Cooperation initiatives between the forestry sector and fire suppression services in the Nordic region
Best practice examples and knowledge sharing
Introduction

Forest fires are a pressing matter in the Nordic countries, highlighted by the summer of 2018 with its extensive fires in the region. The unprecedented fire intensity and consequent damage raised awareness of the severity of the escalating fires and mobilised a range of efforts to tackle the issue.

The complexity of forest fire interventions is partly due to the large number of actors involved, ranging from forest workers to fire suppression services, local, regional, and national governments, and individual citizens. Joint actions and cross-sector cooperation are therefore needed to create effective fire prevention, and structures for these interactions and cooperation are required to create synergies among the involved actors.

Two key actors in preventing ignition and intensification of fires are the forestry sector and fire suppression services. The forestry sector gathers considerable silvicultural equipment, forestry expertise and know-how, local topographic knowledge as well as a network which can provide essential support to fire suppression services. Fire departments, on the other hand, are an evident necessity to prevent and fight forest fires as they hold crucial knowledge in terms of necessary equipment and techniques. Effective and efficient collaborations between these sectors are hence vital to prepare for coming fires seasons.

The purpose of this report is to gather knowledge on cooperation initiatives between the forestry sector and fire suppression services in the Nordic region, providing best practice examples and facilitating knowledge sharing. The report focuses on Finland, Sweden, and Norway, due to their recent fire history. The information is gathered through interviews and document analysis and is structured around six case studies, two from each country.
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"Joint actions and cross-sector cooperation are needed to create effective fire prevention, and structures for these interactions and cooperation are required to create synergies among the involved actors."
Case 1: Forest inventory maps in Finland

To enhance forest fire preparedness, the Finnish Forest Centre (Metsäkeskus) has developed a local map initiative into a large-scale forest inventory map effort. To develop, improve and share maps, the Finnish Forest Centre cooperates with actors in the forestry sector, fire services, the Finnish Meteorological Institute (FMI, Ilmatieteen laitos), and power companies. Figure 1 provides an overview of central aspects of case 1.

The Finnish Forest Centre is a state-funded organisation promoting activities caring for and benefiting from forests. It advises forest owners on how to pursue a diverse array of forestry activities and manage their forest properties while ensuring conservation of the ecosystems they operate within. The organisation also collects and shares data about forests in Finland. Part of the data collection efforts focuses on monitoring the enforcement of forest legislation by public and private entities.

Case description: Forest inventory maps in Finland

The use of forest maps to prevent and manage forest fires comes from an individual initiative by a fire chief in North Karelia. The interest of this one person developed into a collaboration between the fire service and the FMI, gathering professionals with strong competences in geographic information systems (GIS) tools. The Finnish Forest Centre then developed the initiative into a larger scale effort to develop and share forest inventory maps.

Today the Finnish Forest Centre maintains a network of multiple actors (listed in the figure below) sharing knowledge, data, and maps to enable effective responses to forest fires. Facilitating information sharing through maps allows the actors to better understand local conditions and hence facilitate their fire preparedness and firefighting efforts. Besides its focus on forest fires, the network also works with storms.

The maps are developed by the company Arbonaut Ltd. and are based on data provided by the Finnish Forest Centre. The maps contain information on the forest canopy, such as canopy mass, canopy density, tree species as well as ground elevation and flamma-
ble areas (see an example in Figure 2). This type of data is crucial for fire suppression as it can help firefighting services understand how the fire may spread and with what intensity. The maps thereby facilitate more efficient and safer fire suppression efforts.

Current efforts are directed toward making the maps easily available on mobile phones, tablets, and computers. Efforts are also taken to make the maps easily accessible offline so that they can be used in the field. The fire services also provide regular feedback on the maps to ensure a continuous improvement.

The map development is funded by the regional council of North Karelia, the Centre for Economic Development, Transport and the Environment, the Fire Protection Fund and the Ministry of Agriculture and Forestry. Up to this day, it has been organised in the form of projects and has only involved a limited number of individuals at a time. The network currently has four pilot map projects underway, and the centre is implementing cost evaluations to discuss a potential yearly budget with the government.

**Challenges and benefits**

In this case the development and sharing of maps emanated from a fire chief. Fire services therefore play a central role, collaborating closely with the Finnish forest sector in improving the accessibility of the maps. Moreover, members of the network are already aware of the need to work on forest fire preparedness and this mindset has been reinforced by the 2018 fire season.

