Climate change will affect planted forests in New Zealand

Projections of how climate will change:
Over the next two or three forestry rotations, NIWA projects the following likely trends in New Zealand’s future climate:
• Warmer by about 2.0°C*
• Wetter in the west and drier in the east
• More extreme weather events.

* Mid-range projection

Extreme weather events – higher variability and uncertainty
The effects of extreme weather events are already being felt. Intense storms are difficult to predict and their impact on forests can be huge.

More high intensity rain
Higher temperatures mean more rain and severe storms
For forest growers, higher rain means:
Higher risk of erosion and downstream impacts from sediment and debris flows.

Higher winds
Winds may increase by up to 10%
For forest growers, higher winds mean:
More risk of toppling and breakage.

Warmer temperatures, less frost
Fewer frost days in lower North and South Island
For forest growers, higher temperatures mean:
Higher growth rates.
Reduced risk of crop damage or loss from frost damage.

Increased drought
Severe droughts (1 in 20 years) may double or quadruple
For forest growers, more droughts will mean:
Less fungal diseases.
Slower growth rates.
Increased fire danger.

Impacts on forestry

Forest productivity
More rainfall and higher temperatures mean higher growth rates.
Elevated CO₂ typically makes trees grow faster.
Wood density decreases with temperature change.
Increased risk of diseases, pests, weeds, wind and fire.
Forest productivity is expected to increase

Pests and diseases
Less fungal disease in dry areas.
Increased risk of new species from warm-temperate or subtropical regions.
Warmer temperatures mean more insects (due to better survival over winter).
Increased risk of Swiss needle cast in Douglas-fir.
Species composition may change in response to pest and disease trends

Weeds
Weeds adapt to changes more quickly than trees. Faster growing trees mean even faster growing weeds.
Increased weed competition for water in dry regions.
Species composition and distribution will change. Risks of new weeds will increase.
Growth rates of weeds are expected to increase in most regions

Fire
Higher temperatures and more wind mean a longer fire season and bigger fires.
Highly stocked stands have higher risk profiles and insurance rates.
Fire risk is likely to increase in many regions

Summary
Tree growth responds directly to changes in temperature, water availability and CO₂ concentration.
In many regions, this could mean higher productivity and opportunities to establish faster-growing forests.

Climate change issues are driving policy to offset CO₂ emissions.
• Carbon forestry offers increased revenue streams for growers
• Demand for sustainable wood products is expected to increase

Climate change has highlighted the potential for using forests to protect soil and decrease risks of flooding.
The impact of pests and diseases, weeds, fire, intense rainfall and high wind cause significant economic losses in planted forests. These risks are expected to increase with climate change.