp-mat</sub> are required growing degree days from emergence to beginning of stem elongation, emergence to maximal leaf area index, emergence to beginning of grain-filling and beginning of grain-filling to maturity, respectively. P<sub>grain</sub> and P<sub>num</sub> are genetic potential of grain weight and number, respectively. Mean sowing date is used for climate change impact assessment. Settings of initial soil water at sowing is prescribed to mimic common situation and practice for dryland cropping system in Mediterranean region.