

**9th AIEAA Online Conference, 11-12 June 2020**

*"Mediterranean agriculture facing climate change: Challenges and policies"*



## **Socio-economic and institutional effects of windstorms damaging forests: preliminary observations from European cases and Vaia windstorm**

**Federica Romagnoli**, Laura Secco, Mauro Masiero,  
Paola Gatto, Davide Matteo Pettenella, Alberto Udali  
*TESAF Department, University of Padova, Legnaro (PD), Italy*

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- **Introduction – Extreme events:** general trends and a focus on forests
- **Methodological approach:** socio-economic impact assessment & cause-effects linkages
- **Socio-economic impacts** of windstorms in Europe: a preliminary overview
- Vaia storm **impacts on wood market:** preliminary assessment of Trentino region
- Conclusions

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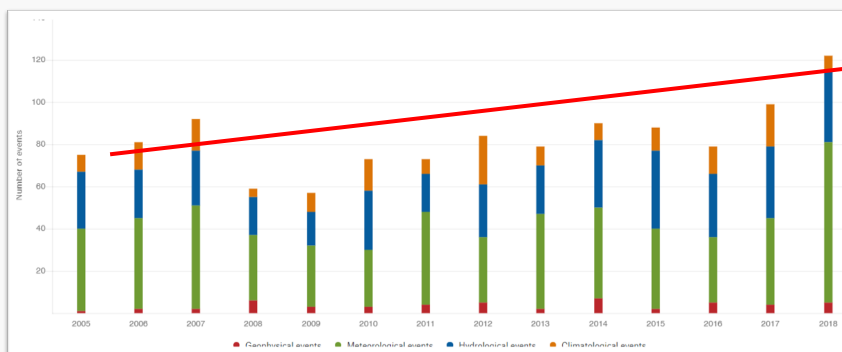
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# Natural catastrophes and extreme events: a growing trend

Number of relevant natural loss events in Europe 2005 – 2018



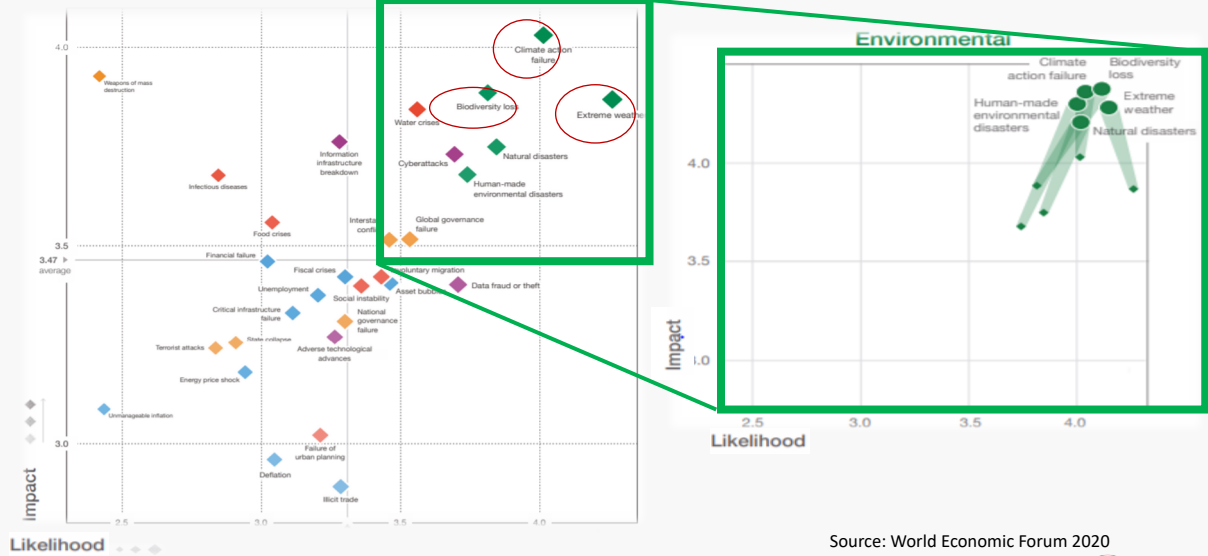
source: Munich Re,2020

*“Climate change is striking more harder and more rapidly than many expected”*

World Economic Forum 2020

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## A growing global risk perception (likelihood & impact)



