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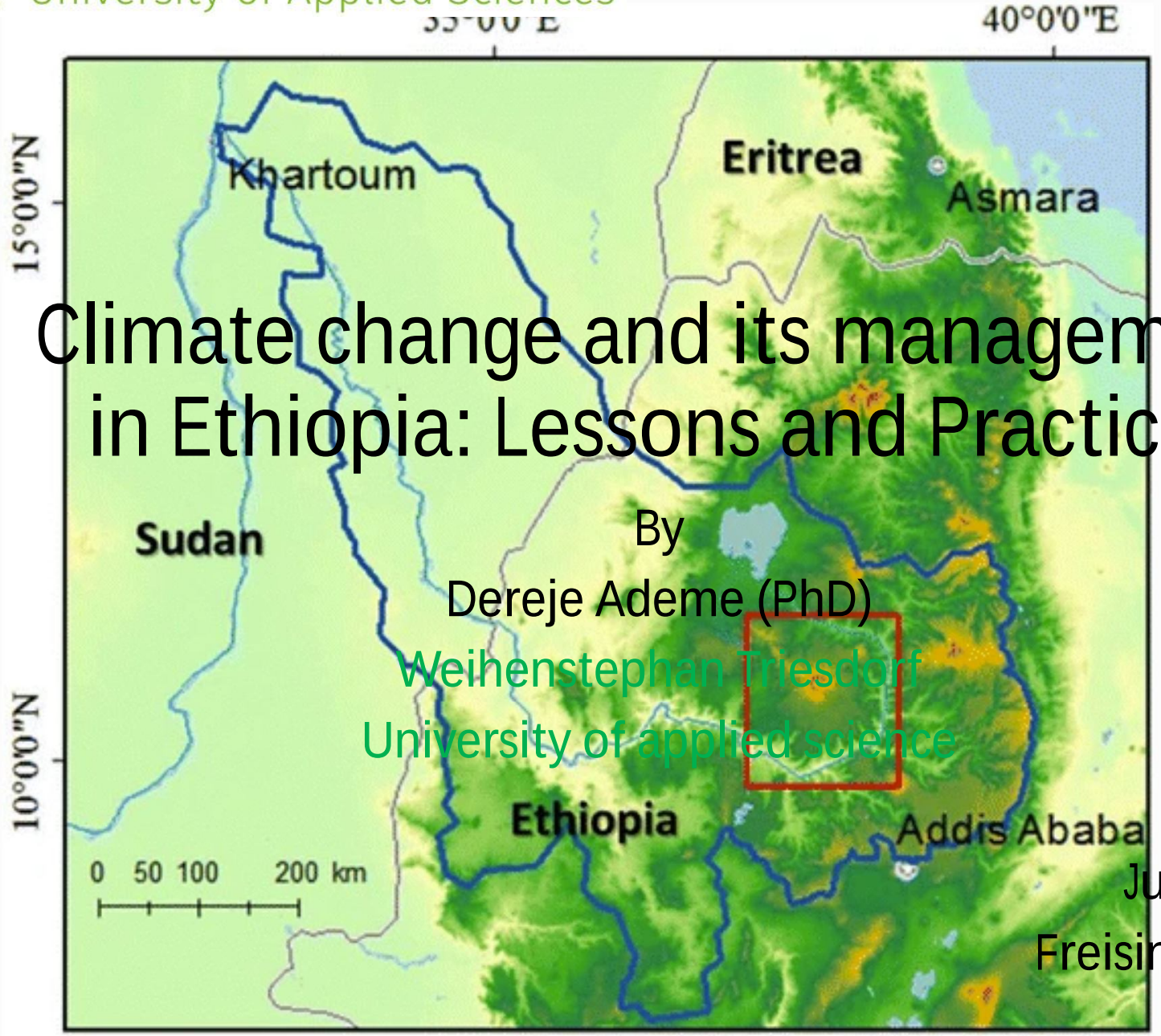

Climate change and its management in Ethiopia: Lessons and Practices

By

Dereje Ademe (PhD)

Weihenstephan Triesdorf

University of applied science

June 22, 2023

Freising, Germany

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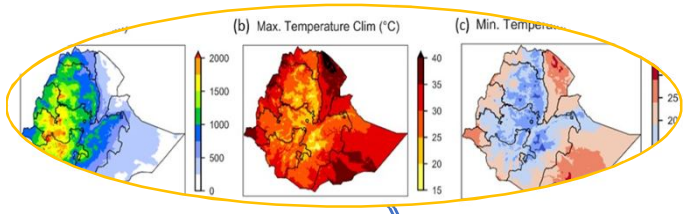
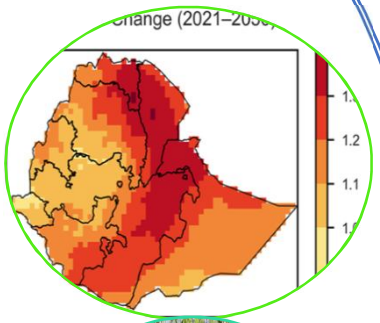
Outline





The climate of Ethiopia

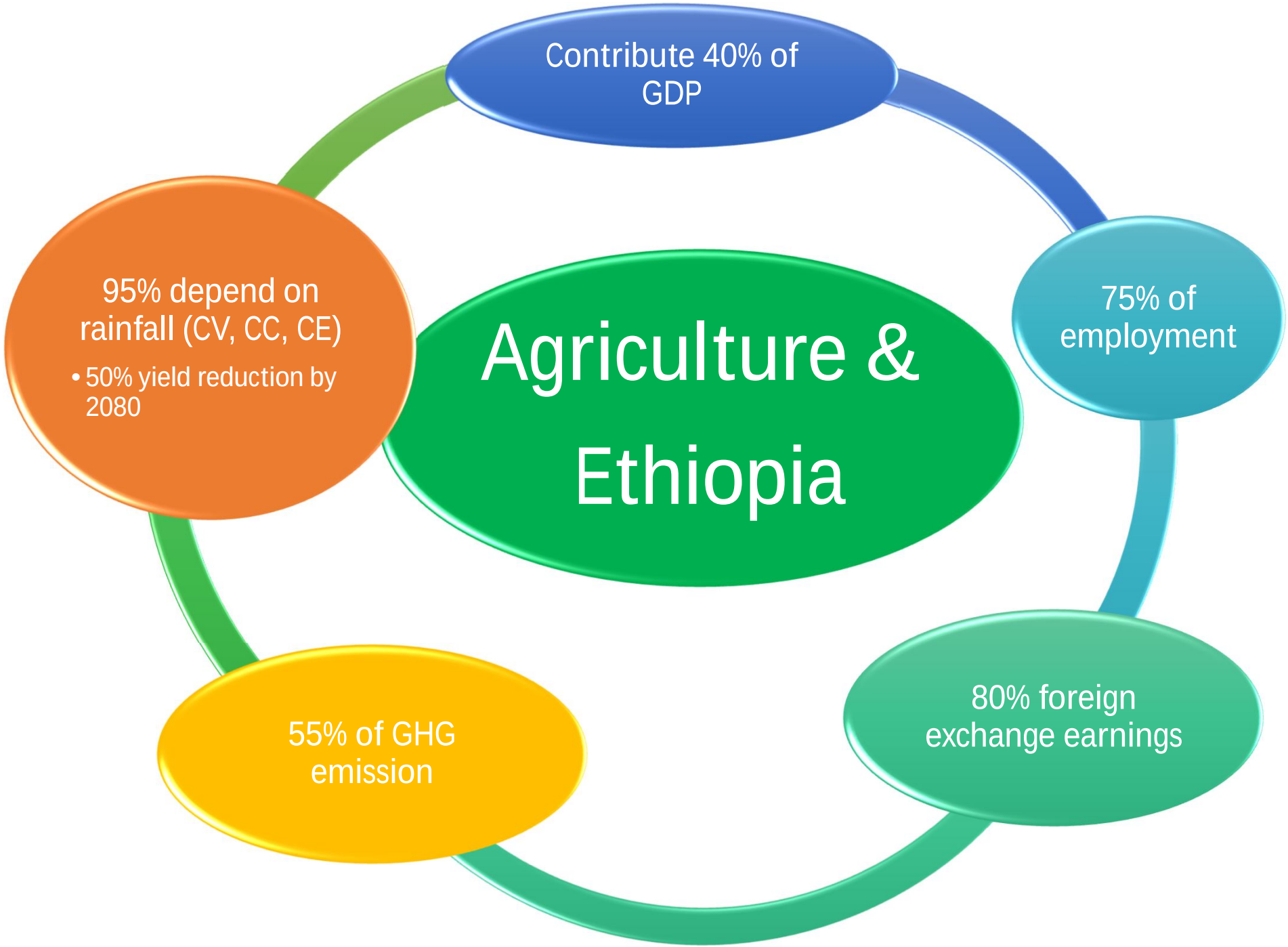
Climate variability, change and extremes

