



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



Paolo Prosperi^{1,3,4}, Thomas Allen², Martine Padilla¹, Iuri Peri³, Bruce Cogill²

¹Mediterranean Agronomic Institute of Montpellier (CIHEAM), ²Bioversity International, ³University of Catania, ⁴Montpellier SupAgro

Introduction

Food and nutrition security and environmental sustainability are indispensable prerequisites for human sustainable development and, presenting several interrelated factors of change, need to be jointly evaluated.

Multidimensional approaches and modeling tools are strongly demanded for capturing essential nonlinearities and complex behavior in a sustainable food system perspective.

The Mediterranean region is a geographically interlocked and heterogeneous area – including South European, North African and South-East Mediterranean Countries – presenting several conditions of vulnerability leading to food insecurity and unsustainability.



Source: HCMR, 2006.

The demographic growth, in urban and coastal areas of the Basin, leads to an increasing pressure on natural resources and to a widening disequilibria with rural areas.



Poor consumption and dietary transition, leading to the double burden of malnutrition (over- and undernutrition), are closely related to behavioral socioeconomic and environmental drivers affecting the food system.

Policy-makers need evidence-based information to lead public policy interventions towards sustainability.

Indicators are essential in informing action but need conceptual contextualization and methodological organization to be expressed.

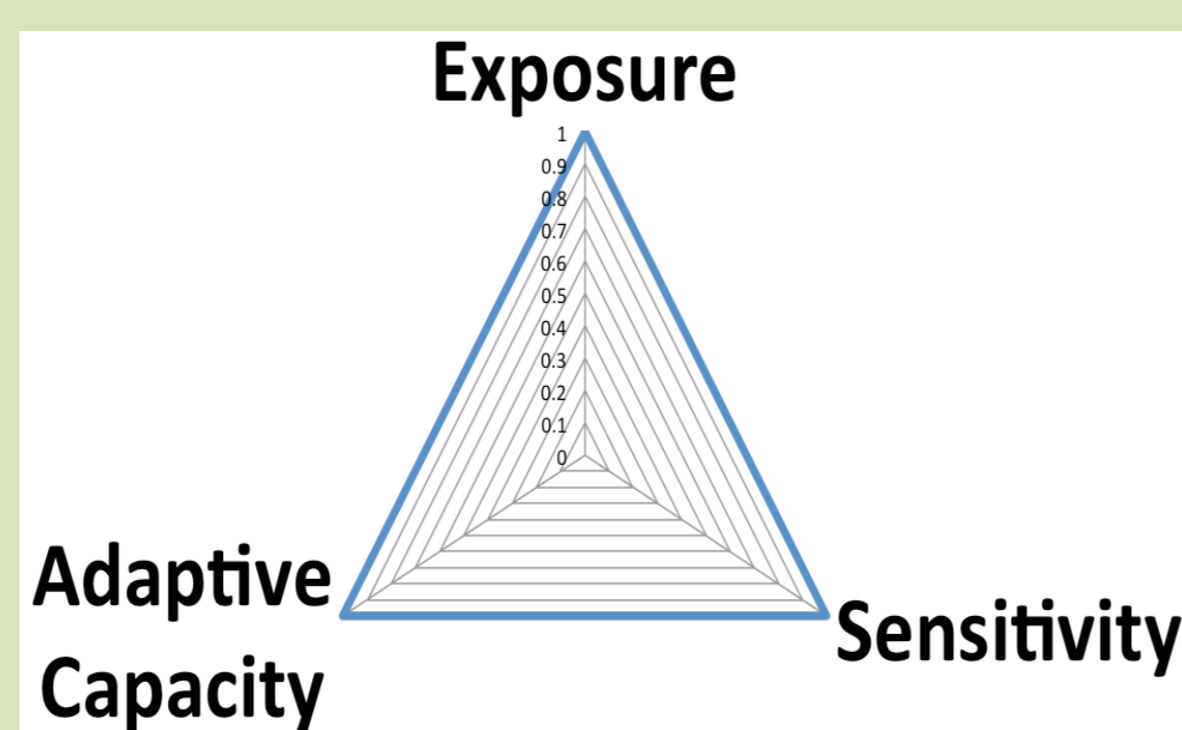
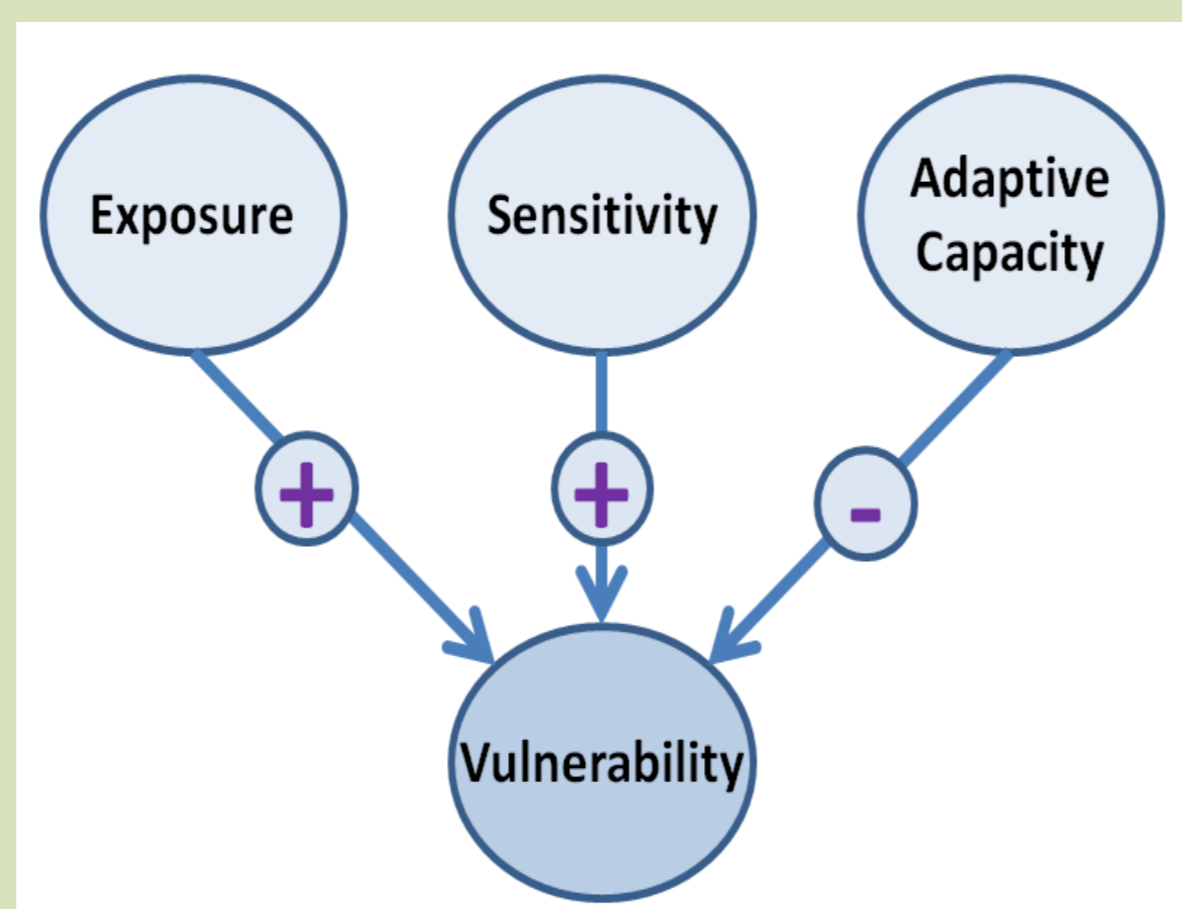
Aims

