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The local government crisis management and resilience index-CMRI

Dimitris Prontzas *

Department of Sociology, Athens, Panteion University of Social and Political Sciences, School of Social Science, Greece.

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Abstract

The evolving landscape of climate-related, natural, technological and public health crises has underscored the vital role of Local Government Organizations (LGOs), at both the municipal and regional levels, in ensuring operational effectiveness and strategic preparedness. The Crisis Management & Resilience Index (CMRI) is introduced as the first integrated scientific instrument tailored to the needs of local governments. The CMRI assesses both strategic planning and operational effectiveness in managing crises, with a focus on long-term sustainability and local community resilience.

Keywords: Crisis Management; Local Government; Risk Assessment; Climate Adaptation

1. Introduction

The role of Local Government Organizations, in first and second tier, through their personnel and local populations, in the operational field of crisis and disaster management has been and will remain crucial. In the face of contemporary demands and the growing challenges posed by climate change, local government is called upon to fulfill a dual and complex role. On the one hand, it must serve as an operational mechanism for the provision of essential services to local populations. On the other, it must act as an active agent of strategic planning, preparedness, response and recovery in relation to multidimensional and complex crises. Natural phenomena, climate-related hazards, accidents and public health emergencies, constantly challenge both local communities and their leadership. This dual role, necessitates the use of scientific tools, that enable local governments to measure, assess and enhance their capacity to respond to these challenges effectively.

The sound governance of the inevitable coexistence of the natural and human made environment[1], the disasters they may generate and their resulting socio-economic costs[2], relies on a three-pronged foundation: a) tailored and targeted training based on local geospatial and demographic characteristics[3], b) a pyramid-type model of strategic planning (from municipalities to regional units, to regions, to central government) and c) performance evaluation using specific criteria and methodologies.

While taking on responsibility demands education, knowledge and a particular mindset, successful governance requires both proper preparation and systematic performance assessment.

In this context, the CMRI Index is introduced as the first comprehensive scientific tool, for assessing both the strategic planning and tactical-operational capacity of a municipality or region to effectively manage crises within the domain of civil protection, while ensuring the long-term viability of its local population.

The Index serves two primary dimensions. The first is the monitoring dimension. The pillars of the Index conceptualize monitoring both as an ongoing process during the implementation of interventions and as a means to assess progress

* Corresponding author: Dimitris Prontzas

in the implementation of a local or regional crisis management strategy. Within this monitoring framework, the Index generates data which feeds into the second dimension, evaluation. Through this second lens, the Index interprets whether, why and how a region's crisis management strategy and operational response are functioning. The evaluation dimension gives meaning to the data, enabling a comprehensive understanding of strategic and tactical approaches, in both temporal and systemic terms.

The CMRI Index is an innovative scientific instrument, that goes beyond merely tracking resilience or conducting assessments. Its core aim is to strengthen the institutional capacity of local governance [4], shifting from reactive responses to proactive prevention [5], from superficial plans to adaptive and effective local strategies tailored to the realities of climate change [6]. Within this framework, the implementation of the CMRI Index offers:

- Objective data for identifying weaknesses and prioritizing policies and interventions.
- Scientific evidence for shaping strategic resilience policies and plans.
- A monitoring framework for tracking long-term progress.
- Enhanced civic engagement and participation from local communities.

2. Methodological Approach of the Index

The methodological development trajectory of the Index is grounded in the multidimensional reality of local government entities, as well as the functional complexity characterizing both regional and municipal structures. Within this framework, the Index is founded on the principles of systemic risk analysis, criteria prioritization based on objective weighting methods, Key Performance Indicators (KPIs) and the Corruption Footprint Index (CFI) [7]. The Index is structured around six core Resilience Pillars, whose thematic domains encompass the full range of critical dimensions in crisis management:

Table 1 Pillars and Thematic Areas of the Index

Pillar	Thematic Area
P1	Governance and Coordination
P2	Infrastructure and Technologies
P3	Social Vulnerability and Cohesion
P4	Environmental Resilience
P5	Economic Resilience
P6	Local Population Education

Each pillar comprises a set of parameters, based on the following criteria:

- Relevance to the specific local context and diversity
- Feasibility of data collection and representation
- Potential for improvement (actionable indicators)
- Alignment with international standards (UNDRR, EU Resilience Scorecards, ISO 22316)
- These parameters may be of three types:
- Binary (Yes/No)
- Scaled scoring (0–5)
- Quantitative (converted into a 0–5 score based on pre-defined thresholds)