Source: World Economic Forum 2020



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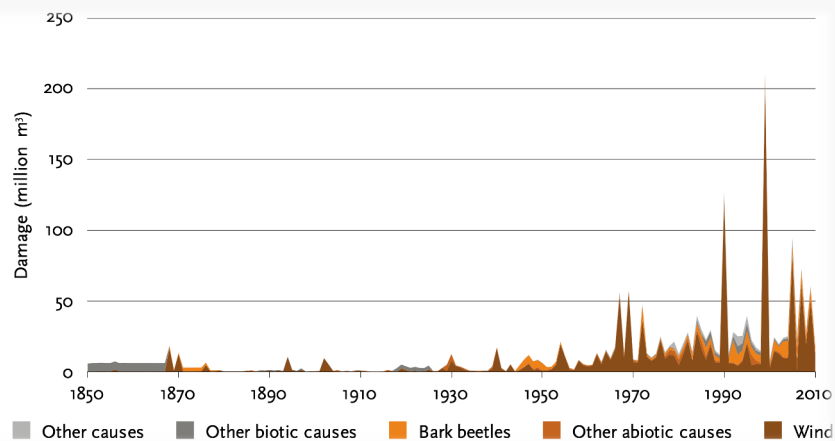


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## A focus on forest resources: trends in European Forest Damages

### Total damage occurring in European forests (million m<sup>3</sup>) due to different disturbances

The category "other causes" includes anthropogenic damage, unidentified causes and mixed causes



source: Schelhaas, 2008; Gardiner et al., 2013

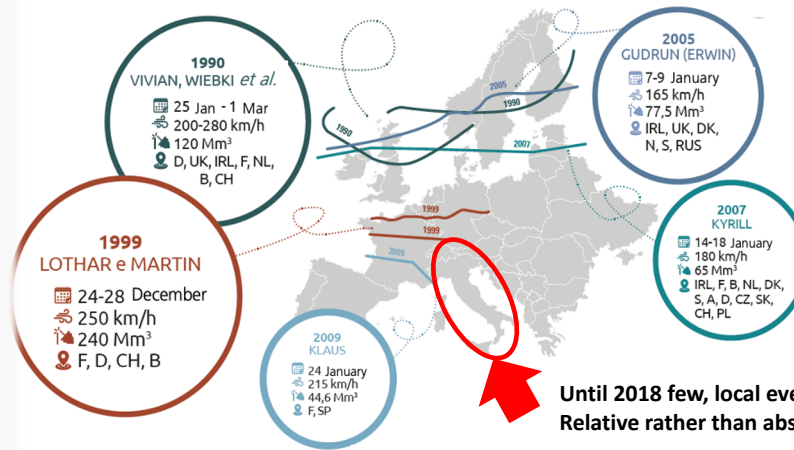


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## Most relevant recent windstorms impacting forests in Europe 1990 - 2009



Source: modified from ERSFA, 2019



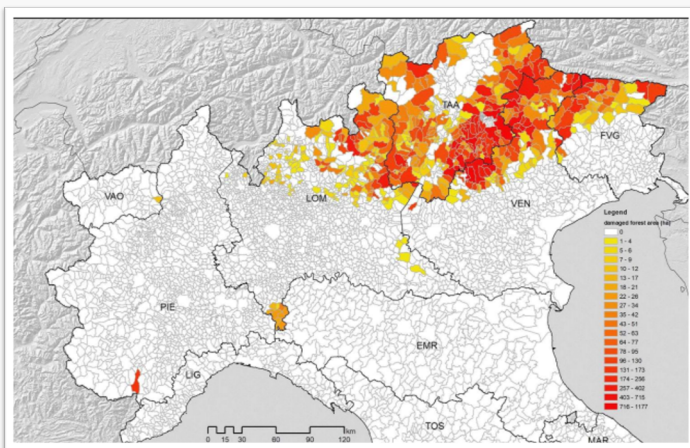
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## Vaia storm (Oct 2018): an unprecedented windstorm in Italy (1/2)



Source: Chirici *et al.*, 2019

**2018**  
**Vaia windstorm**

- 29-30 October
- > 190km/h
- 42.800 ha
- 8.5-8.7 Mm<sup>3</sup>
- 494 municipalities



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## Vaia storm (Oct 2018): an unprecedented windstorm in Italy (2/2)

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**So far:**

- **Strong attention on consequences on the **wood market** and **environmental impacts****
- **Lack of attention of windstorm consequences on **socio economic and institutional dimensions****

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## Methodological approach

*“Management of hazards in modern societies tends to be one of the main preoccupations of public decision-makers”* (Riguelle et al., 2016)



### Objective of the work

To investigate:

- **cause-effects linkages** along forest-based “value chains”
- **socio-economic, institutional and governance impacts** of windstorms in forest socio-ecological systems (SES)

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## Methodological approach

1)

**Review of existing literature** on windstorms impacts on forest SES in Europe

2)

