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## Multidimensional Assessment of Food Security and Environmental Sustainability: A Vulnerability Framework for the Mediterranean Region

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### Abstract

Recurrent food crises and climate change, along with habitat loss and pollution, have put food security and environmental sustainability at the top of the political agenda. Analyses of the dynamic linkages between food consumption patterns and environmental concerns have recently received considerable attention from the international and scientific community.

Using the lens of a wide sustainability concept, this paper aims at developing a multidimensional framework for evaluating sustainability in food systems and diets applicable to the Mediterranean countries.

The Mediterranean region - a geographically interlocked and heterogeneous area including South European, North African and South-East Mediterranean Countries - presents several conditions of vulnerability to food insecurity and unsustainability. Furthermore the demographic growth, in urban and coastal areas of the Basin, leads to an increasing pressure on natural resources and widening disequilibria with rural areas.

Derived from natural disaster and sustainability sciences, a coupled domain/vulnerability approach has been applied to the analysis of the concepts of sustainable food security and diets. Within consensus-based preselected domains, the vulnerability methodology offers a coherent framework that disentangles exposure, sensitivity and adaptive capacities. A DELPHI method is applied to select the final set of indicators from the literature.

The main result is the elaboration of an innovative conceptual evaluation framework for measuring sustainability in the agrofood system. The framework draws upon two existing approaches: a vulnerability-based assessment method combined with an analysis of detailed empirical domains relevant for Mediterranean countries. The DELPHI selection process, involving several international experts, has reduced the number of indicators to a reduced pool of indicators.

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Use of the participatory approach of the DELPHI method helps move beyond subjective evaluation and reach consensus. Recognizing the systemic dimension of sustainability, the vulnerability approach enables to investigate the causal factors dynamics, instead of targeting exclusively the final outcomes. The domain-based framework reflects the region-specific attributes that necessarily need to be identified to link scientific concepts with metrics. Urbanisation is a main domain of vulnerability as it is a key driver of change affecting both market dynamics and consumers' behaviours, raising questions for food security.

**Keywords:** Food systems, Integrated geographical approach, Metrics, Resilience, Sustainable diets