

IIEES



Towards Integrated Earthquake Risk and Resilience Management in Urban Fabrics

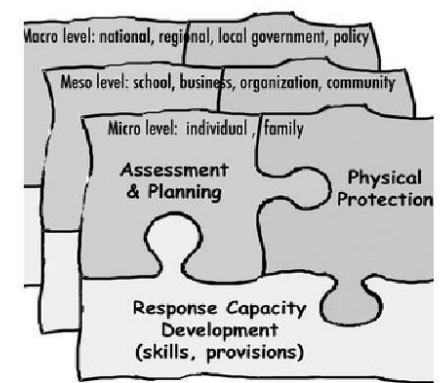
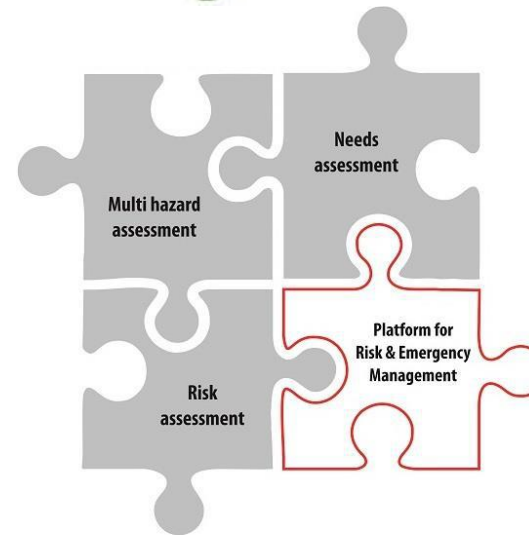
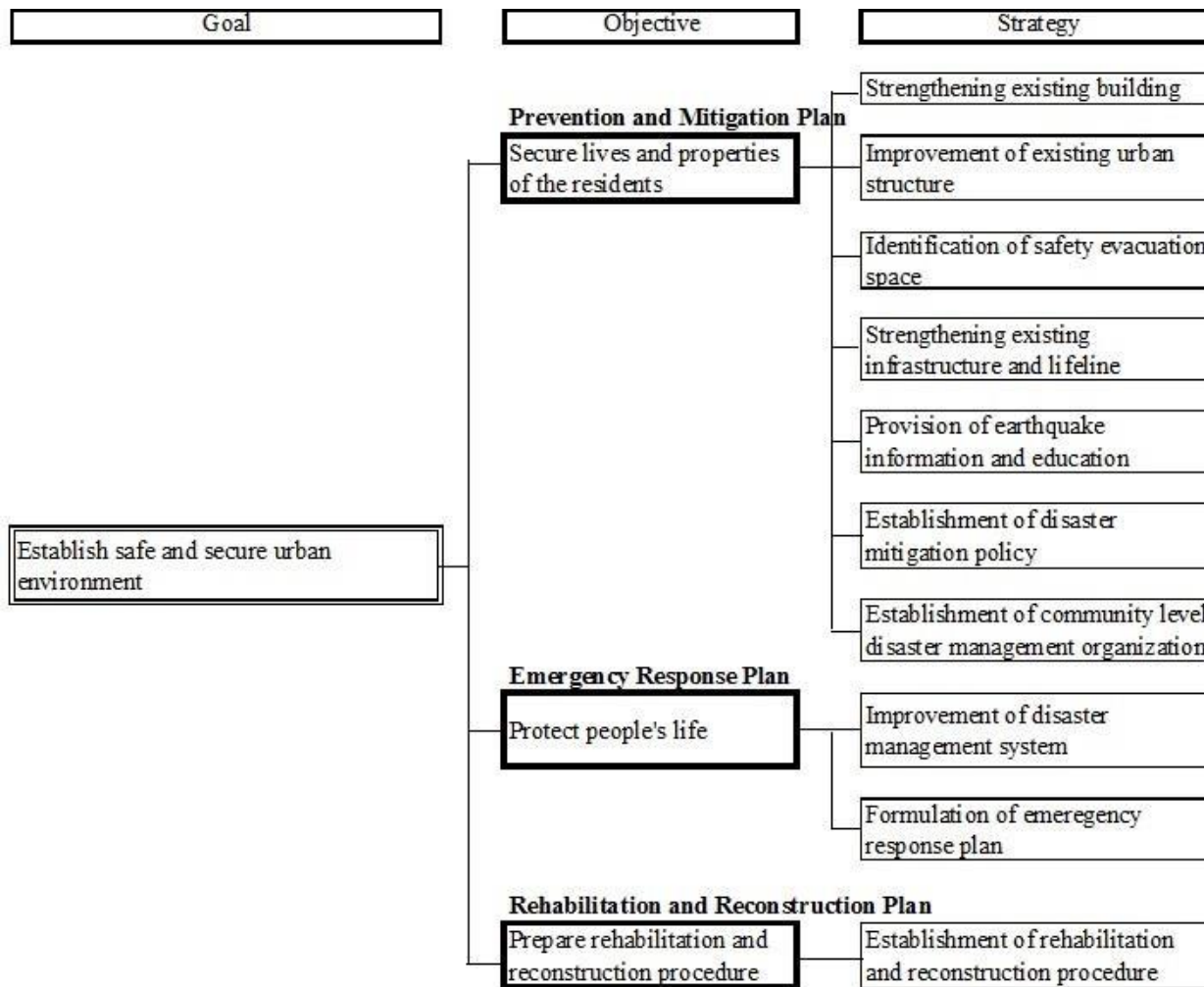
Kambod Amini Hosseini

