# Environmental Resilience in the Context of Planetary Urbanization: Case Study of Hasanoğlan, Elmadağ.

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**CP 501** Planning Studio I

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## Conceptual Framework

**Environmental & Spatial Capital** represents the sum of natural assets—land, water systems, ecosystem services, and green corridors—that sustain life and production in Hasanoğlan (Costanza & Daly, 1992).

This is the "passive inventory" of the settlement. It is what makes Hasanoğlan valuable as an operational landscape or resource for Ankara.

**Environmental Resilience** is the active ability of the system to absorb disturbances (mining, pollution) and regenerate its capital over time. (Gunderson & Holling, 2002)

Resilience is the mechanism that maintains the stock of Capital.

**Without Capital**
There is no system to protect.

**Without Resilience**
Capital is drained faster than it can regenerate.

Costanza, R., & Daly, H. E. (1992). Natural capital and sustainable development. *Conservation Biology, 6*(1), 37–46. https://doi.org/10.1046/j.1523-1739.1992.610037.x
Gunderson, L. H., & Holling, C. S. (Eds.). (2002). Panarchy: Understanding transformations in human and natural systems. Island Press.

## Conceptual Framework

When **environmental challenges** do not occur as sudden shocks but **persist over long periods,** they place settlements in a more vulnerable position. Continuous exposure limits recovery opportunities, as **systems are repeatedly stressed without time to regenerate.** In the case of Hasanoğlan, environmental challenges emerge not as sudden events but as gradual and cumulative processes emerge over decades. Rob Nixon (2011) conceptualizes this condition as **slow violence.**

> Slow violence refers to forms of harm that occur gradually and invisibly over time, rather than through sudden or spectacular events. It operates through **long-term environmental degradation, chronic exposure, and structural neglect,** with impacts that accumulate and disproportionately affect marginalized communities (Nixon, 2011).

To assess resilience under such temporally extended pressure, environmental resilience can be examined across **four analytical layers,** each capturing a different dimension through which slow violence becomes embedded;

Nixon, R. (2011). *Slow violence and the environmentalism of the poor.* Harvard University Press.

# Environmental Resilience Assessment Framework

**Spatial–Ecological Layer** examines how landscape structure, land-use patterns, and ecological continuity influence the capacity to absorb environmental stress.

- Landscape Connectivity (Shackelford et al., 2018), Open Space Functionality (Wang & Foley, 2021), Discontinuous Urban Expansion (Cabral & Cândido, 2019), Incompatible Land-Use Adjacency (Jia et al., 2024)

**Everyday Life Layer** focuses on the ability to sustain daily practices and routines under ongoing environmental disturbance.

- Everyday Spatial Avoidance

**Social–Political Layer** addresses governance capacity, institutional continuity, and collective organization in responding to environmental challenges.

- Intervention Capacity (Dong et al., 2023), Community Self-Organization Capacity (Seymour et al., 2020), Administrative Fragmentation

**Temporal Layer** captures the cumulative effects of chronic stress and gradual transformation over time.

- Chronic Stress (Abad et al., 2023)

## Spatial-Ecological Layer Parameters

**Landscape Connectivity** enables continuous ecological processes such as water flow, nutrient exchange, and habitat interaction.

Connected landscapes can absorb environmental stress more effectively by redistributing pressure across systems. When connectivity is strong, ecosystems are better able to adapt to long-term disturbance.

**Open Space Functionality** supports ecological buffering, climate regulation, and everyday environmental interaction. Well-functioning open spaces allow settlements to absorb and moderate environmental stress rather than intensify it.

Their role extends beyond presence, depending on accessibility, design, and integration into the spatial fabric.

Shackelford, N., Standish, R. J., Lindo, Z., & Starzomski, B. M. (2018). The role of landscape connectivity in resistance, resilience, and recovery of multi-trophic microarthropod communities. Ecology, 99(5), 1164–1172. https://doi.org/10.1002/ecy.2196
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## Spatial-Ecological Layer Parameters

**Discontinuous Urban Expansion** influence resilience by shaping spatial continuity and adaptability. Integrated and continuous expansion allows infrastructure, land use, and ecological systems to adjust collectively to change.

Discontinuity weakens this adaptability by producing uneven and poorly integrated urban structures.