- Observed and Projected

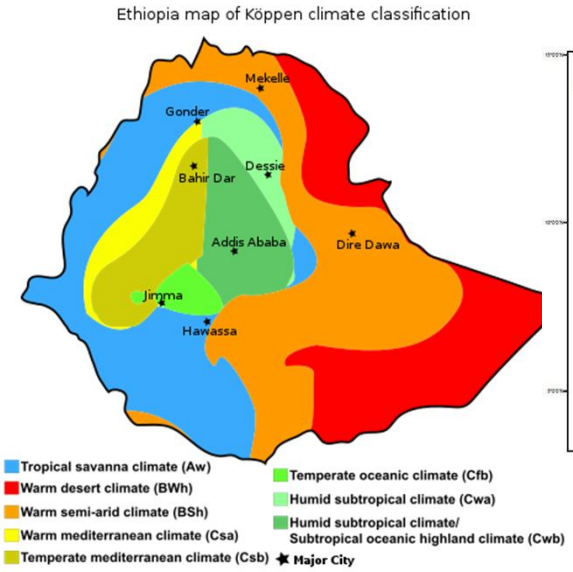
Climate change impacts

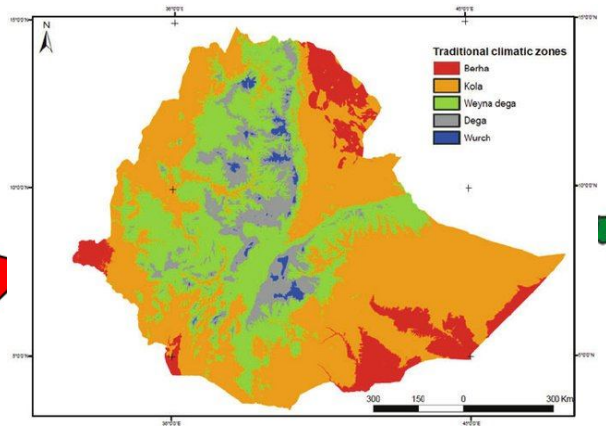
Climate change management practices

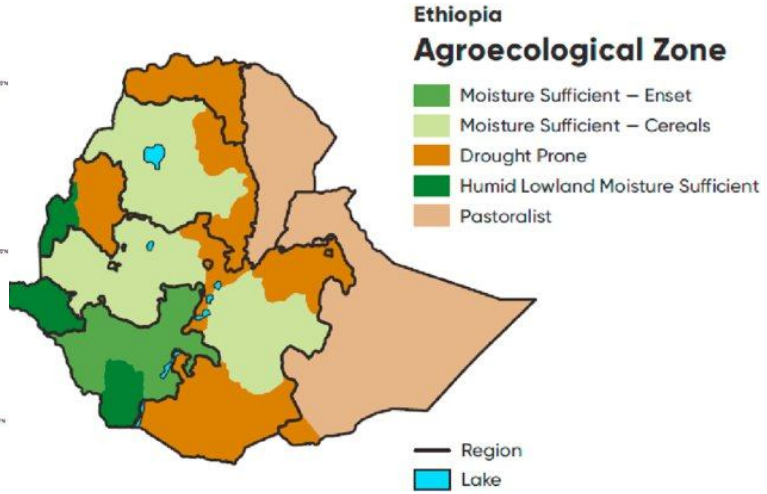
- National level
- Institutional level
- Farm /watershed level

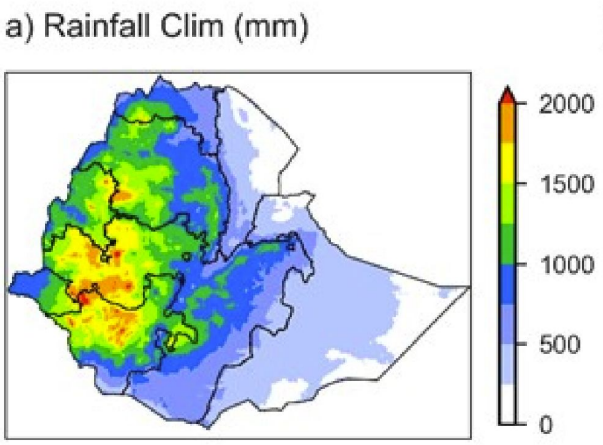

Contribute 40% of GDP
75% of employment
80% foreign exchange earnings
55% of GHG emission
95% depend on rainfall (CV, CC, CE)
• 50% yield reduction by 2080
Agriculture & Ethiopia

