

FINSAPES project finalises a new set of integrated regional scenarios for climate change analysis

Elements of the FINSAPES scenarios

The FINSAPES project¹ is working closely with local experts and stakeholders to co-create a set of regional scenarios for use in addressing climate change. These are based on a set of global shared socioeconomic pathways (SSPs) that describe alternative socioeconomic development trajectories². The new scenarios integrate three aspects of future regional conditions: socioeconomic development, climate and adaptation.

1. SSP-based regional socioeconomic narratives. These describe important factors affecting the exposure and vulnerability of local systems and people to impacts of climate change. They have been co-produced with stakeholders for four SSPs and two Finnish regions: North Karelia and three Ostrobothnian counties (Figure 1). Each regional narrative is structured according to key drivers of socioeconomic change (upper blue box) relevant for major systems identified in a region (lower pink boxes).

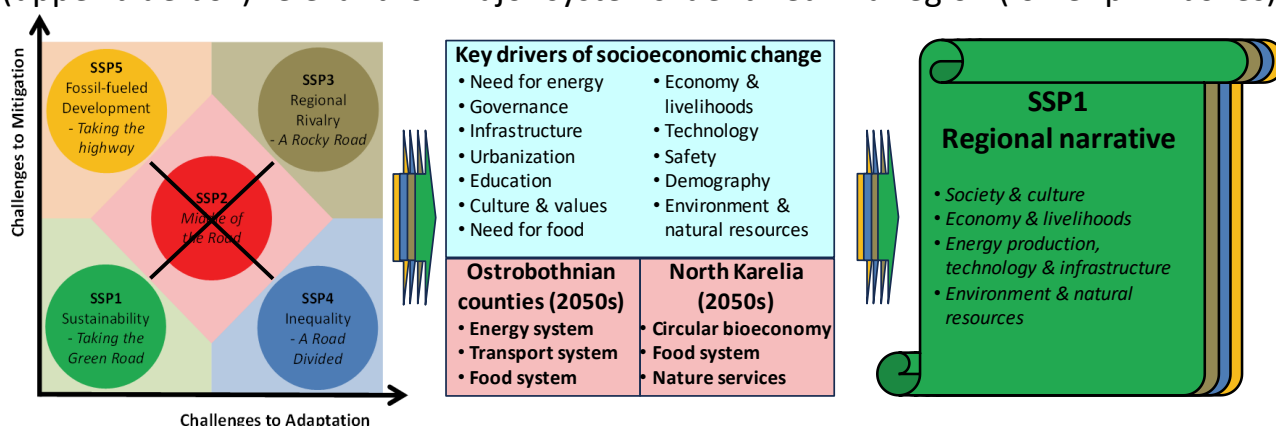


Figure 1: Main elements of SSP-based socioeconomic narratives for the two FINSAPES regions.

2. SSP-based regional climate projections. Future climate is affected by greenhouse gas and aerosol emissions and changes in land use. Both are driven by socioeconomic development and alter the radiative forcing of the atmosphere. Global SSPs exclude climate policy, but they can also be combined with assumptions about mitigation policy to develop alternative radiative forcing scenarios. These have been inputted to global climate models by scientists around the world to see how the climate is affected. Results are analysed for Finland in FINSAPES, and curves in Figure 2 show how mean annual temperature in North Karelia is projected to change under different assumptions of forcing (in Wm^{-2}) up to 2100. Projections of changes in other important climate variables, such as precipitation, wind and solar radiation, are also available³.

¹ Finnish scenarios for climate change research addressing policies, regions and integrated systems (FINSAPES) is a four-year consortium project (2021-2024) financed by the Research Council of Finland's Special funding for system-level research into climate change mitigation and adaptation.

² See FINSAPES Info 2/2022, <https://www.syke.fi/projects/finscapes>

³ More details at: <https://www.ilmatieteenlaitos.fi/finscapes> and [here](#)

Symbols show temperature changes projected by the 2050s. Forcing of 2.6 Wm^{-2} assumes strong mitigation to keep global temperatures below the Paris Agreement target of 2°C above pre-industrial levels (implying $\sim 3.5^\circ\text{C}$ warming in North Karelia). Even then, continued warming from today is inevitable (yellow triangle). Higher forcing levels ($4.5\text{--}8.5 \text{ Wm}^{-2}$) imply higher emissions that fail to comply with the Paris targets, and hence greater warming (three other symbols). Without strong mitigation measures warming in the region will continue out to 2100 and beyond, and could accelerate. All projections point to the clear need, alongside mitigation, for adaptation measures to address the potential impacts of unavoidable climate change.

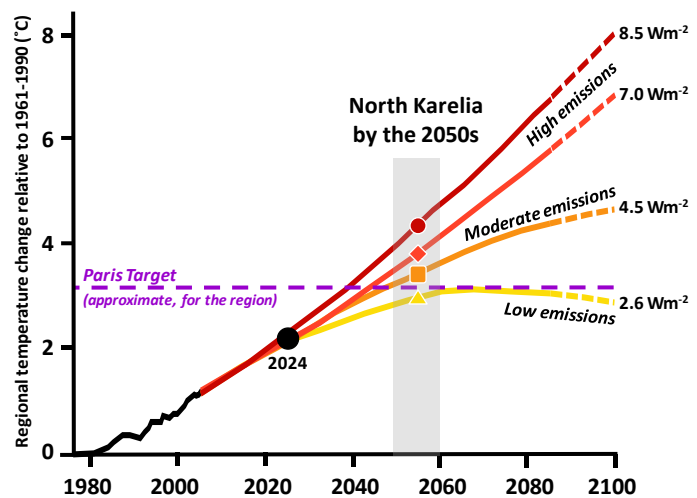


Figure 2: Four warming projections for North Karelia to the 2080s assuming different global emissions

3. Adaptation stories. These are fictional accounts set in the future describing local experiences of how individuals have adapted to a changed climate. Stories are based on projected impacts and on interviews with relevant local stakeholders. For North Karelia, viewpoints are provided of how dairy farmers and milk buyers have adapted to maintain cattle health and milk production in warmer summers ("dairytales") and to describe adaptation to changes by pickers and sellers of forest berries. Similar stories describe adaptation to heatwaves reported by nurses, maintenance engineers and patients following hospital renovations planned in Seinäjoki, South Ostrobothnia.

Integrated scenarios

The four regional SSP narratives can be combined with climate projections (symbols) and complemented by adaptation stories to form integrated scenarios (Figure 3). As these apply to the 2050s, the climate projections are not as widely separated as they are at the end of the century (Figure 2). Thus, most projections can plausibly be combined with any of the SSP narratives, though the high-end warming (dark red circle) would be inconsistent with global assumptions in SSP1 or SSP4 worlds.

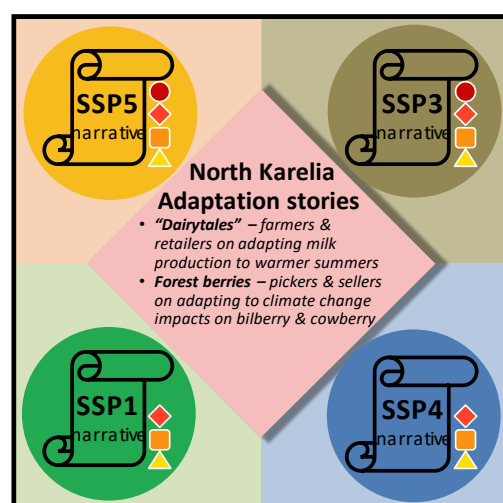


Figure 3: Integrated socioeconomic, climate and adaptation scenarios for the 2050s (details in text)