**Incompatible Land-Use Adjacency** reduces long-term exposure to environmental stress.

Transitional zones and buffers help absorb impacts and prevent the direct transmission of disturbance. Without spatial mediation,resilience is compromised at the structural level.

Cabral, L. d. N., & Cândido, G. A. (2019). Urbanização, vulnerabilidade, resiliência: Relações conceituais e compreensões de causa e efeito [Urbanization, vulnerability, resilience: Conceptual relations and understanding of cause and effect]. Urbe, 11. https://doi.org/10.1590/2175-3369.011.002.AO08
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## Social-Political Layer Parameters

**Intervention Capacity** enables timely, locally grounded responses to environmental and spatial challenges. Local governance structures allow adaptation to cumulative and place-specific pressures. Without intervention capacity, resilience becomes reactive rather than adaptive.

**Community Self-organization** enables collective response in contexts where formal governance mechanisms are weak or absent. Informal networks, associations, and shared practices allow environmental issues to be addressed at the local level, even without institutional support. This capacity indicates whether a settlement can mobilize internal resources to cope with long-term environmental pressure.

**Administrative Fragmentation** affects resilience by disrupting continuity in decision-making, responsibility, and environmental stewardship. When authority is divided or transferred between governance levels, environmental spaces can become neglected rather than managed. Such fragmentation weakens the ability of the system to respond coherently to environmental stress and adapt over time.

Dong, L., Wang, Z., & Zhou, Y. (2023). Public participation and the effect of environmental governance in China: A systematic review and meta-analysis. Sustainability, 15(5), Article 4442. https://doi.org/10.3390/su15054442
Seymour, V., King, M., & Antonaci, R. (2020). Exploring those characteristics which may help to foster and support people's social-ecological resilience: An environmental volunteering case study. Journal of Environmental Studies and Sciences, 10(4), 438–456. https://doi.org/10.1007/s13412-020-00590-0

## Everyday Life & Temporal Layer Parameters

**Everyday Spatial Avoidance** reflects the resilience of a settlement through the ability to sustain everyday life in outdoor and shared spaces. When daily practices can continue under environmental pressure, the system demonstrates adaptive capacity.

Therefore, everyday life functions as an indicator of how well spatial systems support long-term habitability.

**Temporally,** resilience depends on how systems respond to sustained and cumulative pressure. The capacity to manage chronic stress determines whether environmental impacts remain manageable or become structurally embedded.

Temporal resilience requires mechanisms to recognize and respond to gradual change.

Naik, P., Ushamalini, D., & Somashekar, R. K. (2007). Impact of dust pollution on the growth response and dry-matter production of the vegetation in and around stone quarry area. Ecology, Environment and Conservation, 13(2), 409–410.
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# Multi-Layered Analysis of Environmental Resilience

| Layer | Parameter | Assessment Question |
|---|---|---|
| **Spatial–Ecological** | Landscape Connectivity | To what extent are ecological systems (green areas, water systems, agricultural land) spatially and functionally connected in Hasanoğlan? |
| | Open Space Functionality | Do existing open and green spaces in Hasanoğlan function as accessible, designed, and integrated parts of the urban fabric? |
| | Discontinuous Urban Expansion | Does urban growth in Hasanoğlan occur in a continuous and integrated way, or does it produce fragmented development and vacant land? |
| | Incompatible Land-Use Adjacency | Are industrial and residential land uses spatially mediated through buffer zones, or are they placed in direct proximity? |
| **Everyday Life** | Everyday Spatial Avoidance | Can everyday outdoor activities and daily movement be sustained in areas affected by quarry-related environmental pressure? |