Categorization and **visual mapping** of windstorm cause-effects linkages, paying specific attention to socio-economic impacts

3)

Pre and post Vaia **data collection** in key sectors of **forest-based value chain** to **assess damage intensity**

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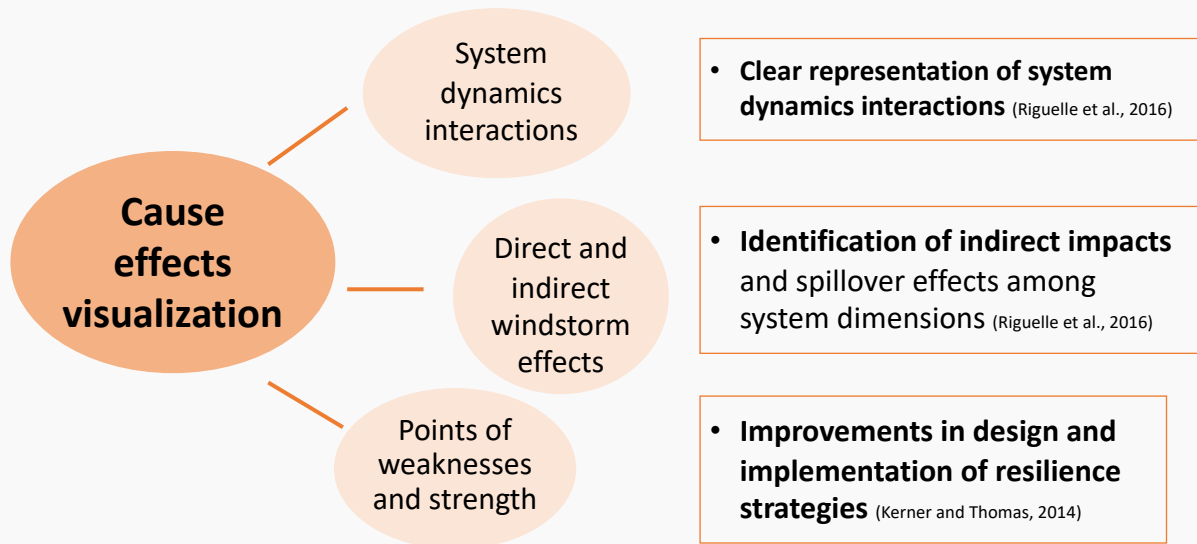
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## Methodological approach: Visual mapping



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## 1. Review of existing literature (1/3) ~ ongoing process


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Preliminary overview of windstorm damages on socio-economic and institutional dimensions


1)

Review of existing literature on windstorms impacts on forest SES in Europe

- In depth analysis of **386 papers**
- **20 papers** deepening windstorm consequences on socio-economic and institutional dimensions



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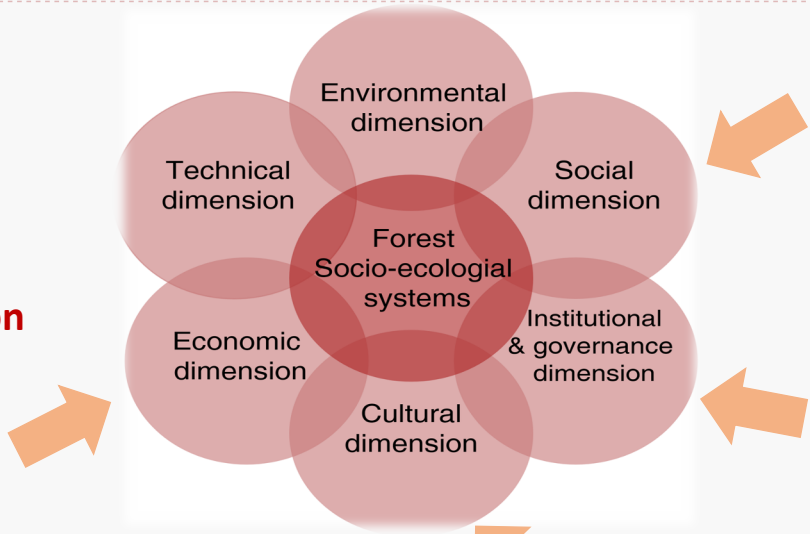
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## 1. Review of existing literature (2/3) ~ ongoing process

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Forest  
SES  
dimensions  
interconnection



Source: modif. from Kelly *et al.*, 2015



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## 1. Review of existing literature (3/3) ~ work in progress

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**Socio-economic data on windstorm impacts**

