

The forest industry's need for tree breeding for future wood properties, increased growth and resistance to pathogens

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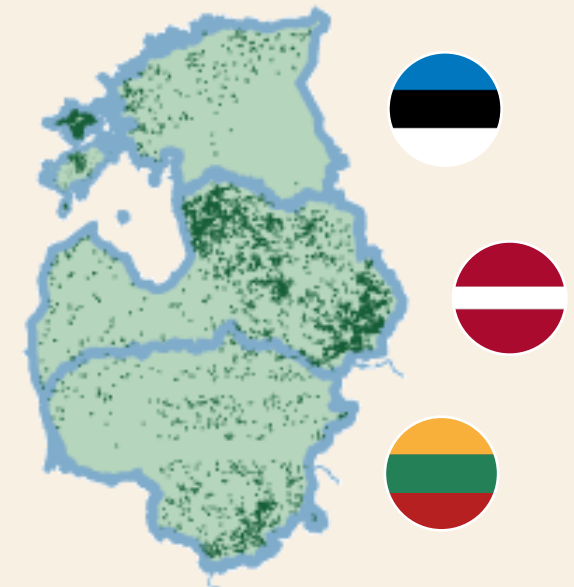
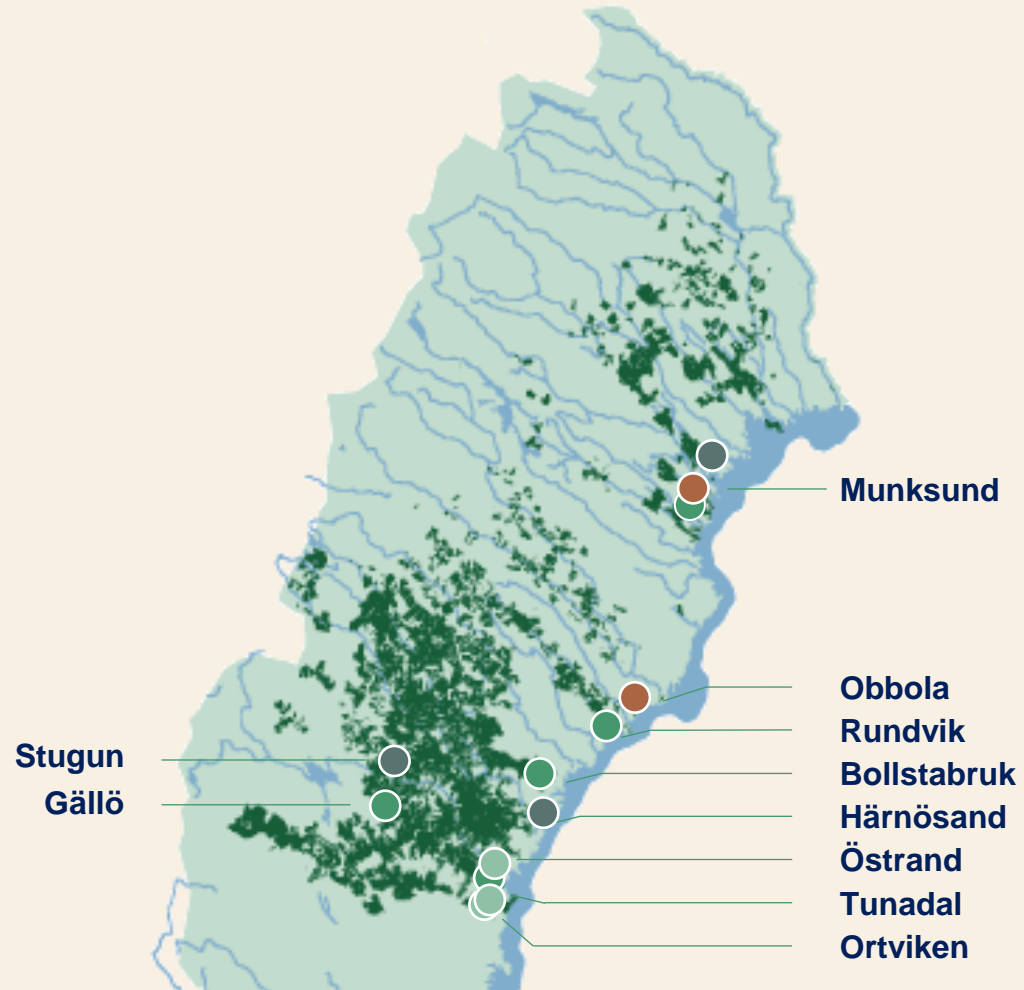
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Our locations