# Multi-Layered Analysis of Environmental Resilience

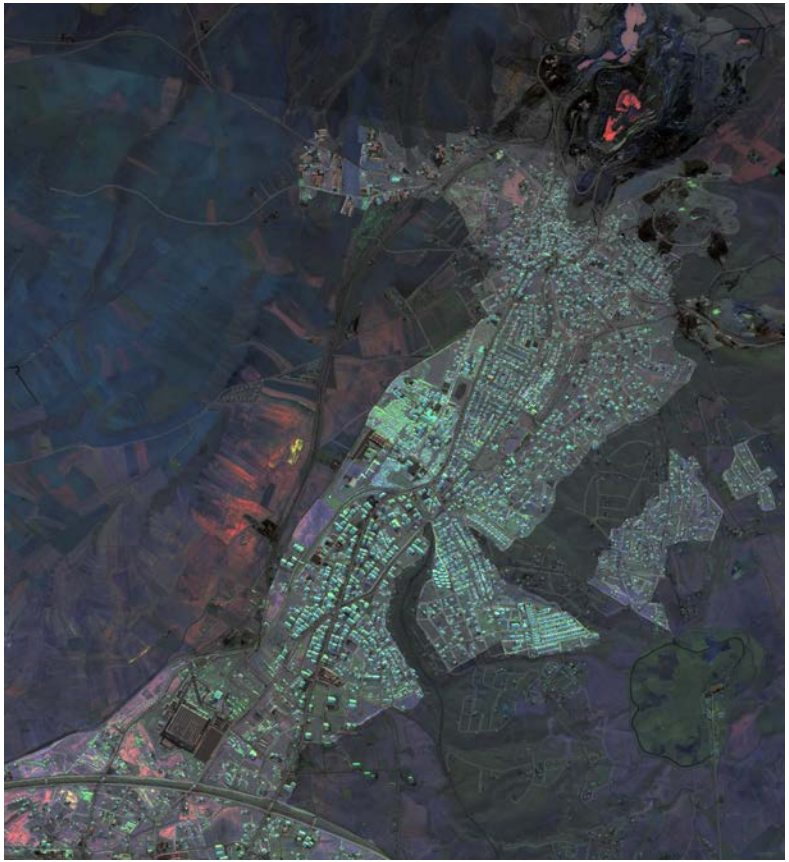
| Layer | Parameter | Assessment Question |
|---|---|---|
| **Social–Political** | Intervention Capacity | Is there a locally grounded governance structure capable of intervening in site-specific environmental and spatial issues? |
| | Community Self-Organization Capacity | Can local residents collectively organize to address environmental problems in the absence of effective local governance? |
| | Administrative Fragmentation | Does the division of authority between governance levels hinder coordinated environmental management and recovery? |
| **Temporal** | Chronic Stress | Do environmental pressures in Hasanoğlan accumulate gradually over time rather than appearing as isolated events? |

## Landscape Connectivity → Fragmentation and Disconnection

Large-scale land transformations have **fragmented** previously continuous green and ecological systems, producing physically **disconnected landscape patches** with limited regeneration capacity.

Altered landforms and surface conditions **disrupt material and biological flows**, weakening the continuity of green space across the landscape.

This combined fragmentation and disconnection **reduces environmental resilience** by breaking integrated ecological relationships.



# Landscape Connectivity → Fragmentation and Disconnection

## Landscape Connectivity → Fragmentation and Disconnection

Disposal of quarry waste in afforestation areas.

Dumping of waste materials into streambeds.

Excavation pits left by stone quarries.

To enable stone quarries, topsoil has been completely removed and disposed of directly into stream channels without stockpiling, disrupting nutrient cycles and affecting local flora.

Özcan, A. U. (2009). Ankara-Hasanoğlan taş ocaklarının onarımı ve kentsel kullanım açısından değerlendirilmesi üzerine bir araştırma [A research on the reclamation of Ankara-Hasanoglan stone quarries and their evaluation in terms of urban use] [Doctoral dissertation, Ankara University]. Council of Higher Education Thesis Center

## Landscape Connectivity → Fragmentation and Disconnection

> "They filled the streams with waste, so the water no longer flows. Ced Stream used to run until June and was almost like a lake, but limestone waste absorbs the water and pulls it underground. Now it is cut off before May, and there is no water left at all." *(Environmental Protection Association representative, interview)*

