

## **Quantifying the Sustainability of Water Availability for the Water-Food-Energy-Ecosystem Nexus in the Niger River Basin**

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### **Additional Supporting Information (Files uploaded separately)**

None

### **Introduction**

The supplement provide additional figures for the manuscript.

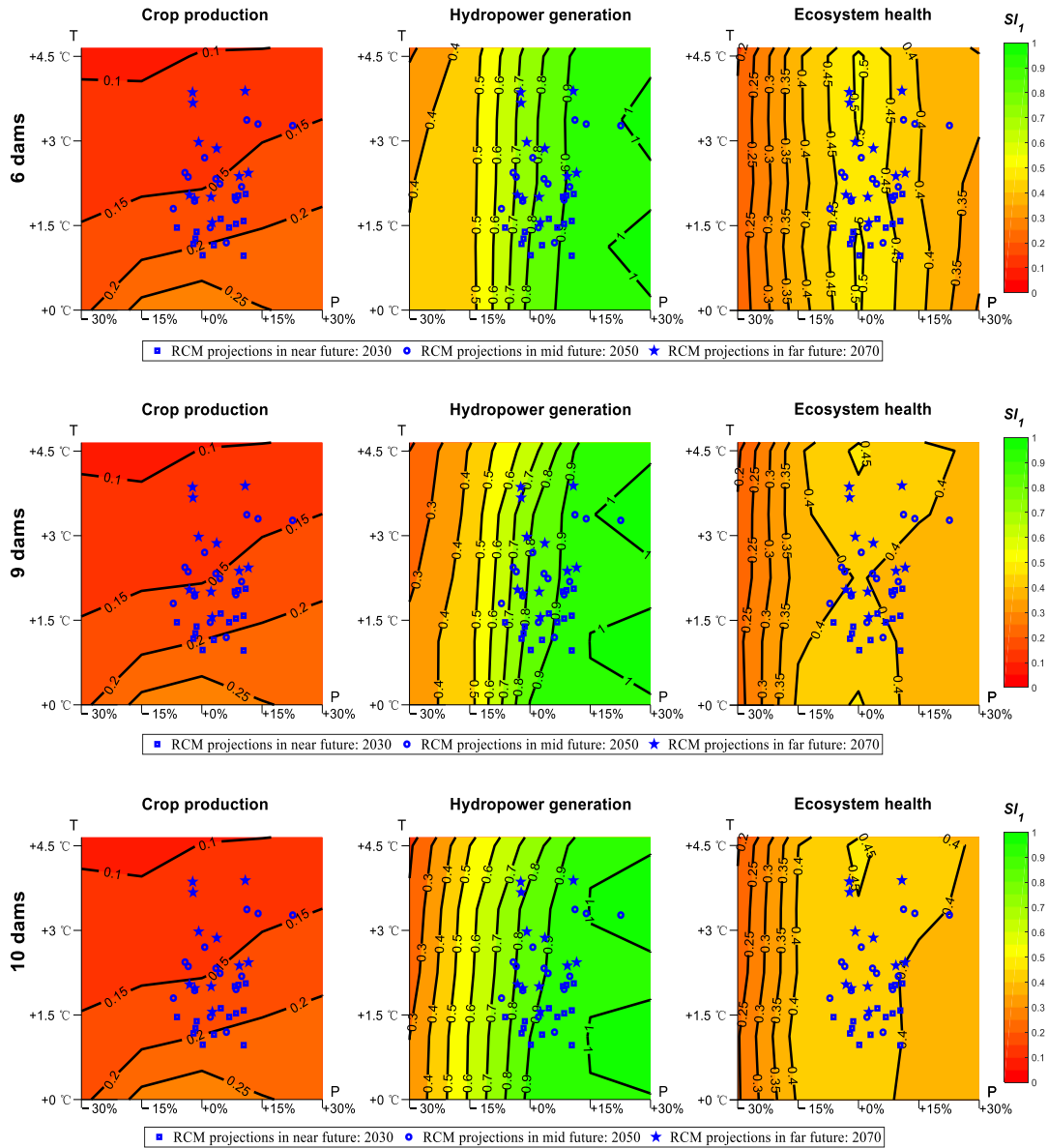


Figure S1. Climate stress test by resilience ( $Res_I$ ) on basin-wide water availability sustainability index of irrigated crop production, hydropower generation, and ecosystem health under different water infrastructure development conditions. The blue dots represent regional climate model (RCM) projections for different periods (2030, 2050, and 2070) to inform the likelihood of future climate conditions