The organisational form and culture of the fire services can however represent a challenge to collaboration with the forest sector. The fire services are a fragmented organisation with local divisions, which means that the map sharing efforts need to be implemented within 22 different organizational units. Cultural differences between the Finnish Forest Centre and the local fire service divisions are notable, which is another aspect requiring adaptability.

Further, securing a budget is a central issue to ensure future map sharing activities. There may however be a potential solution to the funding issue since the maps are considered crucial for forest municipalities for which a fire would be more costly than investing in preventive measures such as maps.

**Further information**

[ Finnish Forest Centre](#)
[ Emergency Services Academy Finland (Pelastusopisto)](#)
Case studies

Case 2: Forest fire warning services in Finland

The Finnish Meteorological Institute’s (FMI, Ilmatieteen laitos) meteorological data is important to detect early signs of fire risk. The FMI therefore shares forest fire risk warnings with actors impacted by forest fires. To issue its forest fire warnings, the FMI works with regional fire departments as well as administrative entities such as the Ministry of the Interior, and regional state administrative agencies. The FMI also collaborates with aviation clubs to operate fire monitoring. Figure 3 provides an overview of central aspects of case 2.

The FMI is a governmental agency gathering and reporting Finnish weather, sea and air quality data and forecasts. The institute’s expertise also extends to producing research data and observations on the atmosphere, near space, and seas. The FMI also engages in international collaborations, notably through the production of observational data and weather forecasts.

Case description: Forest fire warning services in Finland

To implement its forest fire warnings, the FMI cooperates with multiple actors from various sectors. Figure 4 (next page) gives a graphic description of the FMI’s framework of proactive interactions in the context of forest fire services. The FMI’s forest fire warnings are the result of an automatised process and are sent to the public as well as the Emergency Services Academy Finland (Pelastusopisto), fire services, and the Statistical Data System for Finnish Rescue Services and Applications for Fire Prevention (PRONTO, Pelastustoimen ressurssi- ja onnettomuustilasto) as soon as a risk situation is identified. Forest fire risk is assessed by measuring aerial and satellite observations with an index developed by the FMI.

The FMI developed its Forest Fire Index (FFI) as well as its Crown Fire Index with their volumetric moisture model based on field measurements of the soil moisture (temperature, humidity, precipitation...)

Figure 3 A graphical overview of the organisation of case 2.
The FMI identified aspects of the index which correspond to increased risk conditions for forest fires. The monitoring of soil moisture, temperature and precipitation is implemented by using aerial and satellite (NOAA-20 and Suomi NPP) observations. The monitoring data is received and analysed by FMI’s arctic space centre in Sodankylä. If a fire risk is identified, warnings are sent. In the event of fires, firefighting drones can also be deployed to gather data and allow better situational awareness.

The monitoring data is checked daily and forest fire warnings are issued when the risk area of the index is reached. Collaboration with the Emergency Response Centre Agency and fire services ensures that when a fire risk is identified, open fires (campfires, barbecues etc.) are immediately prohibited. Additionally, information is communicated on TV and radio broadcasts.

Challenges and benefits
The forest fire risk warnings benefit greatly from digitalisation. The monitoring activities are being developed and automated, which ensures a continuous flow of information as well as regular updates and alarms. Moreover, further machine learning solutions are being developed to deepen the benefits of automation.

A potential development for the forest fire warning services would be to combine the FFI with forest maps produced by the Finnish Forest Centre to increase local detail.

Further information
FMI
Case studies

Case 3: Forest Fire Advisory Board in Norway

After devastating forest fires in southern Norway in the late 1970s, the Norwegian Forest Fire Advisory Board was established in 1985. The initiative to form this board came from the Norwegian Directorate for Civil Protection (DSB, Direktoratet for samfunnssikkerhet og beredskap) and the national forest insurance company Skogbrand. The Forest Fire Advisory Board consists of forest owners’ associations, interest organisations, member organisations, as well as a forest insurance mutual company. Involved actors from the safety and rescue sector include homeland security, the Norwegian civil defence, the Norwegian fire protection association, the Norwegian association of fire officers, and local fire and rescue bodies. The meteorology sector is involved through the participation of the Norwegian Meteorological Institute. Additionally, the air service sector is included through the participation of private helicopter service providers and the Norwegian air sports association. Administrative actors such as local administrations, the Minister of Agriculture and Food (Landbruks- og matdepartementet), and Landbruksdirektoratet also take part in the collaboration. Figure 5 provides an overview of central aspects of case 3.