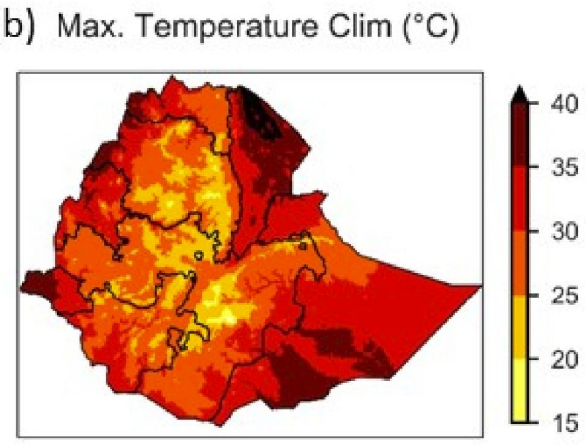
The climate of Ethiopia

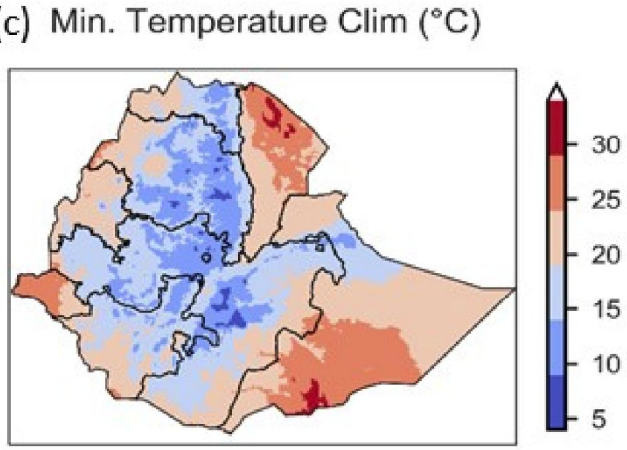












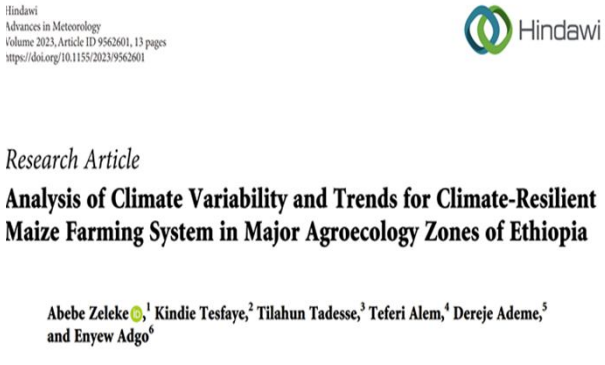
Some of our works related to climate

Trends and variability

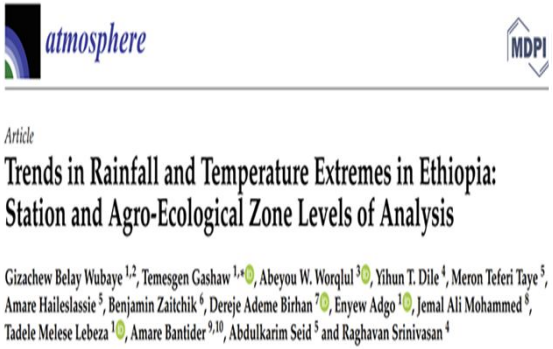
Events

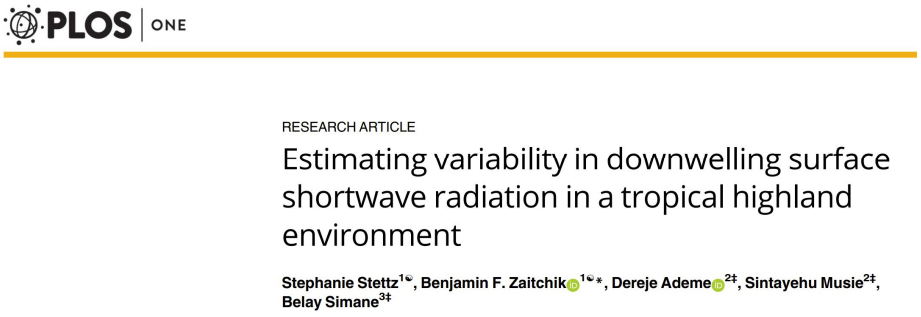
Extremes

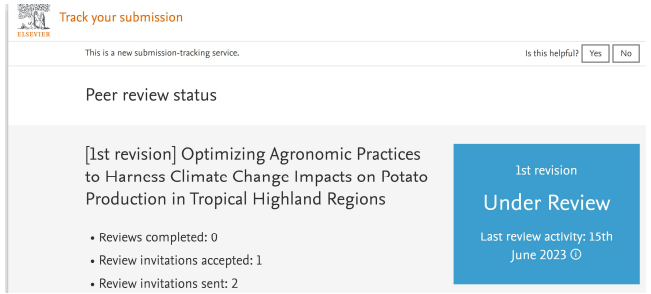