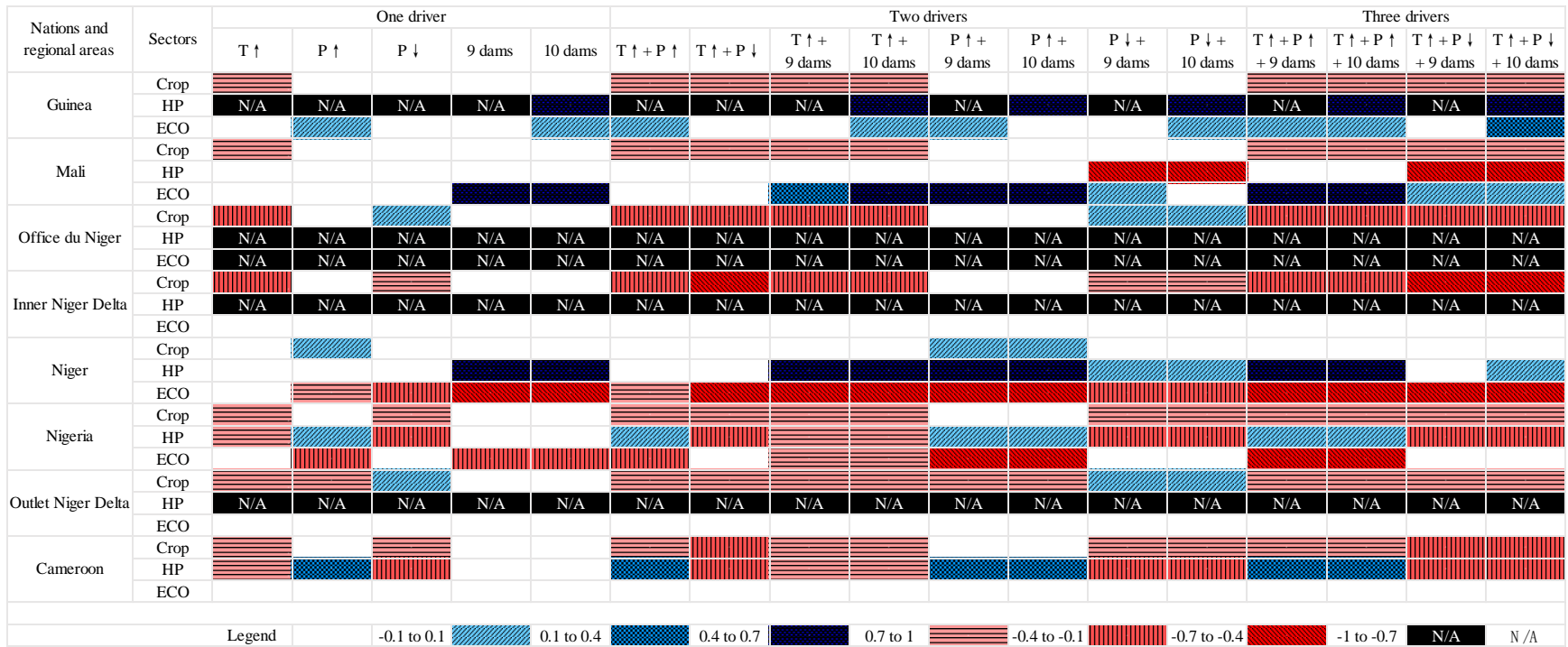


Figure S2. The joint effect of climate change and water infrastructure development on the maximum change of national and regional resilience (*Rel*) of crop production, hydropower generation, and ecosystem health compared to the baseline scenario. Maximum index value changes between +0.1 and -0.1 are defined as “no change” (colored in white). Index value changes from 0.1 to 0.4, from 0.4 to 0.7, and above 0.7 are defined as “minor,” “moderate,” and “major” changes, respectively. Blue colors (from light to dark) are used to represent positive changes and red colors (from light to dark) are used to represent negative changes. Abbreviations: T, temperature; P, precipitation; crop, crop production; HP, hydropower generation; ECO, ecosystem health

