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CLIMAAX climate ready regions

Regional Council of Southwest Finland

VALONIA

CLIVAS – Climate change risk assessment and adaptation in Southwest Finland

Results and experiences

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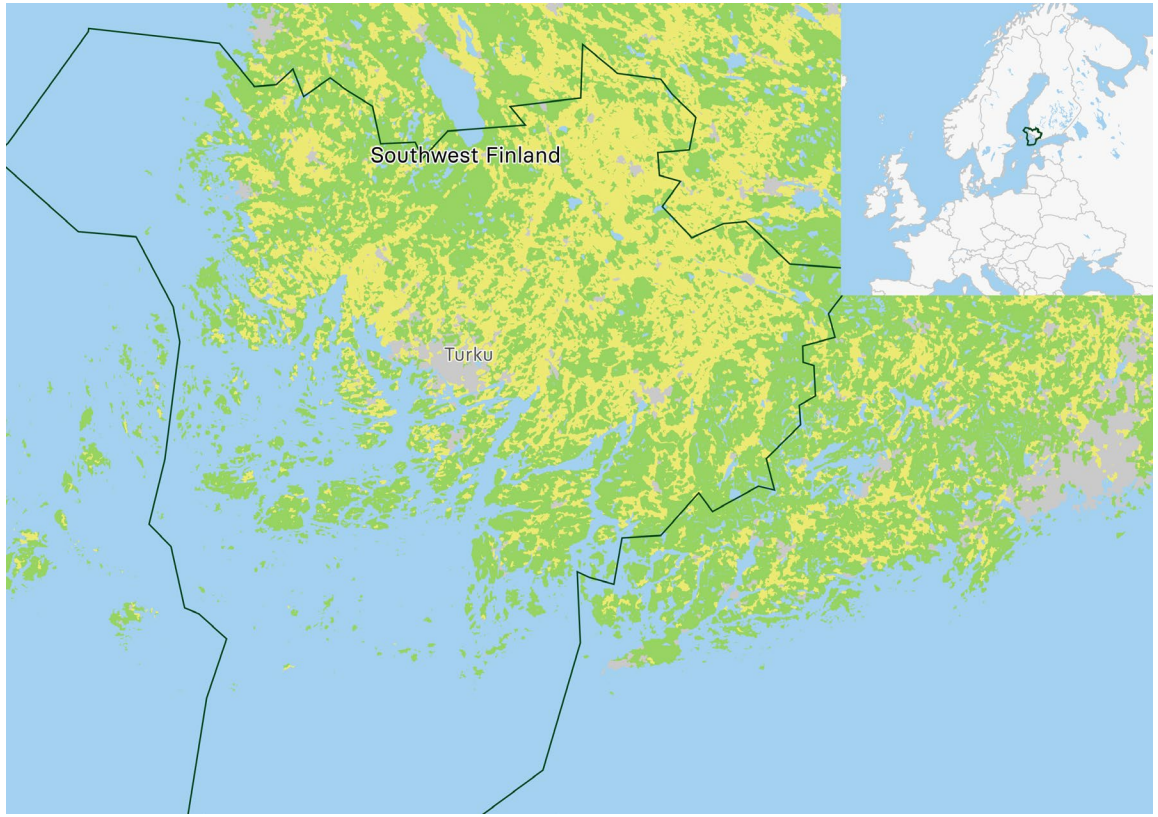
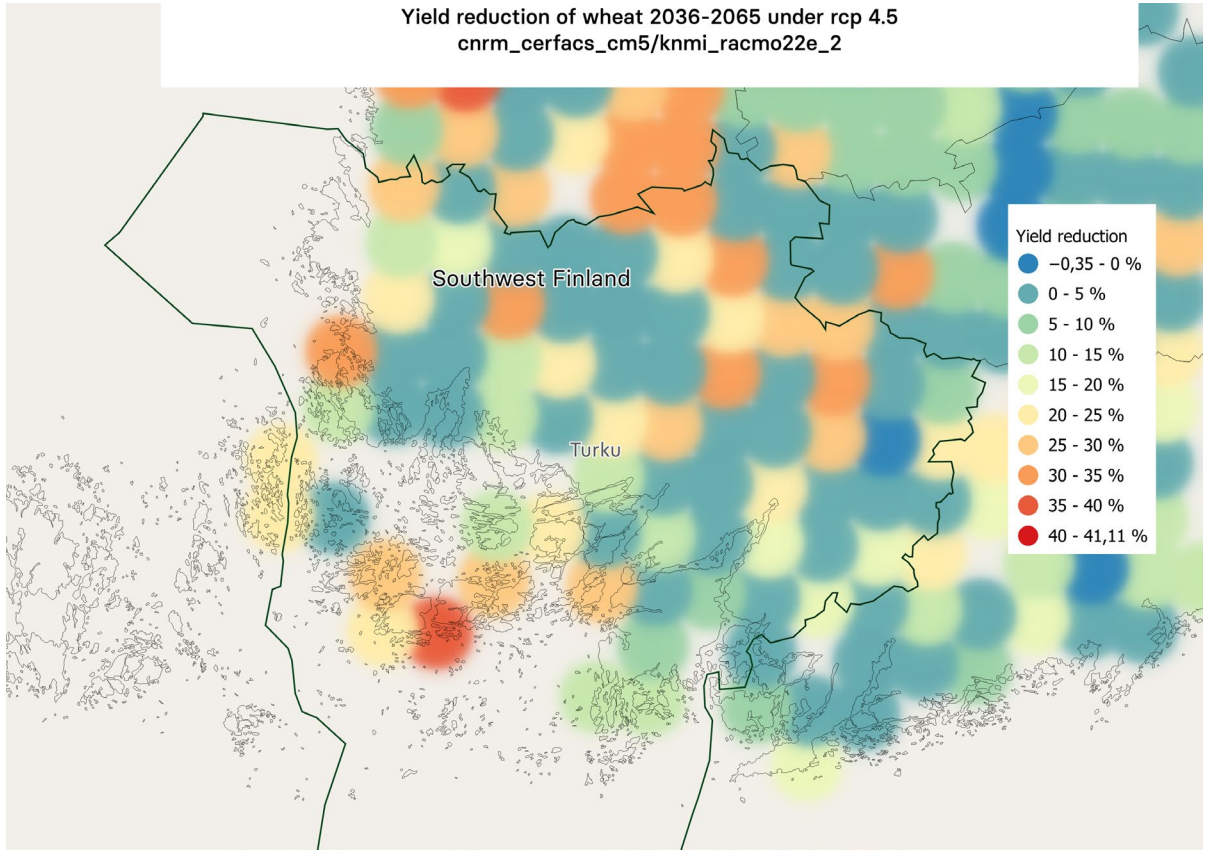
Characteristics of Southwest Finland