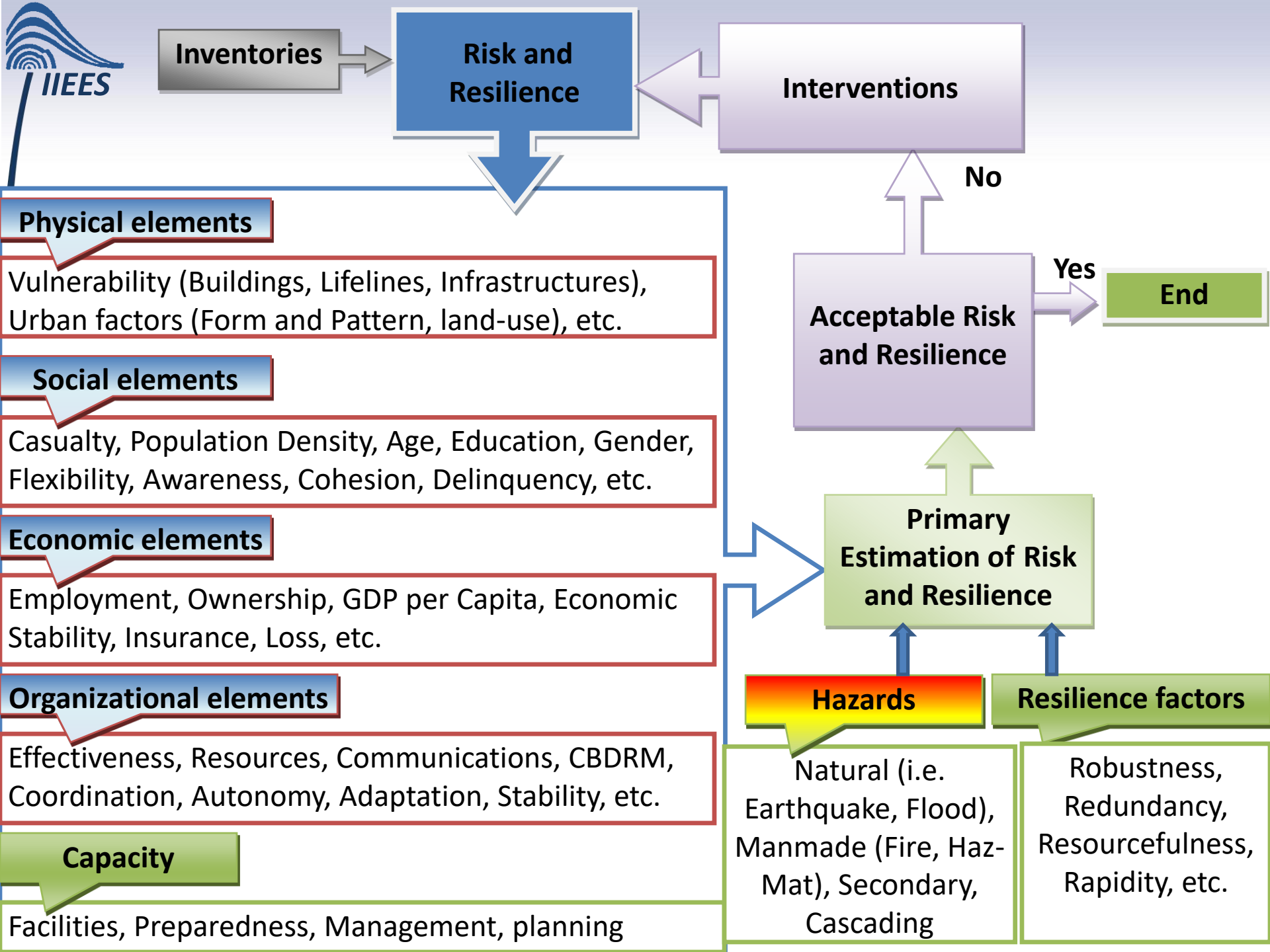
**Workshop on Urban Resilience through
Applied Systems Analysis**

Tehran - July 2018

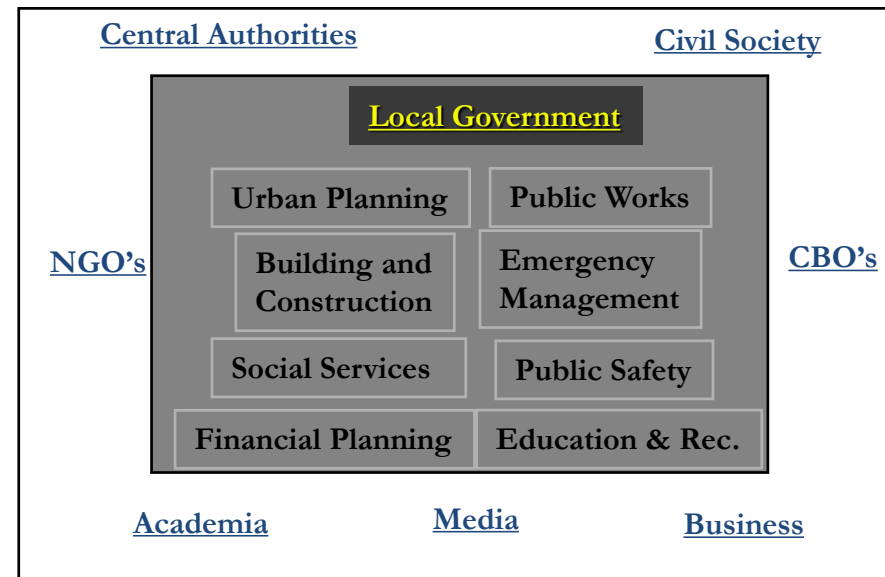
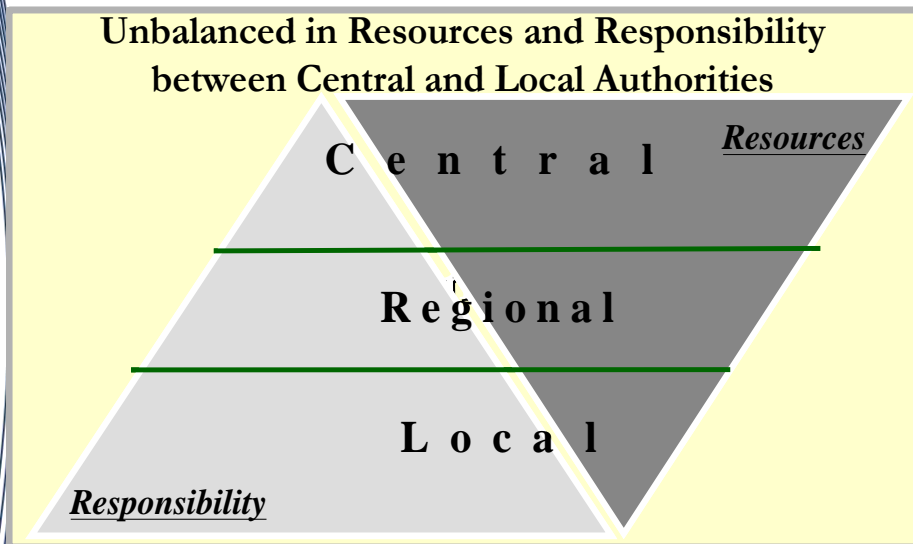


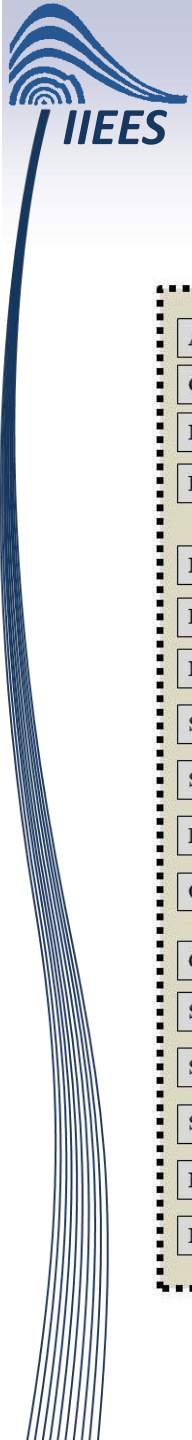
**International Institute of Earthquake
Engineering and Seismology (IIEES)**