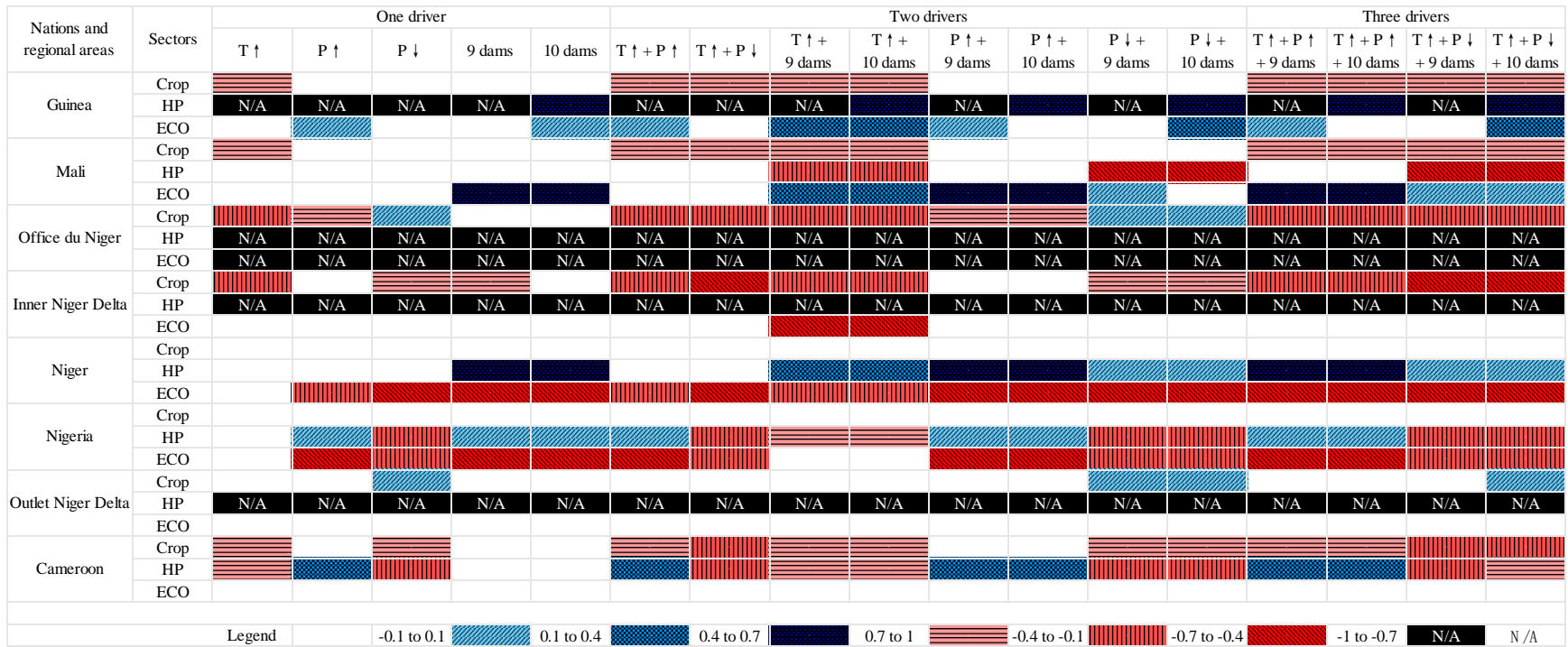


Figure S3. The joint effect of climate change and water infrastructure development on the maximum change of national and regional resilience ( $Res_1$ ) of crop production, hydropower generation, and ecosystem health compared to the baseline scenario. Maximum index value changes between +0.1 and -0.1 are defined as “no change” (colored in white). Index value changes from 0.1 to 0.4, from 0.4 to 0.7, and above 0.7 are defined as “minor,” “moderate,” and “major” changes, respectively. Blue colors (from light to dark) are used to represent positive changes and red colors (from light to dark) are used to represent negative changes. Abbreviations: T, temperature; P, precipitation; crop, crop production; HP, hydropower generation; ECO, ecosystem health