DSB is a Norwegian governmental agency. It aims to protect the country and its citizens against disasters and accidents. To do so, DSB focuses on prevention, collaboration, crisis management, and knowledge creation about risk and vulnerabilities in society (studies, analyses, evaluations).

Case description: Forest Fire Advisory Board in Norway

The purpose of the Forest Fire Advisory Board is to bring relevant sectors closer together and give advice to the fire authorities in terms of forest fire prevention and preparedness. The Board evaluates forest fire incidents in Norway and promotes international forest fire exchange programs, aiming to implement new ideas and systems that can help reduce forest fire risk.

Figure 5 Graphical overview of the organisation of case 3.
in Norway. Since 1985 the collaboration has grown notably as more actors joined the Board. A further extension is currently in progress to include storm prevention services. This change will involve the inclusion of sectors such as electricity, road authorities, railway authorities as well as police forces.

The goal of the Forest Fire Advisory Board is to discuss readiness and preparedness for forest fires and storms as well as give advice to DSB. Bringing relevant sectors together create familiarity and closeness amongst its members so that in case of emergencies, synergies can be set more effectively. It is through recurrent communication that effective communication is created, and members feel comfortable enough to engage in open dialogue. This process helps to prevent occupational and organisational separations.

Sharing knowledge and data is a crucial task for forest fire prevention and requires input from various actors. Therefore, the Forest Fire Advisory Board, in parallel to its focus on bringing actors together, is devoted to map development and knowledge sharing. To develop the maps (exemplified in Figure 6), the board involves several actors. For instance, the forest sector which has updated maps of forest resources that in-
include all new forest roads, soil moisture, site indices, etc, as well as the Norwegian institute for bioeconomy (NIBIO, Norsk institutt for bioøkonomi) which develops soil moisture maps.

Members of the Forest Fire Advisory Board meet three times per year. Before, during, and after each fire season. The Board has a small budget assigned by DSB. Meetings are sometimes held at different members’ organisations to further encourage familiarity among members as well as create understanding about the structure of each member organisation. The meetings are transcribed and shared with all members, each meeting is an occasion to ask questions (members are invited to send questions to be added to the agenda before each meeting) and assign responsibilities within the group.

Collaboration and responsibility sharing are inherent parts of forest fire prevention and suppression. For instance, DSB administers the governmental forest fire helicopter service. To get helicopter support, local fire departments must have staff with forest fire incident commander training. Incident commanders are fire officers with special training and experience in fighting forest fires. This ensures effective use of aeronautical resources.

Challenges and benefits
In Norway, fire services are organised locally which means that organisational discrepancies occur between regions. It is therefore necessary to install local direct contact with each fire department to ensure their involvement in the Forest Fire Advisory Board.

As the Forest Fire Advisory Board has been running for some time, benefits are already notable. The Board has become an umbrella organisation which brings the members closer together without undermining each sector’s competences and expertise. The effects of these efforts are visible through the frequency of interactions and increased collaboration when emergencies occur. Members are less hesitant to contact other organisations which leads to reduced time in setting up responsive collaborative actions and information transfer. Moreover, an extensive handbook was produced to inspire and guide municipalities wishing to set up volunteer forest fire reserves.

Further information
DSB
DSB (2020). HÅNDBOK Etablering av skogbrandtropper
DSB, Skogbrand (2021). Guidelines for forest management during the forest fire season
Nibio: Digitale skogkart gir unike muligheter for skognæringen - Nibio
Case studies

Case 4: Multilevel prevention and preparedness in Norway

To address forest fire preparedness, Skogbrand implemented a multi-level cooperation initiative in which it works closely with research institutions, forest owners, forest organisations and public authorities. Figure 7 provides an overview of central aspects of case 4. Skogbrand is an independent mutual insurance company funded by forest owners in 1912. It currently insures 40,000 forest properties. The group gathers its efforts around insurance of property, injury insurance and awareness raising and support for prevention of forest fires.

Case description: Multilevel prevention and preparedness in Norway

Skogbrand focuses on prevention and preparedness throughout Norway. They target actors of varying types, from public authorities and research institutions to forest owners and forest organisations.

