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Regenerating ecosystems with Nature-Based Solutions: demonstrator study Inn River Basin, Austria

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Nature-Based Solutions (NBS) could be effective measures to respond to land degradation processes and events such as floods. This study demonstrates how to evaluate the benefits of afforestation being a long-term NBS utilizing a combination of an innovative monitoring technology and modelling approaches. The catchment Geroldsbach-Götzens is used as a lead catchment, being typical for numerous Alpine catchments with interacting urban and torrential features. The catchment comprises NBS such as afforestation being installed in the torrent since the early 1950ies.

We use an artificial rainfall runoff test site to test different scenarios and analyse runoff behaviour. Besides artificial rainfall simulations, the site is equipped for continuous monitoring of natural occurring rainfall runoff events. In that course, precipitation, snowfall, snow cover, air and soil parameters are assessed. The development and effects of measures over time are modelled utilizing as well the monitoring data. For generalizing and upscaling of the findings, especially with regard to (a) land use in torrents and (b) land use at the urban scale, models are realized as well for other catchments. Beyond realizing historic and current situations exclusively, land use scenarios for assessing the change over time and potential future scenarios are to be modelled.

Results can provide a quantification of the benefits and co-benefits of NBS such as: reduction of flood risks, improvement of the recreational qualities, and enhancement of biodiversity. Experience from the field can show the best practices and how to develop innovative ways that can be used for upscaling. Land use and climate scenarios give an indication of changes that can be expected over time and potential future scenarios. Overall findings lead to a better understanding of long-term implementation of NBS and support decision making of stakeholders in other catchments.