



**Scientific Journal of the Observatory of Mediterranean Basin.**

Polis University / Ferrara University /

UNECE Center of excellence / Co-PLAN Institute.

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**SOURCE:** *Scientific journal of the Observatory of Mediterranean Basin, Volume 8, Issue 1 & 2 / 2023, pp. 102-109*

**ISSN:** 2959-4081

**ISBN:** (print) 978-9928-3470-9-1  
(e) 978-9928-347-10-7

**DOI:** 10.37199/o41008112

**PUBLISHED BY:** *POLIS-Press*

# Proactive approaches through environmental and architectural elements towards sustainable solutions for post pandemic city. Case study of Lezha

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**Abstract-** *Towards sustainable solutions for post pandemic city is analyzed the city of Lezha - as case study, by splitting it into three zones, whose two are on city's side and one on the beach side, in terms of buildings, their foot within terrain's morphology, the roads grid, etc. Some of identified problems regarding environment and post pandemic consequences appeared to be: air pollution, humidity, lack of water management, and others, settled priorities for an environment, climate and health research agenda in the EU by adopting a holistic and systemic approach in the face of global environmental changes . In relation to the sustainable form of constructions within a plot, based on the research of the previous workshop on the Sustainability of the Form, is proposed to intervene with interdisciplinary approaches to achieving sustainability in terms of form and environmental factors together. Since it is almost impossible to propose demolitions and other rigid solutions that could cause many other aspects too, it is crucial to approach with smart solutions. Thus, resulting the analysis of environmental characteristics of the zones and features together, by linking them with smart sustainable architecture's solutions. The new areas or those to be built by having a certain angle of orientation, intervention on building heights and where possible open corridors for natural ventilation is hypothetical concept. This result as an approach towards hygienic reasons of cleaning the city from polluted air based on studies of buildings and natural characteristics of the environment tailors a lot components towards sustainable solution among settled priorities for an environment. In addition, closing in blocks where it is possible, to avoid the negative phenomena of un-sustainable form, through the proposals of new forms will also contribute to the environmental hygienic aspect - as a factor directly related to the recent pandemic. Actually, the proposal to intervene on the zones by different approaches referring potentials of natural elements like wind, orientation, ventilation and insulation conform terrain morphology, environmental characteristics of the zone - based on blocks and plots - to achieve sustainability through natural elements and existing buildings considering the last pandemic better management and overall contribution on efficiency. The pandemics as crisis leads on opportunities in terms of being proactive when thinking and designing the same way this pandemic exposed the differences and popped up the inequalities reflected also on architecture, society, environment and economics. The crisis and natural catastrophes should serve as an alert on design and planning in order to avoid or at least manage easier the situations like last pandemic.*

**Keywords:** Pandemics, Sustainability, Form, Environment, Interdisciplinary approaches

## State of art

The city of Lezha is analyzed as case their foot within terrain's morphology, study, by splitting it into three zones, the roads grid, etc. The impact of the whose two are on city's side and one research could be a standardized template on the beach side, in terms of buildings, or recommendations for sustainable

solutions which are generated from the findings with specific methodology, different and combined methods, which contribute as well to the similar contexts for sustainable urban form as well. As an example, the Architectural Heritage was long absent from the mainstream sustainable development debate despite its crucial importance to societies and the wide acknowledgment of its potential to contribute to many aspects of the city, particularly in the sustainability of form. The concept of sustainable development has been the main topic of many international discussions in terms of economic, social, and environmental productivity of the city for a long time now but, the focus stands on how can sustainable strategies be found- through methodologies for post-pandemic cities, in this case particularly city of Lezhë.

From the geometric, geographical, and ecological point of view, Lezha is a harmonious kaleidoscope of nature, almost like an unparalleled ecological principality, where the mountain, the field, the forest, the archeological and historical monuments, the lagoon and the sea, constitute a prominent unity.

The ancient city of Lezha is located on a dual terrain: hilly and plain, an area of 20 Ha, surrounded by walls. The town planning of the fortified city has four main areas: 1. the area of the upper part, located at the top of the hill; 2. the area of the middle part, lying down on the hilly slopes; 3. the area of the lower part below the hill; and 4. the riverside area with the bed of the river the Drin and the western wall of the city.

