



Food and Agriculture Organization
of the United Nations



6. Workshop of the working group 2 (WGII) « Hazards and disaster risk management in Mountains »

Of the Working Party on the Management of Mountain Watersheds (WPMW) of the European Forestry Commission (EFC).

Report

The Working Group II Leaders are pleased to announce the sixth practitioners' workshop:

***Loss of Protection Function of Forests due to Storm Events with
a Focus on Avalanches***

Online (Zoom) – hosted by Austria

Date: November 29th– 30th, 2022



Fig. 1: After the Storm Event “Vaia”, 2018

Context

Following the implementation of the WGII activities and according to the workplan, the 6th workshop is addressed to the loss of the protection function of forests due to storm events in alpine watersheds.

Based on a case study, participants discussed the effect of forestry measures and technical constructions after storm events with a focus on avalanches. A special priority was to include secondary hazards e.g. enormous bark beetle populations in climate-change caused warmer summers and longer droughts.

Due to COVID19-caused multiple postponed workshops, the 6th workshop was held online. The host endeavored to give a most vivid virtual impression of the case study, using 3D- Models, pictures and technical maps.

Objective

The aim of the workshop was the discussion and exchange on the loss of the protection function of forests after storm events in mountainous protection forests. Heavy snowfall-events and an extreme increase of bark beetle populations favored by climate change endangered the protection forests and living space in the Alps now and increasingly in the future.

Specific objectives

- Compare methodologies, approaches and structures implemented by the countries for the addressed issue.
- Develop a common proposal on a case study.

Agenda

29th Nov. 2022 - day 1

- 13:30 Welcome words by Gebhard Walter (Director of the Provincial Department of Tirol of the Austrian Torrent and Avalanche Control),
Introduction by the WG2 Co-Leaders
- 14:00 Introduction of participants
- 14:30 Presentation of the detailed program and objectives of the workshop
- 14:40 General presentation of the region and overview on the case study
- 14:55 Formation of groups
- 15:00 Coffee break
- 15:15 Group work in break-out-sessions: Develop a concept for the case study
- 17:30

30th Nov. 2022 - day 2

- 9:00 Presentation of the group results
- 10:30 Coffee break
- 11:00 Measures started by Austria in the case study area
- 11:15 Elaboration of common recommendations and final discussions
- 12:00 Feedback
- 12:15 Closure of the 6th Workshop
- 12:30

Participants

#	Name	Country	Institution
1	Alison Evans	France	Office National des Forêts (ONF)- Service RTM-74
2	Marie-Pierre Michaud	France	Office National des Forêts (ONF)- Service RTM-05
3	Olivier Lamy	France	Office National des Forêts (ONF)- Service RTM-73
4	Benjamin Geraud	France	Office National des Forêts (ONF)- Service RTM-09/31
5	Simon Carlados	France	France Office National des Forêts (ONF) - DRN
6	Caroline Brobecker	France	Office National des Forêts (ONF) - Service RTM-74
7	Stephane Nouguier	France	Office National des Forêts (ONF)-Service RTM-66/11
8	Leopold Stepanek	Austria	Service for torrent and avalanche control Provincial Department Tirol
9	Josef Christern	Austria	Service for torrent and avalanche control Regional Department Bregenz
10	Thomas Fink	Austria	Federal Ministry for Agriculture, Forestry, Regions and Water Management Directorate for Torrent and Avalanche Control and Protection Forest Policy
11	Karem Del Castillo Velazquez (1 st day)	Austria	Food and Agriculture Organization of the United Nations (FAO)