**Scattered in term of scope and methods**

- Data collected only for **large and catastrophic** events (Schellhas, 2008)
- Lack of a single-consistent methodology** in data collection and in windstorm definition (Schellhas, 2008)
- Data on **economic losses** mainly derived by the **insurance losses** (1951-2010): more than €15billion forest damages about 38 mln m<sup>3</sup>/year (Schuck and Schelass, 2013; Gardiner *et al.*, 2013)



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## 2. Categorization of windstorm cause-effects linkages ~ work in progress

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Windstorm impacts

Effects

Macro categories

Dimension

Sub-categories of effects

- Changes in state subsidies
- Changes in technical assistance


Macro categories of effects

Role of institutions


Forest SES Dimension

Institutional

Source: own elaboration



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## 2. Categorization of windstorm cause-effects linkages

~ work in progress

```

    graph TD
      A[Windstorm impacts] --> B[Dimensions]
      B --> C[Macro categories]
      C --> D[Sub-categories]
      B --> E[Table]
      C --> E
      D --> E
  
```

Dimensions	Effects	
	<i>Macro categories</i>	<i>Sub-categories</i>
Institutional	Role of institutions	1) Changes in state subsidies 2) Changes in technical assistance

Source: own elaboration

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## 2. Categorization of windstorm cause-effects linkages

~ work in progress

```

    graph TD
      A[Windstorm impacts] --> B[Dimensions]
      B --> C[Macro categories]
      C --> D[Sub-categories]
      B --> E[Table]
      C --> E
      D --> E
      B --> B1[Institutional]
      C --> C1[Role of institutions]
      D --> D1[Changes in state subsidies, Changes in technical assistance]
  
```

Dimensions	Effects	
	<i>Macro categories</i>	<i>Sub-categories</i>
Institutional	Role of institutions	1) Changes in state subsidies 2) Changes in technical assistance

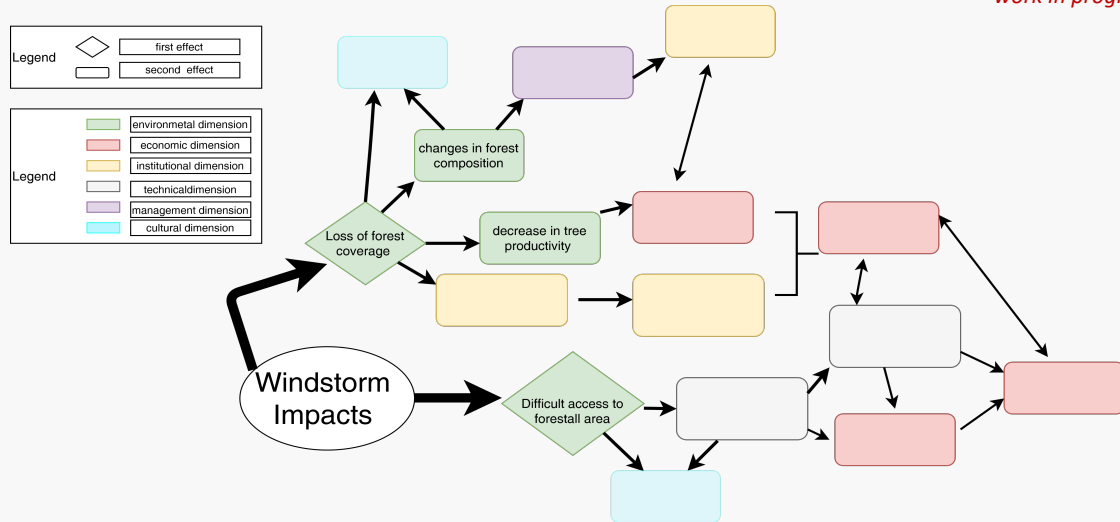
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## 2. Categorization of windstorm cause-effects linkages