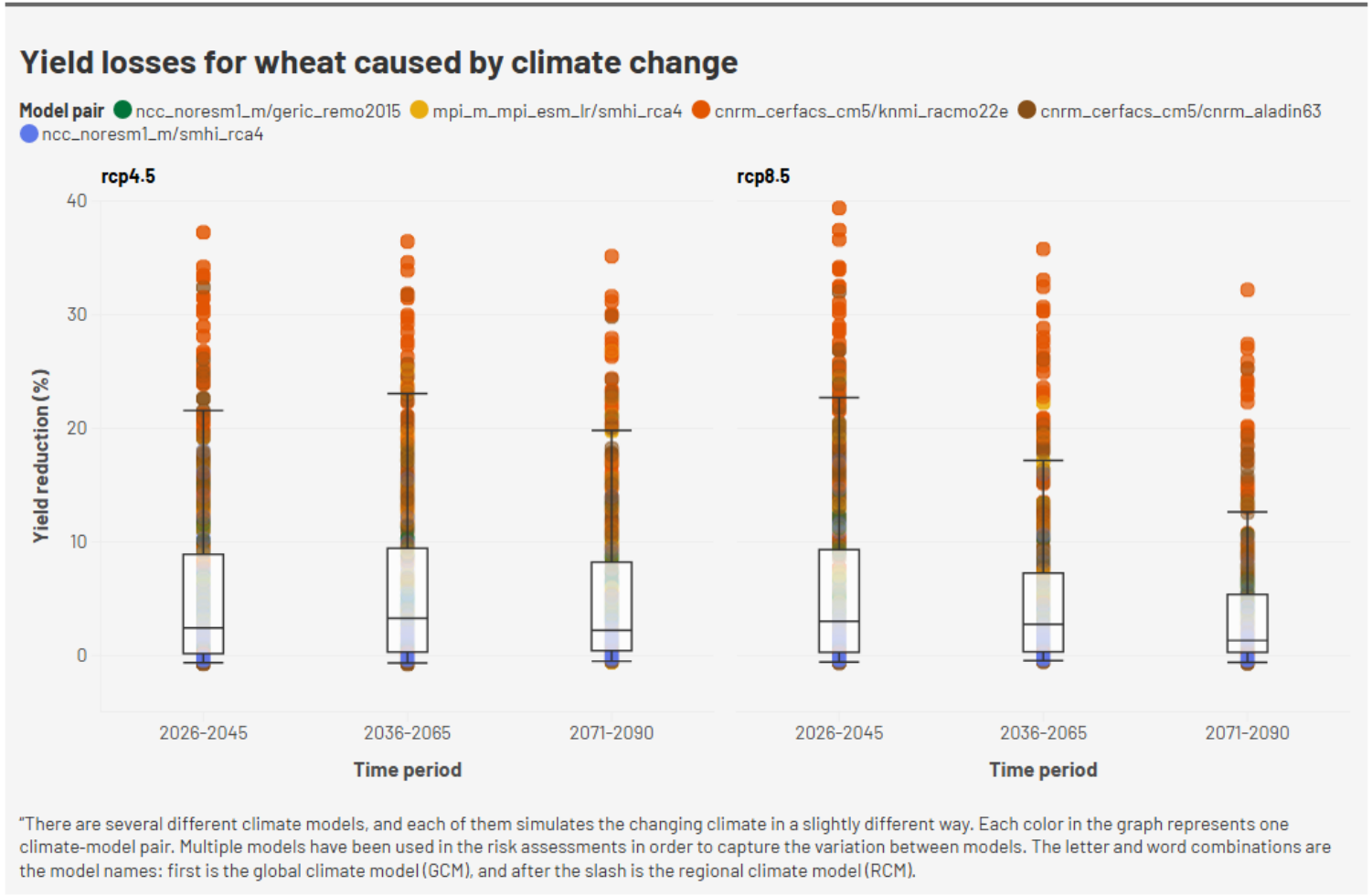
- Southwest Finland is a region with a diverse economic structure, fertile rural landscapes and the unique ecosystem of the largest archipelago in the world
- Southwest Finland is the most important food producing region in Finland
  - Climate change will make the growing conditions more unstable and increase damages from both droughts and heavy rainfall events
  - On the other hand, longer thermal growing season brings benefits
    - Higher yield and new crops available
- The Archipelago Sea is one of the most polluted sea areas in the world and also highly vulnerable to the impacts of climate change
  - The combination of droughts and flooding flush nutrients and harmful substances into the sea