Activities arranged by Skogbrand include courses, agreements, and awareness and prevention campaigns.

Figure 8 (next page) gives a graphical description of Skogbrand’s forest fire prevention work.

In collaboration with the Forestry Course Institute (Skogbrukets kursinstitutt) and several fire brigades, Skogbrand provides forest fire courses for forest entrepreneurs and machine operators. The goal of the courses is to teach participants how to avoid starting fires while working, to extinguish small fires and contribute to the response to larger fires, for example through the creation of fire breaks. In parallel, Skogbrand is developing online courses. These courses are tailored to contractors and forest owners, and the courses cover topics such as forest fire theory, responsibility, preventive measures, contingency plans, and insurance.

Additionally, other potential target groups are under discussion and potential courses are being considered for volunteer reserve firefighters.

Skogbrand is also working with various actors in the

Figure 7 A graphical overview of the organisation of case 4.
forest and fire safety sectors to implement regional and national standard agreements and management support schemes. For instance, resources from the forest sector, available for support in case of forest fires, are listed in the agreements. Moreover, responsibilities, roles and tasks are assigned to interested parties so that response plans are organised around an effective division of labour.

Skogbrand’s efforts also target the public which is considered a key group of actors in forest fire prevention. For instance, the Skogensbrannvoktere campaign aims to spread awareness among families with children. Further developments of Skogbrand’s activities, as well as the creation of a website, are underway. General campaigns are also supported by the creation of alert material (e.g. beach flags and banners) for risk areas and when fire hazard is heightened. It is also possible to print posters directly from Skogbrand’s website.

**Challenges and benefits**

Skogbrand’s approach is focused on preparedness. It therefore aims to create communication channels, as well as formalised processes known by involved actors before emergency situations occur. Through pre-emptive collaboration, initiatives also create awareness between the fire sector, the forest sector, and the public. In turn, this encourages regular updates between actors as well as exchanges of ideas and practices.

**Further information**

[Skogbrand](https://skogbrand.no/en/)

[Skogbrand (2022). Forest fire prevention](https://skogbrand.no/en/)

[Forest fire courses for forest entrepreneurs and machine operators](https://skogbrand.no/en/)
Case studies

Case 5: Data sharing and awareness raising in Sweden

In its effort to raise awareness and provide firefighting services with data and support, the Swedish Forest Agency (Skogsstyrelsen) has established a network of actors involved in the forestry sector and firefighting services. This network is devoted to sharing maps and data and to raise awareness. Figure 9 provides an overview of central aspects of case 5.

The Swedish Forest Agency is an authority focusing on forests. Its goal is to ensure forest management adapted to national policies and the balance between sustainability and production perspectives. Special focus is also given to local anchoring and a proactive attitude, enabled by digitalisation.

Case description: Data sharing and awareness raising in Sweden

The data sharing and awareness raising initiative began in the summer of 2021, focusing on three core areas within the Swedish Forest Agency, namely digital information, equipment, and network sharing. The Swedish Forest Agency has a vast knowledge of forest maps and an extensive experience in mapping forest damage (Figure 10 gives an example of a map developed by the Swedish Forest Agency). The Agency also has equipment such as drones which can be used by fire services. Finally, over the years, The Agency has grown a network of local forest damage coordinators (lokal skogsskadesamordnare) as well as contacts involved with forests and fire. It has therefore planned to create ties between contacts of this network to create new cooperative projects and synergies.

Efforts are directed toward raising awareness and motivation which are deemed crucial for the initiative to progress and gain momentum. To this effect, local coordinators have been given the responsibility to make contact with local fire services. Future integration tasks are anticipated in terms of making data available for actors working with different operating systems and platforms.
Figure 10 Forest map visualisation example (Swedish Forest Agency, 2021)

Map symbols
- Forest boundaries
- Felling notification
- Performed felling
  - Felling year is missing
  - Older felling >10 years
  - Felling 3-10 years
  - Recent felling 1-3 years
- Area of cultural importance
- Natural area

Transparency

Gradient

Satellite ortophoto

Volume of forest in cubic meters/hectare
There is currently no officially-assigned budget or time plan and the task is therefore included in the budget assigned by the Swedish Forest Agency for forest damage. To this date, the Swedish Forest Agency leads this initiative. Efforts are however directed toward further including the Swedish Civil Contingencies Agency (MSB, Myndigheten för samhällsskydd och beredskap).