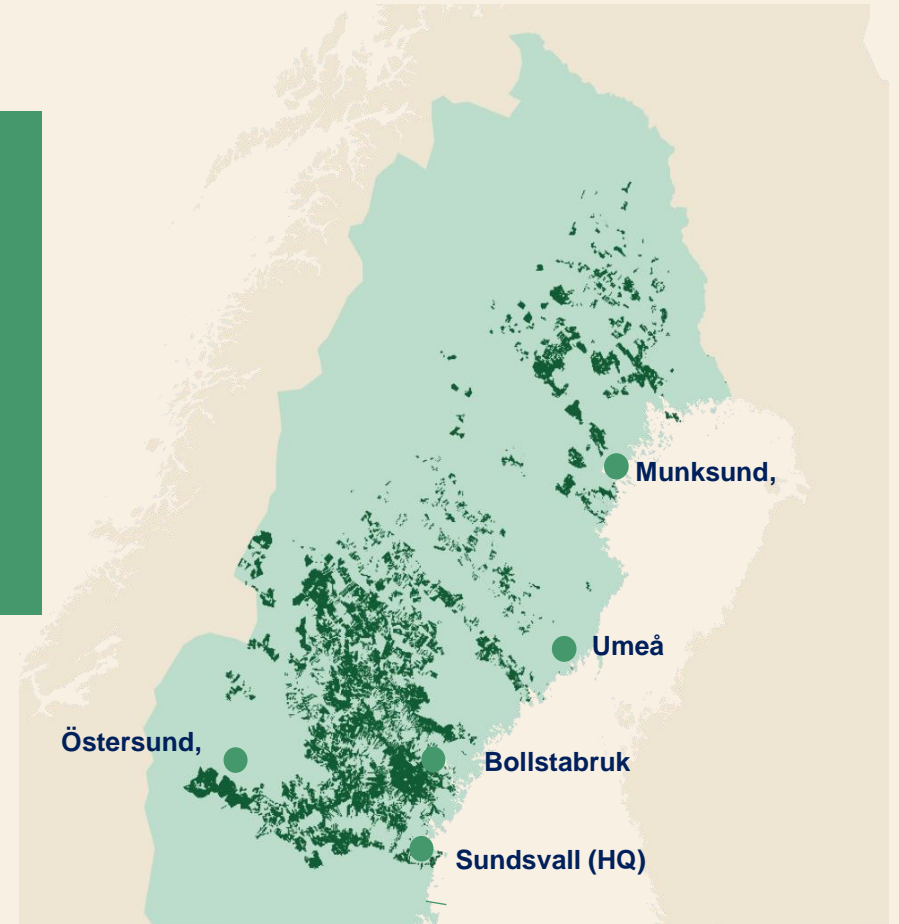
SCA is Europe's largest private forest owner with forest in Sweden, Estonia and Latvia.