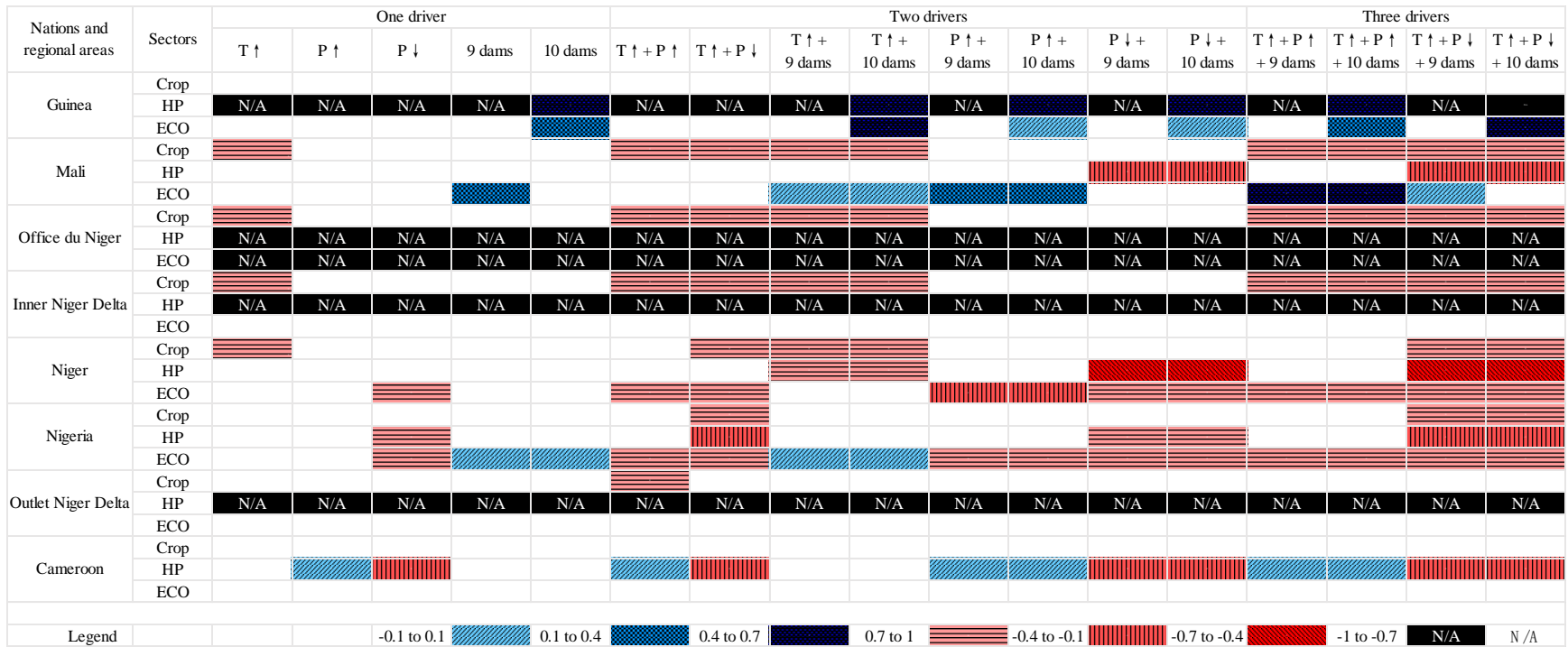


Figure S4. The joint effect of climate change and water infrastructure development on the maximum change of national and regional resilience (*I-Vul*) of crop production, hydropower generation, and ecosystem health compared to the baseline scenario. Maximum index value changes between +0.1 and -0.1 are defined as “no change” (colored in white). Index value changes from 0.1 to 0.4, from 0.4 to 0.7, and above 0.7 are defined as “minor,” “moderate,” and “major” changes, respectively. Blue colors (from light to dark) are used to represent positive changes and red colors (from light to dark) are used to represent negative changes. Abbreviations: T, temperature; P, precipitation; crop, crop production; HP, hydropower generation; ECO, ecosystem health