Each of these areas has had a special and at the same time interconnected function. All urban areas, from 1-4, protected and respected the natural position, contented state institutions which were located within densely populated territory, including craft-commercial centers, ended below to the river port, which connected ancient Lezha with all sea routes of the Adriatic. An integral part of Lezha was the Acropolis, which was the culmination and most special of the city's defense system. The urban plan of Lezha is special and unrepeatable in any of the Illyrian cities known to date. Due to its geographical position with wide access to the sea and generally low relief, Lezha has a mild prevailing climate of the Mediterranean type, characterized by hot and dry summers, mild and wet winters in the lower part and the city, and wet and cold winters in the mountainous area.

During the analysis from the field visit, into two parts of Lezha, within a part of the city and at the part of the beach, are identified the morphological and environmental characteristics of the city, type of constructions, social barriers and other factors with potential for development, including gaps that hinder development in formal terms and hygienic aspect of the city.

In order to have greater diversity and to have more relevant study results, were chosen three different locations with different characteristics in the city of Lezha. These locations were analyzed in terms of morphological and environmental attributes, through visual maps, axonometries, building typologies

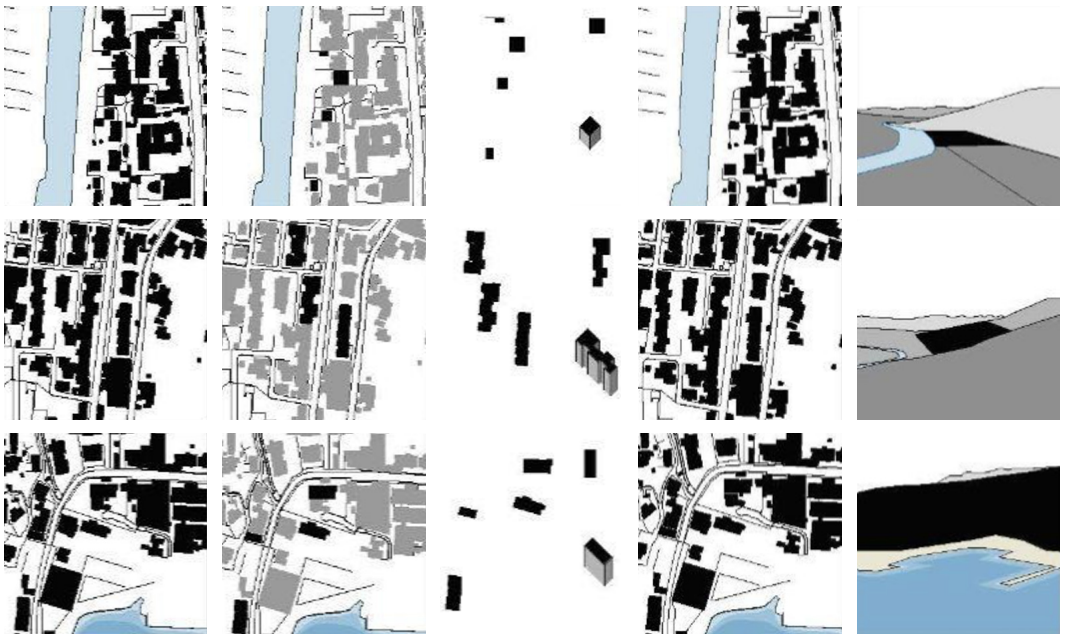


Fig. 1 / Site analysis through visual maps, views, axonometries. Building typologies and terrain morphology of the city of Lezha. Source/ by author RZ

and terrain morphologies (shown on figure 1).

As can be seen from the detached sequences in some parts of the city, Lezha is characterized by the typology of individual house living and collective housing in the block. Dwelling houses are fully located in an attached manner depending on the destination, construction time, and empty spaces are filled over the time both, individual buildings and collective blocks. As a whole, it can be considered as compact site, with some unused spaces and with dead end in some parts. In the part of collective blocks, this phenomenon is avoided and exploited more rationally. Where emptiness has occurred, it is filled over time, while the road network differs, from individual housing to more regular with easier access to public areas, to be continued with the part of the sea shore. Depending on the morphology of the terrain and landscapes the road network is developed based on the orientation and configuration of the terrain and built units with mixed functions (as show in figure 2).

In terms of sustainability of form, it is necessary to present different attitudes and studies of form/morphology approaches that have been developed in recent decades, from the historical-geographical approach (promoted by the Conzenian School) to the logical process type approach (promoted by the Muratorian School) always combining them with the work on site and previous studies regarding the image of the city by K. Lynch, then the architecture of the city A. Rossi, to continue with "Studi for una operante storia urbana di Venezia" by S. Muratori. This is to comparatively

analyze the theory and studies with the case study, the city of Lezha, and the parameters that have influenced or are potential for the improvement of the post-pandemic city.