- Sawmill
- Pulp mill
- Kraftliner mill
- Pellet production
- SCA's forests

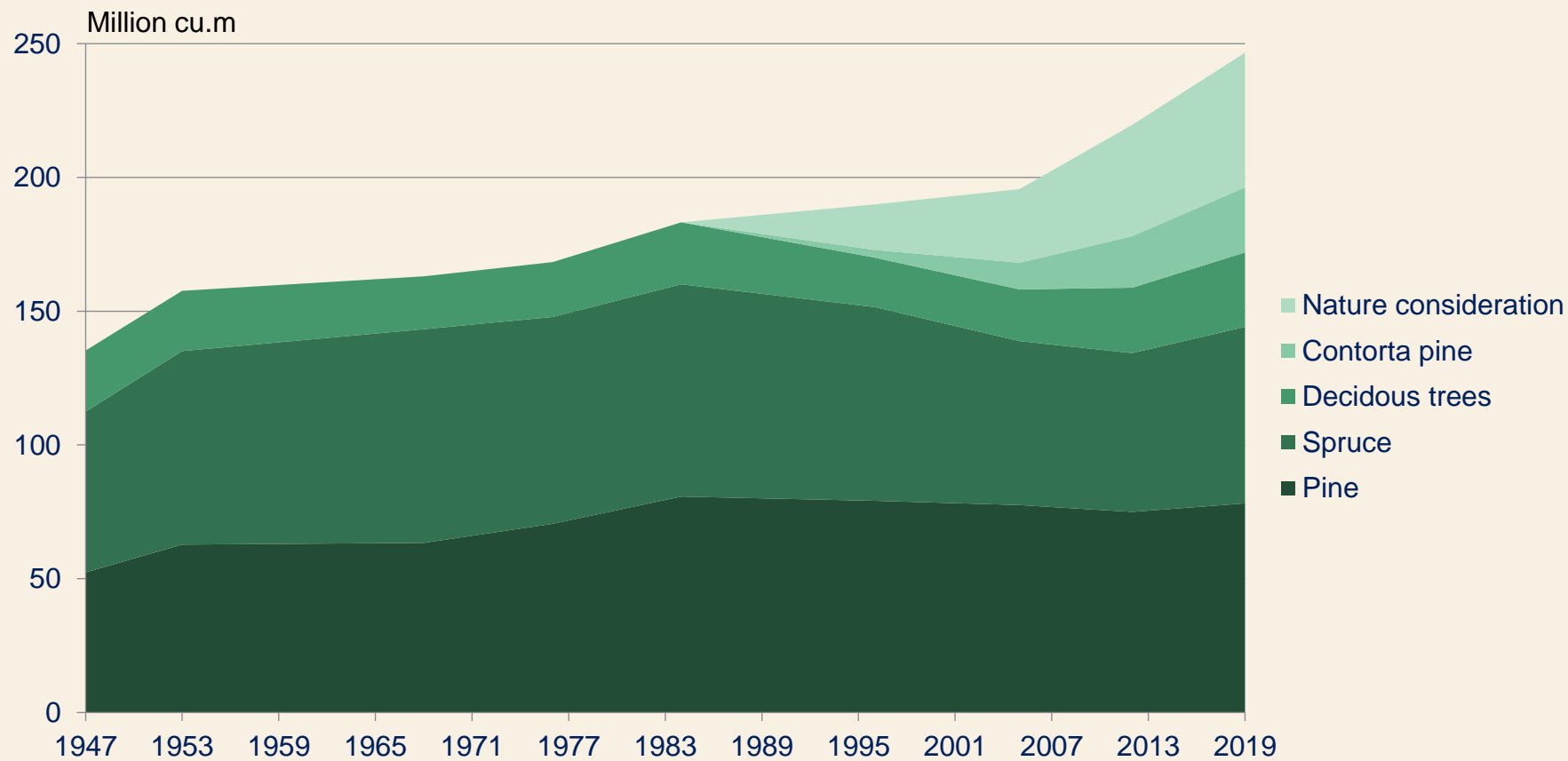


Forest in brief

- Manages 2.6 million hectares forest land in northern Sweden, of which 2 million is used for timber production, and 60,000 hectares in the Baltics.
- Supplies SCAs Swedish industries with wood raw materials.
- Buys wood from private forest owners and offer them different forestry services.