Landscape Connectivity **— Low to Moderate Resilience**

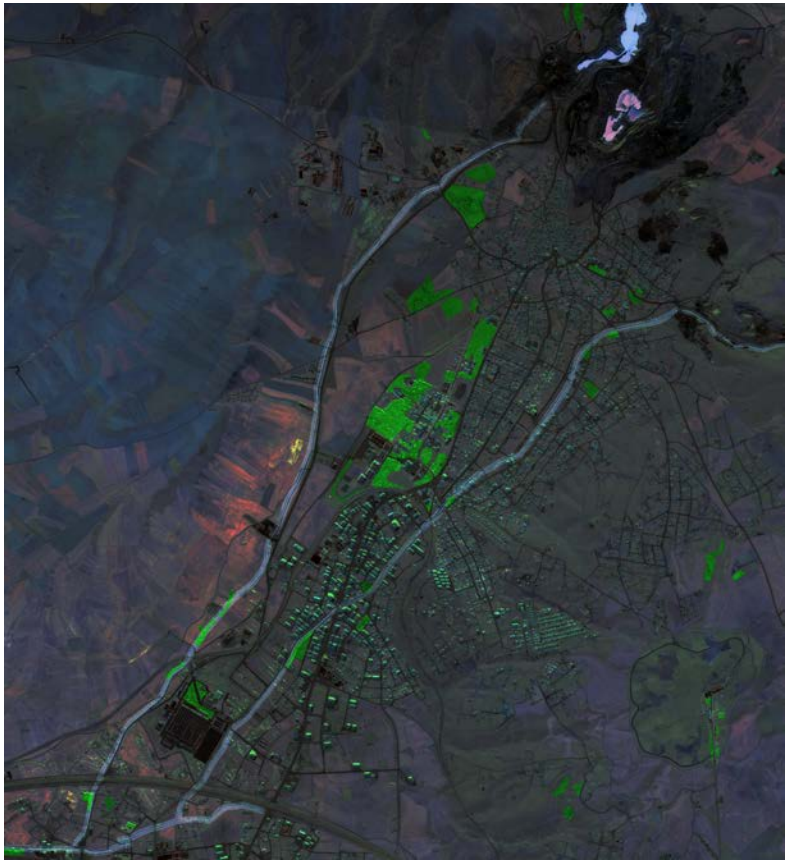
Although major ecological corridors and water systems have been fragmented, partial landscape elements and residual connections remain, indicating **weakened but not entirely collapsed** landscape connectivity.

## Open Space Functionality → Absence of Designed Public Green Spaces

Within the residential fabric of Hasanoğlan, there is an **absence** of designed and publicly accessible green spaces.

What is identified as “green” primarily consists of leftover urban vegetation that has remained unchanged over time or areas characterized as **vacant land** with spontaneous or unmanaged vegetation.

Beyond these, the most extensive green areas belong to the Village Institute campus, which is **not publicly accessible**, or to specific uses such as cemeteries.



# Open Space Functionality → Absence of Designed Public Green Spaces

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## Open Space Functionality → Absence of Designed Public Green Spaces

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Only a very **limited number of spaces** can be described as formally designed parks. This condition reveals a gap between the formal recognition of open space and its actual functionality. Green space exists as a spatial category, but not as an everyday, lived, or ecologically active environment.

> "The streets and the settlement have turned into irregular development under the name of 'becoming a district'. The settlement is now 80–90 percent concrete. Except for small green areas in front of buildings, there is almost no publicly accessible green space left for residents." *(Environmental Protection Association representative, interview)*

Open Space Functionality **— Low Resilience**

> The absence of designed, accessible, and integrated public green spaces means that open areas cannot perform ecological or social buffering functions, resulting in low resilience at the settlement scale.

## Discontinuous Urban Expansion → Production of Vacant Land

Urban expansion in Hasanoğlan is **squeezed** between the expanding **stone quarry** to the north and the **industrial**–highway corridor to the south, forcing growth eastward in a discontinuous expansion pattern that leaves **spatial gaps** within the urban fabric.

The settlement has produced internal parcels that are neither cultivated nor integrated as green space. These **interstitial areas** function as vacant land within the urban structure, **detached** from both everyday use and ecological continuity.

# Discontinuous Urban Expansion → Production of Vacant Land

## Discontinuous Urban Expansion → Production of Vacant Land

Discontinuous Urban Expansion — **Moderate Resilience**

Rather than serving as adaptive buffers, they reflect **uneven and fragmented spatial integration** produced by constrained urban growth. It has produced vacant and underutilized land, reducing spatial adaptability; however, the absence of complete spatial saturation leaves latent potential for reintegration.

