



**Socio-economic impacts
of natural or human threats
on the forest sector;
some results of
the French-German expertise
on
drought and heat 2003"**

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Key questions



- Which are the economic **consequences** of drought and heat on the forest sector :
 - Forest management?
 - Wood activities?
 - Non-wood activities and uses?
- Which are the main **recommendations** in terms of:
 - Mitigation?
 - Prevention?



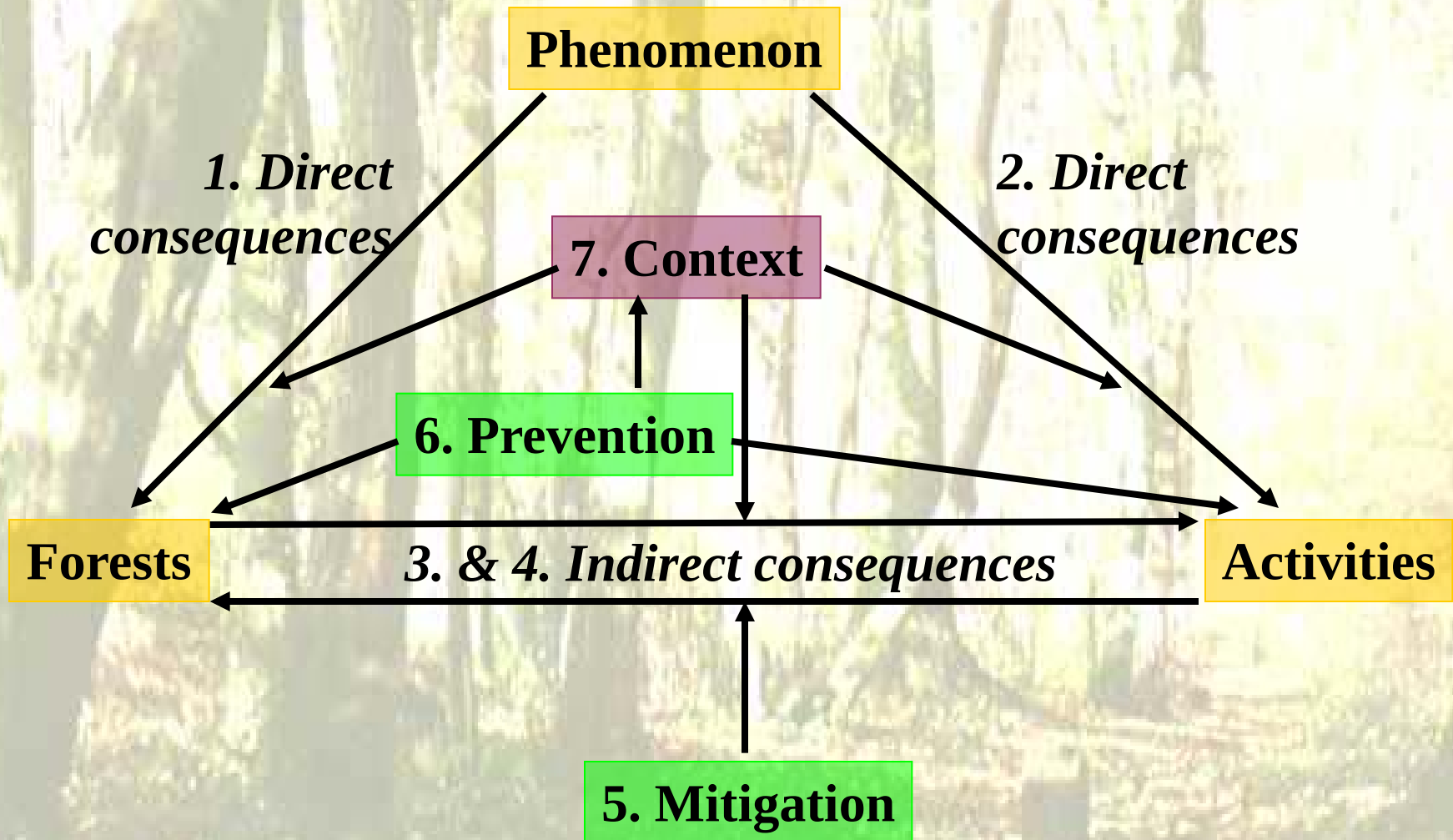
Towards a larger scope



- Prevention must be decided on a global basis
- All the more that global changes are at stake
- Drought and heat are threats among many others
- It is interesting to compare between threats
- Only a few economic references on drought & heat
 - hazards in general: 48 references
 - storms: 26