Trends and variability



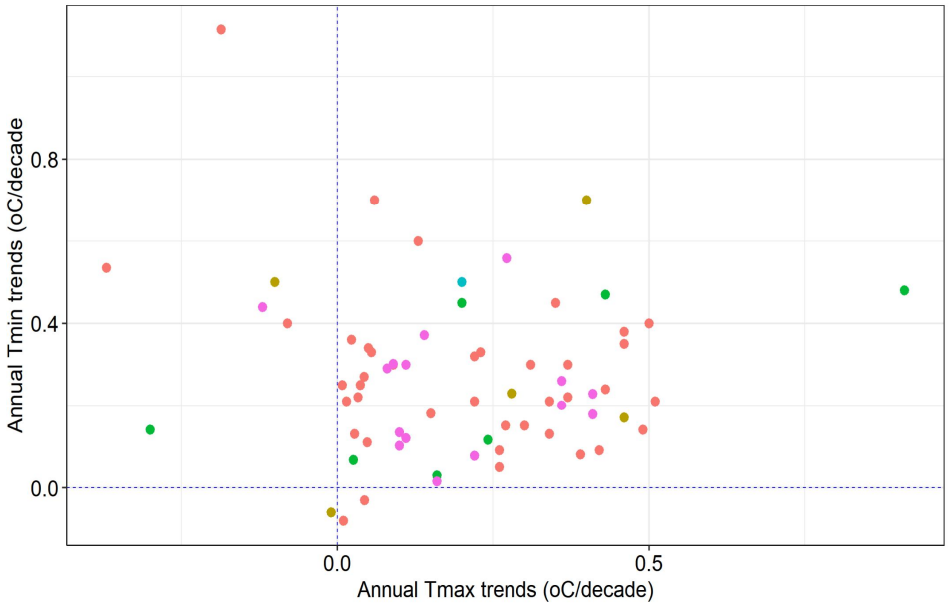
Extremes

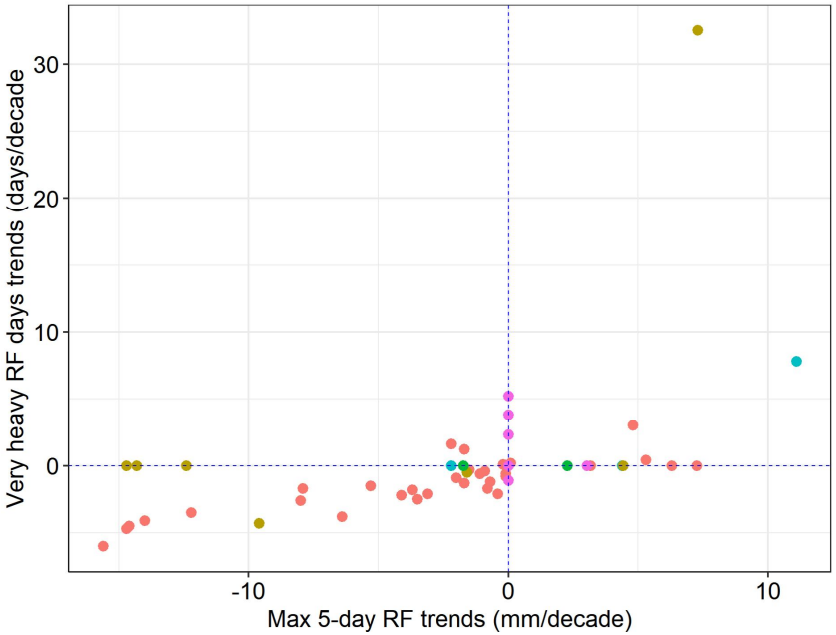


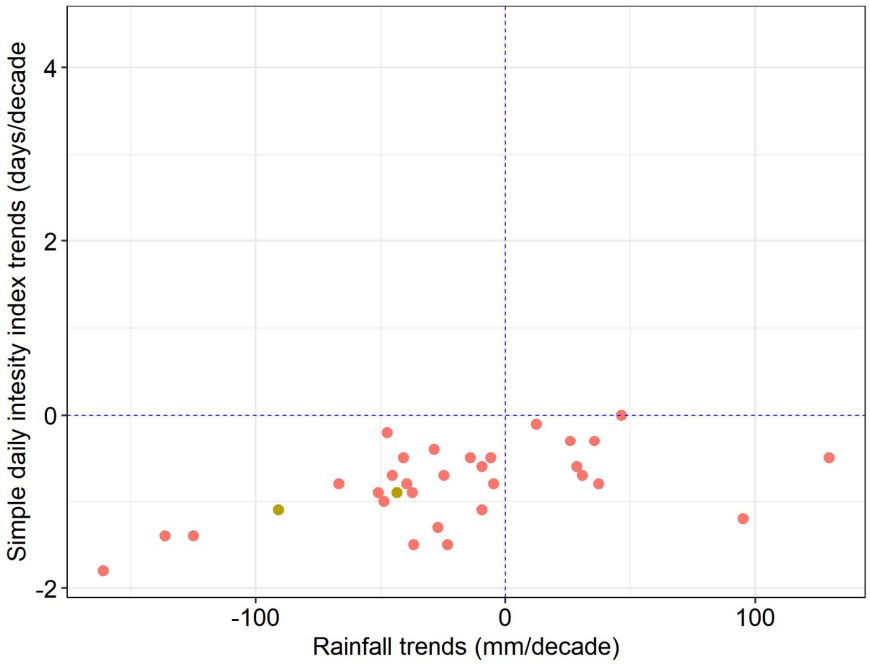


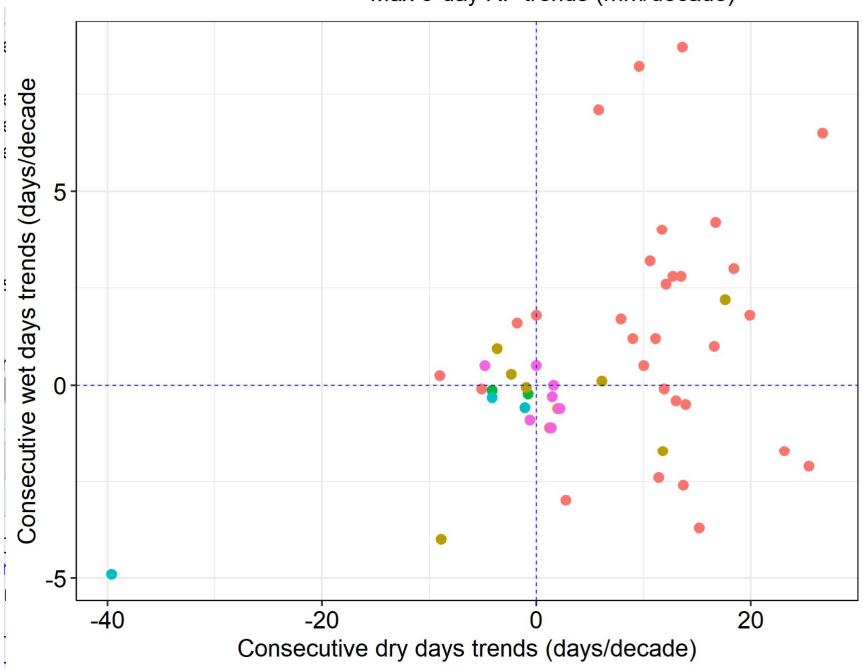


Observed trends in climate variables

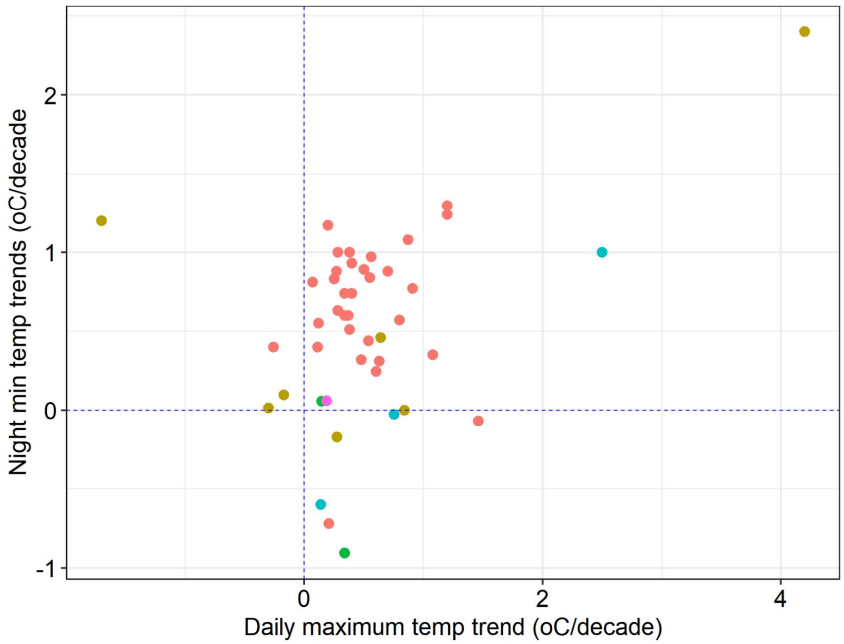


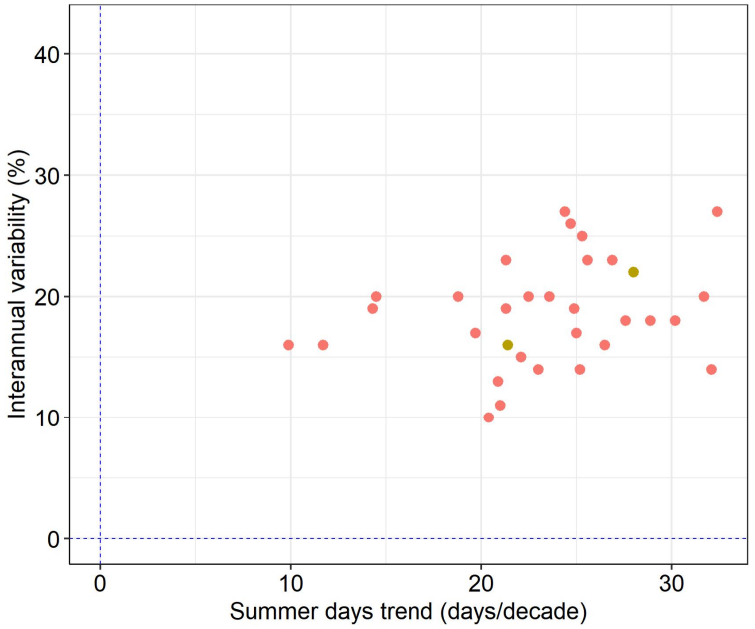