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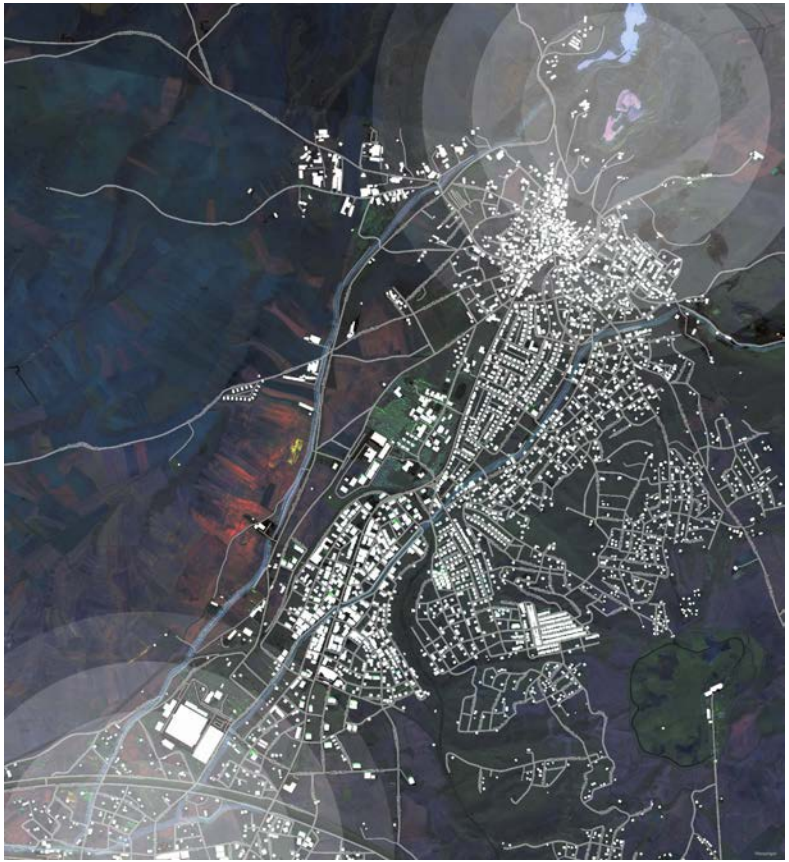
## Incompatible Land-Use Adjacency → Proximity of Industrial and Residential Areas

Stone quarries cause significant **environmental damage** through impacts such as noise, dust, ground vibration, erosion, topographic alteration, and changes in landscape visibility.

In Hasanoğlan, the close proximity between stone quarries and the settlement **intensifies** these effects.

**Dust and noise** are generated during processes such as blasting, excavation, crushing, and transportation.



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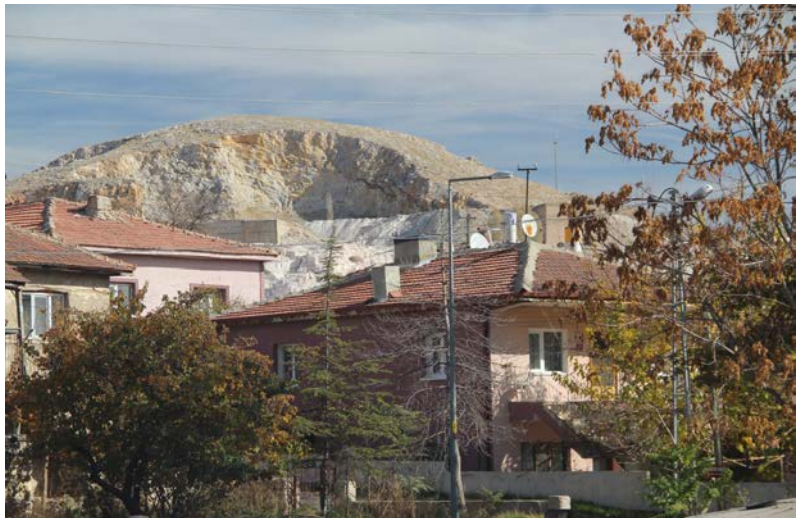


# Incompatible Land-Use Adjacency → Proximity of Industrial and Residential Areas

Dust generated during blasting in quarries.

Wall cracks in residential buildings.