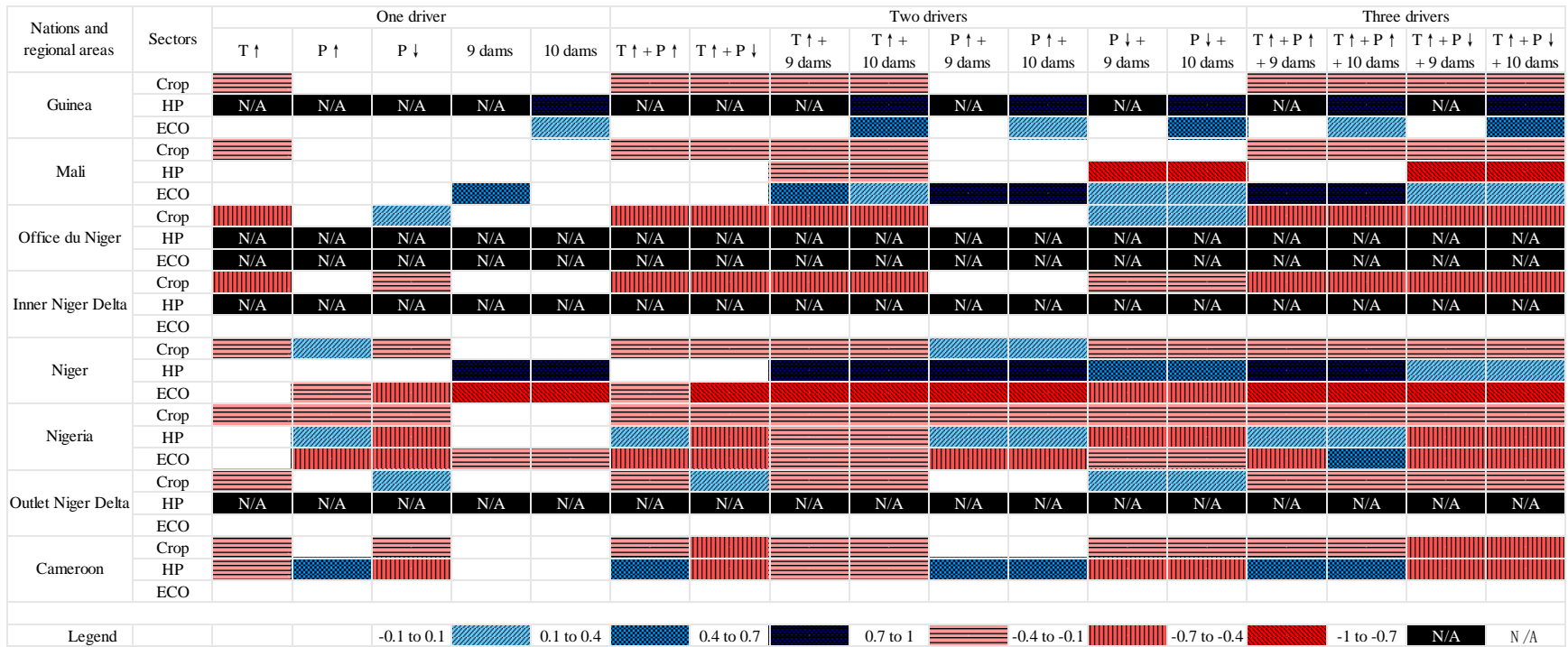


Figure S5. The joint effect of climate change and water infrastructure development on the maximum change of national and regional resilience ( $SI_I$ ) of crop production, hydropower generation, and ecosystem health compared to the baseline scenario. Maximum index value changes between +0.1 and -0.1 are defined as “no change” (colored in white). Index value changes from 0.1 to 0.4, from 0.4 to 0.7, and above 0.7 are defined as “minor,” “moderate,” and “major” changes, respectively. Blue colors (from light to dark) are used to represent positive changes and red colors (from light to dark) are used to represent negative changes. Abbreviations: T, temperature; P, precipitation; crop, crop production; HP, hydropower generation; ECO, ecosystem health