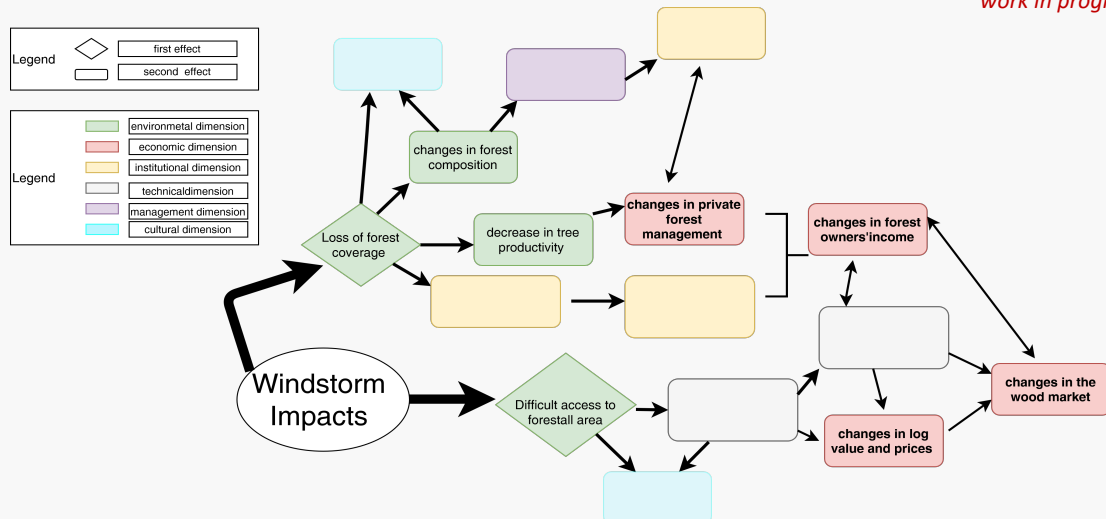
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Source: own elaboration

## 2. Categorization of windstorm cause-effects linkages

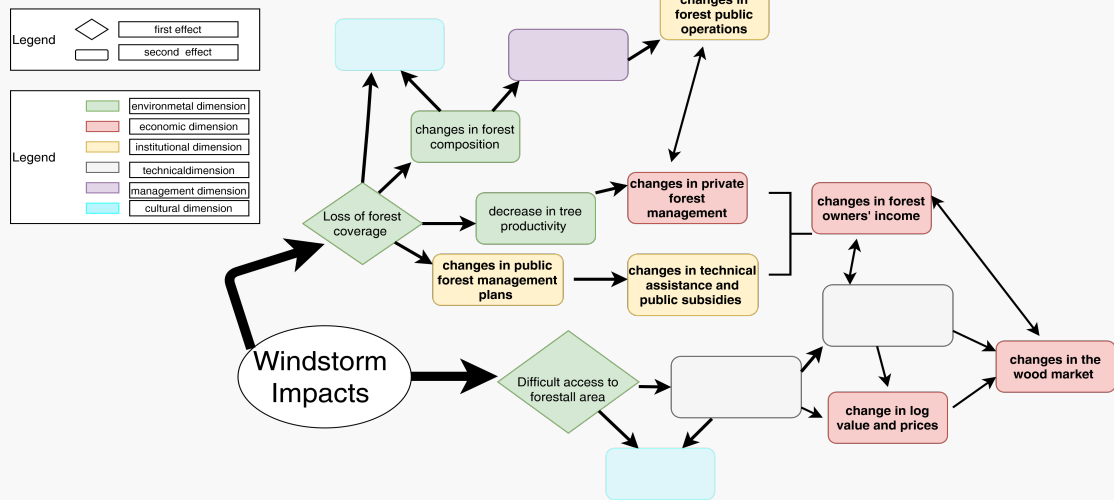
~ work in progress



Source: own elaboration

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~ work in progress



Source: own elaboration



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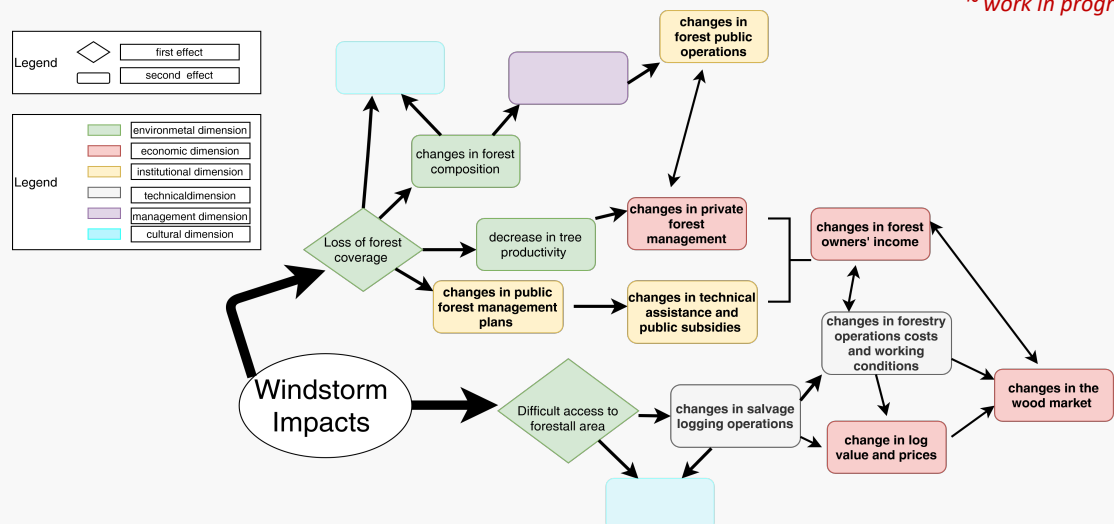