Roofs of houses in close proximity to quarries

Incompatible Land-Use Adjacency **— Low Resilience**

The direct proximity of industrial and residential areas **without buffer zones** structurally embeds environmental stress into everyday space, indicating a low level of spatial resilience.

Özcan, A. U. (2009). Ankara-Hasanoğlan taş ocaklarının onarımı ve kentsel kullanım açısından değerlendirilmesi üzerine bir araştırma [A research on the reclamation of Ankara-Hasanoglan stone quarries and their evaluation in terms of urban use] [Doctoral dissertation, Ankara University].

## Everyday Spatial Avoidance → Inability to Sustain Everyday Life around the Quarry

In Hasanoğlan, continuous quarry-related disturbances **restrict the capacity to sustain everyday life** in surrounding spaces. Heavy truck traffic, dust, noise, and blasting activities reduce the usability of outdoor areas and **disrupt routine daily movement**.

"They are very close. Extremely close. A relative of mine lives right next to the quarry. When the dynamite explodes, it feels like an earthquake in your hand; the houses shake as if we are living in a war zone. Even though they say dynamite is no longer used regularly, occasional blasts are still felt from here."*(Environmental Protection Association representative, interview)*

## Everyday Spatial Avoidance → Inability to Sustain Everyday Life around the Quarry

Everyday Spatial Avoidance **— Low Resilience**

The gradual withdrawal of everyday practices from quarry-adjacent areas demonstrates an inability to sustain daily life under prolonged disturbance, reflecting low resilience in lived space.

## Intervention Capacity → Loss of Local Administrative Authority

The **closure of the Hasanoğlan Municipality** significantly reduced local intervention capacity by eliminating an autonomous administrative structure capable of responding to site-specific environmental and spatial issues.

Local residents described the 2009 administrative integration into Elmadağ as a moment of **“sahipsizlik,”** that can be described as a sense of institutional **abandonment**, where local demands became harder to articulate and services increasingly **disconnected from local needs**.

Intervention Capacity **— Low Resilience**

> It requires the capacity to give timely, site-specific responses to environmental stress. When the administrative center is removed from the local context, the system loses its ability to adapt quickly, forcing it to become reactive rather than adaptive."

## Community Self-Organization Capacity → Social Capital as Environmental Buffer

In response to governance gaps, local residents have mobilized **collective action** through the Environmental Protection Association and **collectivity based practices**. Interviewees described the association as assuming roles typically performed by municipal authorities, including environmental advocacy, monitoring, and social support.

This capacity reflects the activation of social capital, where trust, shared norms, and collective responsibility are converted into **collective environmental action** (Bourdieu, 1986). Rather than replacing formal governance, these practices function as a buffering mechanism that partially absorbs environmental and institutional stress.

Community Self-Organization Capacity **— High Resilience**

> Strong collective action through the Environmental Protection Association and collective practices compensates for governance gaps by actively mobilizing social capital, indicating high community-level resilience.

Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood.

## Administrative Fragmentation → Breakdown of Institutional Recovery Pathways

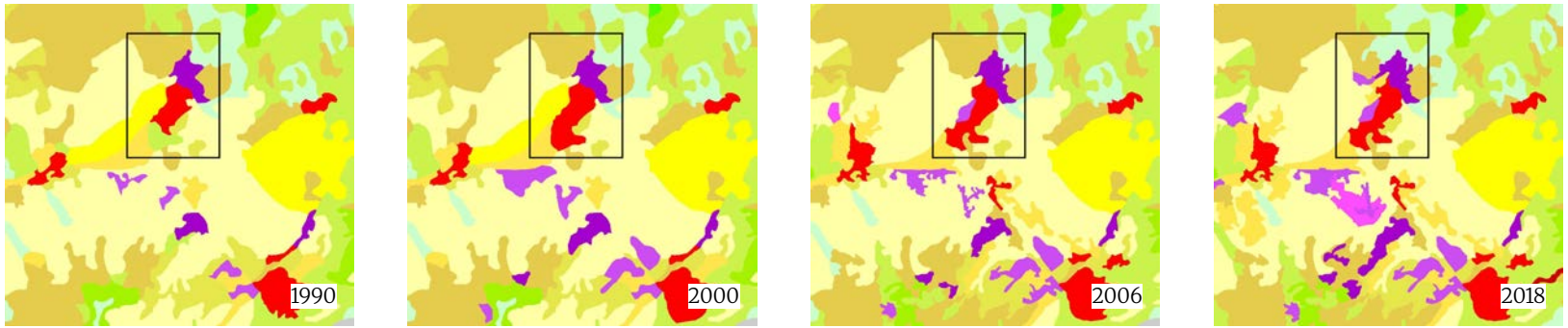
Beyond the loss of intervention capacity, Hasanoğlan exhibits a form of administrative fragmentation shaped by political interference, where **environmental recovery processes are disrupted through governance conflict**. Interview data indicate that following the flood event associated with Ced Stream, damage extended to nearby houses, shops, and public space, including a frequently used park located along daily movement routes such as the bus stop area.