Results of the agricultural drought workflow

- Southwest Finland is considered a region with the highest drought risks in Finland
  - Importance of agriculture
  - High share of agricultural land
  - Little irrigation capacity and potential
- We studied the effects of drought on wheat, sugar beet and barley
- The results forecast moderate impacts on the studied crops
  - On average, yield losses of 2–10 % for each crop in the region
  - Significant annual and spatial variation
  - Largest losses in the near future
  - The losses decrease towards the end of the century in every scenario and model
    - Better growing conditions overall



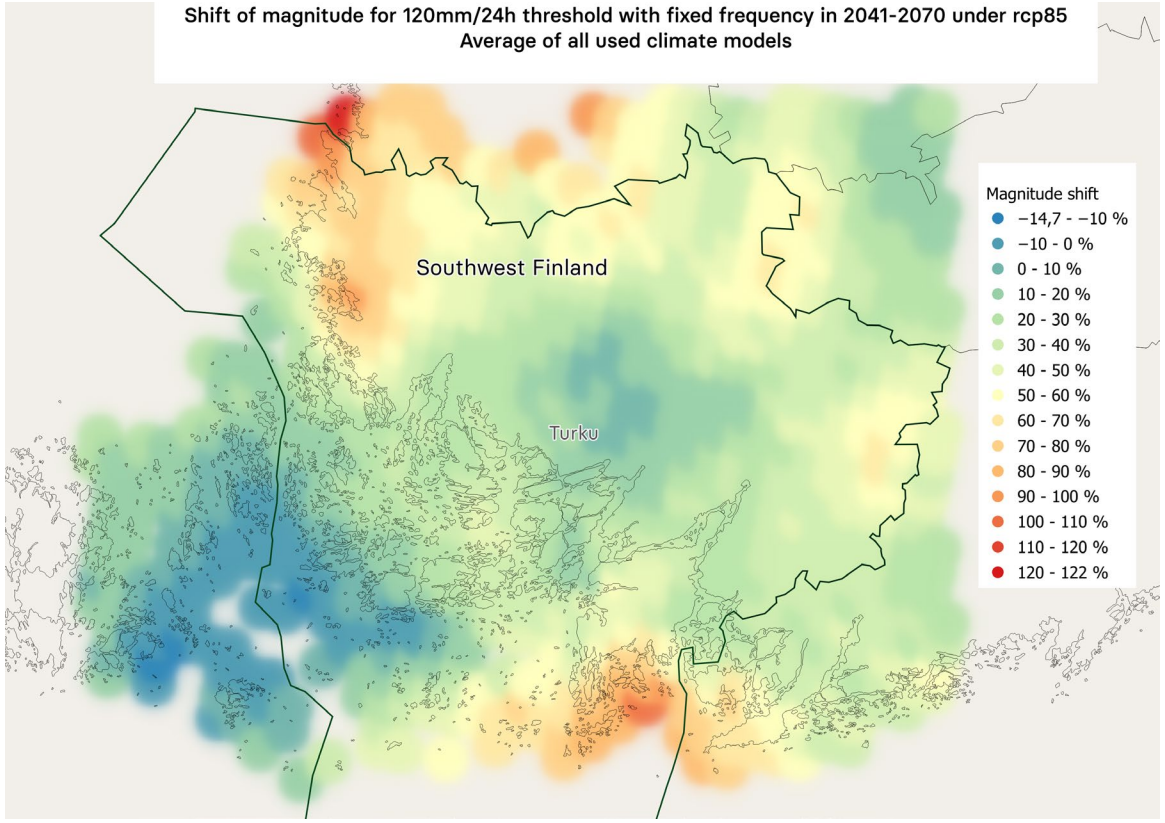


"There are several different climate models, and each of them simulates the changing climate in a slightly different way. Each color in the graph represents one climate-model pair. Multiple models have been used in the risk assessments in order to capture the variation between models. The letter and word combinations are the model names: first is the global climate model (GCM), and after the slash is the regional climate model (RCM).

Click here for interactive plot: Wheat, yield loss boxplot

Results of the heavy rainfall workflow

- Preparedness for flood risks is rather good in Finland but storm water systems in the cities are a weak point
- We studied 24h periods of rain and used the heavy rain warning levels of the Finnish Meteorological Institute as thresholds
  - 50mm (yellow warning)
  - 70mm (orange warning)
  - 120mm (red warning)
- Both the frequency and intensity of heavy rainfall events will increase in the future