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## 2. Categorization of windstorm cause-effects linkages

~ work in progress



Source: own elaboration

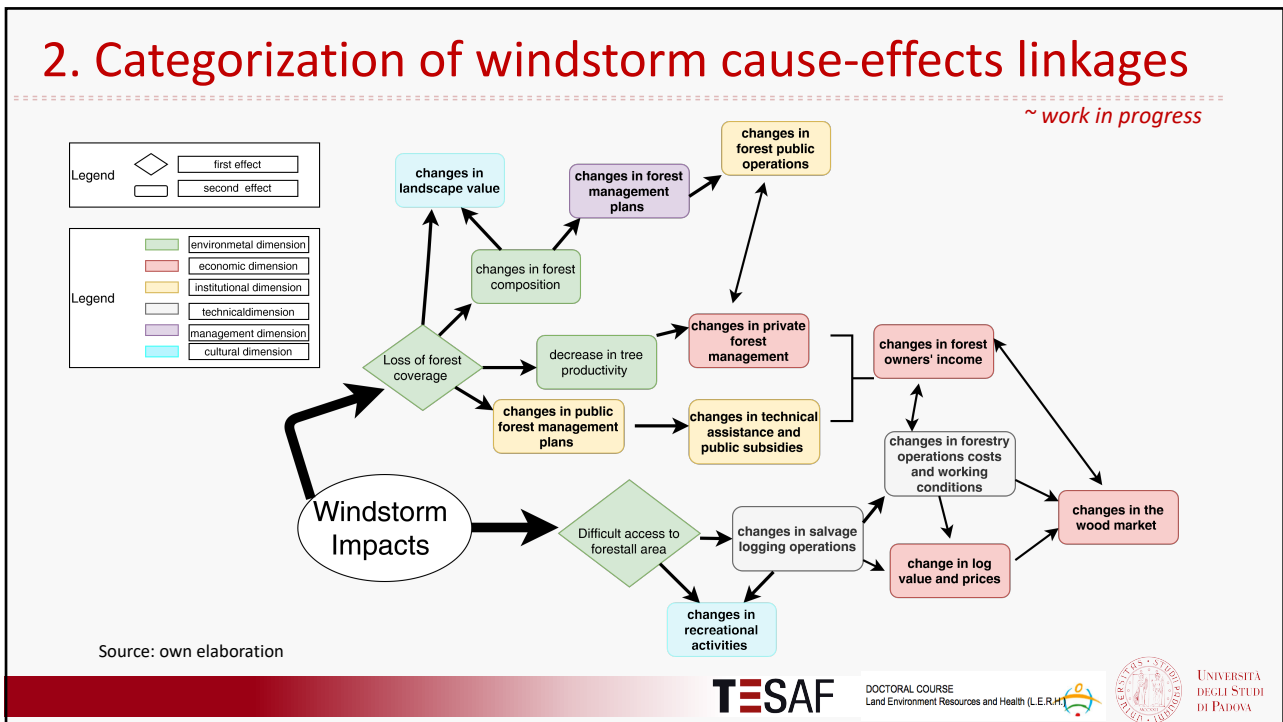


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