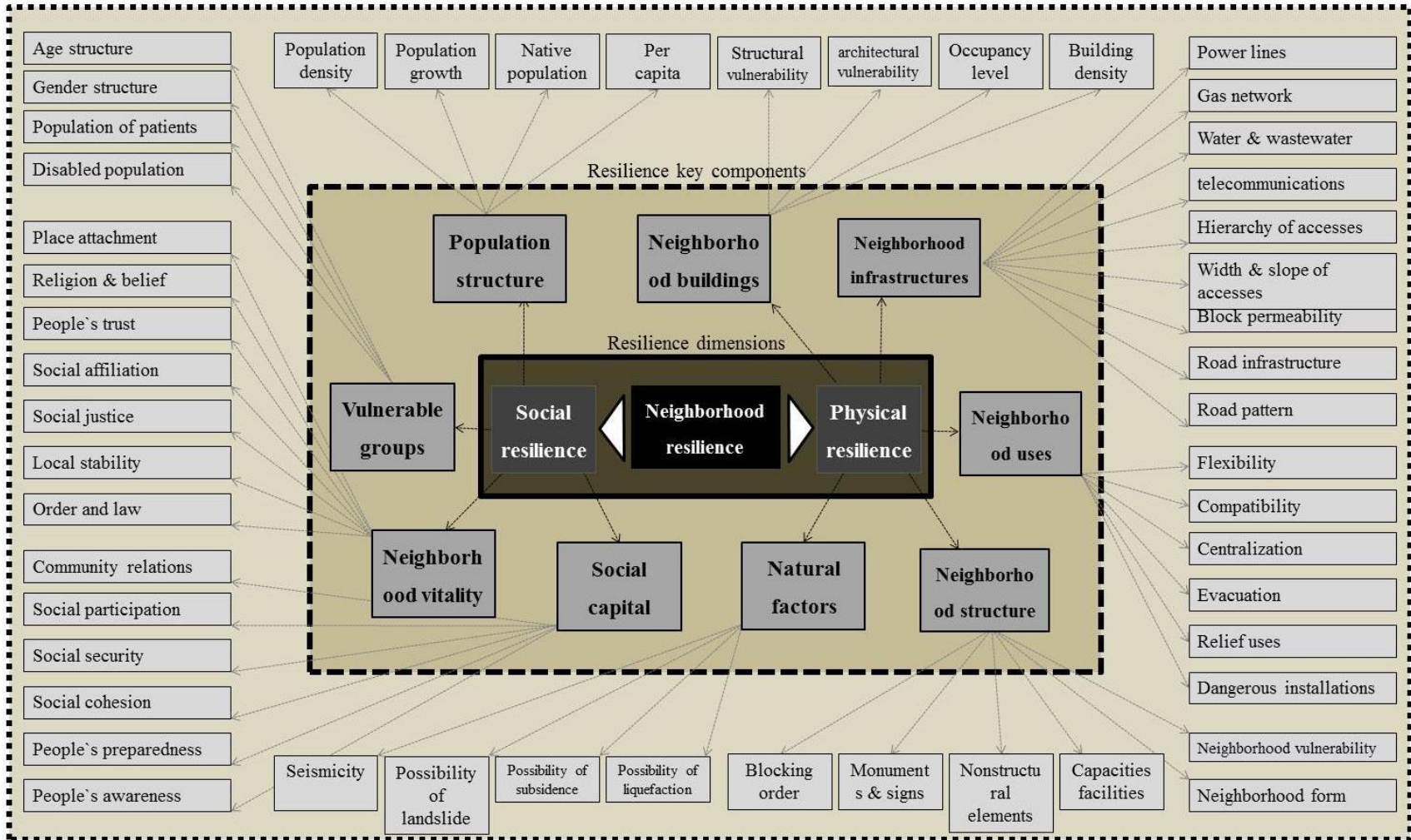


Multi-level approach and respective actors necessary for scalable and holistic resilience approach





Resilience indexes

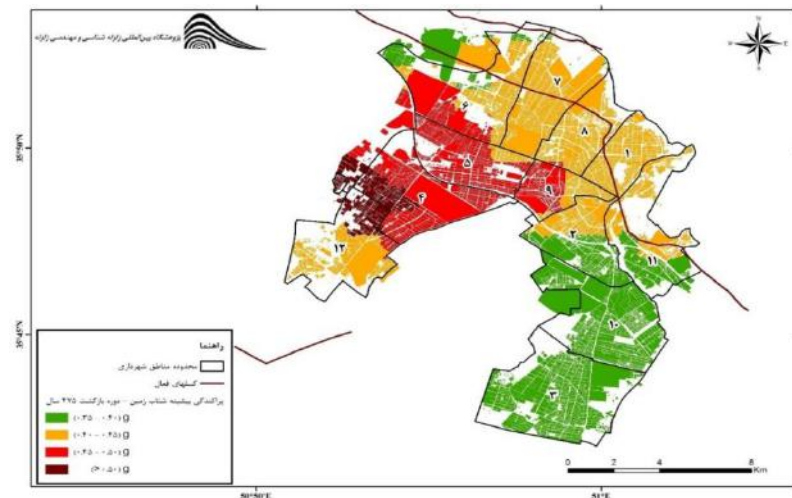
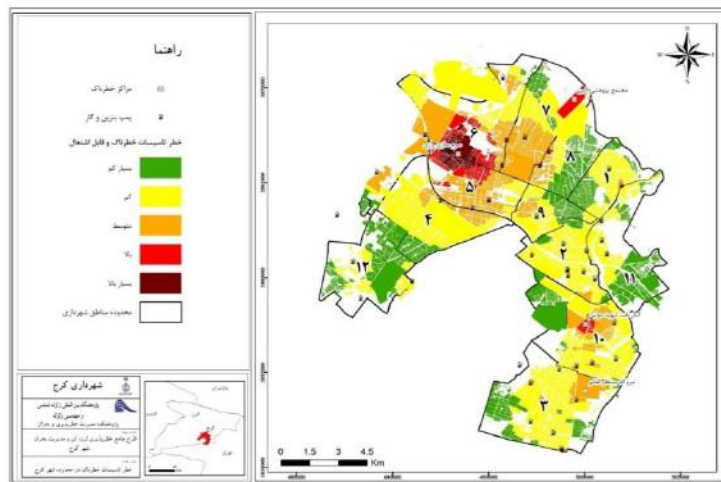
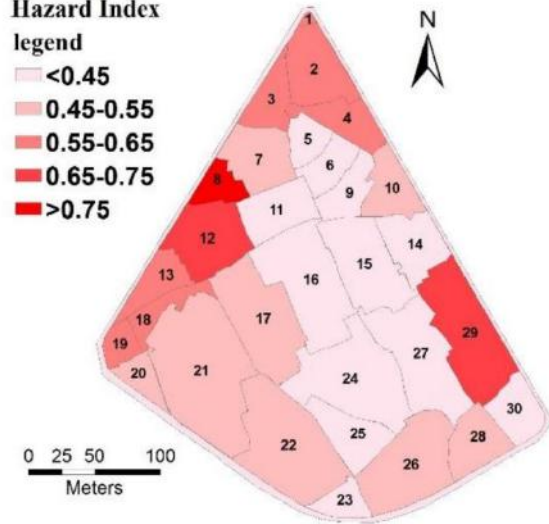