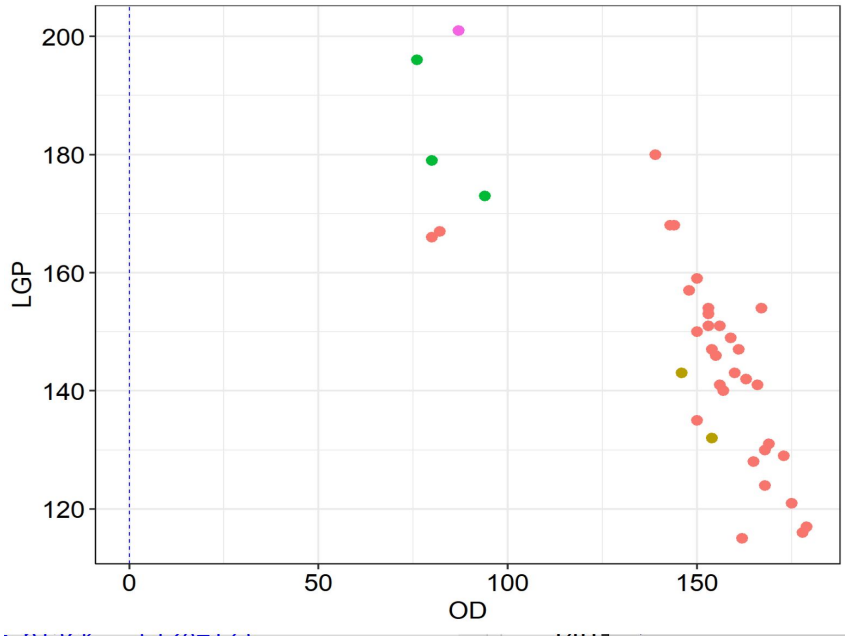


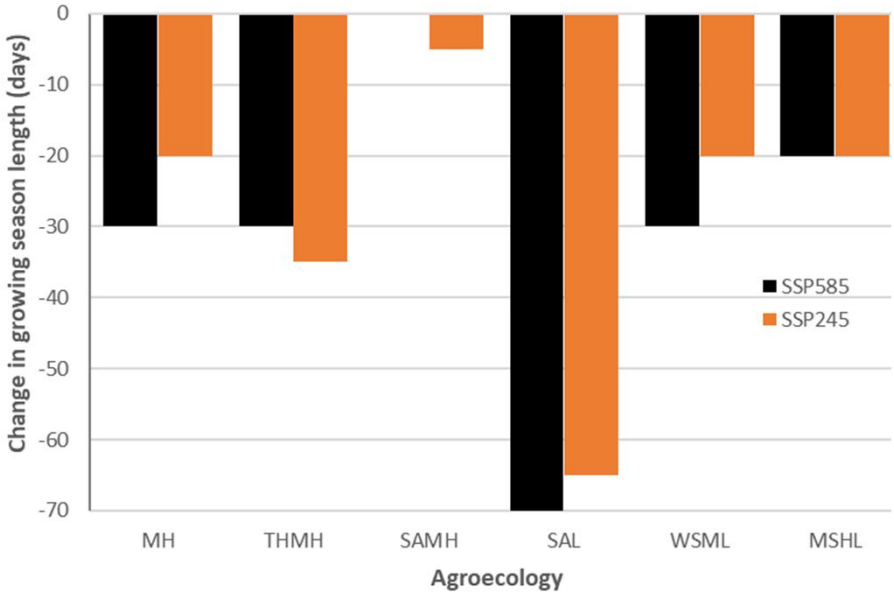


Observed trends in climate variables

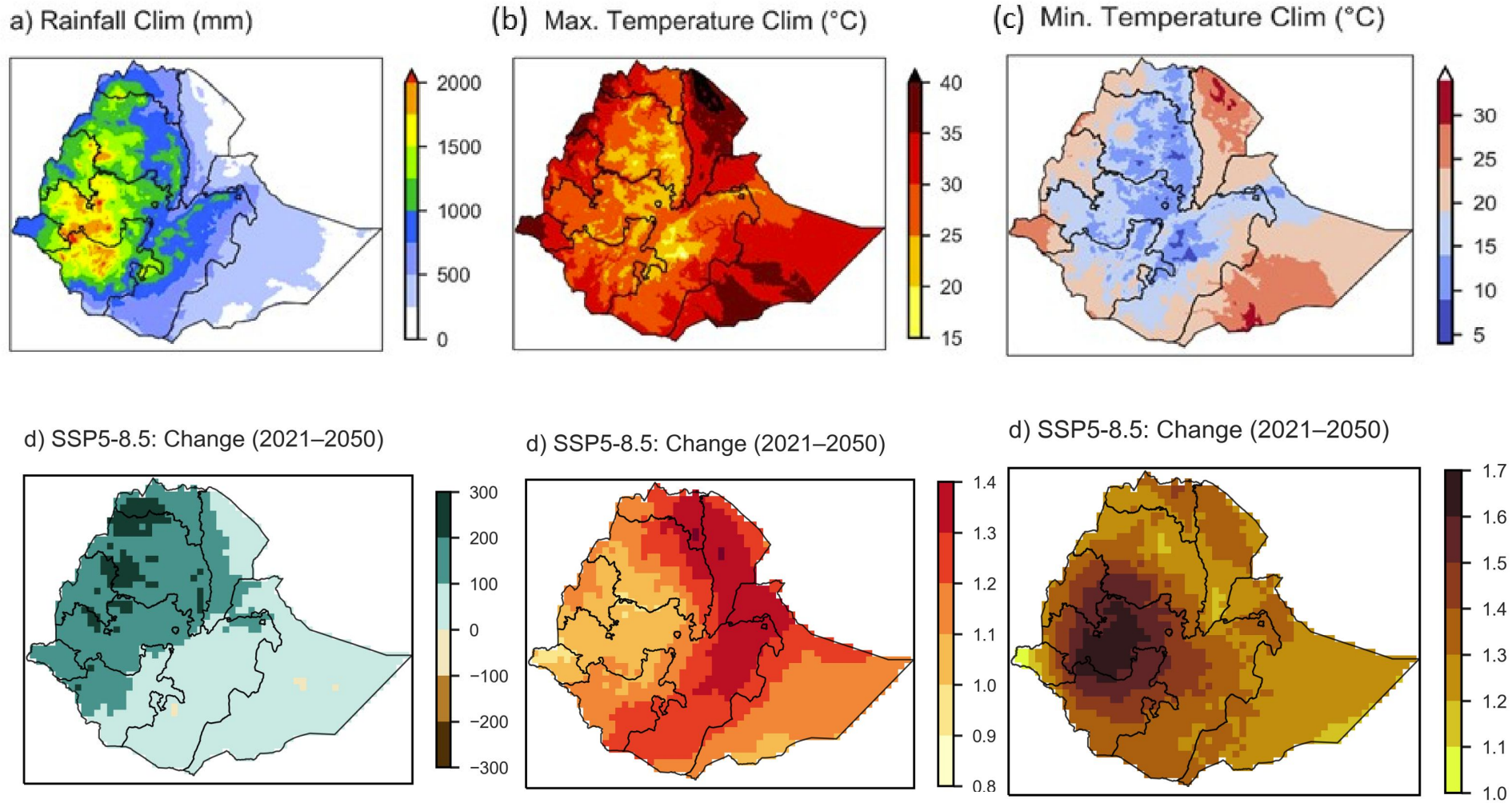




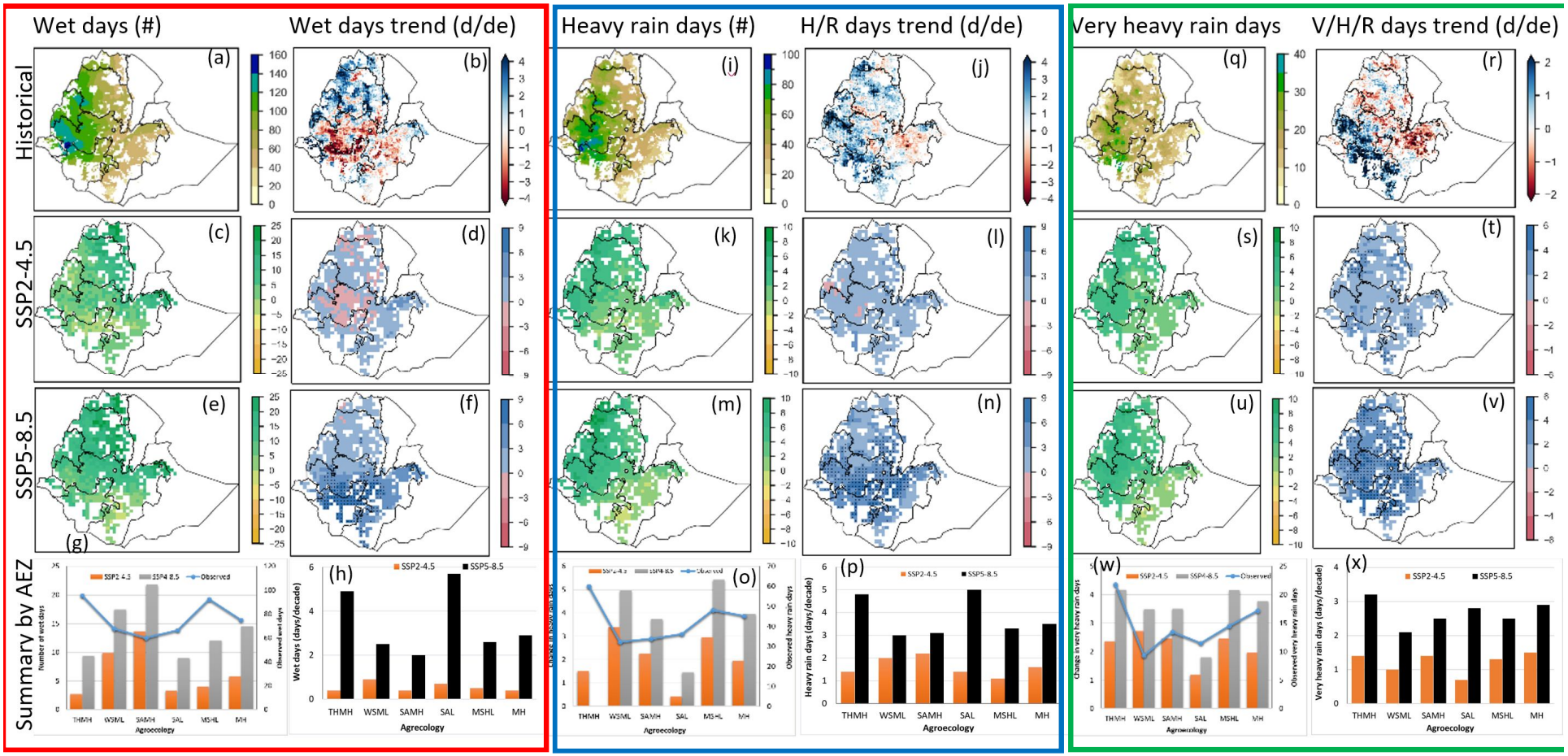




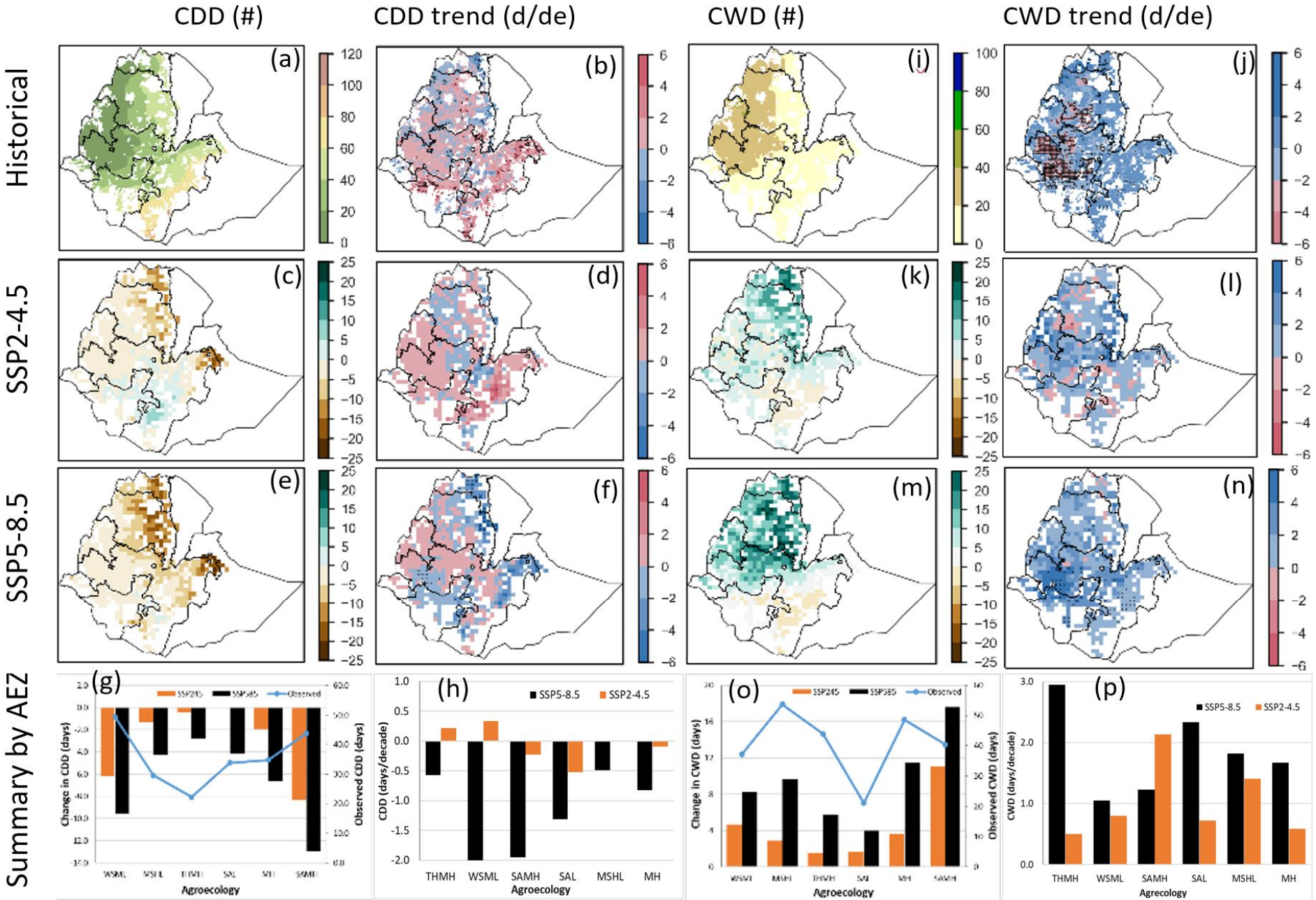
Observed and projected RF and Temp



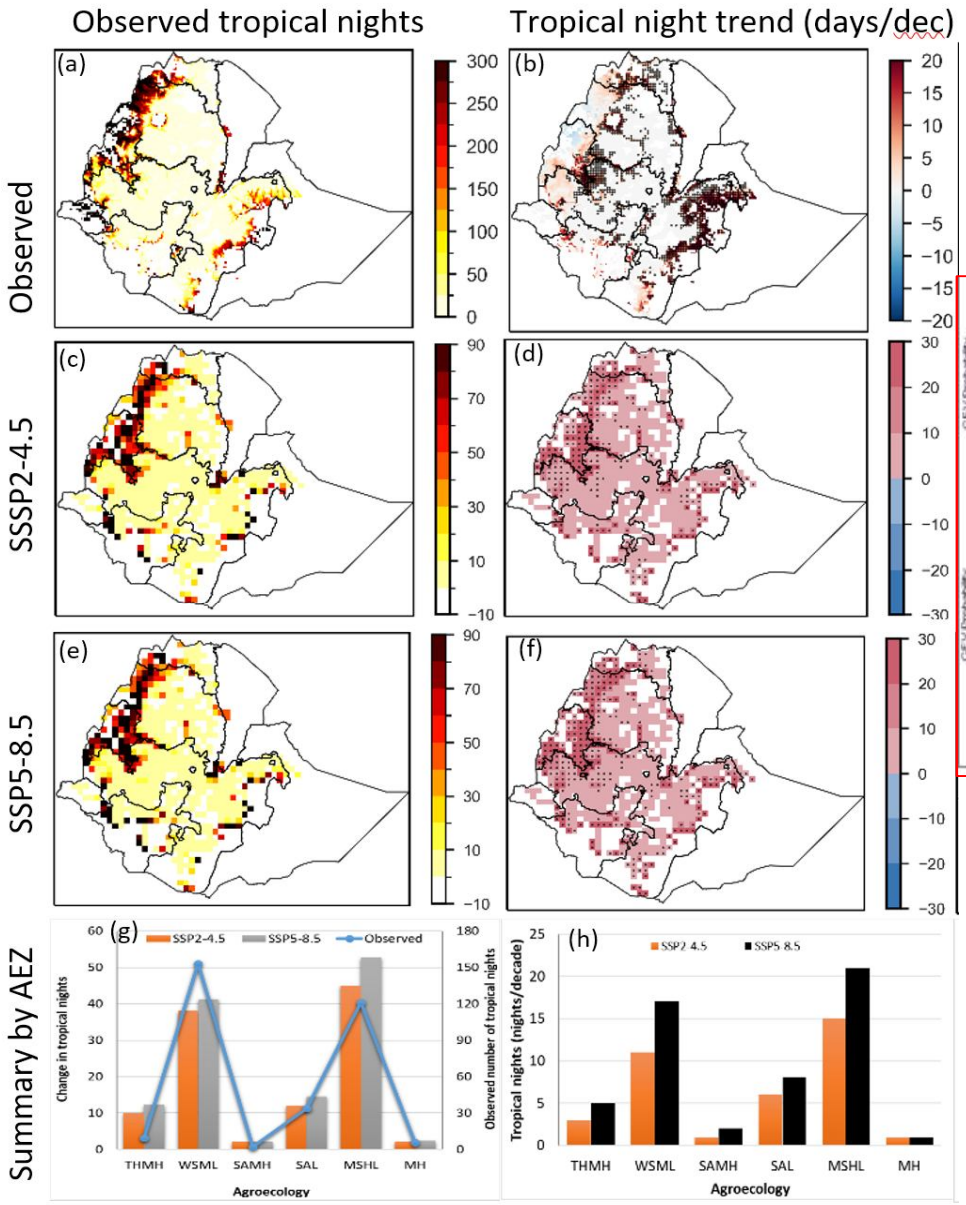
Observed and projected changes in extremes