**Challenges and opportunities**
Local context is important for forest issues including the organization of fire services. Each region is organised in an independent way. Discrepancies in term of awareness as well as in terms of systems used are therefore observed between regions. Consequently, expected challenges can be categorised as both organisational and technical.

**Further information**
The Swedish Forest Agency
Forest maps (The Swedish Forest Agency, 2022)
WebMap service (WMS) display service
REST viewing service
Data download Landslides (Ras&skred)
Download of raster data FTP

**Sweden Case 5**

![Sweden Case 5 Image]
Case 6: Preparedness, guidelines, and R&D in Sweden

To address forest fire preparedness and improve cooperation, Skogforsk organises various working groups, shares data, and leads R&D activities. Involved actors consist of forestry companies of varying sizes, forest entrepreneurs, as well as groups of local forest owners. Fire services are another key actor in the case, as they gather all the expertise in terms of response to fire. International actors are also involved. For example, Norway has collaborated with Skogforsk since 2015. Figure 11 provides an overview of the central aspects of case 5.

Skogforsk is the forestry research institute of Sweden. Its area of research expands from forest production and management to forest machinery. The institute also pays particular attention to environmental protection. Forest companies and forest owner associations are traditionally involved with Skogforsk as they are at the core of their research and directly benefit from it.

Case description: Preparedness, guidelines, and R&D in Sweden

After the devastating 2014 fires in Västmanland, several points of friction within the forestry sector were identified. For example, overlapping guidelines amongst companies led to confusion regarding responsibility assignment. Therefore, a need for national guidelines for the sector as whole emerged. Consequently, AG Brand was formed in 2015 with the aim to instigate guideline standardisation, as well as data gathering and networking efforts.

The aim of AG Brand is to work toward preparedness and to ensure that decisions are made at a local level where on-the-ground knowledge is the most developed. Skogforsk considers that risk evaluation and field-related knowledge to be extremely localised. Decisions should therefore be taken locally aside from...
general agreements which should involve all relevant actors nationally.

AG Brand is organised around 11 areas: responsibility, planning, fire risk, consultation, equipment, competency, observations, communication, alarm procedures, site directive, and firefighting. A responsible person and a group of experts is assigned to each. The areas are however not strictly separated, so some are therefore joined in the same working groups and vertical communication is implemented overall (Figure 12 gives an example of various projects led by the working groups). Meeting recurrence varies on a project basis aside from two annual general meetings before and after the fire season.

Another approach embraced by AG Brand is creating partnerships and communication at an international level. Exchanges occur with actors in Norway and to a lesser extent, with actors in Finland, the USA and Canada. Plans are underway to strengthen existing cooperation and potentially extend the network of co-operators to Baltic countries and Russia.

Challenges and opportunities
Forest fire preparedness is a field with fuzzy boundaries when it comes to responsibility assignment. In the case of AG Brand, it is essential to balance the concerns of the financing sources, central actors, and society around the common goal of preventing forest fires. In a similar fashion, interests of the numerous actors involved vary greatly. It is therefore considered crucial to create a balance between, amongst others, digitalisation solutions, forest management and regulatory solutions.

AG Brand has the ambition to create industry-wide guidelines and gather as many actors working in the silvicultural sector as possible, implying that the activities will scale up. Another important aspect is unexpected challenges related to the impact of AG Brand. An illustrative example is shortages in recommended equipment: in 2017 a guideline was implemented regarding equipping forestry machinery with fire extinguishers which led to shortages in the market.

Another difficulty for a national network operating in this area is the tension between national cohesion and varying local contexts. On one hand, there is a need for national guidelines to create cohesion and standardisation of procedures nationwide. On the other hand, particular attention should be given to the importance of the local context as well as the strength and importance of local decision making for fire services. It is therefore necessary to combine national guidelines for the forestry sector with the promotion of local interest and motivation through a bottom-up approach for partners such as fire departments.

Finally, international communication is deemed crucial to exchange knowledge and best practices. Communication with other specialist groups is considered key to build effective practices. Such initiatives however take time to build as finding partners with suitable expertise is a time-consuming activity. However, AG Brand has already produced tangible results to improve cooperation. For instance, it instigated a project which led to the development and production of loading ramps to enable forestry machinery to load and transport firefighting equipment and water tanks.