 - fire: 10
 - pollution: 8
 - biotic threats: 2
 - drought: 2



General frame: consequences and measures





From general frame to detailed analysis



- Consequences
 - Physical impacts
 - Valuation methods
 - Remaining questions
 - Gravity scale
- Recommendations
- Methodologies more than actual results



Direct consequences on forests



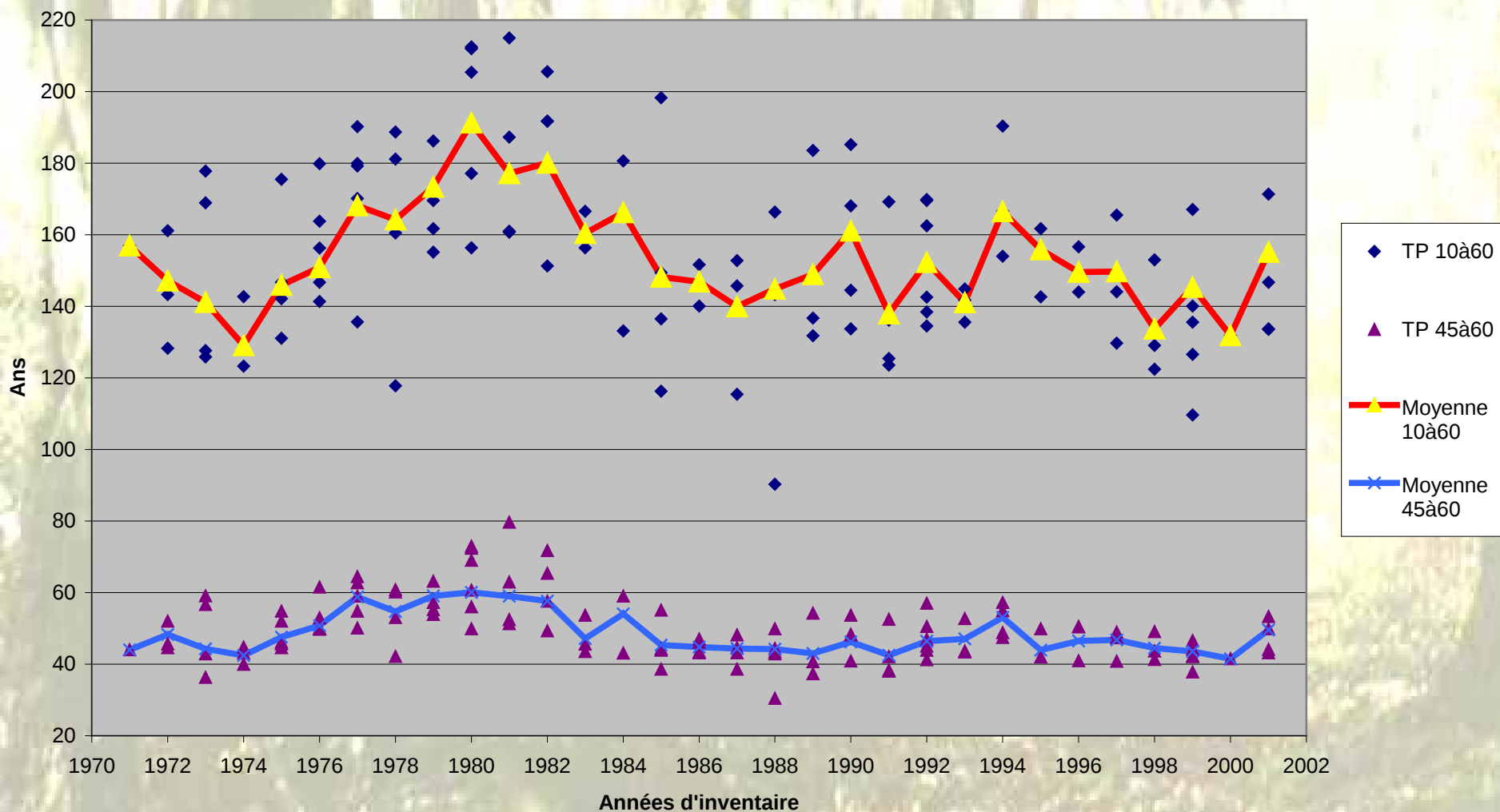
- **Reduced growth**
 - loss in expectation value due to delay or early harvest
 - mortality (particular case of plantations)
- **Reduced wood quality**
 - loss in market value
- **Harvesting difficulties**
 - increased harvesting costs and loss in market value
 - importance of salvage when areas are concerned
- **Increased sensitivity to future hazards**
 - fire, bark beetle, weather extremes
 - loss in expectation and market values