Hazards

- Active faults
- Seismic Microzonation
- Landslide risk
- Hazardous installations

Hazard Index legend








- <math><0.45</math>
- 0.45-0.55
- 0.55-0.65
- 0.65-0.75
- >0.75

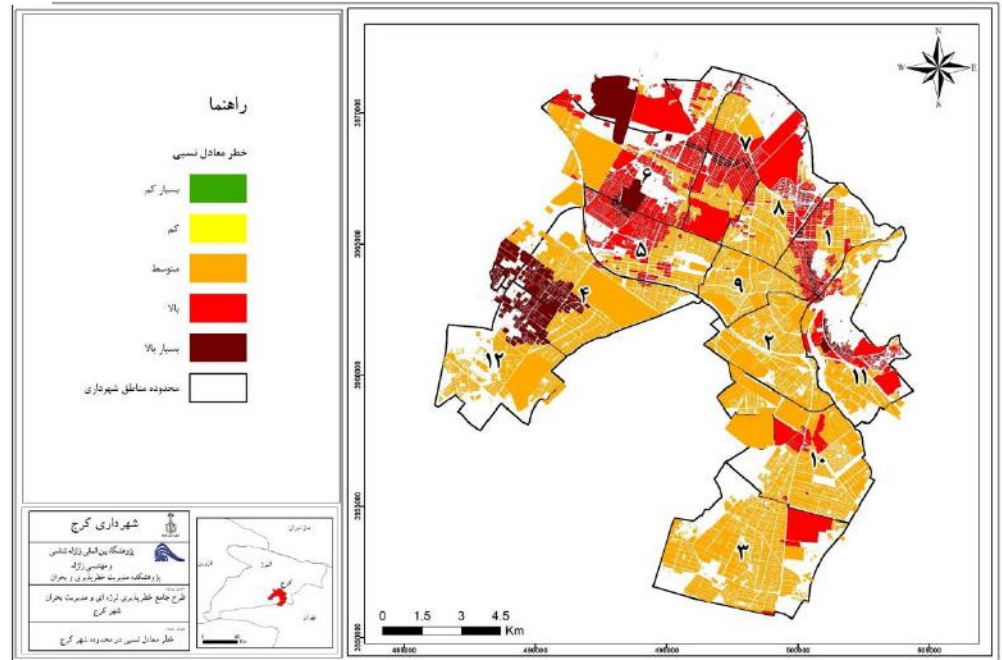
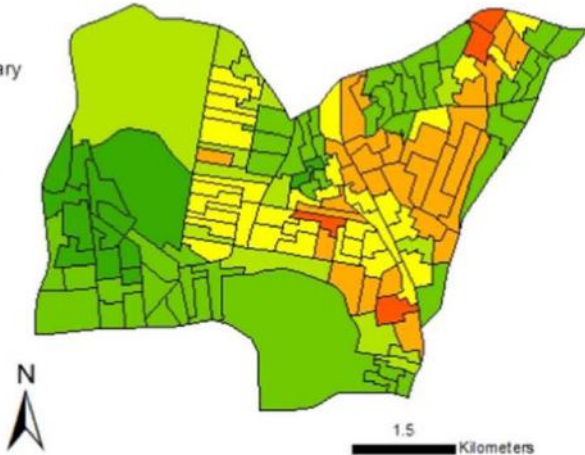


Integrated hazard map

Legend

— Zone Boundary
Hazard Index

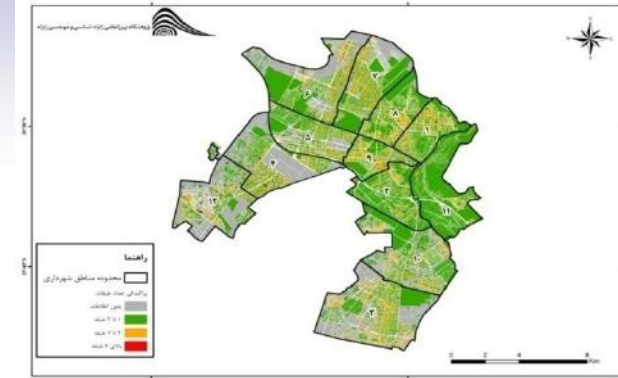
-  < 0.30
-  0.30 - 0.40
-  0.40 - 0.50
-  0.50 - 0.60
-  0.60 - 0.70
-  0.70 - 0.80
-  > 0.80



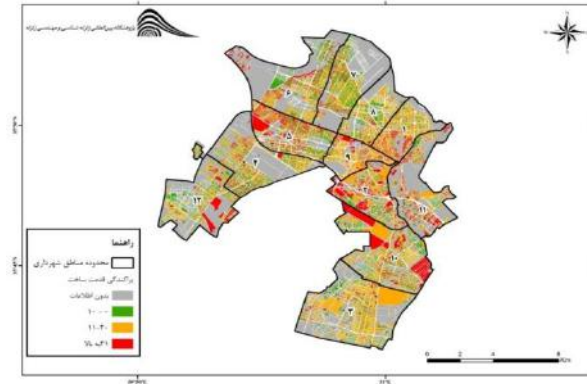


Physical Vulnerability

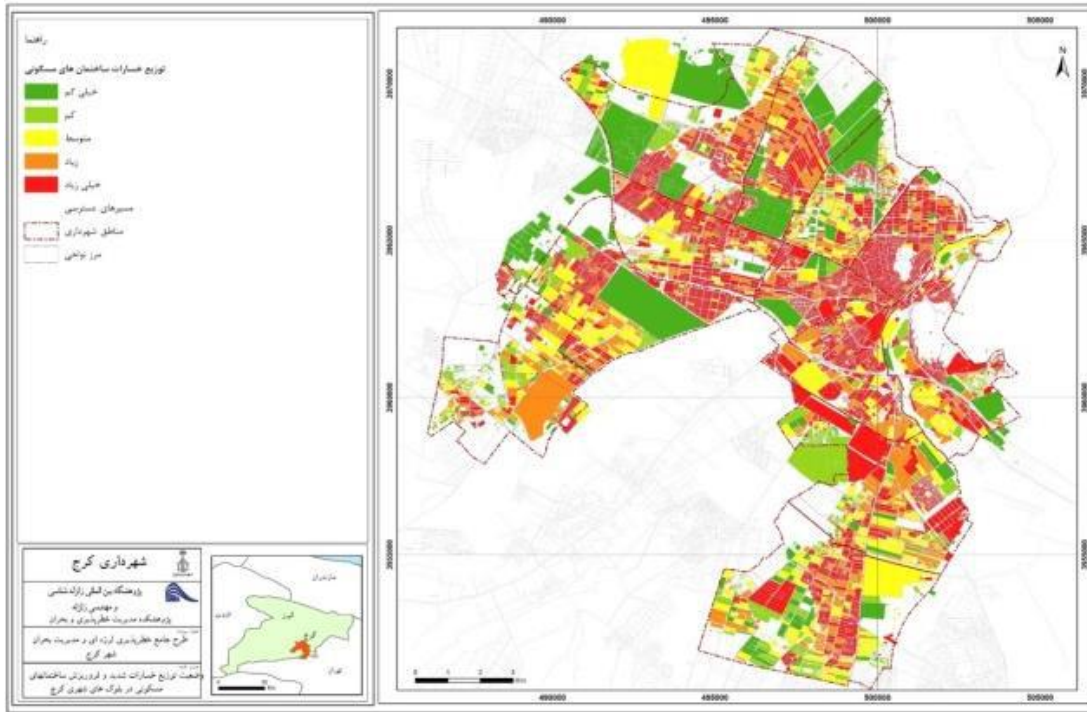
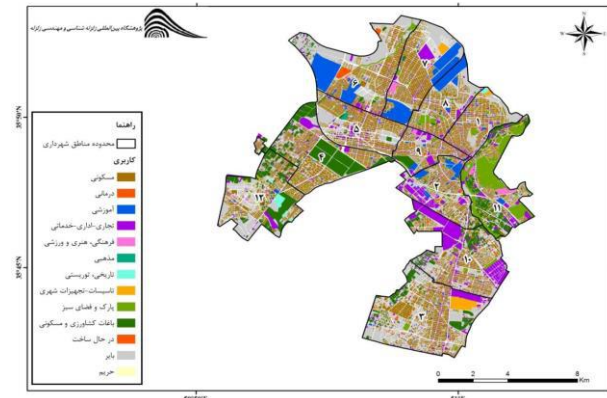
Number of stories



