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## Reference Scenarios for Bioproduct Assessments: soil carbon and standardized reference scenarios

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Assumed effects on land attributes have important implications for nearly all aspects of social, environmental and economic sustainability as well as policy designed to enhance sustainable agriculture. Life-cycle assessments, technical-economic assessments, and sustainability assessments of agriculture and bioproduct industries often use computational models to contribute to an understanding of complex processes. However, because the impacts attributed to a specific process or product must be interpreted in terms of a “business as usual” case, the reference scenario is a key factor in interpreting assessment results. Further, predictions of change are not equivalent to knowledge or data from empirical studies and instead can reflect underlying assumptions and embedded uncertainty from large input datasets. For example, in estimating soil organic carbon (SOC) dynamics, there is no internationally agreed SOC measurement protocol. This complicates the establishment of baseline scenarios for comparison across industries and continents (e.g. Brazil and the US: two of the largest bioproduct producers who often trade in equivalent products). If these models are used to accurately predict change and to justify the sustainability of a product, the reference scenario assumptions need to be realistic, measurable, and clearly documented. Justification for assumptions or simplifications should be based on published data and research that employs scientific principles and best available practices for measurement. We will present the results of a systematic literature review to determine the degree to which reference scenarios are explicitly defined when the effects of bioproducts are assessed; and to identify any published guidelines or rules for defining appropriate reference scenarios when assessing bioproducts. We will also present a summary of key aspects of a reference scenario and show the application of these principles to develop a SOC baseline for bioproduct assessments.