



## Assessing forest influences on torrential hazards and risks: IRSTEA mission within the European H2020 project NAIAD

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NAIAD (NAture Insurance value: Assessment and Demonstration) is a H2020 European project gathering 23 partners interested in ecosystems services related to water. The project more specifically links nature services to the assurance world and aims to operationalise “Natural Assurance Schemes”, defined as a range of schemes to internalise the value of ecosystems services, e.g., the buffering role of river systems against water risks, in insurance policies. It is based on an assessment methodology that includes the physical, socio-cultural and valuation aspects of ecosystems services in relation to water, adapted to the institutional frame to align economic incentives and financial flows.

Within the NAIAD projet, IRSTEA will more specifically try to highlight **the role of mountain forests in torrential flood hazards and risks**. The forest eventually acts on hydrology by buffering part of the rainwater. Vegetation has also a key role in soil conservation by curtailing primary sediment production in the hillslopes. Conversely, woody debris dramatically aggravate hazards by clogging bridges and key protections structures as open check dams. Finally this dual role may change in time due to the forest vulnerability to climatic, biologic or physical changes, e.g. after a wildfire.

The first project step will be an extensive literature review on all these effects. Secondly indicators describing the torrential systems will be proposed and link to variably pronounced influence of forest. In a third time, case studies will be undertaken. The dramatic flood that occur in the region of Nice in summer 2015 (20 fatalities) will probably be used as a benchmark test. Several scenarios of alternative forest and river managements under varying climate forcing will be tested later. **Complete torrential risk assessment studies will be performed on several sites within this project, with and without the forest influences in order to highlight its role**. Numerous check dams have been built in headwaters to facilitate reforestation in the past, their influence on the torrential flood triggering (e.g., sediment supply) and transfer (e.g., debris flow propagation) will be assessed. The effectiveness of protections structures as debris basins and woody debris traps will be studied. They are supposed to be key solutions to the drawbacks of woody debris jams resulting from forest standing in catchments, other effects on hydrology and sediment production being quite positive. The issue of uncertainty and its propagation along the whole chain of analysis will be subject to a special effort in our work.

The NAIAD project just beginning in 2017, we propose to present the research steps and data treatment chains that are planned to be used along the project. More results and the case studies being under progress.