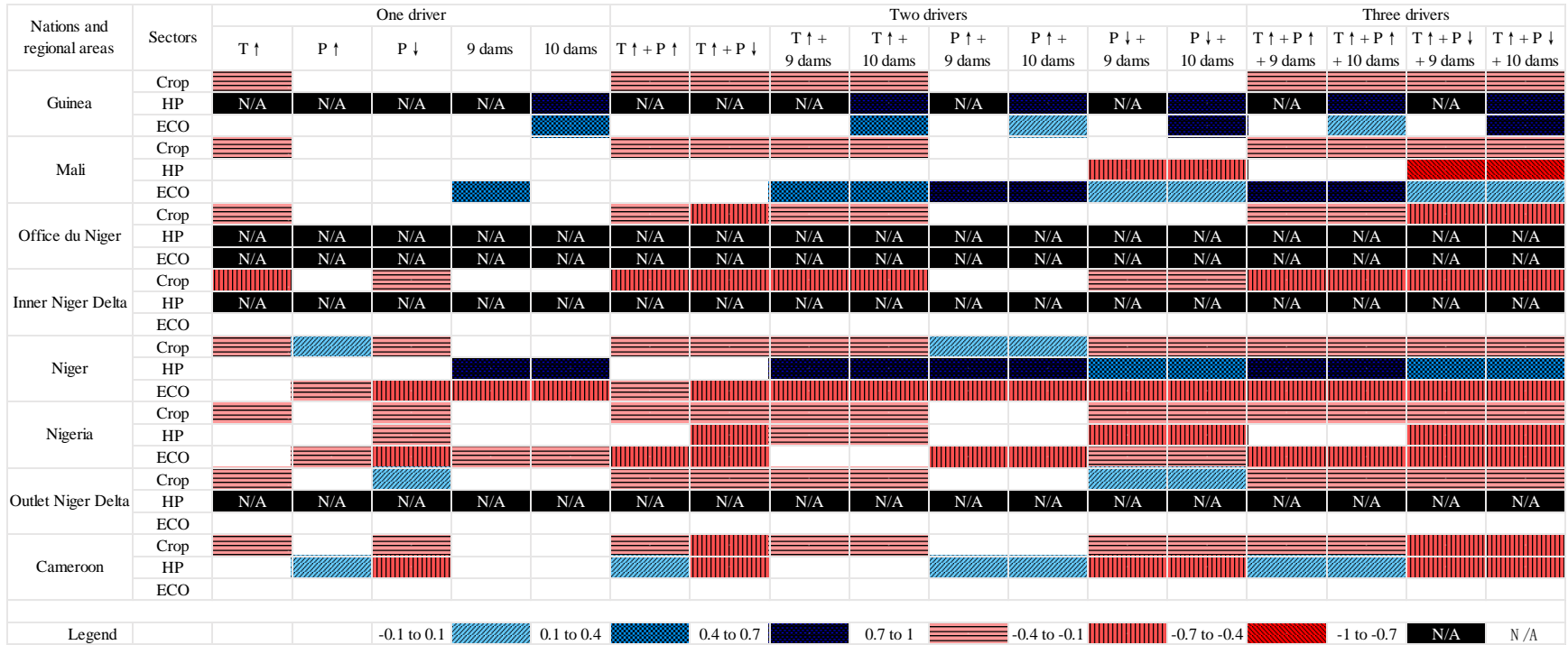


Figure S6. The joint effect of climate change and water infrastructure development on the maximum change of national and regional resilience ( $SI_2$ ) of crop production, hydropower generation, and ecosystem health compared to the baseline scenario. Maximum index value changes between +0.1 and -0.1 are defined as “no change” (colored in white). Index value changes from 0.1 to 0.4, from 0.4 to 0.7, and above 0.7 are defined as “minor,” “moderate,” and “major” changes, respectively. Blue colors (from light to dark) are used to represent positive changes and red colors (from light to dark) are used to represent negative changes. Abbreviations: T, temperature; P, precipitation; crop, crop production; HP, hydropower generation; ECO, ecosystem health