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Inclination Map

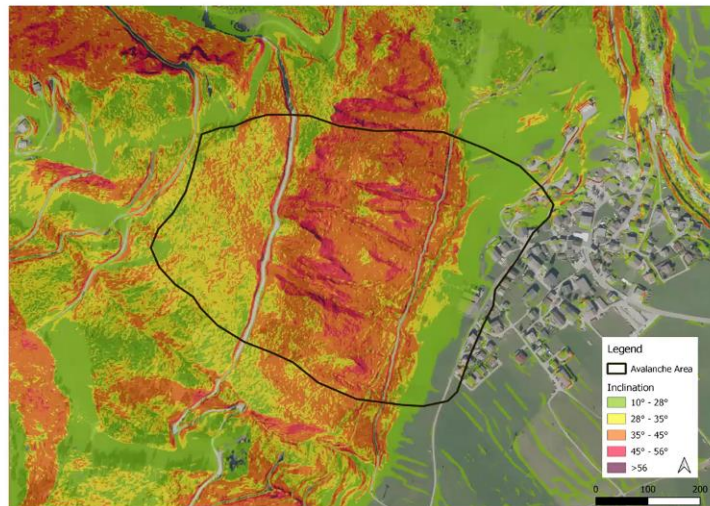


Fig. 2: Screenshot during the “Overview on the case study”

Case study “Kals am Großglockner”

After the introduction of the study case, the participants worked in groups on a concept for measures to be taken after the storm event “Vaia” in 2018.

The study area “Dorfer Berg” (elevation 1400m to 1820m a.s.l.) next to Kals in the Tyrolean district Osttirol has been treated with care for centuries. The inhabitants of Kals knew that this forest protected them against big avalanches and rockfall. Small avalanches from the few gullies within the forest made them understand that life in the settlement would be hazardous without the forest.

The commonly owned forest was therefore managed by the agricultural community. Larch (*larix decidua*), spruce (*picea abies*) and pine (*pinus sylvestris*) was harvested in traditional fashion in small clear cuts to sustainably regenerate the area.

Historically, no extreme avalanche events occurred in the study area, only infrequent smaller events, mainly from the gullies, reaching the pastures between settlement and forest. From neighboring avalanche areas extending the timber line, extreme events in 1951 and 1975 and many smaller events have been documented.

The storm event “Vaia” (Oct. 29, 2018 to Nov. 1, 2018), which affected northeaster Italian and bordering southwestern Austrian provinces, hit Kals very hard.

With wind speeds of more than 200 km/h, “Vaia” deforested most of the SE-facing slopes of the Kals valley, uprooting not only spruce, but also pine and larch trees.

The cyclones “Ingmar” (Nov. 14 to 17, 2019) and “Virpy” (Dec. 6, 2020) brought huge masses of wet snow, the latter in combination with wind speeds of more than 140 km/h, leading to snapped off treetops and trunks spread all over the remaining forest in the district.

As a result of the events, a steadily growing bark beetle population sealed the fate of the forest disaster.