According to Muratori at " Studi Per Una Operante Storia Urbana Di Venezia" the basic urban concepts are urban tissue, organism and operational history. It has been pointed out that one element can never be identified without including the context of the place which implies the importance of the connection between history and planning. On the other hand, K. Lynch through the study of three different cities in America, differentiates the urban elements to less extent and under the lens of experiencing to the view of the city. They are paths, nodes, landmarks, districts and edges. Through the interconnection of such elements, the creation of an urban form is suggested.

Then, as far as the experience of the city is concerned, Muratori, who connects the experience with the history of the city and its design, has almost the same approach as Lynch, who suggests that the experience of the city belongs to the citizen himself. A. Rossi in his book "Architettura Della Citta" divides the buildings of a city into urban facts and minor buildings. According to Rossi, the city is formed by two instances, as by combining typologies with networks of urban artifacts and residential buildings. Rossi emphasizes that the sustainability of the city depends conditionally on the networks of urban facts as propelling elements and that have dominated time, history with their presence as artifacts

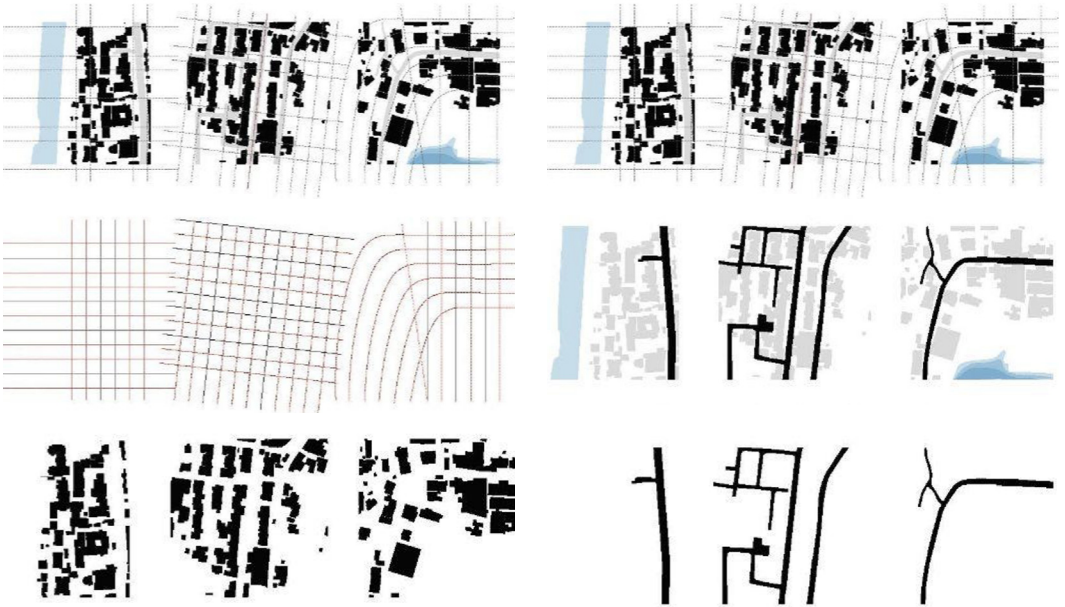


Fig. 2 / Site analysis for three chosen zones, including grids, roads, build typologies and terrain morphology. Source/author RZ

and have influenced the sustainability of form as well as the very form of the city. The example of Lezha and those three moments captured from the city, are analyzed and find out that some factors influenced and affected the sustainability of form and are directly or indirectly related to the development of the city, but related to the performance of the city. Differences or inequalities of varying degrees in comparison, such as urban and other aspect, seem to be more differentiated throughout the pandemic period and requires the treatment in the post-pandemic period, taking into account the state of the city and further development. Intervention in different areas to create compactness, which provides the formal but also the functional stability turns out to be a developmental / improving element in mitigating social inequalities that are created by the lack of sustainability of form, then the economic development aspect in terms of the functions that these buildings carry, the hygienic aspect and that of the environment - for the improvement of the quality of life and the optimization of the expenses. These are some of the main pillars that have been noticed during the pandemic period that have aggravated the current situation in terms of urban, architectural, formal, and social point of view.