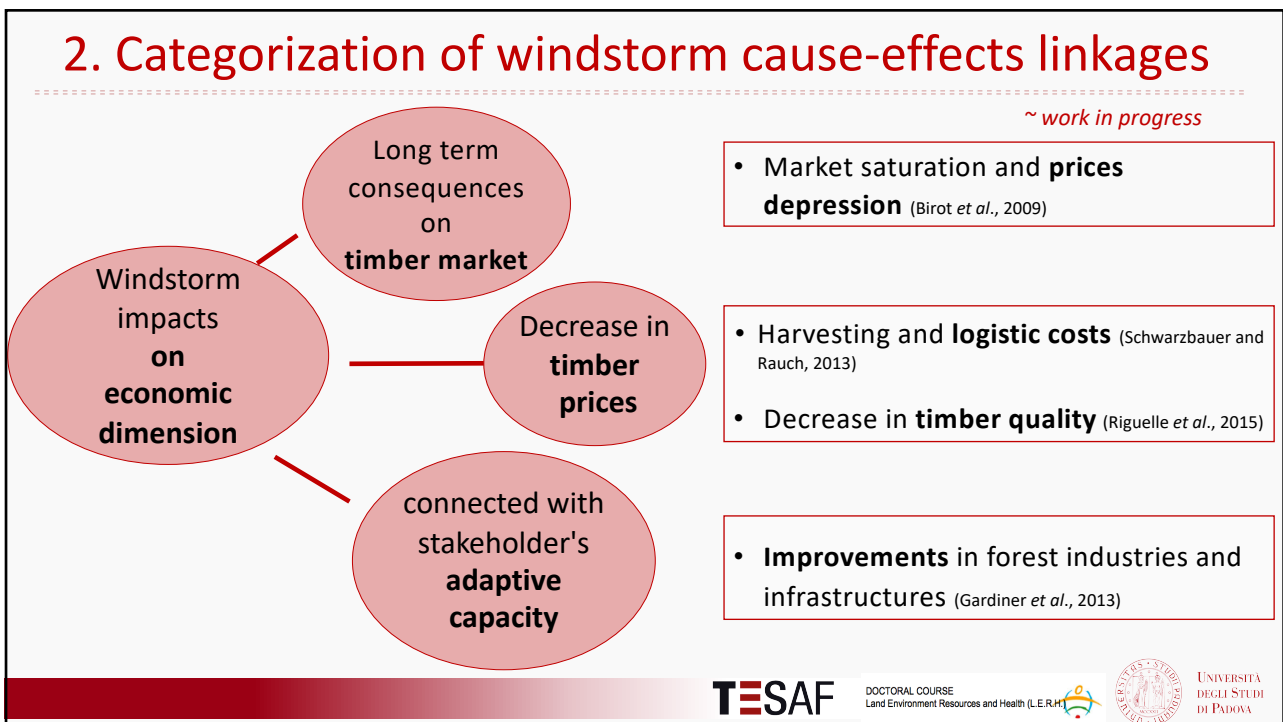


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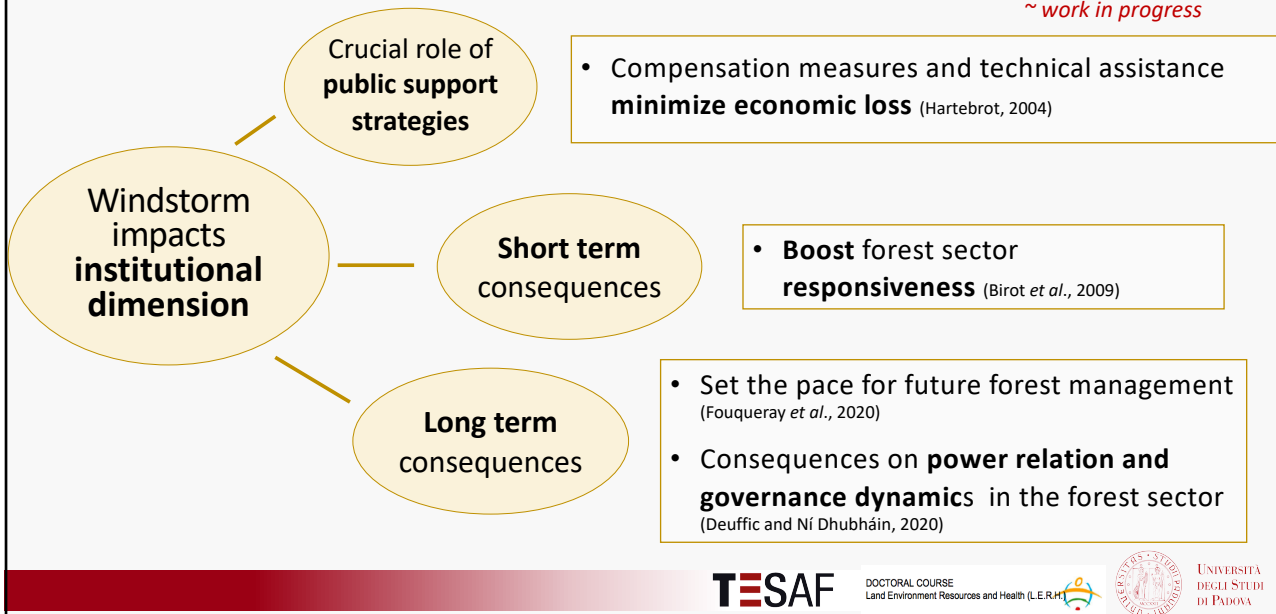
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## 2. Categorization of windstorm cause-effects linkages

