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May 2019

# Policy Brief



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## NORDIC FORESTRY IN A FUTURE OF EXTREME WEATHER

**Extreme weather events resulting in extensive forest fires demand highly efficient Nordic cooperation and experience exchange.**

The Nordic countries regularly experience forest fires. The consequences can be severe, both economically and for affected people and animals. The summer of 2018 was extraordinary in many ways. Hot and dry weather caused more and bigger fires than normal. The situation required urgent action, far more than any country could handle alone, and cross-border cooperation was implemented.

To handle extreme fires in the future, it is important to further develop the exchange of experience and cooperation among the Nordic countries.

The Nordic Council of Ministers for Fisheries and Aquaculture, Agriculture, Food and Forestry (MR-FJLS) decided in September 2018 to set up a task force to investigate the

challenges facing forestry in a future with more extreme weather. The group includes representatives from Finland, Norway, Iceland, Denmark and Sweden. The group is led by Sweden, but the secretariat for Nordic Forest Research (SNS) and the Nordic Council of Ministers have assisted in the operational work.

In the report “Nordiskt skogsbruk i en framtid präglad av extremväder” the working group systematized the experiences of the Nordic countries from the 2018 fires and proposed concrete areas for Nordic cooperation that can contribute to more resilient forestry. This policy brief is based on that report and highlights the proposed areas of cooperation that have been developed under the leadership of the working group.

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### Proposal for Nordic cooperation areas

- ❖ How to avoid forest fires – inform all relevant stakeholders
- ❖ Rapid response – detect and extinguish fires early
- ❖ Increase emergency services’ knowledge of forest lands
- ❖ The entire forest sector has a responsibility
- ❖ Long-term forest management is crucial

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## How expected climate change will affect Nordic forests

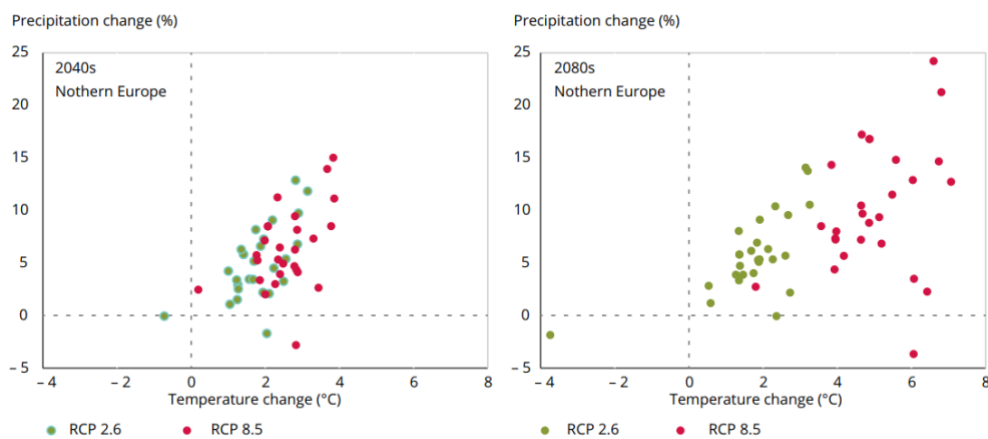
**Weather in the Nordic countries is expected to become more extreme and unstable in the future. According to the IPCC, the average annual temperature in the Nordic countries will rise and in the southern parts extreme heat will become more common. Overall, precipitation is expected to increase, but it will be concentrated in certain periods and regions.**

Hotter temperatures increase both evapotranspiration and the risk of forest fires. However, rainfall is also expected to increase, which may help lower fire risk, but since rainfall is not expected to be evenly distributed throughout the year, periods of drought can increase forest fire risk.

Milder winters and increased rainfall can also lead to higher productivity and thus increased storage of biomass in forests, which in turn can affect the extent of the fires that do occur.

### Expected change in average annual temperature and rainfall

According to the IPCC, Northern Europe is facing increased temperature and precipitation. To project the impact of climate change, IPCC uses different scenarios. The figures below illustrate two of the IPCC's Representative Concentration Pathways (RCP) scenarios. The one with the smallest change in net radiation, RCP 2.6 (green dots) corresponds to a net radiation of 2.6 W / m<sup>2</sup>, and the biggest change, RCP 8.5 (red dots). The left figure is a projection for the year 2040 and the right for 2080; the points represent predictions of different climate models.



## The 2018 forest fires and their effects on forestry

**Fires occurred in many places in the Nordic region during 2018 and several fires were significantly larger than normal. Sweden, Finland and Norway were the most affected countries.**

In Sweden, around 23,000 hectares of forest were affected by fire, the largest area burned since statistics were first compiled in the mid-1990s. The risk of fire was extreme in almost all of Sweden, but four major fires accounted for around 40% of the burned forest land. In Norway, almost twice as many fires as the five-year average were recorded, but only 250 hectares of forest burned. In Finland, 1,200 hectares of forest burned, also well above the average for the past five years.