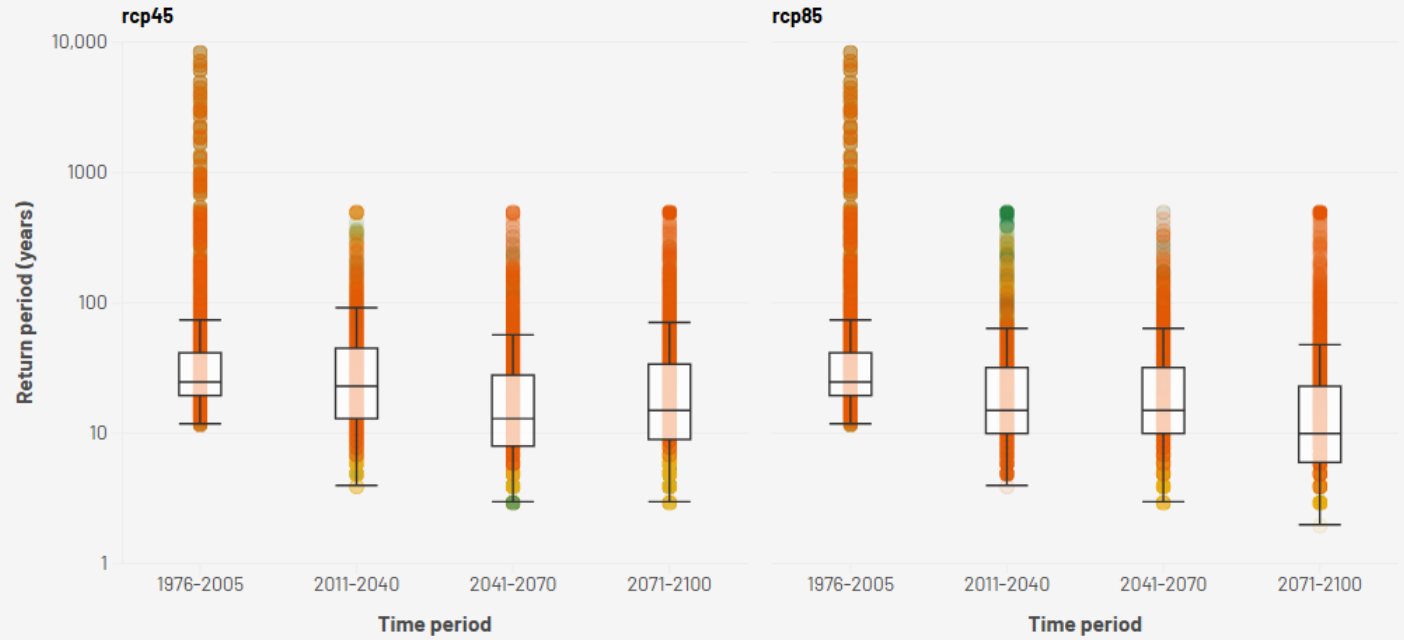


Change in rainfall return period due to the impact of climate change

Each point in the graph represents the average value for a point value in grid

Rain event, mm/24h 50 | 70 | 120

Model pair ec-earth/racmo22e · hadgem2-es/racmo22e · mpi-esm-lr/rca4



There are several different climate models, and each of them simulates the changing climate in a slightly different way. Each color in the graph represents one climate model pair. Multiple models are used in the risk assessments in order to capture the variation between the models. The letter and word combinations are the names of the models: the global climate model comes first, followed by the regional climate model after the slash.

[Click here for interactive plot: Return period boxplot]

Usability of the results and the impact of the project

- CLIMAAX funding allowed us to conduct the first climate risk assessment of our region
- The project plays a key part in including climate change adaptation in the regional climate roadmap as a strategic theme
- The project has been a great way to spark a discussion on regional climate risks and adaptation measures with stakeholders
- The results from the CLIMAAX workflows are easy to communicate to stakeholders
- In the end, the usability of the data depends on whether local stakeholders find the results useful after they've been published
    - There are already large amounts of well researched data available – What is the added value of our studies?

Usability of the results and the impact of the project

- Overall, the results from the agricultural drought and heavy rainfall workflows have been well received by both our stakeholders and researchers that we have consulted
- The crop specific results on yield reductions from droughts have not been studied before
- Results on the intensity and frequency of heavy rainfall events are in line with national results – regional results are easier to communicate to stakeholders
- Estimating the monetary values of crops in the future seems very difficult the further into the future we go
- Some of the most important crops (eg. oat) are missing from the database
- Forecasting the incidence of heavy rainfall events as locally as the maps present is likely not possible
- River flood damage workflow produced unrealistically high results – maybe it just does not fit for our rivers?

Lessons learned

- Developing the climate risk analyses in-house with the help of local stakeholders and researchers requires expertise and human resources BUT, on the other hand, it creates deep understanding and ownership, and allows for knowledge transfer both within our organization and our stakeholders
- With the guidance from the CLIMAAX handbook and helpdesk, it is possible to learn the use of the tools with basic GIS and good coding knowledge
- While the results seem rather trustworthy overall, they cannot be trusted blindly
  - → Critical thinking and the ability to compare results with existing data and assessments is important!
  - → Reaching out to national researchers is key in ensuring the correctness of the climate risk analyses and the interpretation of the results

Lessons learned

- Climate risk analysis and adaptation measures are new themes for many stakeholders
  - Communicating difficult themes to stakeholders (incl. citizens) in an understandable fashion is crucial
  - Giving the data a context and a meaning is more important than showing numbers and graphs
- Inclusion of local stakeholders is important – a resource instead of a burden
  - Increased ownership through a co-creation process
  - Getting feedback and new ideas for localizing the data
  - A way to push forward stakeholders in their adaptation journey

Next steps

- Drafting the key risk assessment
- Developing adaptation measures together with local stakeholders
- Planning for the dissemination of the project results – especially the visualization of the data
- Communicating the results to stakeholders
- Updating the regional climate roadmap with adaptation measures

Thank you!

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