Each parameter's score is normalized on a unified numerical scale (0–5) to allow cumulative aggregation. To calculate the overall performance, each pillar is assigned a specific weight that reflects its relative significance. The final score is produced through the weighted average of all parameters, following the formula:

$$CMRI = \sum_{i=1}^{6} (Bi\ x\ Mi)$$

Where:

- Bi = Weight assigned to pillar *i*
- Mi = Mean score of indicators within pillar *i* (on a 0–5 scale)

3. Index Result Classification

Each pillar, with its thematic field, is therefore assessed through qualitative and quantitative parameters, which are weighted according to their importance in strengthening overall management and resilience. The CMRI Index emerges from the results, which captures the carrying capacity and crisis management readiness of a region, a municipality. The outcomes of applying the CMRI Index to a local government entity are categorized into five resilience/management levels, as shown in the table below:

Table 2 Categorization of index results

Resilience / Crisis Management Level	Index Score Range	Description of Outcome
Very High	4.0 – 5.0	Excellent management capacity and resilience
High	3.0 – 3.9	Significant measures in place
Moderate	2.0 – 2.9	Identified weaknesses present
Low	1.0 – 1.9	Severe deficiencies
Very Low	0.0 – 0.9	Absence of fundamental infrastructure and planning

4. Description of Parameters by Pillar

Table 3 Governance and Coordination (Weight: 20%)

Parameter 1	Description	Scale
P1.1	Existence of an up-to-date Local Crisis Management Plan	Yes/No (1 or 0)
P1.2	Operation of a Local Coordination Center for Civil Protection and Crisis Management	0–5
P1.3	Local Corruption Footprint Index	0–5
P1.4	Collaboration with central government, municipalities, regions	0–5

Table 4 Infrastructure and Technologies (Weight: 20%)

Parameter 2	Description	Scale
P2.1	Percentage of critical infrastructure covered by emergency response plans	% (scored 0–5)
P2.2	Availability of early warning systems	Yes/No (1 or 0)
P2.3	Existence, digitization, and processing of disaster and crisis management data	0–5
P2.4	Energy sufficiency in the event of a crisis or disaster	0–5

Table 5 Social Vulnerability and Cohesion (Weight: 15%)

Parameter 3	Description	Scale
P3.1	Percentage of elderly/vulnerable individuals in the local population	%
P3.2	Existence of updated support plans for vulnerable groups	0–5
P3.3	Uninterrupted access to social services	0–5

Table 6 Environmental Resilience (Weight: 15%)

Parameter 4	Description	Scale
P4.1	Hazard exposure of the area to natural disasters (fires, floods, etc.)	0–5
P4.2	Availability of water, sewage, and electricity infrastructure	0–5
P4.3	Existence, use, and management of green infrastructure and parks	0–5

Table 7 Economic Resilience (Weight: 15%)

Parameter 5	**Description**	**Scale**
P5.1	Existence of an emergency fund/reserve	Yes/No (1 or 0)
P5.2	Economic diversification (tourism, agriculture, industry)	0–5
P5.3	Access to external funding sources	0–5

Table 8 Local Population Training (Weight: 15%)

Parameter 6	**Description**	**Scale**
P6.1	Participation of local government personnel in crisis management training (last 2 years)	0–5
P6.2	Participation of citizens in crisis management training (last 2 years)	0–5
P6.3	Availability of information in multiple languages and formats (accessibility)	0–5

5. Important Clarification on Index Application

It is important to emphasize that this index is not intended for direct comparative analysis across different local government organizations, either geographically or over time. Due to the significant variability in local context and data availability, the CMRI Index should be considered a localized performance and preparedness assessment tool, providing measurable but non-comparable results among different municipalities or regions.

6. Conclusion

The Local Government Crisis Management & Resilience Index, is a comprehensive framework designed to evaluate the preparedness, responsiveness, adaptability, and long-term resilience of municipalities and regional authorities in the face of crises and emergencies. The index integrates key dimensions such as risk assessment, emergency planning, interagency coordination, infrastructure resilience, community engagement, and recovery capacity. It aims to provide a strategic tool for local governments to identify gaps, benchmark performance and enhance their crisis management capabilities in a rapidly changing risk environment.

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