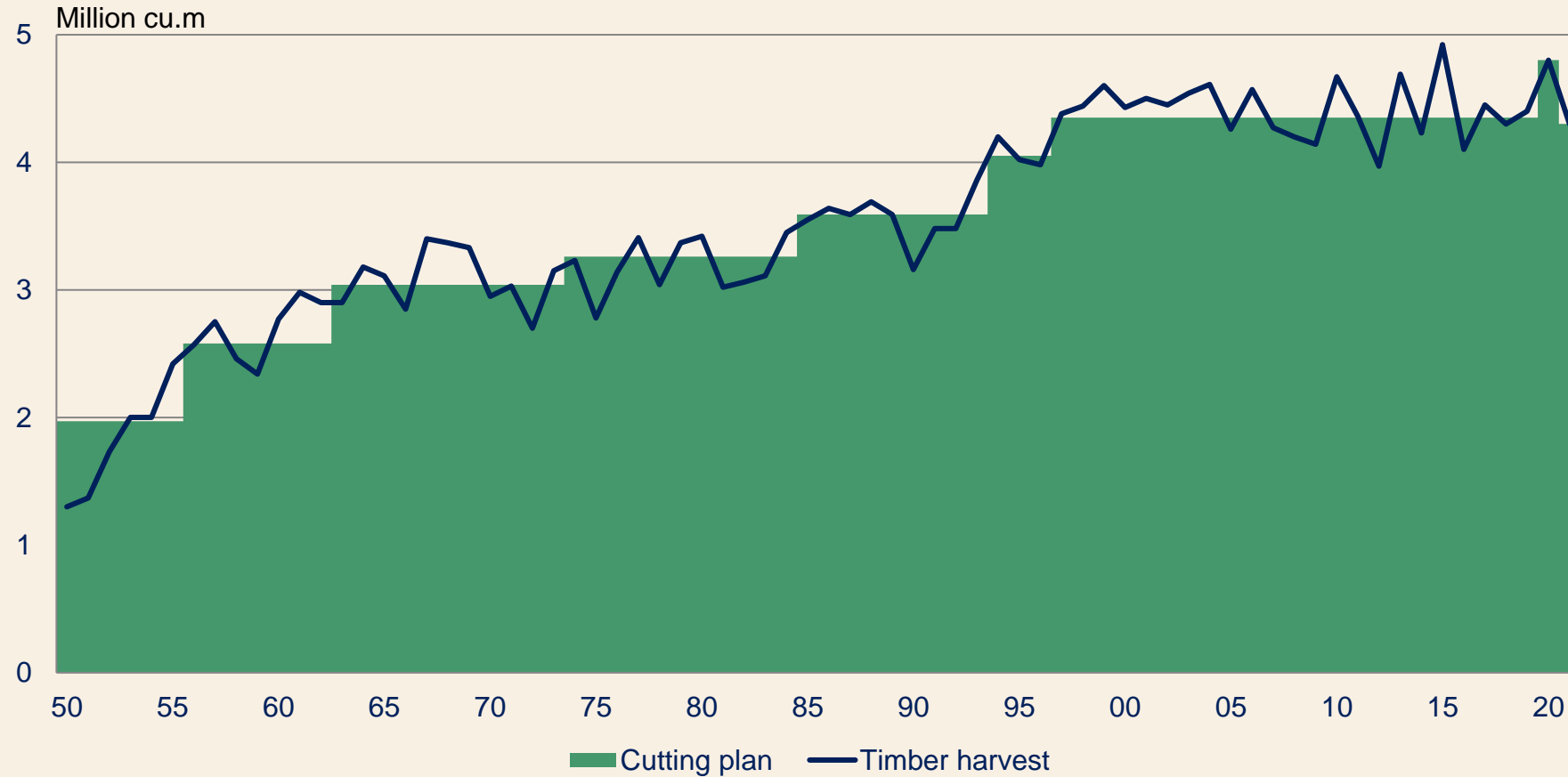


Standing timber volume SCA in Sweden



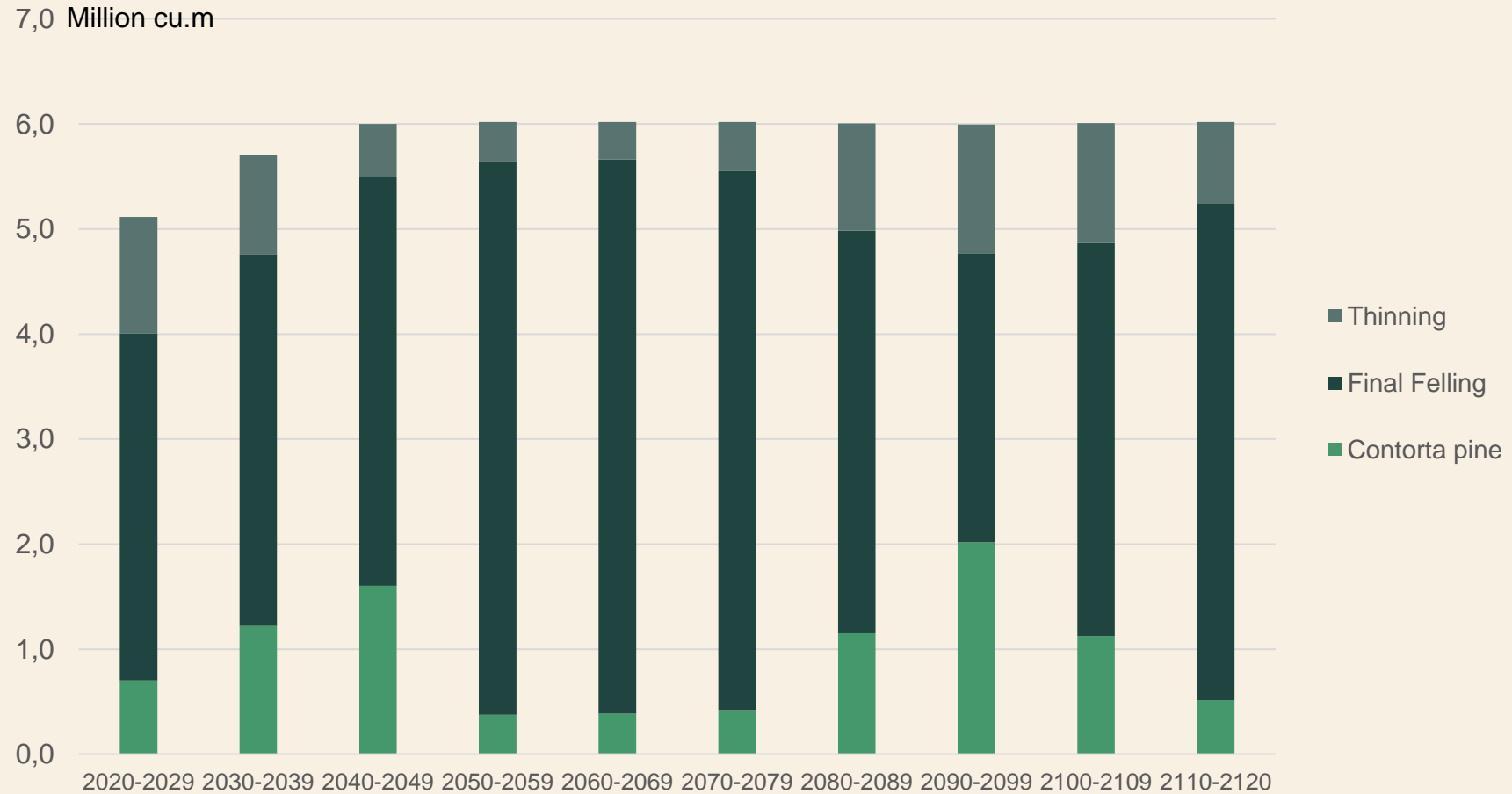
Timber felling from own forests

1950-2021



Potential harvest

Harvesting in ten-year periods according to SCA's harvesting calculation plan 20



