



Enhancing the usability of seasonal to decadal (S2D) climate information – an evidence-based framework for the identification and assessment of sector-specific vulnerabilities

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The successful provision of from seasonal to decadal (S2D) climate service products to sector-specific users is dependent on specific problem characteristics and individual user needs and decision-making processes. Climate information requires an impact on decision making to have any value (Rodwell and Doblas-Reyes, 2006). For that reason the knowledge of sector-specific vulnerabilities to S2D climate variability is very valuable information for both, climate service producers and users.

In this context a concept for a vulnerability assessment framework was developed to (i) identify climate events (and especially their temporal scales) critical for sector-specific problems to assess the basic requirements for an appropriate climate-service product development; and to (ii) assess the potential impact or value of related climate information for decision-makers. The concept was developed within the EUPORIAS project (European Provision of Regional Impacts Assessments on Seasonal and Decadal Timescales) based on ten project-related case-studies from different sectors all over Europe. In the prevalent stage the framework may be useful as preliminary assessment or ‘quick-scan’ of the vulnerability of specific systems to climate variability in the context of S2D climate service provision.

The assessment strategy of the framework is user-focused, using predominantly a bottom-up approach (vulnerability as state) but also a top-down approach (vulnerability as outcome) generally based on qualitative data (surveys, interviews, etc.) and literature research for system understanding. The starting point of analysis is a climate-sensitive ‘critical situation’ of the considered system which requires a decision and is defined by the user. From this basis the related ‘critical climate conditions’ are assessed and ‘climate information needs’ are derived. This mainly refers to the critical period of time of the climate event or sequence of events. The relevant period of time of problem-specific critical climate conditions may be assessed by the resilience of the system of concern, the response time of an interconnected system (i.e. top-down approach using a bottom-up methodology) or alternatively, by the critical time-frame of decision-making processes (bottom-up approach).

This approach counters the challenges for a vulnerability assessment of economic sectors to S2D climate events which originate from the inherent role of climate for economic sectors: climate may affect economic sectors as hazard, resource, production- or regulation factor. This implies, that climate dependencies are often indirect and nonlinear. Consequently, climate events which are critical for affected systems do not necessarily correlate with common climatological extremes.

One important output of the framework is a classification system of ‘climate-impact types’ which classifies sector-specific problems in a systemic way. This system proves to be promising because (i) it reflects and thus differentiates the cause for the climate relevance of a specific problem (compositions of buffer factors); (ii) it integrates decision-making processes which proved to be a significant factor; (iii) it indicates a potential usability of S2D climate service products and thus integrates coping options, and (vi) it is a systemic approach which goes beyond the established ‘snap-shot’ of vulnerability assessments.