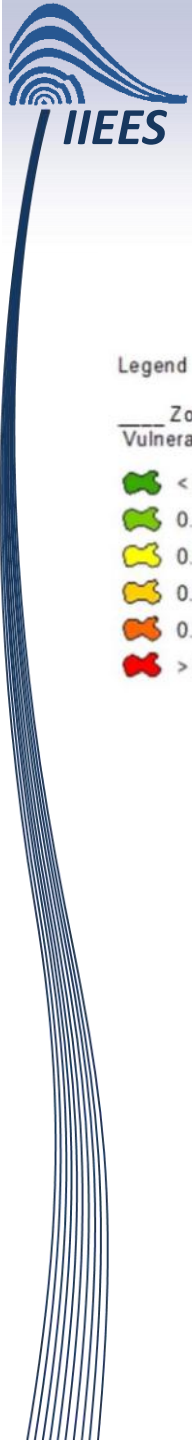
Age of buildings



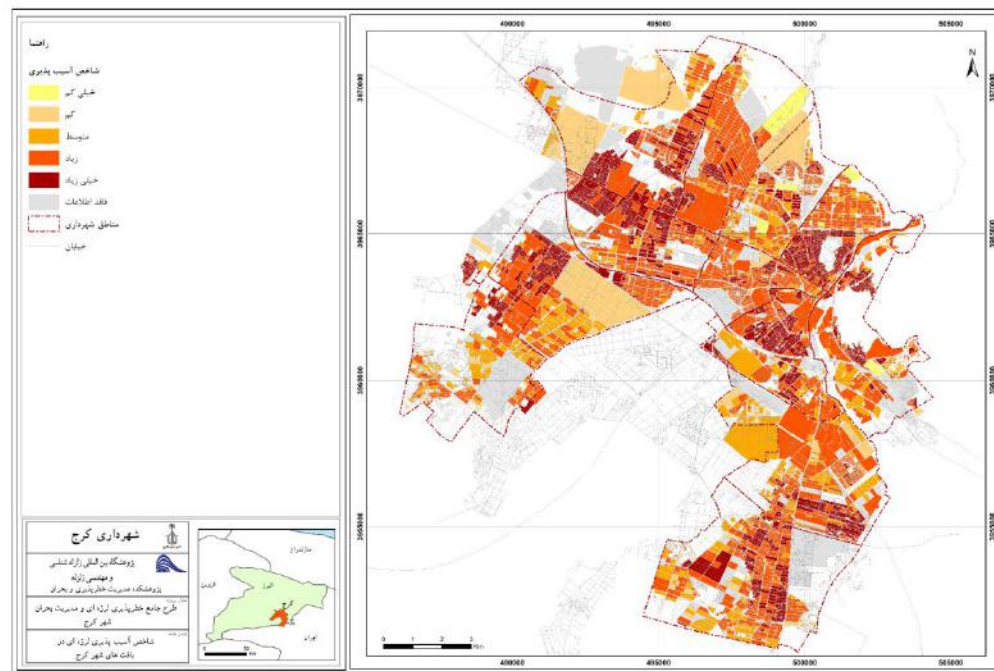
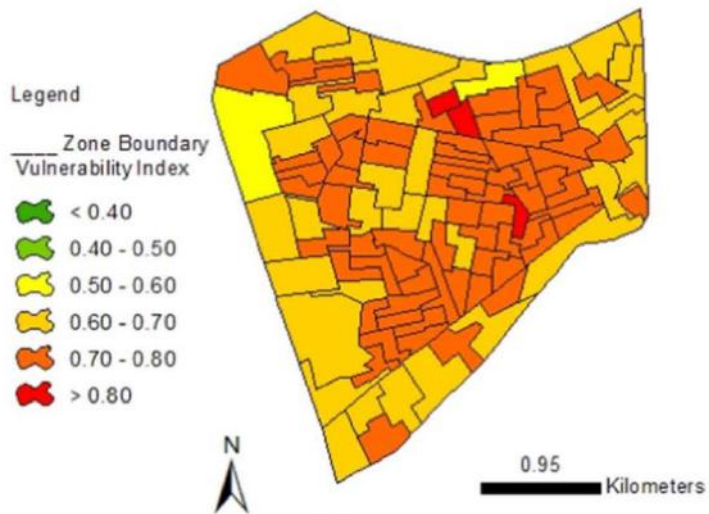
Landuse



