FACCE-MACSUR

DC-3.1 Review on scaling methods for crop models

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Abstract/Executive summary

Agricultural systems cover a range of organisational levels and spatial and temporal scales. To capture multi-scale problems of sustainable management in agricultural systems, Integrated assessment modelling (IAM) including crop models is often applied which require methods of scale changes (scaling methods). Scaling methods, however, are often not well understood and are therefore sources of uncertainty in models. The present report summarizes scaling methods as developed and applied in recent years (e.g. in SEAMLESS-IF and MACSUR) in a classification scheme based on Ewert et al. (2011, 2006). Scale changes refer to different spatial, temporal and functional scales with changes in extent, resolution, and coverage rate. Accordingly, there are a number of different scaling methods that can include data extrapolation, aggregation and disaggregation, sampling and nested simulation. Comparative quantitative analysis of alternative scaling methods are currently under way and covered by other reports in MACSUR and several publications (e.g. Ewert *et al.*, 2014; Hoffmann *et al.*, 2015; Zhao *et al.*, 2015). The following classification of scaling methods assists to structure such analysis.

Improved integration of scaling methods in IAM may help to overcome modelling limitations that are related to high data demand, complexity of models and scaling methods considered.

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