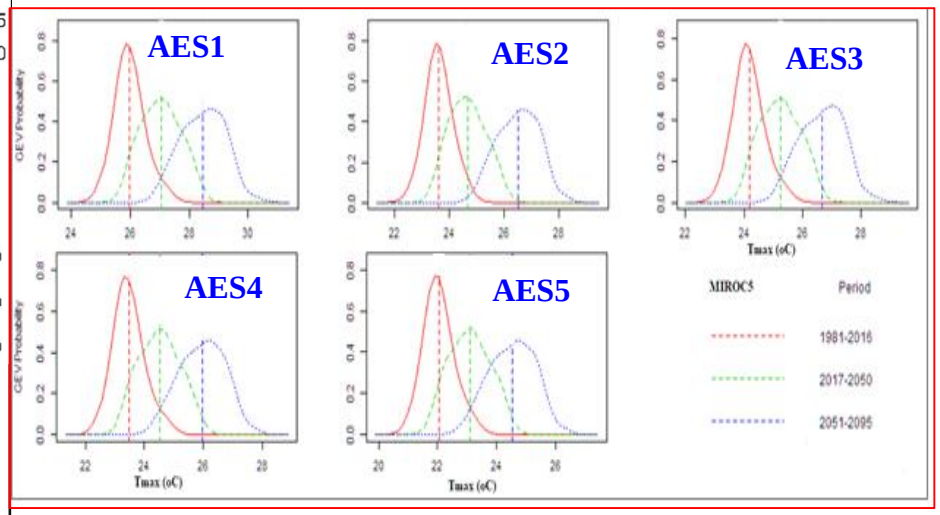


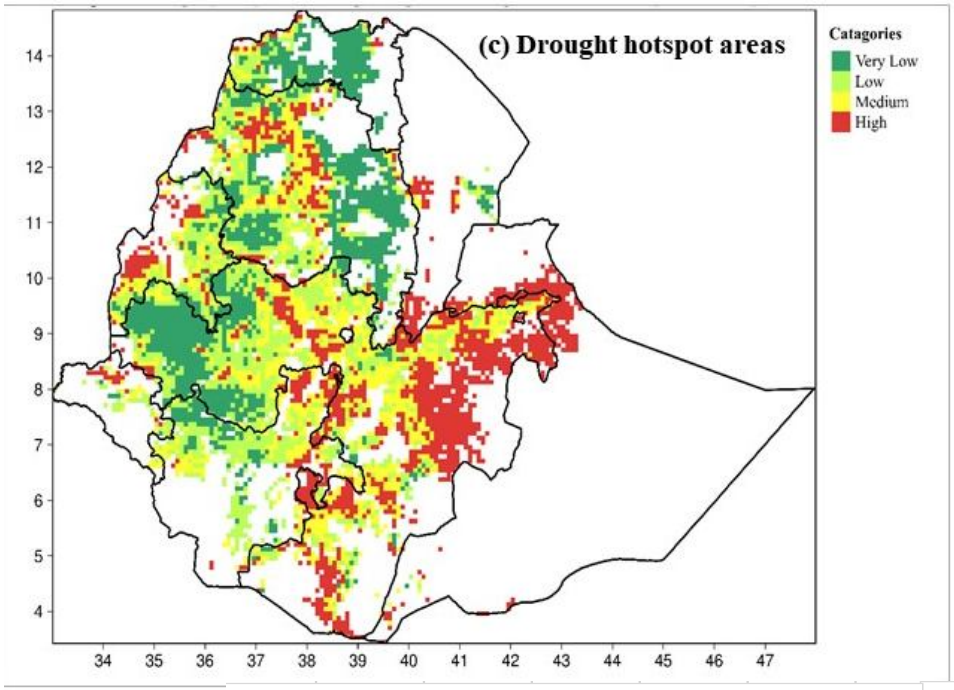
Projected changes

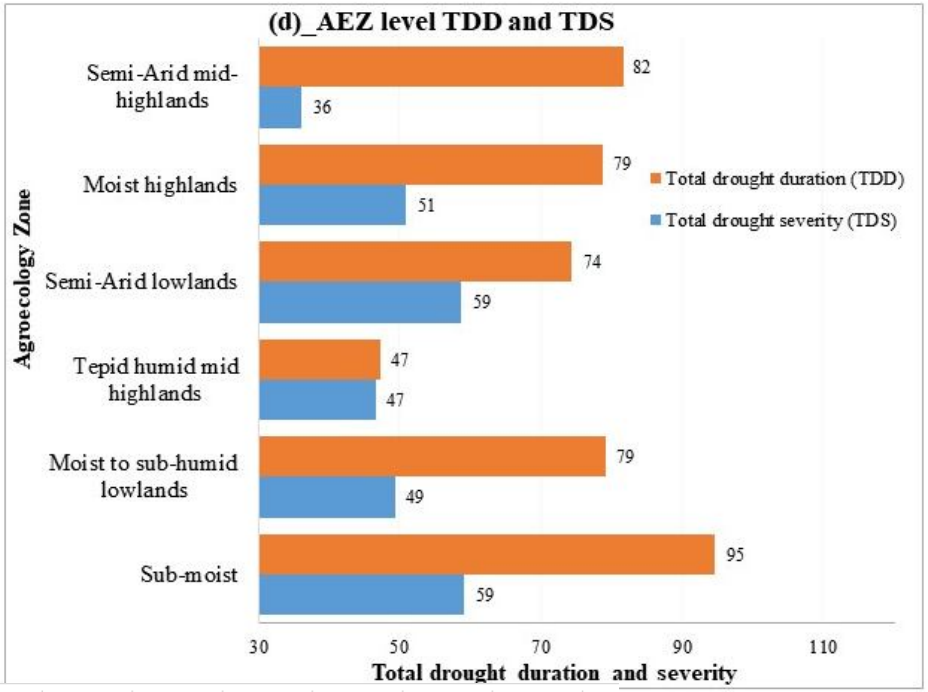


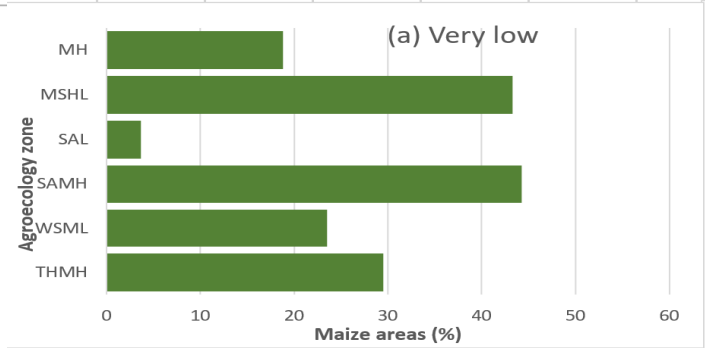
Projected changes

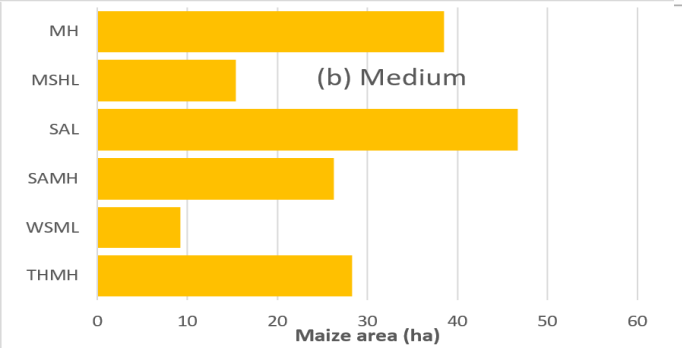


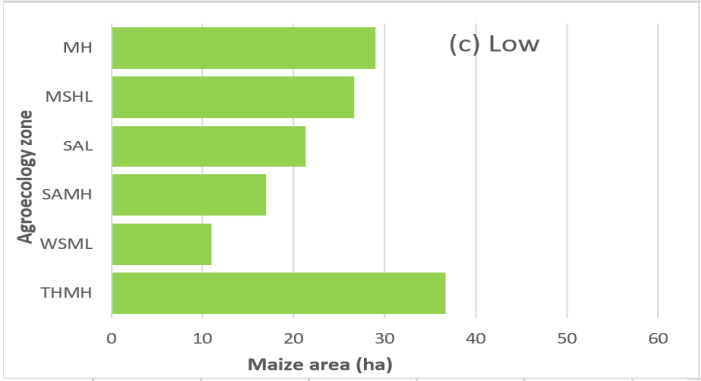


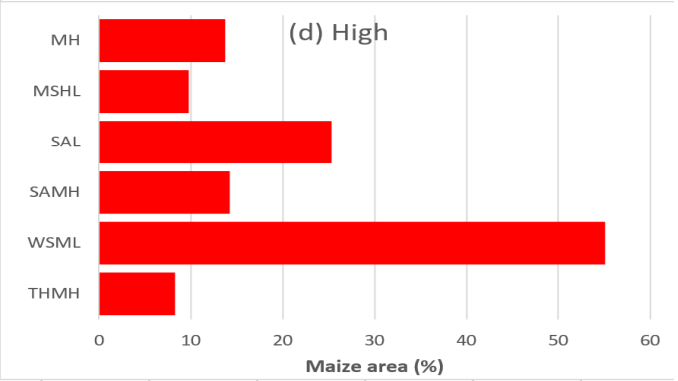

(c) Drought hotspot areas
Catagories
Very Low
Low
Medium
High
14
13
12
11
10
9
8
7
6
5
4
34
35
36
37
38
39
40
41
42
43
44
45
46
47


(d)_AEZ level TDD and TDS
Agroecology Zone
Semi-Arid mid-highlands
Moist highlands
Semi-Arid lowlands
Tepid humid mid highlands
Moist to sub-humid lowlands
Sub-moist
82
36
79
51
74
59
47
47
79
49
95
59
Total drought duration (TDD)
Total drought severity (TDS)
30
50
70
90
110
Total drought duration and severity

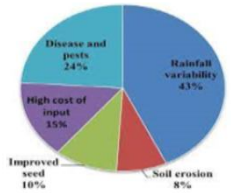

(a) Very low
Agroecology zone
MH
MSHL
SAL
SAMH
WSML
THMH
0
10
20
30
40
50
60
Maize areas (%)

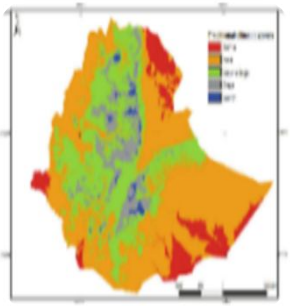

(b) Medium
MH
MSHL
SAL
SAMH
WSML
THMH
0
10
20
30
40
50
60
Maize area (ha)


(c) Low
Agroecology zone
MH
MSHL
SAL
SAMH
WSML
THMH
0
10
20
30
40
50
60
Maize area (ha)


(d) High
MH
MSHL
SAL
SAMH
WSML
THMH
0
10
20
30
40
50
60
Maize area (%)

Implication!!

