

1 **Supplementary Material**

2 (To be filled during review)

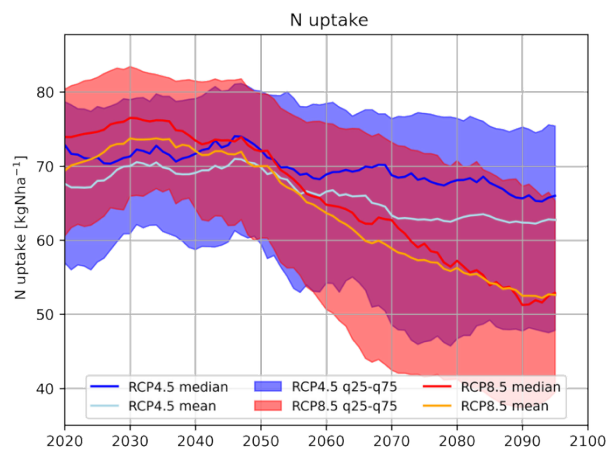
3 **Table S 1** detailed overview of the cultivated crops, crop rotations, fertilization practices, and
4 **manure application on the national scale**

6 **Table S 2** All raw data presented in all plots

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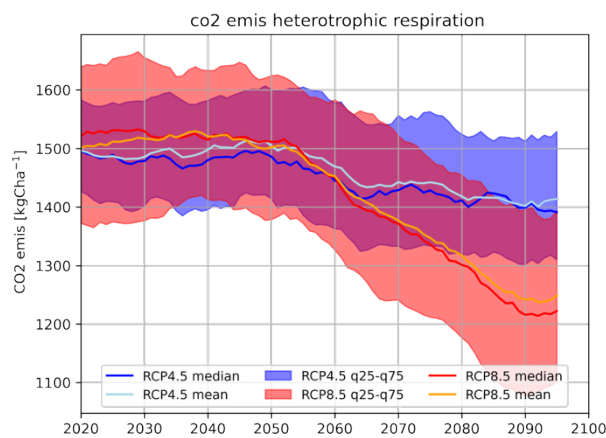
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10 **Figure S 1** Results of ensemble simulation of crop nitrogen uptake under climate change

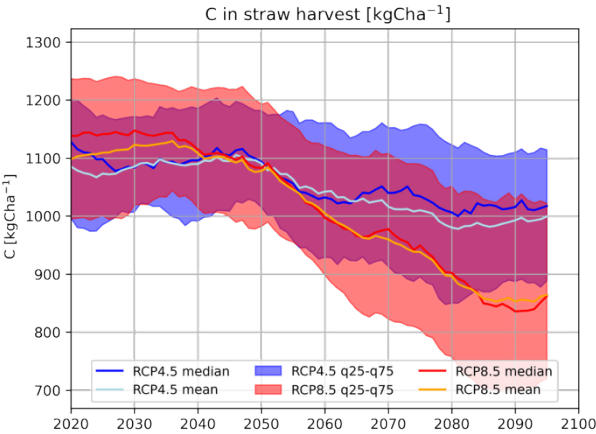
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13 **Figure S 2** Results of ensemble simulation of heterotrophic respiration (CO₂ emission) under climate
14 **change**

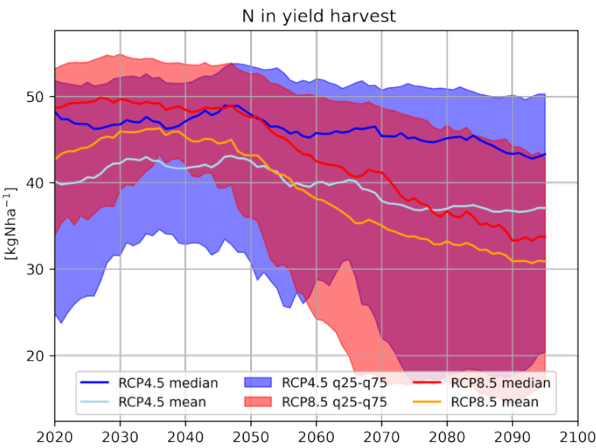
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17 **Figure S 3 Results of ensemble simulation of carbon harvest in straw removed from field under climate**
18 **change**