NorrPlant 2021

BogrunDET plant nursery

Production 85 million plants/year

Wifstamon plant nursery

Production 15 million plants/year

Seed plantations

Own: 5 Pine – 40 hectares

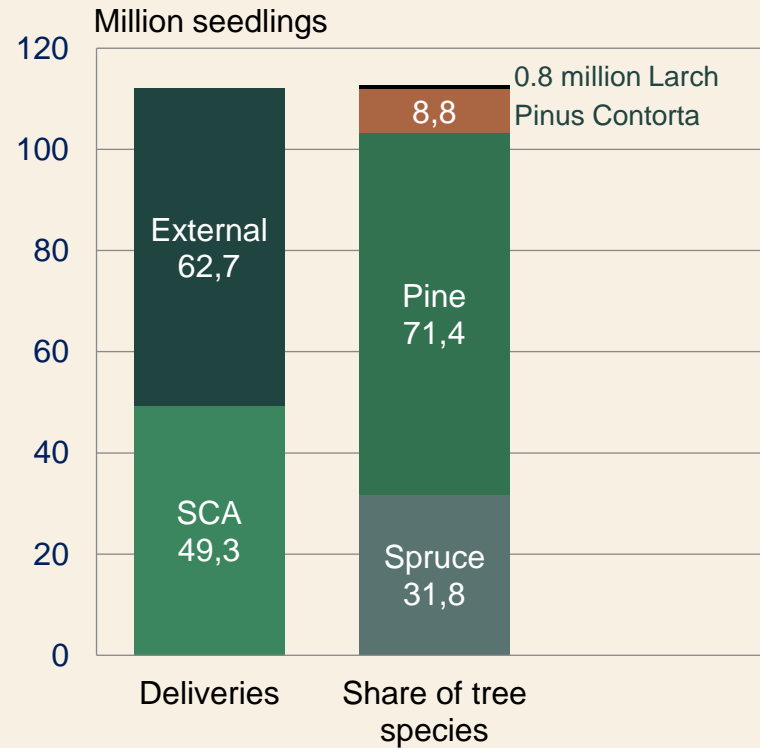
7 Contorta pine – 40 hectares.