Drought/heat effect on growth

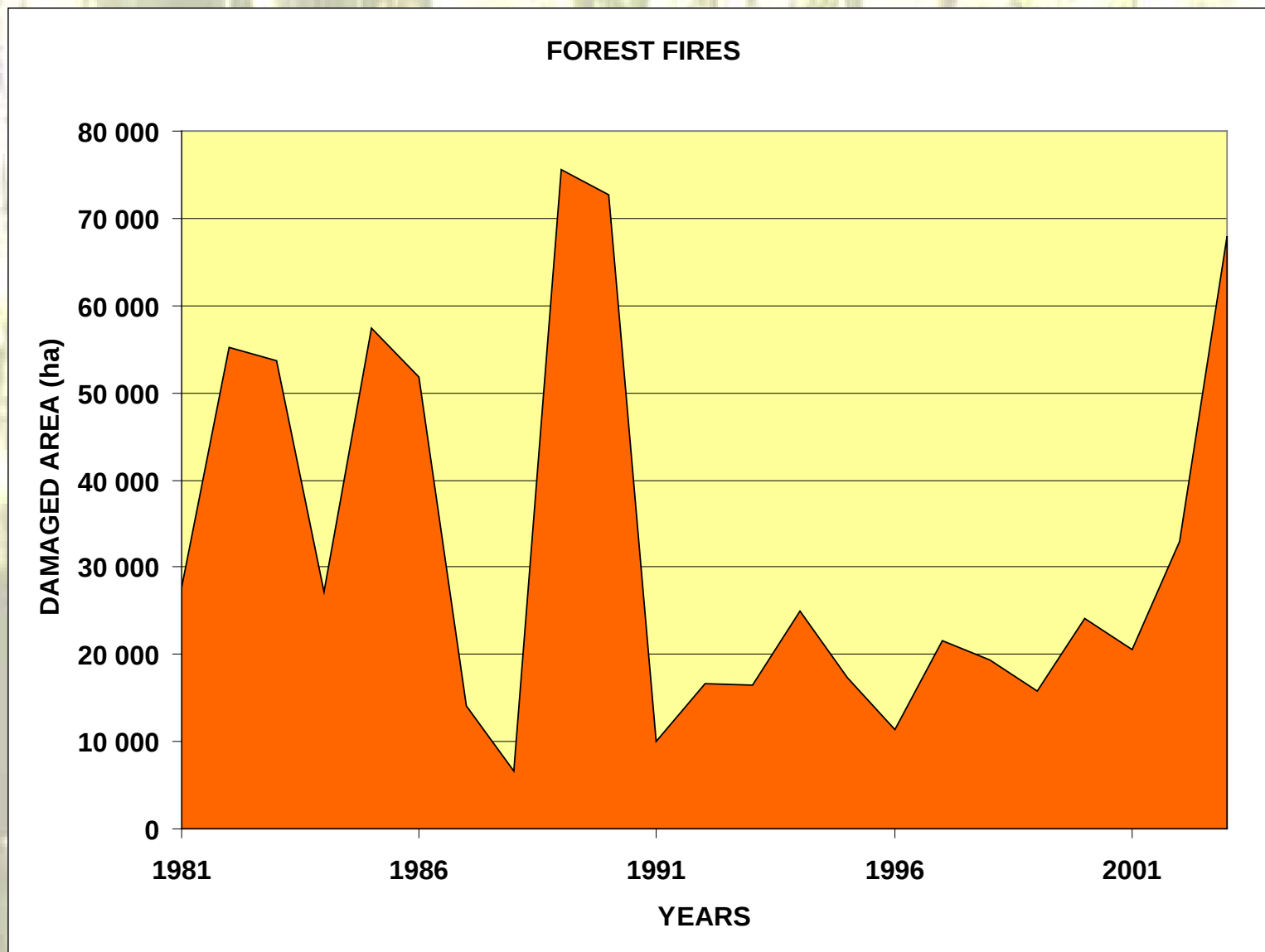


Temps de passage pour le chêne (seulement départements où surface chênes > 40 000 ha)





Forest fires





Direct consequences on forests



- Excess supply
 - need for supply and demand models
- Reconstitution
 - extra cost due to the phenomenon
- New management plan
 - extra cost
- Other resources than wood are concerned in the same way (mushrooms, ...)