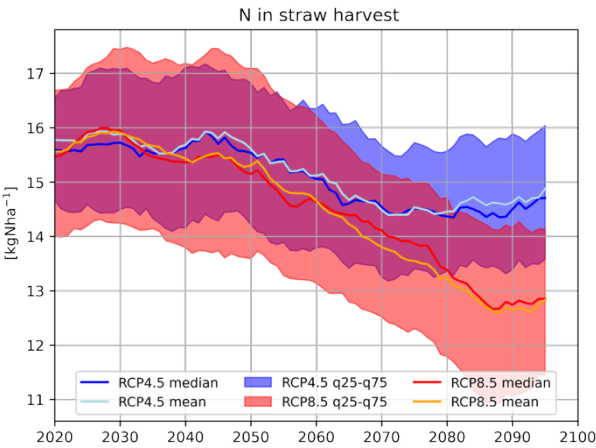
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21 **Figure S 4 Results of ensemble simulation of nitrogen harvest in yields removed from field under climate**
22 **change**

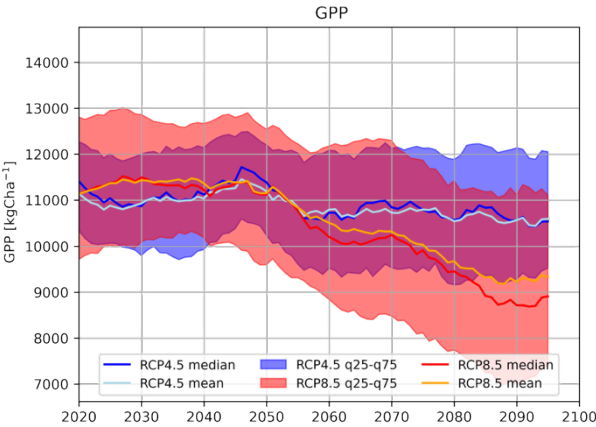
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25 **Figure S 5 Results of ensemble simulation of nitrogen harvest in straw removed from field under climate**
26 **change**

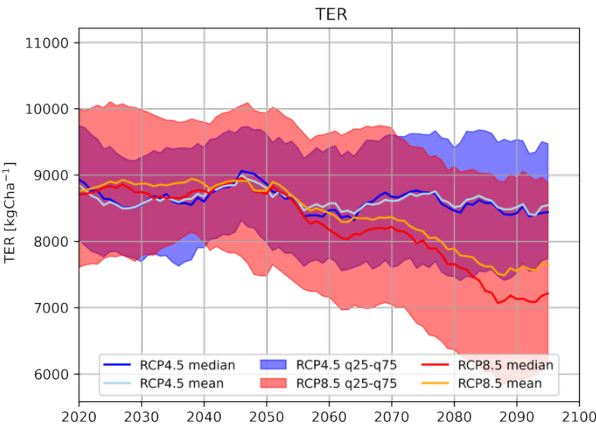
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29 **Figure S 6 Results of ensemble simulation of GPP (gross primary production, CO₂ flux) under climate**
30 **change**

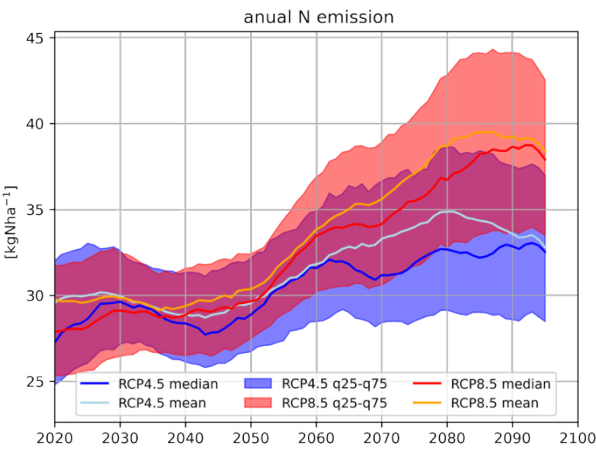
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33 **Figure S 7 Results of ensemble simulation of TER (terrestrial ecosystem respiration, CO₂ flux) under**
34 **climate change**

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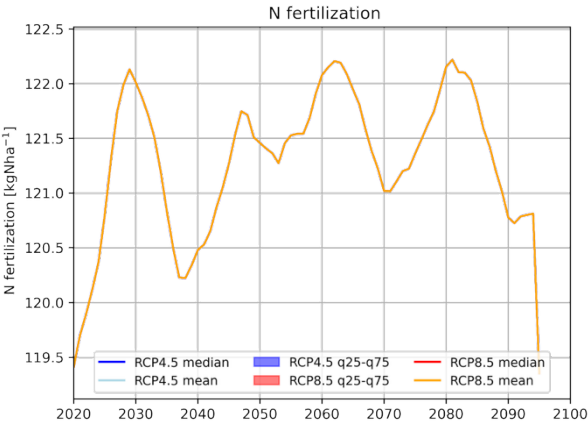