### Objectives

The main objectives are to intervene in the city of Lezha with different approaches in order to improve the city in its formal aspect, to achieve

the sustainability of form of the city in function to environmental elements, in order to avoid various threats, such as a pandemic issue, which later continues to be present by identifying different scales risks and opportunities through different approaches in terms of morphological aspect of the city.

Based on latest researches, climate change, which have direct effects on the distribution of pathogens, their animal reservoirs and vectors, is recognized as a key driver of epidemic emergence (Boissier et al., 2016, Ryan et al., 2019, Caminade et al., 2019, Bartlow et al., 2019). While there is an evidence that climate conditions and air pollution may also facilitate viral spread (Woodby et al., 2020, Karan et al., 2020, O'Reilly et al., 2020), but additional investigations was needed. Features of the built environment, from crowded housing to inadequate ventilation in commercial spaces and mass transit vehicles, may facilitate virus transmission lied to this research, which is needed not only to elucidate these effects but to reconcile disease control with broader goals in housing, transport, and other sectors. A better understanding of these critical aspects is to improve both, the prospects for prevention and to develop predictive models for public health risk management. For instance, the dual role of indoor air quality in both environmental contamination and viral spread, which requires more research focus, as well as innovative solutions for mitigation, including development of air purification technologies (Domínguez-Amarillo et al. 2020).

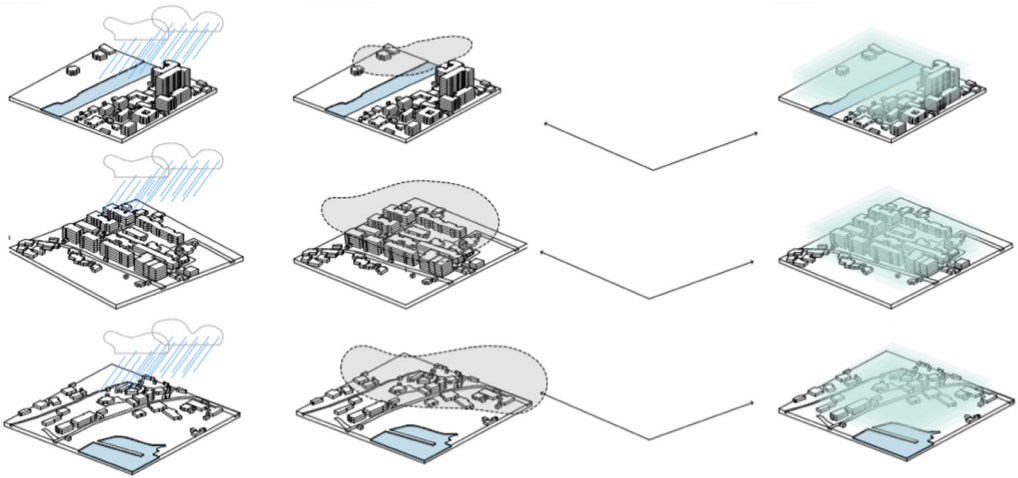


Fig. 3 / Sustainability resilience and post pandemic effect in a schematic view, with possible sustainable approaches.  
Source/ The author RZ

A major challenge in responding to COVID is balancing reduced economic activity to control disease spread, and restored economic activity to avoid the harsh social and health consequences of the shutdown. Recovery plans are currently being discussed or implemented. The environmental and health impacts of those plans is not clearly foreseen.

For clarification, hence the COVID-19 has a long-lasting impact to the environmental health field could be open new research perspectives and policy needs. Thus, there is a need to identify and implement policies that will bring short-term and long-term benefits to health and sustainability.

The research continues with the identification of problems such as building typologies along with terrain morphology, orientation of buildings and additional indicators such as air pollution, humidity especially in the beach area. In the Figure 2 are schematically seen the analysis, made regarding the typologies of buildings, roads, block shape and street grids.

On the other hand, there opportunities for the city of Lezha too, by further developing on the principles of sustainable development in terms of use of natural resources to minimize the use of consumable resources, at the same time contributing to air quality, water and consequently improving of quality of life. One of these priorities would be to intervene in the system of collection and reuse of rainwater, systems presented in schemes which would help in sustainable development then, interventions in terms of solar panels to generate electricity and increase insulation and ventilation

to improve the quality of life starting from even the smallest housing units (findings from interactive "Sustainability of (Urban) Form"\*; together with field professionals and environmentalists). As a result, the addition of multifunctional or flexible spaces which can be used by the community of a residential block for example serves as a multi-purpose space such as recreation, work, entertainment, etc. This is also shown schematically in figure 3.