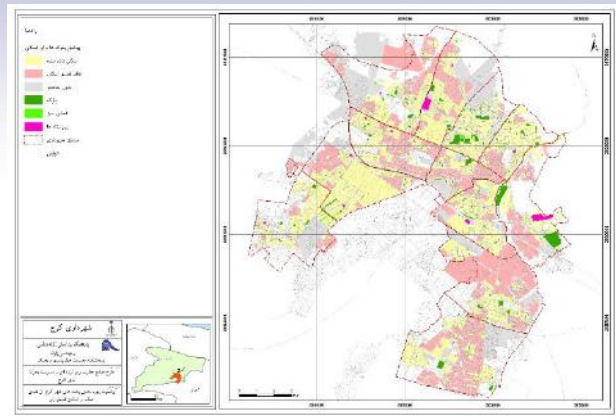
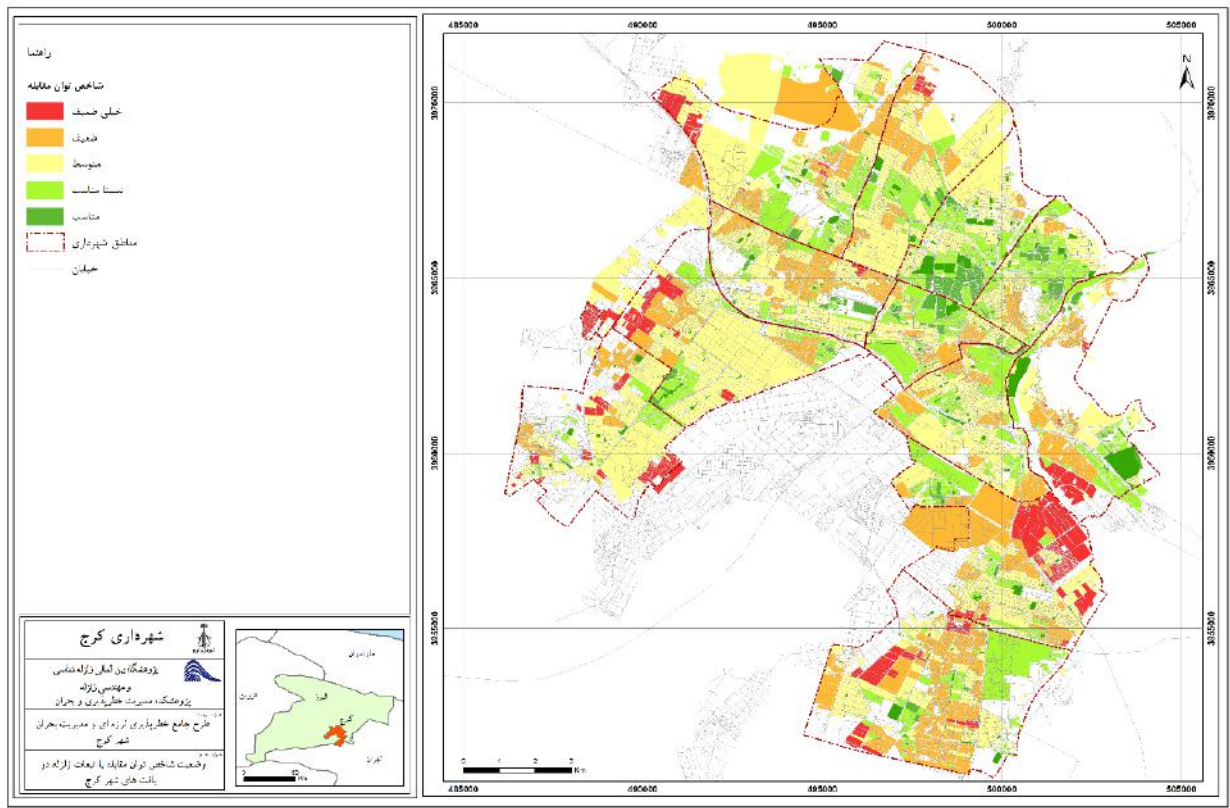
Heavily Damaged Buildings