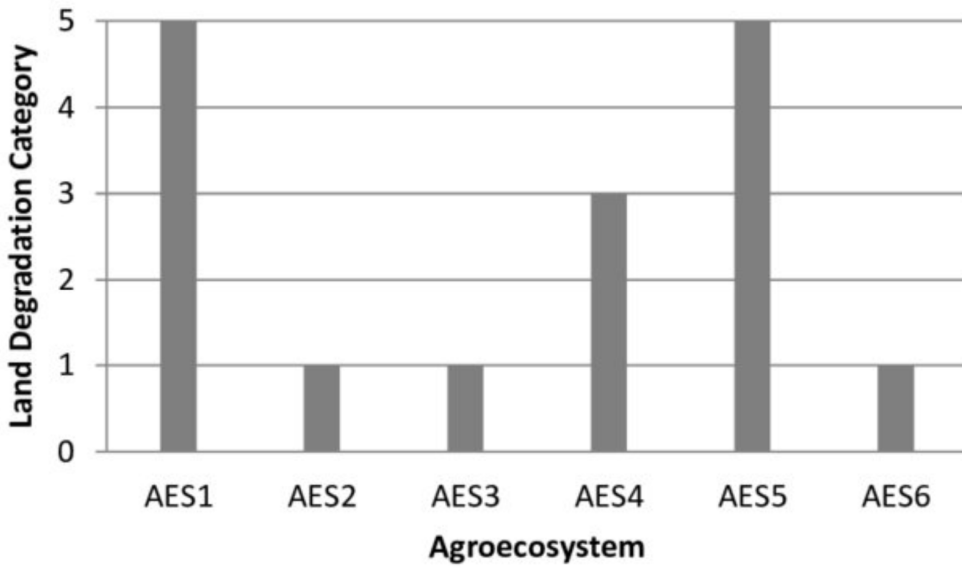




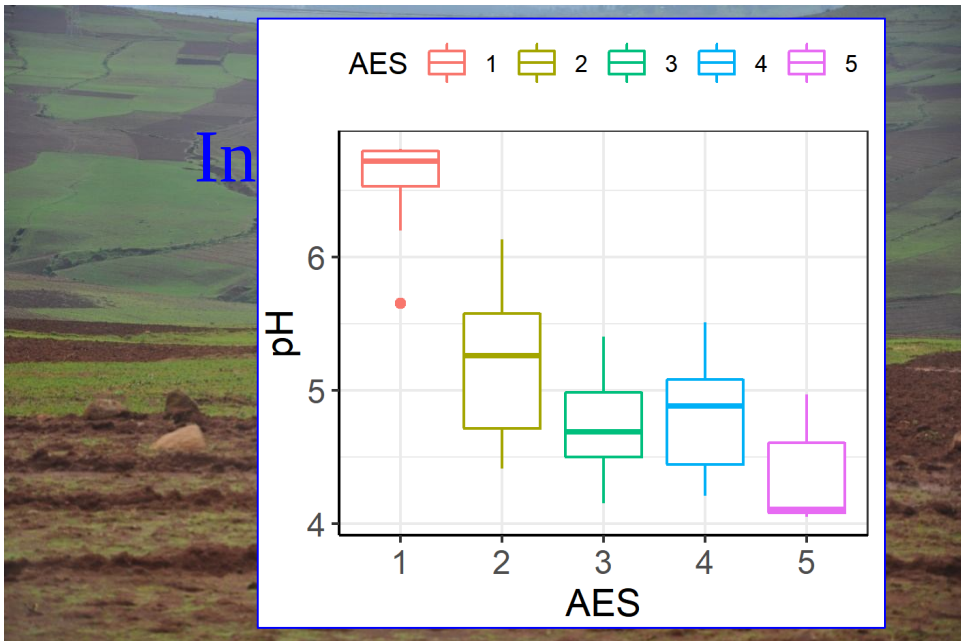
- CC and CV related problems are major causes for lower yield (Adem et al., 2021)
- More intense in mountainous areas
  - Diverse spatial climate
  - High variability
  - Low public awareness
  - Low adaptive capacity
- The changing climate will aggravate existing problems
  - High soil acidity
  - Prolonged dry spell => crop failure
  - Disease and pest burden
  - Sever soil erosion (~42 t/ha) and fertility degradation

Future production and productivity will be more challenged!!