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37 **Figure S 8 Results of ensemble simulation of total gaseous Nitrogen emission under climate change**
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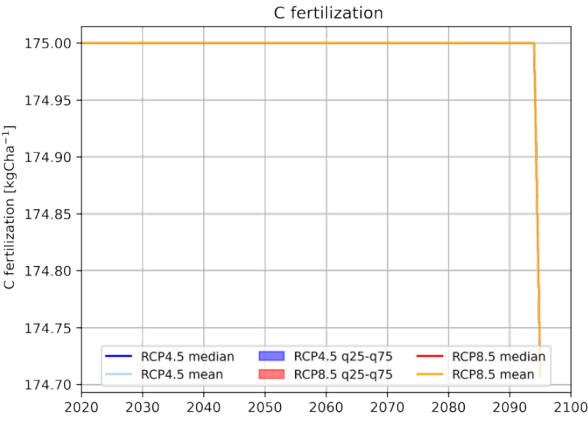


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41 **Figure S 9 Results of ensemble simulation of synthetic Nitrogen fertilization (constant over time) under**
42 **climate change**

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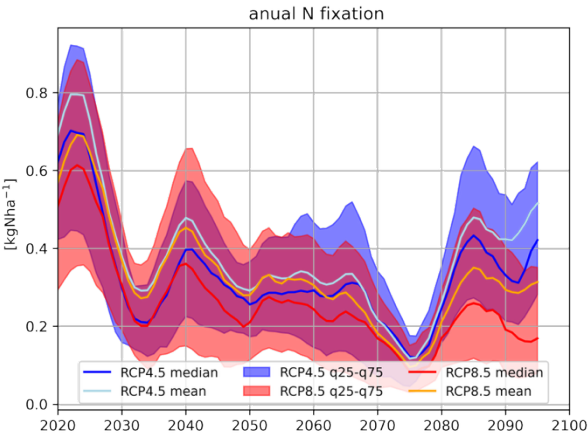
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46 **Figure S 10 Results of ensemble simulation of carbon fertilization (carbon content in manure) under**
47 **climate change**

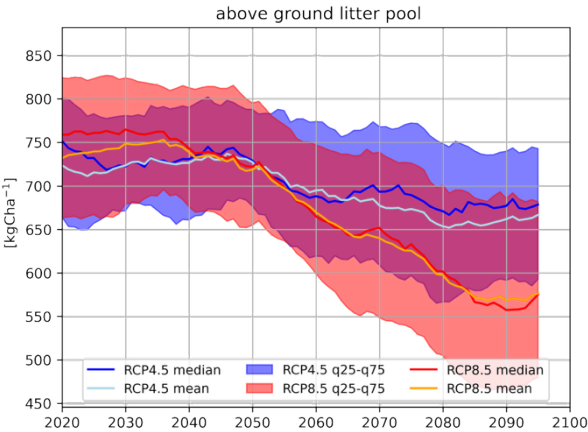
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50 **Figure S 11 Results of ensemble simulation of annual nitrogen fixation (low representation of legume**
51 **crops within the rotations) under climate change**

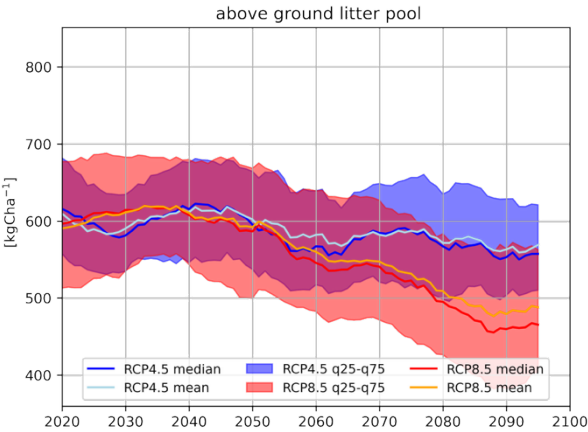
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54 **Figure S 12 Results of ensemble simulation of above ground Carbon litter pools (stubbles on the fields**
55 **after harvest until tillage) under climate change**

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58 **Figure S 13 Results of ensemble simulation of below ground Carbon litter pools (stubbles and roots**
59 **subject to decomposition and transferred into soil Carbon pools) under climate change**

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