Further information

Skogforsk
Trends and takeaways

**Identified common trends**

Several patterns emerge from the presented case studies. Notably, two types of structures have been identified. Some initiatives are organised around information-holding entities which cooperate to adapt their data and share it with benefiting parties. After reaching a certain level of maturity, additional networking and development activities can occur to complement the knowledge shared between involved parties. This type of initiative is illustrated in three of our case studies:

**Finland, case 1: Network building and forest inventory**
- Efforts led by the Finnish Forest Centre focus on sharing their forest inventory maps with fire services. Moreover, a network of actors is maintained to enable quick and effective response to forest fires.

**Finland, case 2: Forest fire warning services**
- The Finnish Meteorological Institute used its existing expertise and monitoring equipment to craft its Forest Fire Index. Based on this index, the FMI transmits fire risk warnings to the public as well as fire services in Finland.

**Norway, case 4: Multilevel prevention and preparedness**
- Skogbrand cooperates with other actors to provide forest entrepreneurs and machine operators with
courses in forest fire prevention, theory, responsibility, etc. It also organises prevention and awareness campaigns targeting the public and children. Additionally, Skogbrand works together with its network to implement regional and national standard agreements as well as management support schemes.

There are also initiatives structured around entities which create new knowledge, rules, and practices through facilitation of cooperation. It is important to note that such cases can also be initiated by an information-holding entity. However, they revolve around a more circular organisation of work as well as joint production of knowledge or developments. The three following cases illustrate this category:

Norway, case 3: Network building and knowledge sharing
● The Norwegian Directorate for Civil Protection (DSB) is building an extensive forest and fire actors’ network. It organises frequent meetings to create familiarity and closeness within the group. Further, it shares maps provided by several forest actors.

Sweden, case 5: Data sharing and awareness raising
● The Swedish Forest Agency initiated a project to bring together actors in cooperative responses to forest fires. To do so, it focuses on raising awareness and interest through a network of local forest damage coordinators.

Sweden, case 6: Preparedness, guidelines, and R&D
● AG Brand is working toward gathering actors involved in forestry and fire services around various working groups and focus areas. It therefore facilitates the implementation of R&D projects and intensifies networking among interested parties.

Most cases also highlight the importance of the local knowledge, expertise, and resources gathered within the forest sector.

Actors demonstrated awareness of the critical role that actors in the forest sector can play in times of crisis. Many solutions indeed revolve around the improvement and/or dissemination of maps by the forestry sector.

Finally, it is important to note that responsibility for fire-related issues seems to be rather diffuse. Indeed, in the majority of the cases, no organisation seems to have an overall responsibility for forest fire prevention regionally or nationally. Rather, it appears that spontaneous initiatives tend to develop into a bigger scale and that roadmaps and tasks are fine-tuned over time. This is made possible by the use of networks and various actors.
Challenges

As mentioned previously, cooperation between fire services and the forestry sector involves entities with varying organisational cultures as well as a wide array of local specificities. Such initiatives therefore require considerable flexibility from actors and structures involved. Dialogues need to be adapted locally, regionally, and nationally with changing levels of detail and frequency of communication. It is important to balance potential national rules and communication networks with the importance of the local responsiveness and knowledge. Moreover, adaptability is required between regions as topographies, forests, and fire services vary greatly regionally.

Budget shortfalls also appear to be an important hurdle to many cases. It is important to note the diversity of strategies observed in the presented case studies. On one hand, some organisations structure their work with a rather informal allocation of time to the initiative. On the other hand, some organisations focus on securing regional funding for their projects. This appears to be a crucial aspect of collaborative work as it directly impacts the frequency of meetings, production of work and communication resources.

General awareness is another critical aspect of collaborative work. It is considered to directly impact individual motivation to invest time and efforts in projects as well as public receptiveness to preventive measures and guidelines. An interesting effect of the devastating 2018 fire season mentioned in interviews has been increased awareness throughout the Nordic countries. It can be recommended to look for measures to maintain such a level of interest from local actors and the public.
Concluding remarks

Initiatives vary greatly in terms of size, resources, and focal points. However, general trends are also observed. Information sharing appears to be a crucial activity for cooperation. Moreover, individuals are a key element in the described cases. This is reflected amongst others in the prevalence of bottom-up and grassroots initiatives in our sample of case studies. It appears that local projects have the potential to develop into nation-wide schemes. Finally, internationalisation appears to be an enabling element, allowing valuable exchange of knowledge as well as network building.