Identifying a framework to link concepts, methods and metrics, for a multidimensional joint analysis of food and nutrition security and environmental sustainability applicable to the Mediterranean countries.

Achieving evidence-based scientific knowledge and metrics to inform stakeholders, including policy-makers on response interventions to major changes at national and regional scale.

Methodological approach

- A coupled issue-vulnerability approach is applied to the analysis of sustainable food security and diets, using methods from natural disaster and sustainability sciences.
- A causal factors approach analyzes the vulnerability domains and the dynamics of phenomena, instead of directly targeting the final outcomes.
- Exposure, Sensitivity and Resilience are components of vulnerability that are taken into account for the assessment.
- A DELPHI selection process is used to select the relevant indicators.



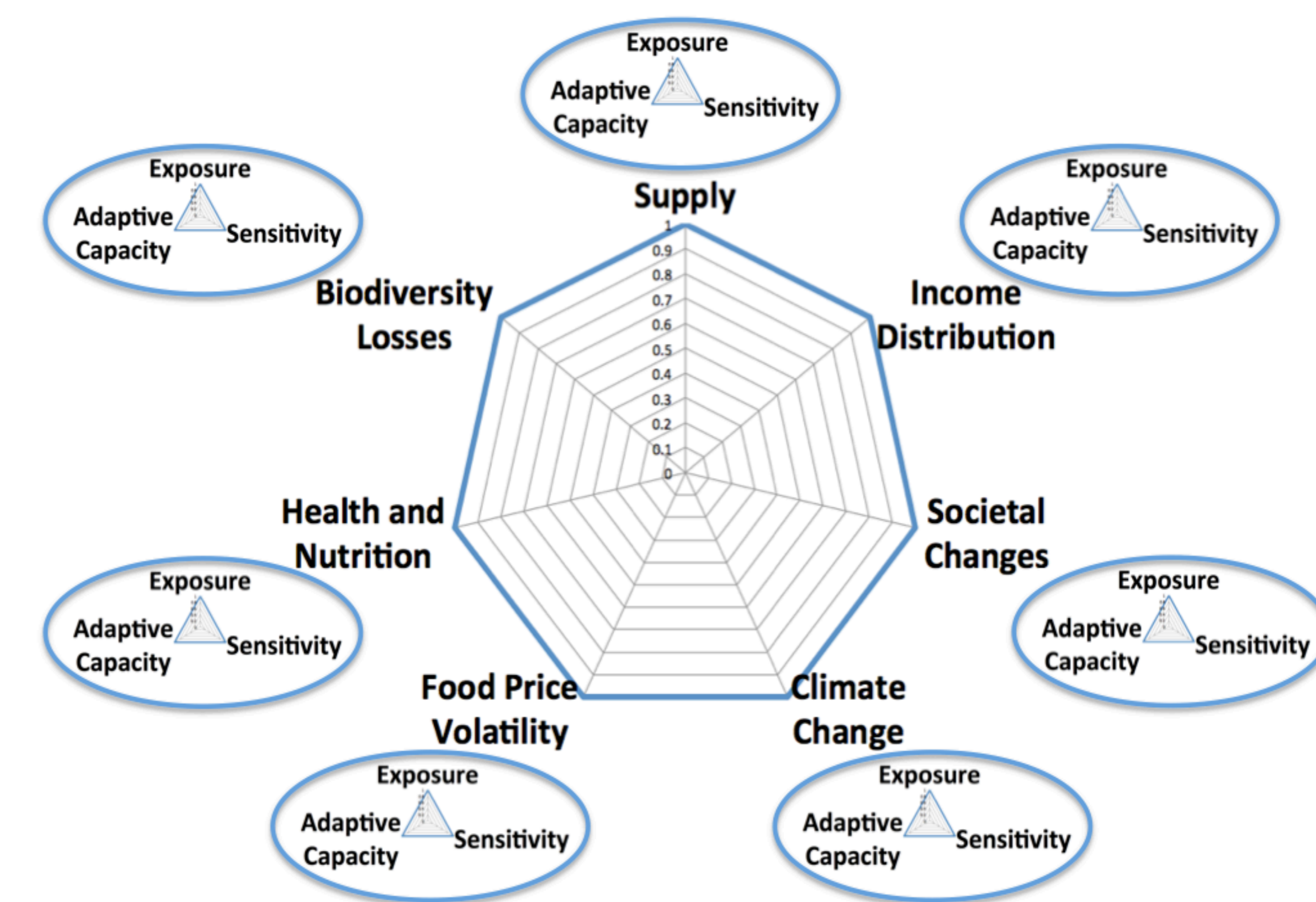
Results

An innovative and coherent assessment framework is identified for measuring the sustainability of food systems.

The framework improves metrics and information analysis, introducing novel methods for scientific knowledge.

Improving information, through causal factor analysis, deepens the understanding of phenomena for decision-making and response purposes.

Participatory and multidisciplinary vulnerability-based methods indicate direction for assessing environmental, economic, social and health impacts and factors of change affecting food and nutrition security and environmental sustainability in a sensitive geographic region.



Conclusions

The vulnerability approach enables investigating causal factors as sequential dynamics of the food system.

Issues and challenges for food security and environmental sustainability have to be defined before choosing assessment methods.

Use of the participatory approach of the DELPHI method allows objective evaluations, reaching consensus.

Vulnerability approach and analysis are necessary for sustainability research, providing conceptual and methodological understanding of food security, and global change knowledge connecting science and decision-making.

Urbanization is a main domain of vulnerability as it is a key driver of change affecting both market dynamics and consumers' behaviors, raising questions for food security.

References

- Brunori et al. (2009). New challenges for agricultural research: climate change, food security, rural development, agricultural knowledge systems. 2nd SCAR Foresight exercise.
- CIHEAM (2008) *Mediterra 2008. The Future of Agriculture and Food in Mediterranean Countries.*
- Esnouf C, Russel M, Bricas N. (Eds.), (2013) *Food System Sustainability: Insights From duALine.*
- Fanzo J, Cogill B, Mattei F. (2012) Metrics of Sustainable Diets and Food Systems, Bioversity Intl. Technical Brief.
- PARME Forward-thinking Workshop: Partnerships and Research in the Mediterranean (2011) Agropolis International.
- Pinstrup-Andersen P. (2009) Food security: definition and measurement, *Food Security*, n. 1.
- Turner B.L. et al. (2003) A framework for vulnerability analysis in sustainability science. *PNAS*, n. 214

Contacts: Paolo Prosperi
PhD Student at: IAMM/CIHEAM
Montpellier Supagro - UniCT
prosperi@iamm.fr



Research activities:
We are applying this methodology at a national level to study several critical food-related issues in Mediterranean countries, recognizing the role of experts through the Delphi method.