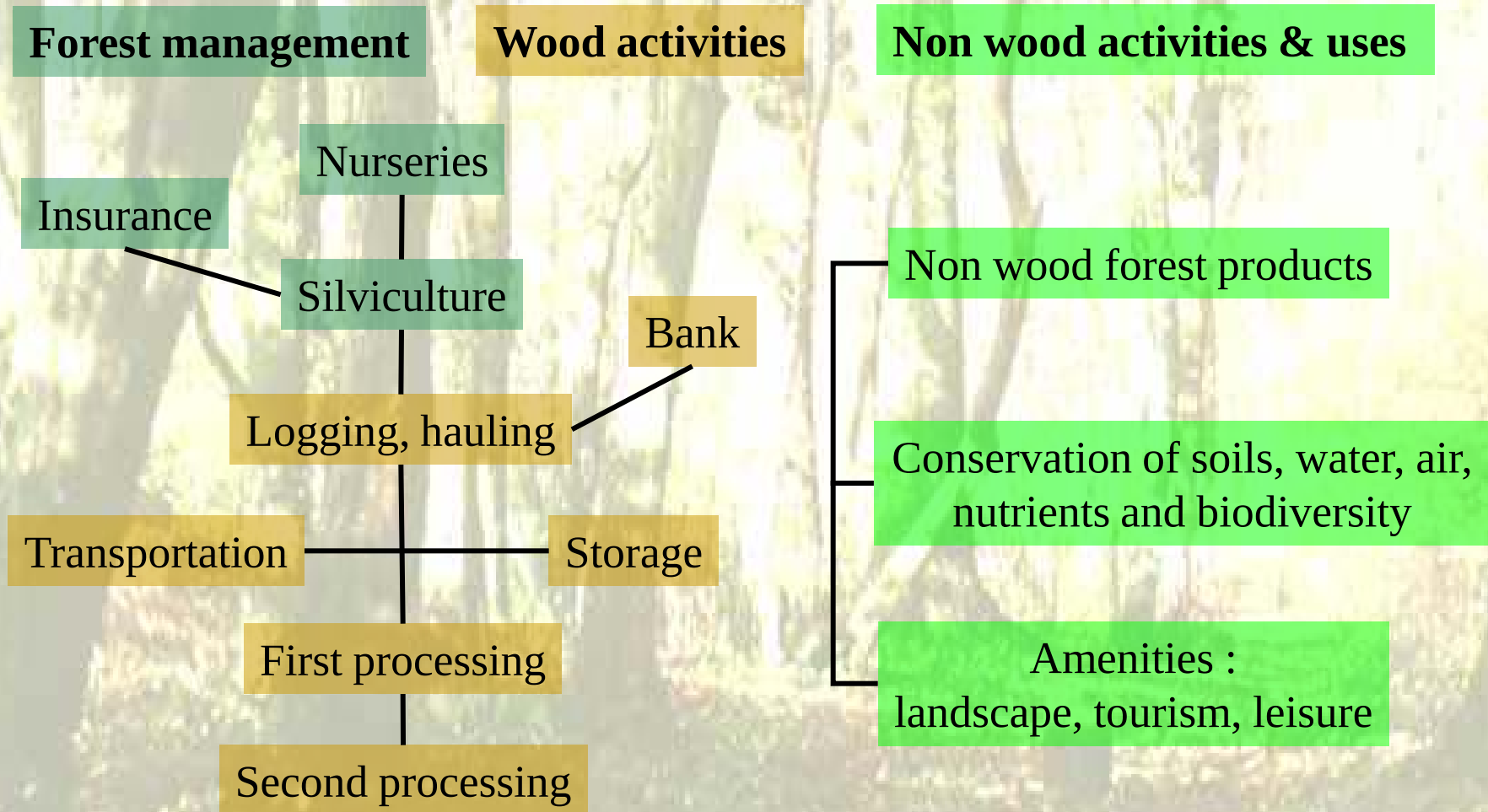


Direct consequences on activities & uses

- A few ones but that need to be quoted:
 - **Damages to industries**
 - fire
 - water restrictions (wood storage)
 - Reduced productivity of employees
 - **Changes in household activities**
 - forest shadow
 - but travel to forests
- Lack of references



Activities and uses





Indirect consequences on activities



- Activity variations (e.g. reconstitution)
- Management changes
- Compensation for damages: insurance, public policy)
- Decrease in material yield
- Lack of particular assortments
- Logging accidents
- Reduced leisure for security or landscape
- Impacts on all other activities
- For drought and heat, weak impacts in that case



Feed-back consequences on forests



- Physical limits to some production capacities
- **Increase of dead wood in forest**
 - more biodiversity
 - some decrease in aesthetic value
- Soil damages after harvesting



Gravity scale

**Drought
& heat**

**5. Persistent impacts
(medium-term imbalance
between resources and uses)**

**4. Global impacts
(limits to some production capacities)**

3. Regional impacts (variation of industrial activities)

2. Local impacts (loss in forest expectation value)

1. Scattered impacts (loss in roundwood market value)



Mitigation



- Quick measures
- Strategy against insects
- Compensation for extra costs
- tax reduction
- Policy evaluation



Prevention



- Self-protection
 - forest planning
- Self-insurance
 - salvage facilities
- Insurance
 - difficulty to implement an efficient system



Context



- General economic situation
 - growth
 - oil and commodity prices
 - exchange rates between currencies
- Weather
- Silvicultural practices
- Insurance possibilities
- Action plan for crisis situation



Conclusions: consequences



- Forest management:
 - direct damages in young plantations
 - reduced growth
 - rather scattered (thus weak) damages in time and space
 - risks of insects, fires
- Wood sector
 - mainly direct consequences (damages to industries)
 - few consequences due to forest mortality
- Non-wood sector
 - mushrooms
 - carbon and biodiversity: depend on salvage
 - amenities: mainly direct consequences



Conclusions: recommendations



- Close links with physical impacts
- Risk management in general and in respect of global changes
- Some research needs
 - evaluation of past risks
 - general equilibrium models
 - insurance systems
 - forest owner behaviour in front of risk
 - decision models with risks, wood and non wood outputs