~ work in progress




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## Methodological approach

- 1) **Review of existing literature** on windstorms impacts on forest SES in Europe
- 2) Categorization and **visual mapping** of windstorm cause-effects linkages, paying specific attention to socio-economic impacts
- 3) Pre and post Vaia **data collection** in key sectors of **forest-based value chain** to assess damage intensity

## 3. Vaia storm impacts on the wood sector and market (1/3)



Removing windthrows in Vaia damaged areas. Source: Cavalli and TESAF Dept., 2020

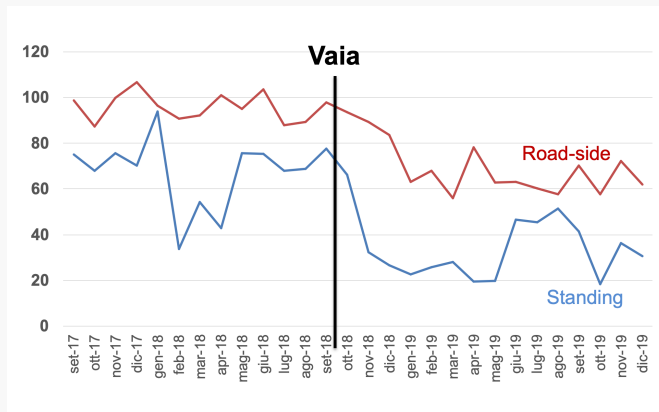
Region Autonomous province	Damaged area (ha)	Windthrown wood volume (1,000 m <sup>3</sup> )
Veneto	12.114	2.500
Auton. Prov. BZ	18.300	3.300
Auton. Prov. TN	4.200	1.500
F-Venezia Giulia	3.600	950
Lombardy	3.200	400
<b>Total</b>	<b>41.491</b>	<b>8.690</b>

**49,910 ha; 9.6 m<sup>3</sup>**  
Unofficial data

### 3. Vaia storm impacts on the wood sector and market (2/3)

Market saturation and prices depressed (e.g., Auton. Prov. Trento)

Average stumpage (standing) and road-side prices (€/m<sup>3</sup>)  
Sept.17-Dec.19



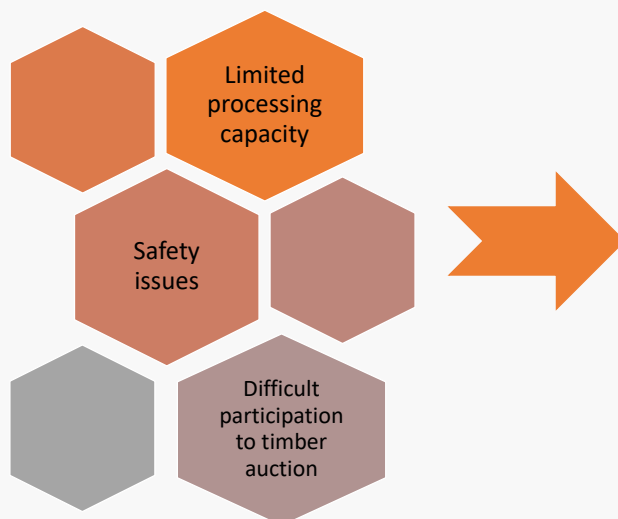
Source: Udali based on Portale Legno data , 2020

Average **pre-Vaia**  
price: **80 €/m<sup>3</sup>**



Average **post-Vaia**  
price: **40-45 €/m<sup>3</sup>**

### 3. Vaia storm impacts on the wood sector and market (3/3)



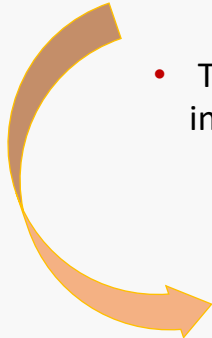
- ✓ Export (AUT, PRC)
- ✓ Specialized foreigner forest enterprises for wood harvesting
- ✓ Financial barriers displacing local enterprises



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## Conclusions (1/2)

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- A **research gap** regarding windstorm impacts on socio-economic and institutional dimensions
  - Tendency to **mono-sectorial approach** in storm-related issues investigation
    - **Poor understanding of cause-effects network linkages** among system dimensions affected by windstorms
    - **Lack of consideration of timespan and scale effects** on windstorms impacts

## Conclusions (2/2)

- **Undermined** development of **effective strategies** to cope with climate change (increasing risk of extreme events)
- Less effective solutions to enhance SES resilience
- More **interdisciplinary and integrated research** needed

*Resilience strategies are hampered by a limited knowledge about the system and the spatial, temporal, and contextual (environmental, socio-cultural, regulatory, and related) circumstances within which it functions* (Kerner and Thomas, 2014)



**Thanks  
for your  
attention**