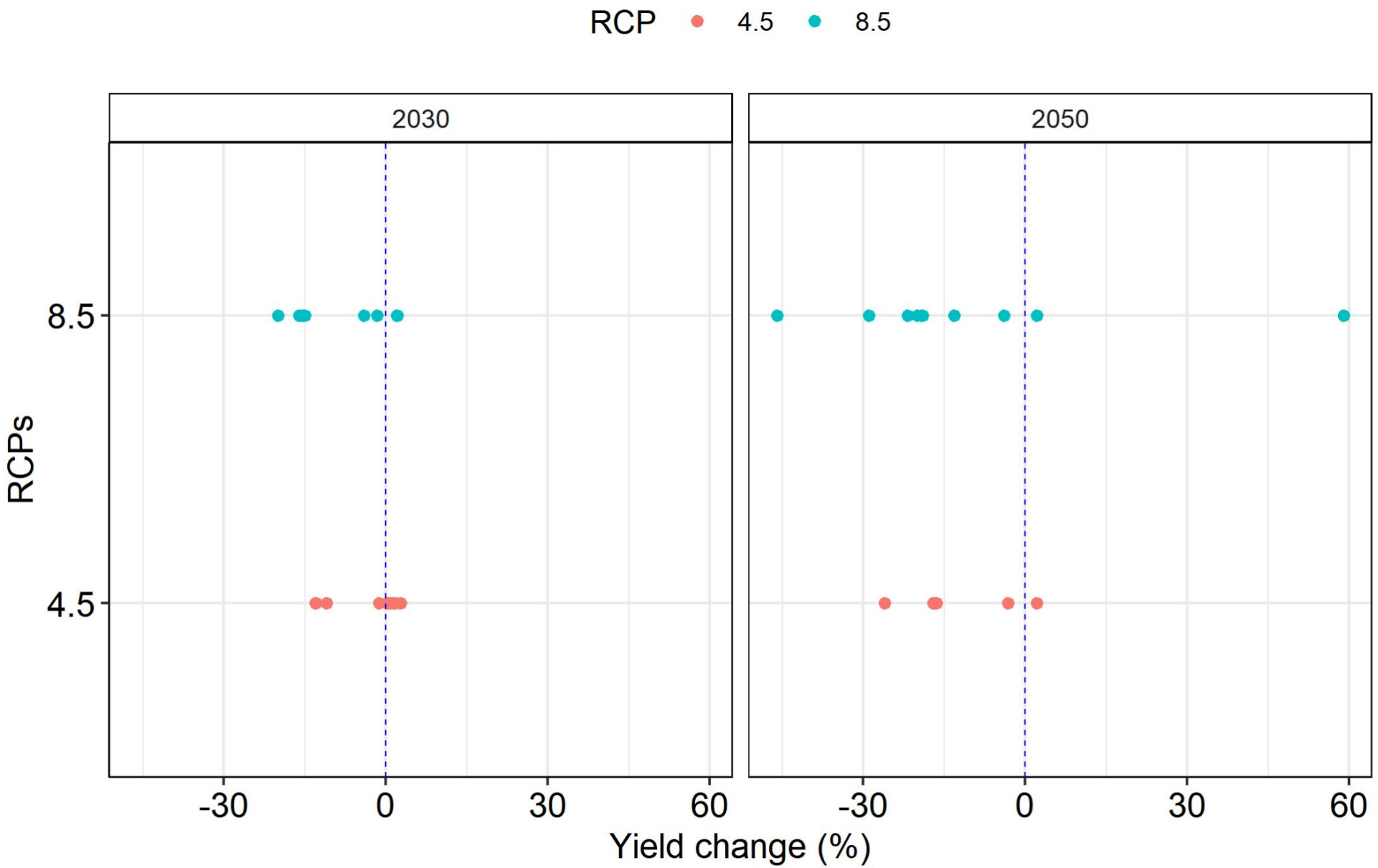
Contexts: Constraints for agriculture



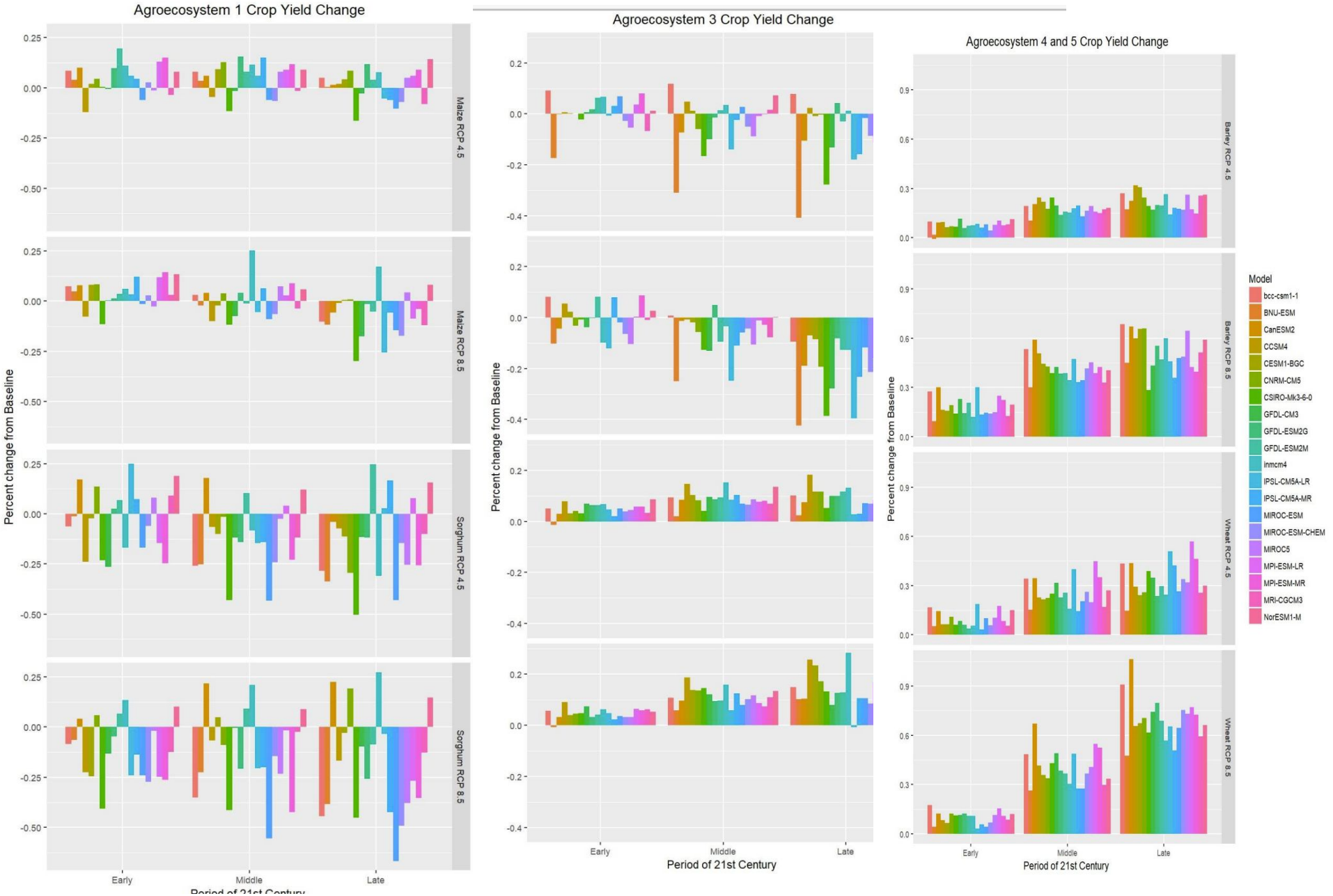
Human-induced land degradation of Choke Mountain watersheds by AES (Simane et al., 2013)



Impacts of CC and CV on crop yield (the case of Maize)



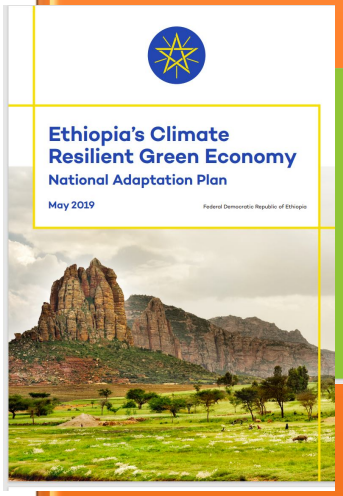
Impacts of CC and CV on crop yield …

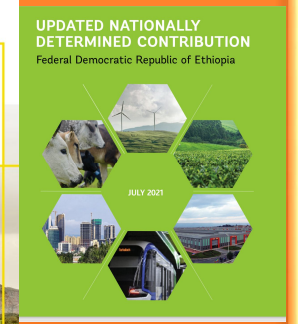


Climate change management

National level

- CRGE
- Green legacy
  NAP
- Nationally determined contribution





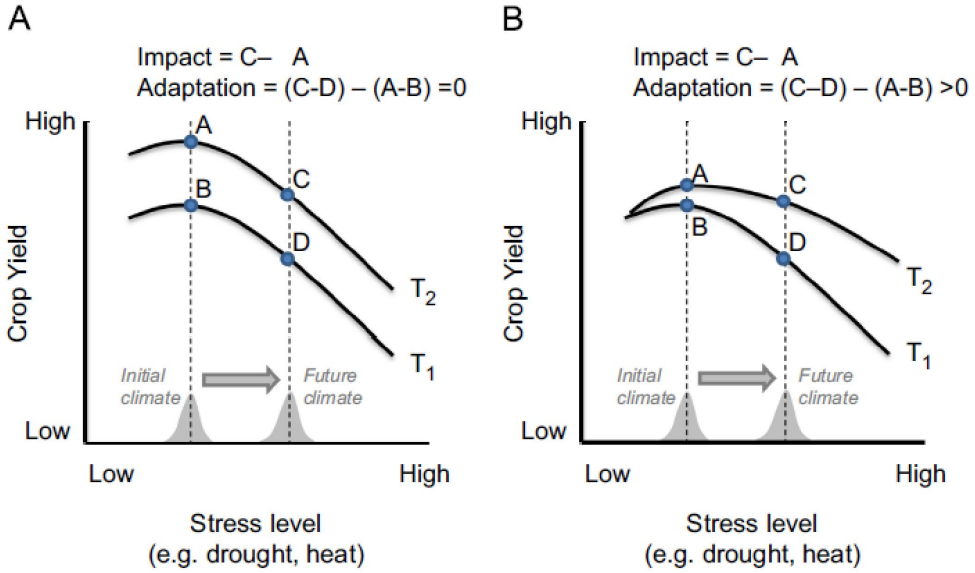
Sectorial level

- Integration of climate basics, CIS, CSA and CRM in the BSc curriculum
- Establishing climate advisory services (forecasting and early warning services)
- Crop index insurance

Farm/watershed level

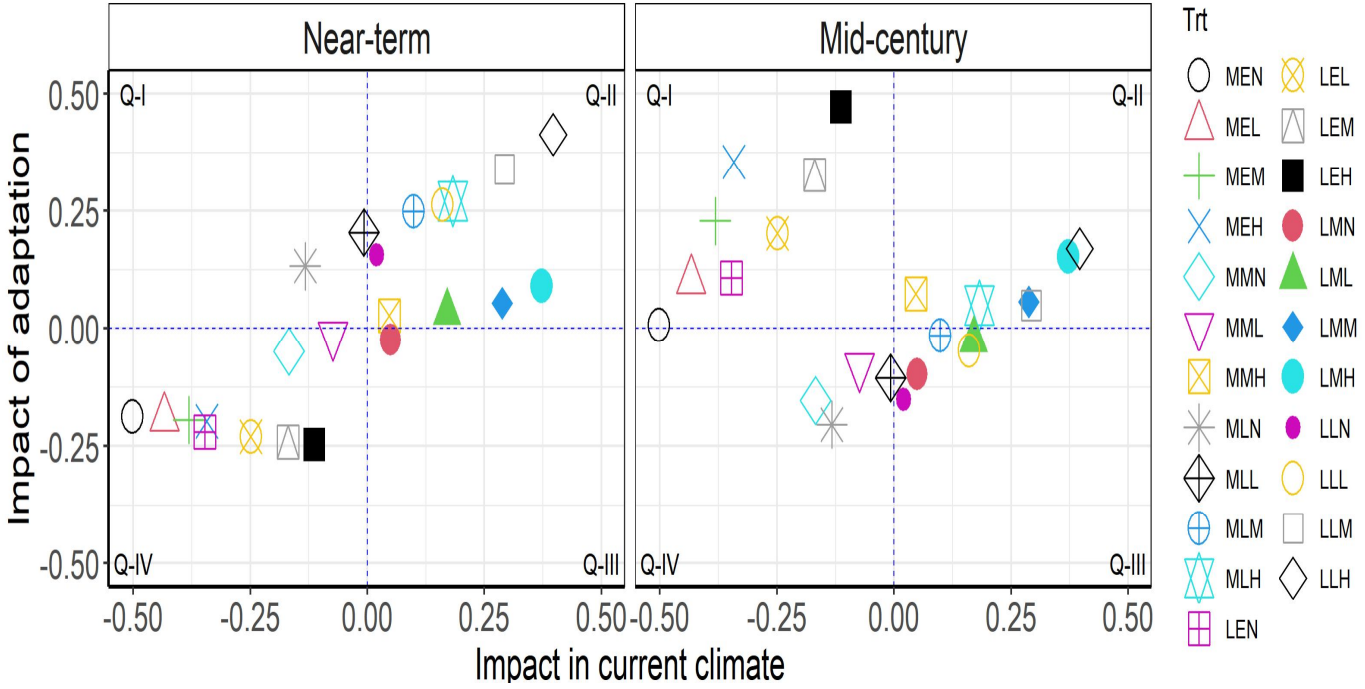
- Crop/variety switching
- IWSM
- Change in planting date
- Soil and water conservation
- Small-scale irrigation
- Use of early-warning system
- CSA
- Capacity building

Climate change management...



Lobel,2014

Fig. 1. A schematic of how adaptation should be calculated for new agricultural technologies.



Thank you

ademe.dereje@gmail.com

+251911802125