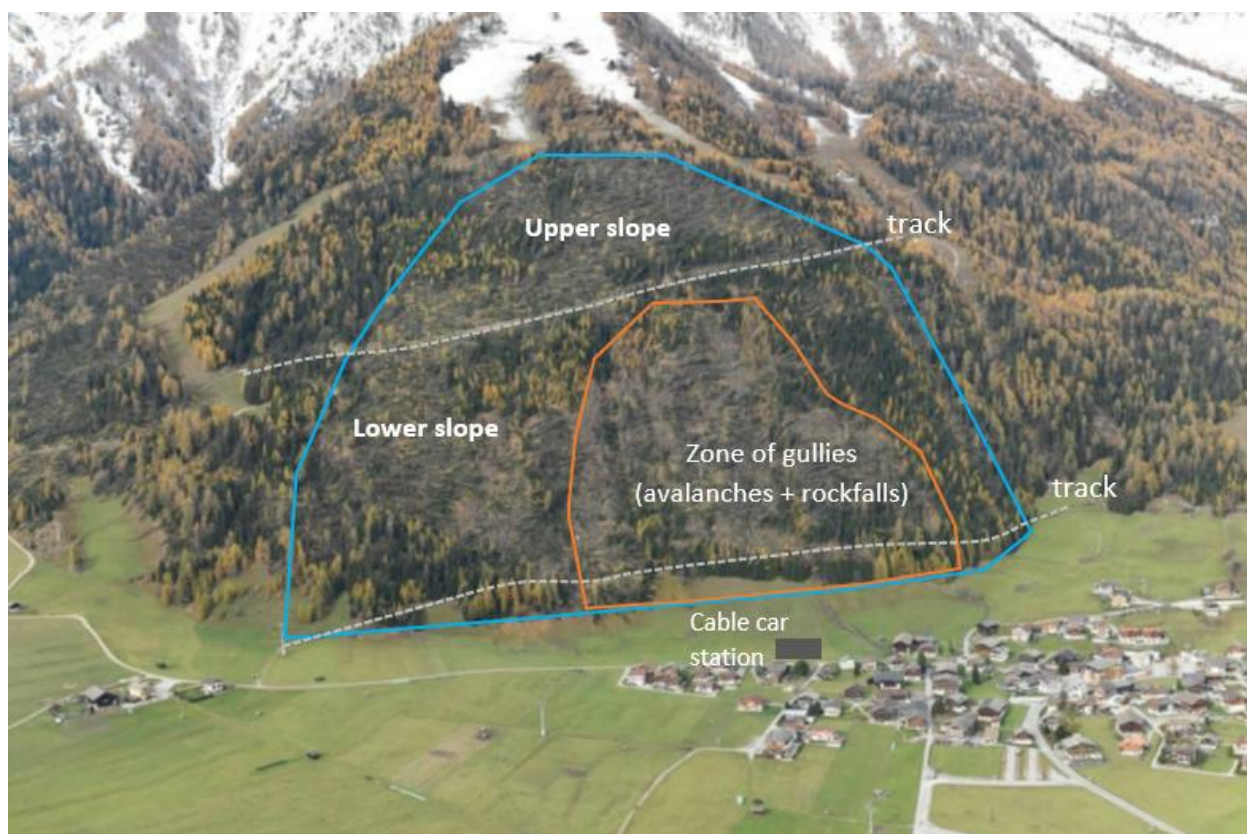


Fig. 3: Case study area, 2015 => 2020 => 2021

Results Group 1

The group decided to work on this study case considering 2 main events out of the 4 major events that struck the study zone between 2018 and 2020. We considered the period directly after the storm Vaia, and a situation grouping the effects of the storms “Ingmar” (2019) and “Virpy” (2020) which caused the fall of most remaining trees.

The list of actions¹ that are summarized below, form the concept we developed for this case.



Area of the case study after Vaia, 2018

Step 1: After Vaia:

Lower slope

Harvest maximum of fallen trees:

- Positive: regeneration
- Positive: mitigation measures

¹ **Note:** Color reading code

- In green: forest management measures
- In blue: technical measures
- In orange: measures concerning “land users” in, and around, the study area

- Negative: soil nutrition
- Negative: Reduction of roughness

Leave high stumps

When trees have been uprooted, bring roots back into position to prevent remobilization in the slopes.

Privilege Hard wood species (rock fall).

Install emergency mitigation measures (road at the bottom), preferably nets (combined function rock fall + avalanche)

Upper slope:

Remove wood, not immediately, but within a year (bark beetle problem)

Prevent skiers from skiing in the study area (fences, posters)

Step 2: After Ingmar/Virpy:

If all measures cannot be taken immediately, leave wood on the slopes. If small events occur, they can be mitigated by the emergency measures already taken. The rest of the fallen trees must be removed before the following summer.

Replanting in diamond shaped structure with protective tripods.

Change of species (introduce pinus, less picea, less larix, some hardwood).

Natural regeneration on remaining site.

Install permanent mitigation measures (life span until new forest is strong enough to take over) to protect settlement and afforestation.

Protection for cable car station (evacuation is also a possibility).

Awareness raising with hunters, to help protect regeneration and afforestation.