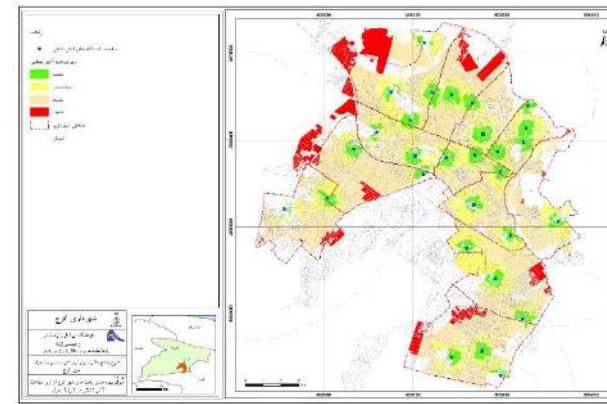
Integrated Vulnerability



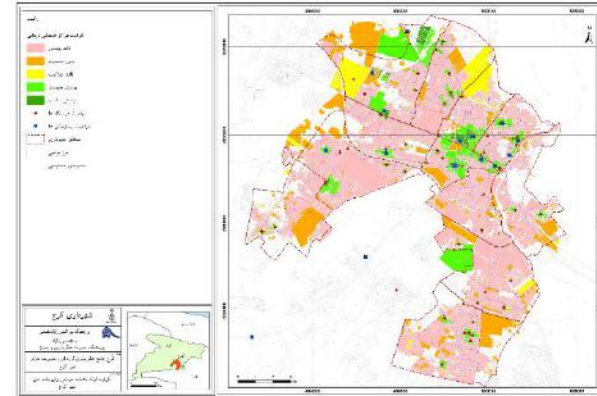
Evacuation



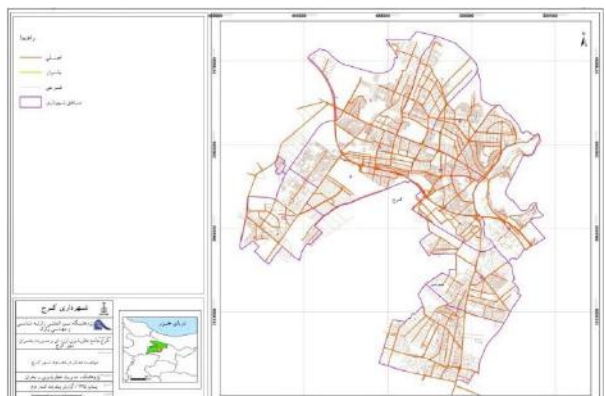
Rescue and Relief



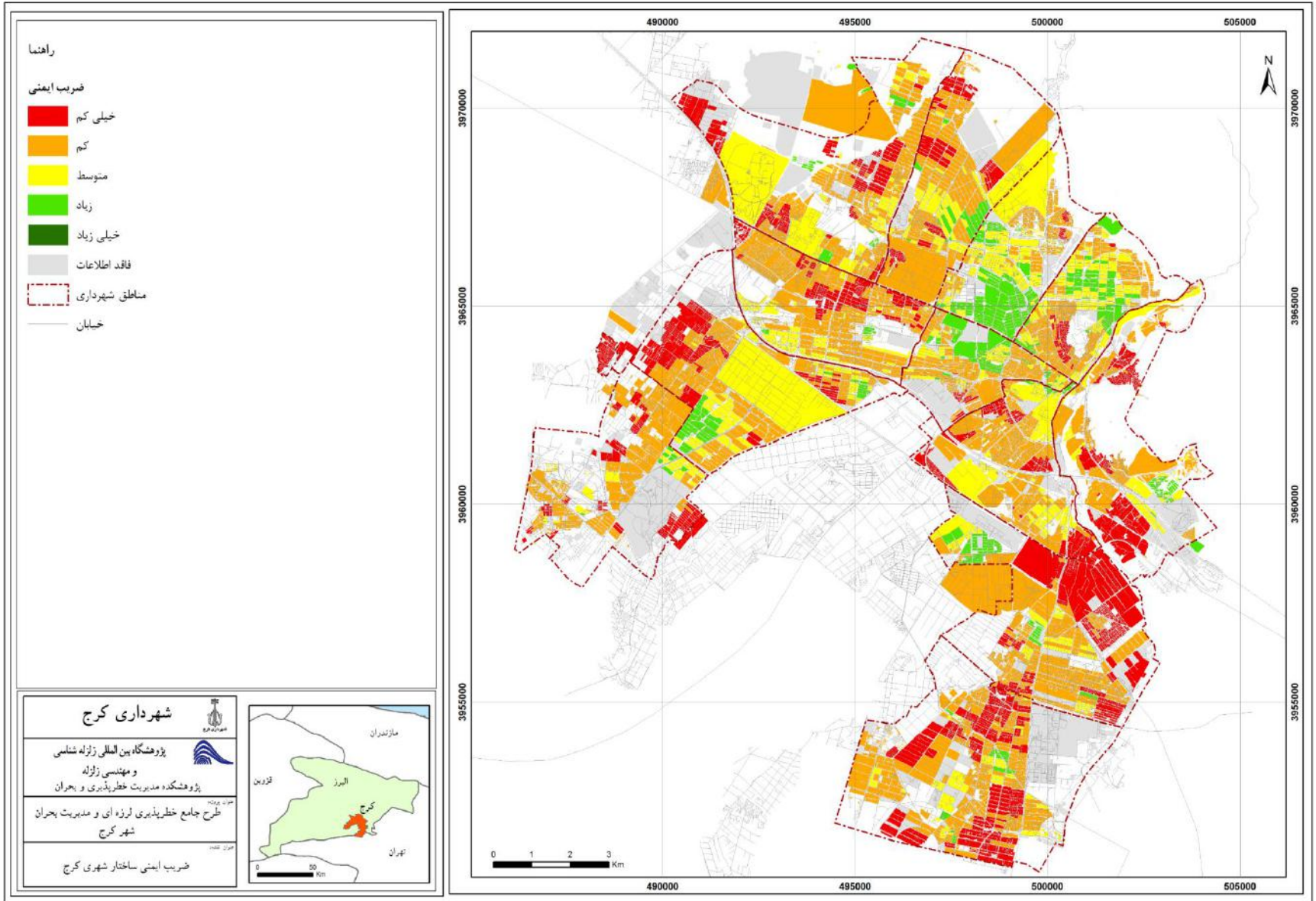
Medical Care



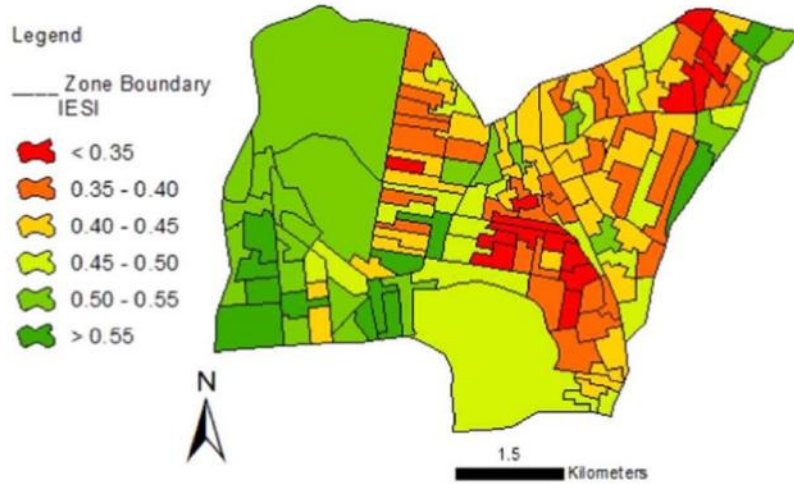
Road network



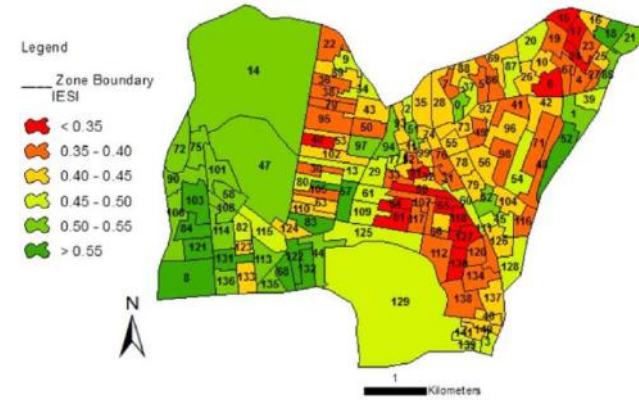
Safety Index



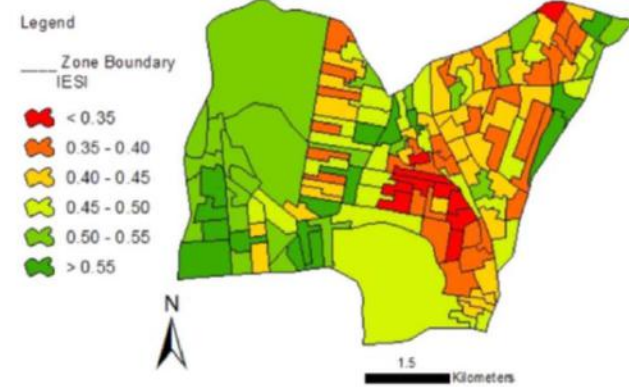
Improvement of Safety Index by different interventions