Rather than supporting post-disaster recovery, the park was removed from the control of the locally elected municipality and dismantled under higher-level governmental authority during an election period. Existing park elements were removed, and **no restoration or replacement** was implemented.

Administrative Fragmentation **— Low Resilience**

> The fragmentation of responsibility across governance levels interrupts institutional recovery processes, allowing environmental damage to persist and signaling low resilience in administrative continuity.

## Chronic Stress → Continuous Small-Scale Land-Use Transformations




Chronic stress emerges as the **cumulative outcome of slow violence** rather than a single process of land-use transformation. Long-term exposure to environmental disturbance, spatial fragmentation, governance deficits, and infrastructural **pressure gradually accumulates over time.**

Copernicus Land Monitoring Service. (n.d.). Corine Land Cover (CLC) 2018 [Map]. European Environment Agency. Retrieved January 7, 2026, from https://land.copernicus.eu/pan-european/corine-land-cover

## Chronic Stress → Continuous Small-Scale Land-Use Transformations

Interviews emphasized that **no single moment marked** the loss of resilience; instead, agricultural decline, quarry expansion, administrative restructuring, and environmental degradation **developed incrementally** over decades.

These conditions manifest through incremental and fragmented spatial changes, **normalized environmental degradation,** and reduced adaptive capacity. The temporal dimension of slow violence lies in this gradual accumulation, where impacts remain largely **invisible in the short term** but structurally reshape the settlement over extended periods.

Chronic Stress **— Low Resilience**

> The accumulation of incremental land-use changes, governance failures, and environmental degradation over decades reflects unmanaged chronic stress, resulting in structurally embedded low temporal resilience.

## Overall Environmental Resilience Assessment

| Layer | Parameter | Observed Condition | Resilience Score |
|---|---|---|---|
| **I. Spatial–Ecological Layer** | Landscape Connectivity | Fragmentation and Disconnection | **Low–Moderate** |
| | Open Space Functionality | Absence of Designed Public Green Spaces | **Low** |
| | Discontinuous Urban Expansion | Production of Vacant Land | **Moderate** |
| | Incompatible Land-Use Adjacency | Proximity of Industrial and Residential Areas | **Low** |
| **II. Everyday Life Layer** | Everyday Spatial Avoidance | Inability to Sustain Everyday Life around the Quarry | **Low** |
| **III. Social–Political Layer** | Intervention Capacity | Loss of Local Administrative Authority | **Low** |
| | Community Self-Organization Capacity | Social Capital as Environmental Buffer | **High** |
| | Administrative Fragmentation | Breakdown of Institutional Recovery Pathways | **Low** |
| **IV. Temporal Layer** | Chronic Stress | Continuous Small-Scale Land-Use Transformations | **Low** |

## Conclusion — Perceived Resilience

**Overall,** Hasanoğlan's resilience is socially sustained but structurally constrained: adaptive capacity relies heavily on informal community mechanisms, while spatial, institutional, and temporal conditions limit the long-term environmental resilience.

**It exhibits a low - moderate resilience**; while high community strength temporarily sustains the settlement, it cannot fully compensate for the structural collapse of ecological and administrative systems.

## Further Research Questions

- Is it possible to transform the quarries and vacant lands from operational landscapes into ecological corridors? If so, what strategies can be used to repair the fragmented green system?
- How can the community be included in the official decision-making process, so they are not just coping alone but planning together?
- What design interventions can reduce chronic stress like dust and noise to make the streets livable again?

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