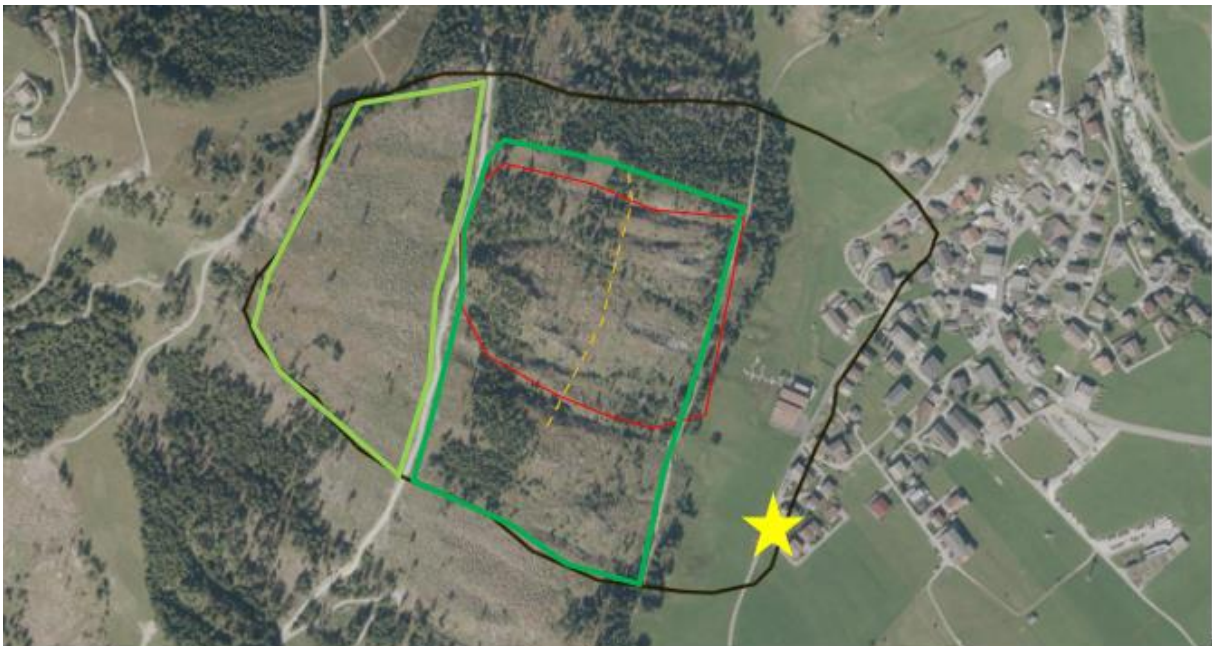
Results Group 2

Basic assumption: occasional rockfalls - rocky outcrops in the slope.

Action 1 :

Because of the risk of bark beetle attack, systematic exploitation, and removal of the wood, with maintenance of a few debarked stems wedged behind high stumps to limit rockfalls and snow cover creep.

If there was no risk of bark beetle attack, we could have thought of leaving the wood to create a roughness of the ground (without taking into account the economic reasoning, the landscape, the social impact...)



Action 2: Red zone - slope upstream the issues

Installation of protective structures such as a fence or net in two stages :

- upper part of the slope to limit large-scale avalanches
- lower part : we are waiting to see how the slope reacts following the first stage of work.

Caution: implementation to be specified according to the local topography, which seems to be heckled on the northern part of the slope.

Action 3: yellow star

Construction of a close protection structure such as a dyke, land levee, etc.

Action 4: Dark green area - downstream part of the road

The use of natural regeneration is preferred :

- Enclosure ? size to be specified. Precise location linked to natural dynamics.
- Increased hunting pressure ?

This option requires regular monitoring and maintenance with the community.

Action 5: Light green zone

Reforestation option in groups protected by wooden tripods. Favour a diversity of species.

Individual or collective protection.

Nota bene : impact of climate change on snowfall could influence the options chosen: increase in extreme precipitation? rise in the rain/snow limit?