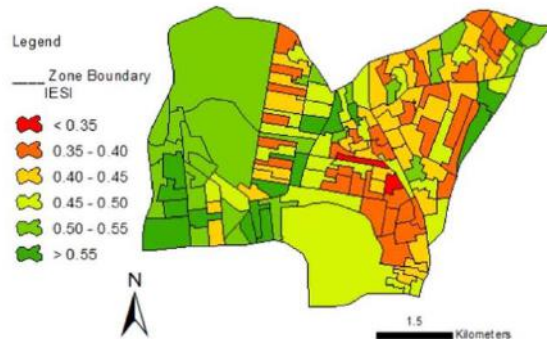
Additional Open Space



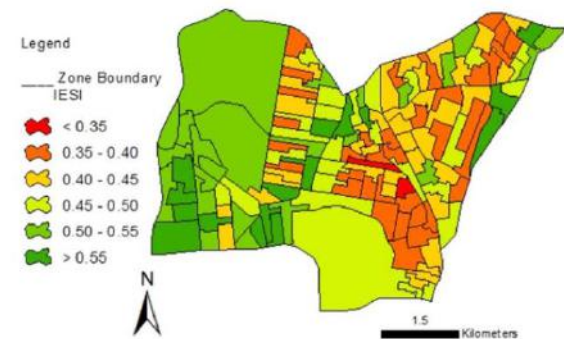
Additional Fire Station



Improving Response Capacity

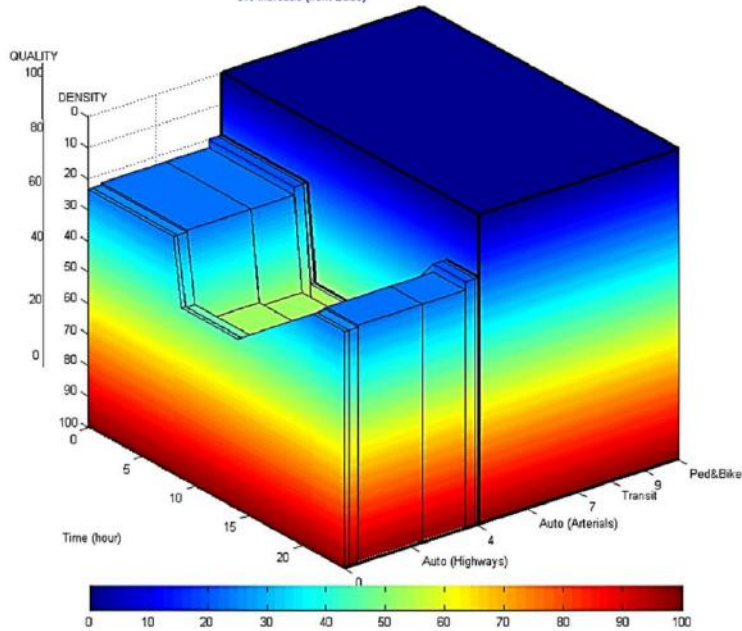


Developing CBDRM



RI (Resiliency Index): 865

0% increase (from Previous)
0% increase (from Base)



Other models for estimating resilience

STATE II (interventions)

Question 1: Preparations for increase in police force during an earthquake through trained support forces (currently in charge of other areas)

Appropriations (\$) 200000
Total budget: 300000

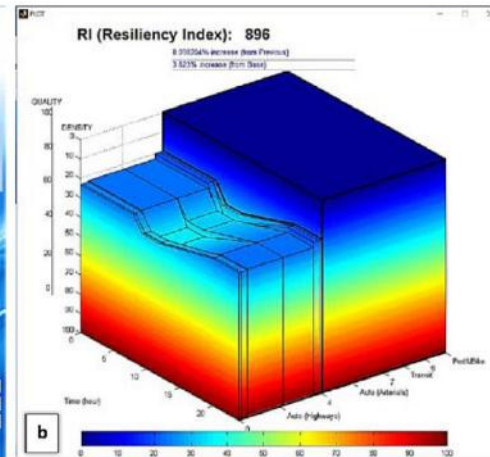
New FP: 0.8
base FP: 0.8

Reduction of SFx Values (%) 20
base sD: 1500 base sD: 1600 base sF: 1740

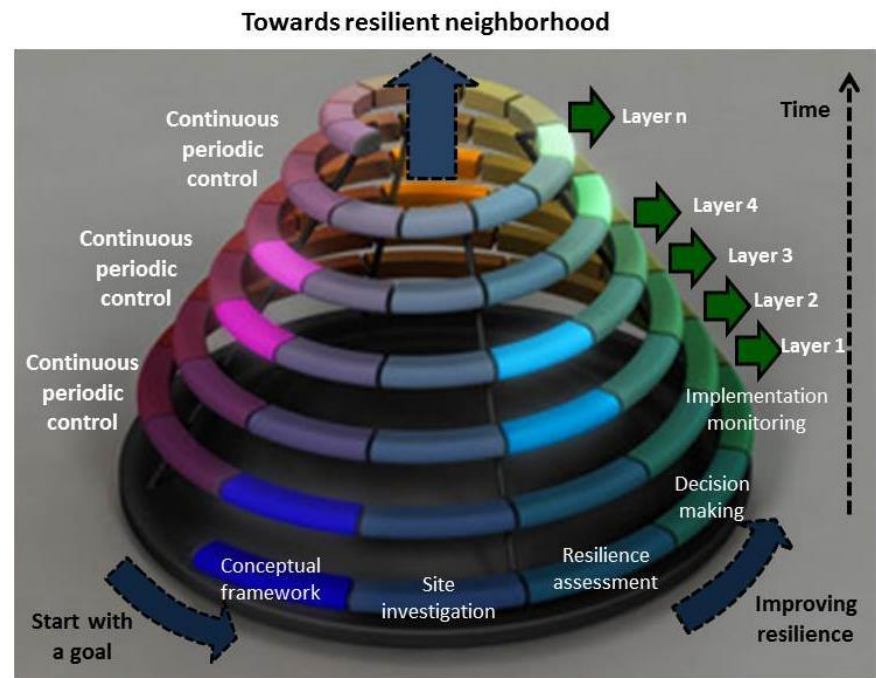
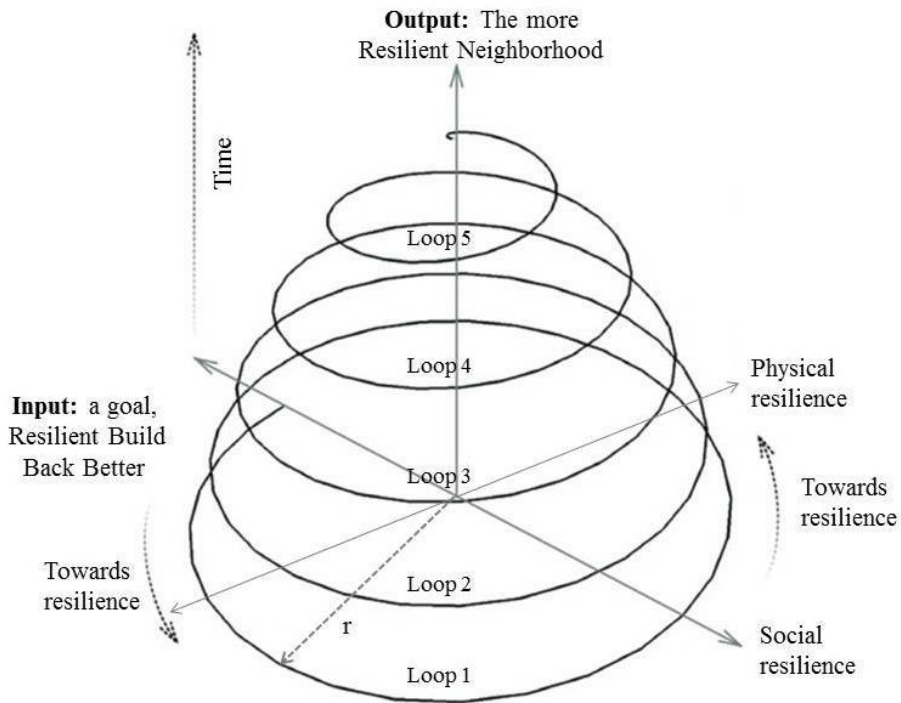
Reduction of Percentage of Additional L (%) 10
base m: 27 base n: 54 base p: 03

Delayed t1 (H:M) 9 : 30 11 base: 9:5
Optimized t2 (H:M) 12 : 00 12 base: 12
Optimized t3 (H:M) 20 : 00 13 base: 20

OK



Other models for enhancing resilience





Thanks for your attention