The value of forest lost to fires is estimated at NOK 4 million in Norway and at SEK 900 million in Sweden. National compilations are underway in Finland.

Several factors contributed to the overall costs. In Sweden, for example, measures by the forest industry may have prevented forests with a value of SEK 500 million from burning. The total costs for fire preparedness by the forest sector is also estimated to approximately SEK 500 million.

Fire is not the only way drought affects forestry. Other negative impacts include water stress reducing tree growth, increased problems with pests, and a reduced resistance to fires. The positive effects can include, for example, higher biodiversity and ecological values.



## Lessons and suggestions for areas of Nordic cooperation

### ❖ How to avoid forest fires – inform more

The realization that it is important to reduce fire risk is not new, but will become even more important in a future with more extreme weather, longer fire seasons. All Nordic countries are actively working on initiatives to reduce the risk of forest fires.

**RECOMMENDATION: The Nordic countries should share experiences, instructions and informational material on measures to reduce the risk of forest fires.**

### ❖ Rapid response – detect and extinguish fires early

It is important to be able to detect fires early and dispatch firefighters quickly. Early resource allocation in areas with high damage potential reduces the risk of the fire growing out of control. Many also emphasize the importance of collaboration between rescue services, civil defense and forest owners at an initial stage and that cooperation between the actors working to put out the fire should be as effective as possible.

**RECOMMENDATION: Exchange experience and cooperate to identify and control fires. Cooperate to educate stakeholders about fire detection and how to extinguish fire or call proper resources. This work should start with a pilot study to generate suggestions on how a main project can be designed.**

### ❖ Increase emergency services’ knowledge of forests

All Nordic countries provide forest fire training for rescue personnel. Sweden and Norway, the countries most affected by the forest fires,

particularly highlight the need for both increased education and more and expanded exercises to manage forest fires more effectively.

**RECOMMENDATION: Extend forest fire training for rescue services, at both operational and management levels, at national and Nordic scales. The work should start with a pilot study to produce suggestions on how a main project can be designed.**

### ❖ The entire forest sector has a responsibility

Voluntary organizations, the armed forces and forest users have insufficient training in managing forest fires. Associations for these players are now demanding joint safety and risk training exercises for fire personnel who are deployed in forest fires. Landowners and the forest industry are demanding education and training in forest fire extinguishing and everyone who clears or otherwise works in fire-stricken areas needs safety training.

**RECOMMENDATION: Extend forest fire training for voluntary organizations, the armed forces, landowners and forest users. The work should begin with a pilot study to inform the design of a larger project.**

### ❖ Long-term forest management is crucial

Long-term forest management efforts and increased knowledge of forest management as a fire prevention initiative are a crucial for limiting future forest fires and their effects. Better knowledge of forest planning and management is needed to reduce the long-term risk of fires and fire effects. Furthermore, conflicting objectives in production economics, biodiversity, landscape planning and fire risk needs to be managed.

Long-term forest management efforts are important to limit all types of fires, but crucial in 'mega-fires' that cannot be extinguished by human intervention. Climate change is expected to increase the occurrence of mega-fires, while these fires feed back into global warming. In a future with more extreme weather in the Nordic countries, it is possible that mega-fires may occur here, and therefore knowledge about this type of fire needs to be increased and preventive measures implemented.

Nordic countries differ in their knowledge about how different forest management methods affect fire risk, opening opportunities for stronger exchange of knowledge at both industrial and governmental levels.

**RECOMMENDATION: Exchange knowledge within the Nordic countries to increase understanding of long-term forest management efforts' potential to prevent and minimize the effects of forest fires, and discuss how joint Nordic research efforts on long-term forest management issues can be designed in relation to extreme weather and fires.**

Under the leadership of the working group, a number of suggestions for areas of Nordic co-operation have emerged within the scope of the emergency services:



### Suggestions within the framework of rescue service work

- **Joint analyses and evaluations from the 2018 forest fires.**
- **Common terminology and material standards.**
- **Better collaboration when fires happen:**
  - Increased knowledge of organizational structures, routines and regulations
  - A clear order of priority when forest fires affect several Nordic countries at the same time
  - Increased knowledge of national governance structures and the capabilities of the various response forces
  - Joint Nordic rescue leader training plus exercises and training in countries' systems for community protection and preparedness
  - Joint contingency planning in border regions
  - A Nordic project involving several sectors, such as emergency services, forestry, health care and the environmental sector
  - Creation of a uniform management system to facilitate cooperation among different firefighting forces on large fires
  - Review existing agreements between the Nordic countries on forest firefighting, and analyze how international forest fire efforts can be streamlined within existing agreements and how these agreements could be developed