Partly owned: Pine, spruce - 50 hectares



Forest seedling 2021

Total deliveries 112 millions seedlings



Seed orchards in Sweden

- 3rd generation Seed Orchards established
- 4th generation planned

- Long-term
- Co-operation between forest owners
- State finance relatively low

- Selection so far mainly for:
 - Increased growth
 - Wood properties

Tree breeding

Climate change

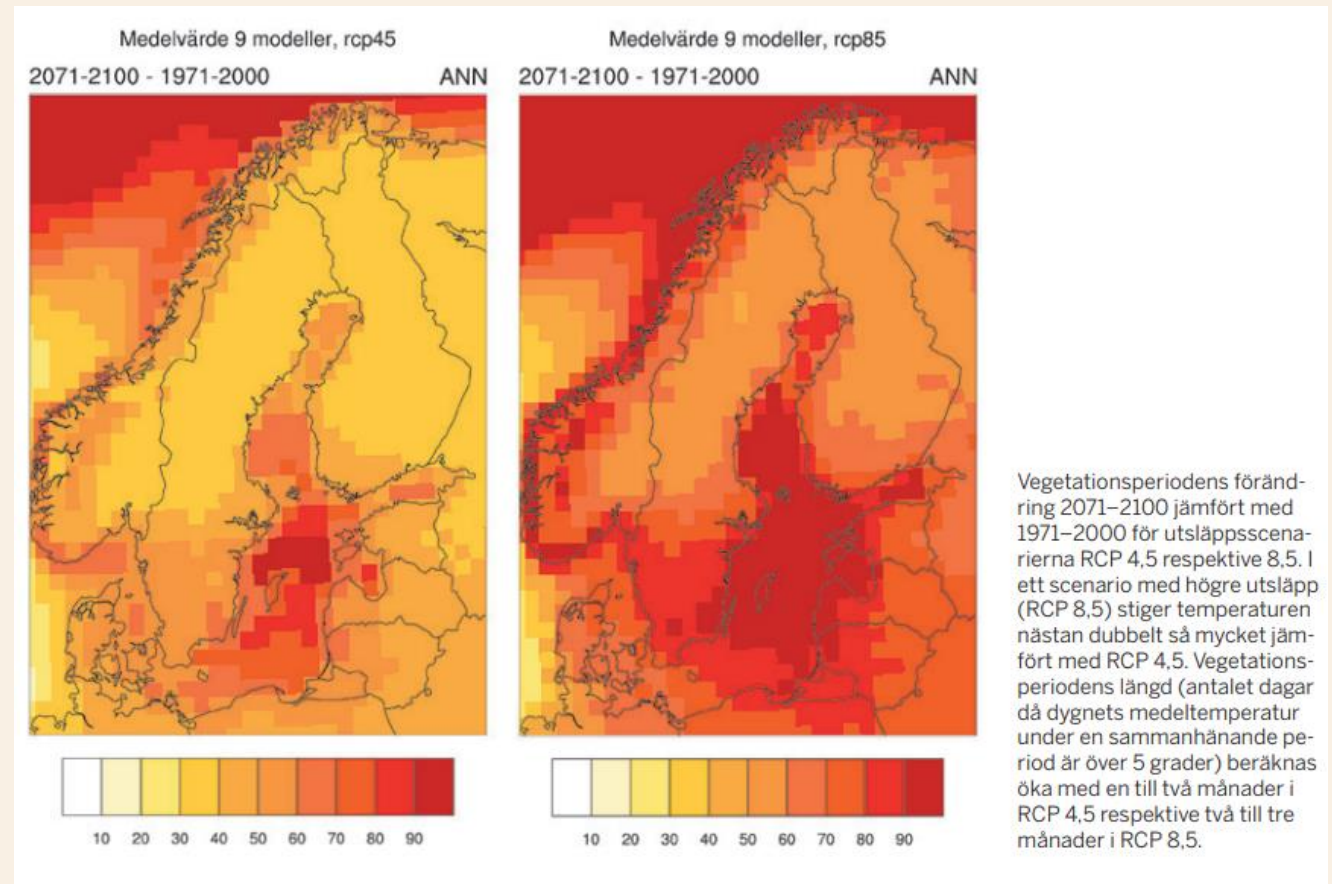
- Moisture – both wetter and dryer
- Increased stress & damages – direct and indirect
- Avoid loss of growth (mortality or decreased growth) just as important as increasing growth!?