### Methodology

Taking into consideration: (i) the already built environment (ii) the problems related to the pandemic situation and (iii) highlighting a paragraph from Aldo Rossi's book "The Architecture of the City" on urban artifacts/ monuments; can be concluded that those structures, in series, contribute to morphologic sustainability of the city, despite the function that may change through time, hence the individuality, memory, place and design are the parameters that matters. It is only important that they are present as an artifact and serve as collective memory, contribute to the future development of the city and constitute an important urban focus. These constructions, whatever they are, creates the place and the identity of a country, contributing as development elements, as part of a development chain of the city. So, from this point of view, radical interventions are almost impossible, but interventions with a sustainable approach may be appropriate in terms of improving the quality of life in these areas in Lezha by using the built, natural and architectural

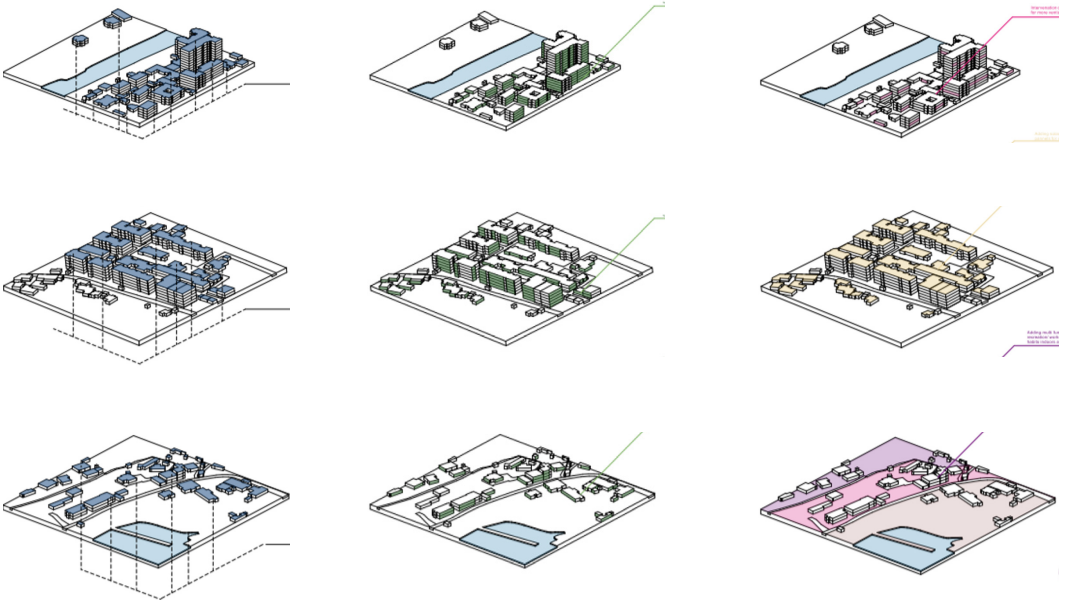


Fig.4 / a) Analysis on sustainability of form in terms of urban blocks and buildings, environmental attribute. Source/ The author RZ

potential towards contributing in the prevention of various threats in terms of air quality, hygiene in the city and the visual aspect of the city, i.e. constructions together with the morphology of the city. On the other hand, based on the principles of stable blocks and sustainable shapes analyzed in the workshop "Sustainability of (Urban) Form" \* it has resulted that closed blocks are more stable in terms of shape. This is seen in the analysis in fig. 4. In figure 4 a) are shown the problems of air pollution or even humidity in the areas studied during the workshop are arranged in a diagrammatic form. Together with the analysis of the shape of the plot, and the buildings, elaborated earlier, in these parts it is possible to intervene by architectural approaches - the shape of the objects in conjunction with the natural elements, such as: the wind, which helps to clean the air depending on the direction given to the building and the creation of natural corridors for ventilation, sunning, etc. This is directly related to the analysis of the building and the plot shapes. Those analyses are done during the first part of the workshop.

In figure 4 b) are shown the analyzes of the sustainable ideal form of the plot, which are presented in a diagrammatic form together with the shapes/forms of the construction and from the shapes/ forms that have turned out to be sustainable, variations or so-called morphemes, created by using matrices with basic sustainable form of the building and the prefix, the suffix or both together, which are added to the basic form. These sustainable variations forms created the plot-building that could

can be repeated in different degrees, by creating a sustainable area based on the analyzed elements and the results of these analyses. These variables are divided into static and variable elements. Static results are the relationship between the plot and the form together with their variations, while variables are the natural factors and features and vary from place to place (climate, winds, sunshine, terrain morphology, etc.) based on their combination for specific cases of stable morphemes result.

