**Article Title**

Building regional water use scenarios consistent with global Shared Socioeconomic Pathways

**Journal Name**

Total Environmental Change

**Authors**

Mingtian Yao\*, Sylvia Tramberend, Pavel Kabat, Ronald W.A. Hutjes, Saskia E. Werners

*\* Water System & Climate Change, Wageningen University and Research Centre, PO Box 47, 6700 AA Wageningen, The Netherlands.* mingtian.yao@wur.nl

## Overview of the Quantitative Scenario Assumptions

Table S-1. Overview of quantitative scenario assumption of population

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | SSP-CN | SSP-PRD |
| SSP1 | 2010 | 4.19% of IIASA-VIC v9[[1]](#footnote-1) population assumption for China | 100% of SSP2 |
|  | 2020 | 99.10% of SSP2 |
|  | 2030 | 97.59% of SSP2 |
|  | 2040 | 96.17% of SSP2 |
|  | 2050 | 94.56% of SSP2 |
| SSP2 | 2010 | Same as SSP2-CN |
|  | 2020 |
|  | 2030 |
|  | 2040 |
|  | 2050 |
| SSP3 | 2010 | 100% of SSP2 |
|  | 2020 | 101.11% of SSP2 |
|  | 2030 | 102.89% of SSP2 |
|  | 2040 | 104.72% of SSP2 |
|  | 2050 | 107.43% of SSP2 |
| SSP4 | 2010 | 100% of SSP2 |
|  | 2020 | 99.28% of SSP2 |
|  | 2030 | 97.85% of SSP2 |
|  | 2040 | 96.06% of SSP2 |
|  | 2050 | 93.80% of SSP2 |
| SSP5 | 2010 | 100% of SSP2 |
|  | 2020 | 99.01% of SSP2 |
|  | 2030 | 97.47% of SSP2 |
|  | 2040 | 96.10% of SSP2 |
|  | 2050 | 94.56% of SSP2 |

Table S-2. Overview of quantitative scenario assumption of GDP

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | SSP-CN[[2]](#footnote-2) | SSP-PRD |
| SSP1 | 2010 | 8.72% | 100% of SSP2 |
|  | 2020 | 7.04% | 99.67% of SSP2 |
|  | 2030 | 4.53% | 102.74% of SSP2 |
|  | 2040 | 2.41% | 107.88% of SSP2 |
|  | 2050 | 0.86% | 109.79% of SSP2 |
| SSP2 | 2010 | 8.76% | 9.23% of China's GDP |
|  | 2020 | 5.98% | 8.98% of China's GDP |
|  | 2030 | 2.99% | 8.73% of China's GDP |
|  | 2040 | 1.83% | 8.48% of China's GDP |
|  | 2050 | 0.88% | 8.23% of China's GDP |
| SSP3 | 2010 | 8.80% | 100%% of SSP2 |
|  | 2020 | 5.38% | 99.88%% of SSP2 |
|  | 2030 | 1.85% | 96.37%% of SSP2 |
|  | 2040 | 0.81% | 92.12%% of SSP2 |
|  | 2050 | 0.04% | 86.75%% of SSP2 |
| SSP4 | 2010 | 8.70% | 100%% of SSP2 |
|  | 2020 | 5.98% | 98.94%% of SSP2 |
|  | 2030 | 3.10% | 98.63%% of SSP2 |
|  | 2040 | 1.74% | 99.92%% of SSP2 |
|  | 2050 | 0.63% | 98.79%% of SSP2 |
| SSP5 | 2010 | 8.71% | 100%% of SSP2 |
|  | 2020 | 7.98% | 100.44%% of SSP2 |
|  | 2030 | 5.45% | 111.6%% of SSP2 |
|  | 2040 | 2.83% | 129.49%% of SSP2 |
|  | 2050 | 1.23% | 141.94%% of SSP2 |

Table S-3. Overview of quantitative scenario assumption of technological change rate (TC)

|  |  |  |
| --- | --- | --- |
|  | SSP-CN | SSP-PRD |
| SSP1 | 1.10% | 1.20% |
| SSP2 | 0.60% | 1.10% |
| SSP3 | 0.30% | 1.00% |
| SSP4 | 0.60% | 1.10% |
| SSP5 | 1.10% | 1.20% |

Table S-4. Overview of quantitative scenario assumption of manufacturing share in the total GDP

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | SSP-CN[[3]](#footnote-3) | SSP-PRD |
| SSP1 | 2010 | 42.63% | 47.46% |
|  | 2020 | 47.51% | 42.65% |
|  | 2030 | 49.19% | 39.17% |
|  | 2040 | 49.34% | 36.09% |
|  | 2050 | 48.88% | 31.60% |
| SSP2 | 2010 | 42.64% | 47.46% |
|  | 2020 | 47.23% | 42.79% |
|  | 2030 | 49.36% | 38.12% |
|  | 2040 | 49.38% | 33.45% |
|  | 2050 | 49.23% | 28.79% |
| SSP3 | 2010 | 42.02% | 47.46% |
|  | 2020 | 45.13% | 42.74% |
|  | 2030 | 46.32% | 36.74% |
|  | 2040 | 46.99% | 30.82% |
|  | 2050 | 46.47% | 24.97% |
| SSP4 | 2010 | 42.63% | 47.46% |
|  | 2020 | 47.51% | 42.34% |
|  | 2030 | 49.19% | 37.60% |
|  | 2040 | 49.34% | 33.43% |
|  | 2050 | 48.88% | 28.44% |
| SSP5 | 2010 | 42.64% | 47.46% |
|  | 2020 | 47.23% | 42.98% |
|  | 2030 | 49.36% | 42.55% |
|  | 2040 | 49.38% | 43.32% |
|  | 2050 | 49.23% | 40.86% |

## Contribution of difference in technological change (TC), manufacturing sharing (MAN), population (POP), and GDP on difference between water use under SSP-CN and SSP-PRD

formula = Total Water Use ~ TC + MAN + POP + GDP

Residuals:

Min 1Q Median 3Q Max

-0.009473 -0.004253 -0.001315 0.002454 0.014136

Table S- Coefficients

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Estimate | Std. Error | t-value | Pr(>|t|) | Sign. |
| TC | 1.08610 | 0.04514 | 24.060 | 3.09e-16 | \*\*\* |
| MAN | 0.39568  | 0.02717  | 14.561  | 4.16e-12  | \*\*\* |
| POP | -0.01304  | 0.17421  | -0.075  | 0.941  | NS |
| GDP | 0.93207  | 0.06203  | 15.026  | 2.33e-12  | \*\*\* |

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.006893 on 20 degrees of freedom

Multiple R-squared: 0.9987, Adjusted R-squared: 0.9984

F-statistic: 3819 on 4 and 20 DF, p-value: < 2.2e-16



Figure S-1. Subsequent plotting of model residuals against fitted values

1. Available at the SSP Database (secure.iiasa.ac.at/web-apps/ene/SspDb/dsd?Action=htmlpage&page=about) [↑](#footnote-ref-1)
2. Compiled from OECD Env-Growth v9 GDP, available at the SSP Database [↑](#footnote-ref-2)
3. Compiled from UNEP GEO4 Driver Scenarios, Distributed by International Futures (pardee.du.edu) [↑](#footnote-ref-3)