Climate change

- Warmer climate (pro-longed growing period) = increased growth, utilize in selection & breeding

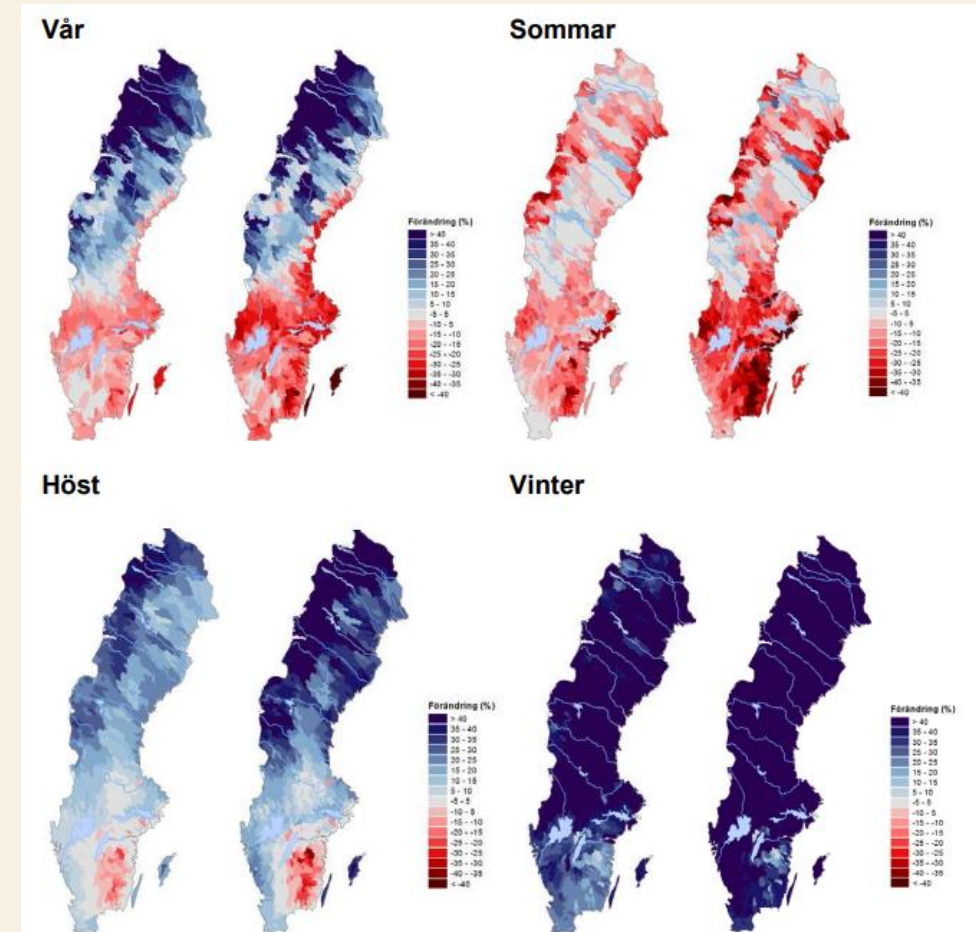
Warmer



Climate change

Moisture

	North Sweden	South Sweden
Spring	Wet	Dry
Summer	Dry (coast, mountain)	Dry
Autumn	Wet	Dry (SE Sw.)
Winter	Wet	Wet



Figur 3.2. Förändring (%) av vattentillgång vår, sommar, höst och vinter mellan referensperioden 1963–1992 och perioden 2069–2098 för RCP4.5 (vänster) och RCP8.5 (höger). Ju rödare desto torrare och ju blåare desto blötare i medeltal.

Interaction climate change & pathogens

Increased risks

- Drought (2018)
- Spruce bark beetle (outbreak in Europe equals M. Pine beetle in N. Am)
- Cronartium on Pine
- Moose – largest cause for damage today
- Gremmeniella
- Many others



Conclusions

- Change in choice of tree species
- Increase of mixed forests

- A challenge for tree breeders
- Changed demand for seed inorchards (species/growth/quality/resistance)
- Need for forecasts for breeders
- Need for better models for forest management (interaction climate change & risks)

- Short term: More resistant plant material in nurseries & planting