Common Recommendations

General recommendations for the study area

Measures: priority depends on the protected goods: cable car station, settlement, street

Distinguish between emergency actions and longer termed actions

Emergency actions:

- Make an evacuation plan
- Technical rockfall-protection measures along the bottom road (e.g. concrete block or nets); also protects against falling logs during forestry measures
- Remove wood: priority in lower area, because there are the steeper slopes
- If possible: Take out the entire trees with the brunches; only leave some branches for soil nutrition (distinguish: soil type and erosion)
- Cross felling and debarking
- High stumps (~ 1,5 m)

Long termed actions:

- Reforestation (esp. hardwood) or natural forestation in the whole study area
- Wildlife management (incl. hunters), local protection of the trees
- Protection against free skiing in study area
- Increase diversity of tree species (climate change)
- Technical structures for stabilization of the snow cover in the avalanche starting zones
- Where trees can't be brought out of the gullies: cut them into smaller pieces (~1 m)

Feedback and evaluation

At the end of the workshop the participants were asked to give feedback on the following questions. The answers are echoed as given.

1. Please give your feedback on the organization of the online-workshop:
positive aspects / necessity for improvements
 - The format of 2 half days, turned out to be good. It was enough time for the discussions and not too long although I understand it is more difficult to get into and stay concentrated for people not too fluent in English.
 - Very well organized (thank you). For English, it is ok but it is easier on site (speaking with hands). It can be difficult for no fluent at all. And it is always interesting to be on site for on-site discussions.
 - Its' hard to concentrate in an online workshop, especially in a foreign language.
 - There is a risk of technical problems at online workshops. 3 -4 times participants fell out of the meeting (and came back after one minute).
 - I was surprised how well the group work went in the online Workshop. Nevertheless, being far from the study area and not being able to see the topography, the soils and other circumstances in person made it hard to get very specific on the results. So in the end, the online format might be considered for discussions and group work, but is definitely no substitute for working on a study area.
 - Very interesting to get some insights on the approaches of experts from other countries.
 - Improvements: In person meeting is (in my opinion) necessary in order to facilitate the total immersion into the topic and the discussions. Furthermore the exchange between the different participants after the official program is often a source of inspiration for new international engagements or simply put the most effective way of networking. The networking part is rather limited in online meetings.
 - The breakout sessions worked without any problems.
 - There were minor technical Problems, which didn't really affect the Workshop as a whole, but still gave some irritation.
 - The online workshop has the advantage of being less time-consuming than an on-site workshop. On the other hand, it is difficult for a forester to grasp the subject without having visited the site... I'm sure we'd have identified many more topics to develop after visiting the case study.
 - No problem for the splitting online. Maybe a little difficulty for formalizing the results, leaving all the hard work to one person :-)! May he be thanked!
 - breakout sessions work well
 - Online workshop will never replace a field trip!

- I have had some technical problems with the zoom application during the screen shares, thus I have not been able to see the videos or photographs of the work you did. Would have been better on site, but that worked good overall.
 - Thank you for the organization and “bravo” for your good management of these successive crises that we may encounter in our territories. I also regret the language barrier. All the best.
2. Please give your feedback on the workshop topic and content.
- Topic really interesting because it's a real new problem in mountainous areas. In the South Alps, we fear the same consequences of loss of forest cover in case of firewood, with huge problems with gully erosion and rockfall.
 - Interesting and a good thing that foresters protection colleagues are with us for it. Thank you a lot for all the prepared supports that makes it very easier.
 - Being from Austria and working for the WLW, this case study was very interesting for me as Vorarlberg has for now been lucky in terms of storm damage but I am sure that we'll have similar experiences in the future.
 - Interesting case, with a lot of questions we could encounter in our sectors. (We have similar problems in the Pyrénées with fires on our protection forests (out of control human-set fires))
3. What new topics are you interested in for future workshops?
- fires (evolution given climate change, preventing management, emergency management - a little bit the same as this year topic)
 - Appropriate hazard mapping in the prospect of climate change and an expected amplification of the intensity of events.
 - The question is also how to motivate other colleagues (not only Austrian and French people).

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