Consequently, the orientation and other sustainable elements analyzed above are combined in this framework of sustainable approaches that gives more comprehensive results in terms of the analyzed areas as well as a pro-active approach to future threats, by following a study and the point of view from D. Keplinger on building orientation and its importance:

"Once a building is poorly located or faultily oriented, the opportunity for correction is gone forever, or the cost is prohibitive. A building properly designed and oriented can greatly reduce the demands on the heating and cooling system, in turn reducing the needed area of expensive solar collectors. Reducing the initial costs of solar systems will speed acceptance and implementation of solar energy utilization." Keplinger 1978: 577-585

In particular, the contribution of urban morphology are the basic aspects of our collective life in the city, especially to the social, economic and ecological aspects.

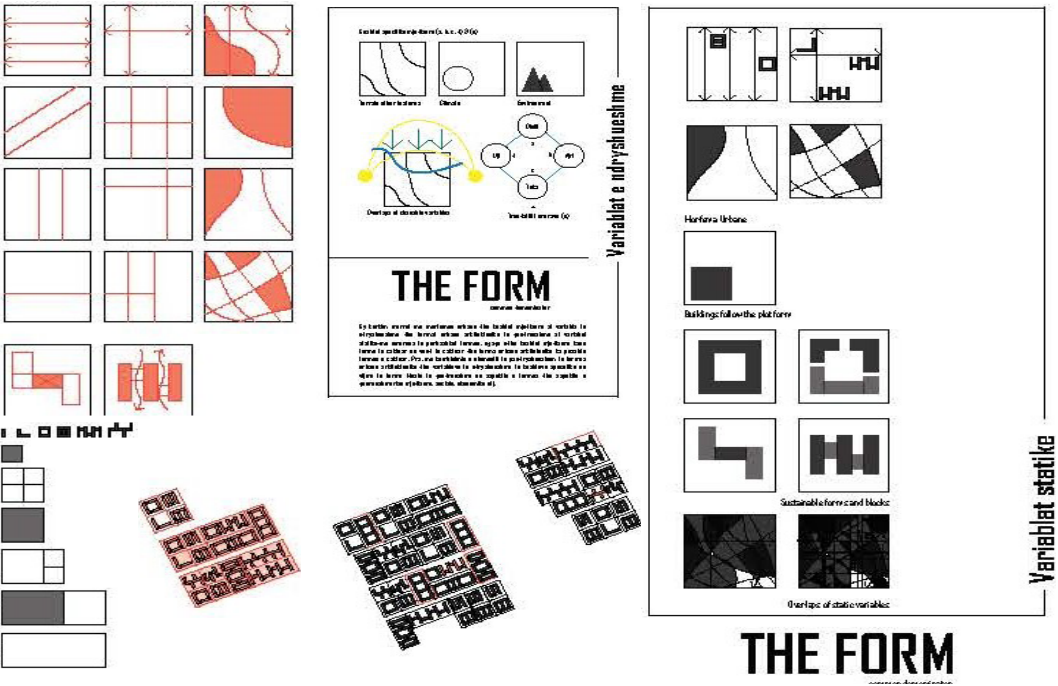


Fig.4 / b) features and their indications together with terrain morphology. Source/ The author RZ

With practical realization of this goal in mind, five specific themes are selected from three broad aspects: public health, social justice, heritage tourism, climate change and energy. The key and possible approach to a sustainable solution is how to strengthen the communication channel between each of these themes and the field of urban morphology – with all aspects of urban phenomenon and elements mentioned (Rossi, Muratori, Lynch Conzenian School). While, based on previous theories, the morphology and sustainability depends on factors such as: context, history, planning, urban artifacts, street layouts, and grids in different morphologies, terrain, and interconnections, i.e. phenomena, physical and formal elements - the missing factors must be identified or dominate in these areas. This is a way of achieving a sustainable balance and form. This addresses identifying specific problems and provides interdisciplinary proposals in the analyzed zones which increases the quality of life- consequently, sustainability is long-term and proactive in preventing negative phenomena with wider impact. The sustainability of form depends on several phenomena and factors in the time function but, it is possible to partially intervene in the improvement or upgrade of specific parameters in achieving this sustainability.

## Results

The proposal is to intervene on the zones by different approaches regarding natural elements like wind, orientation, ventilation and insulation conform terrain morphology,

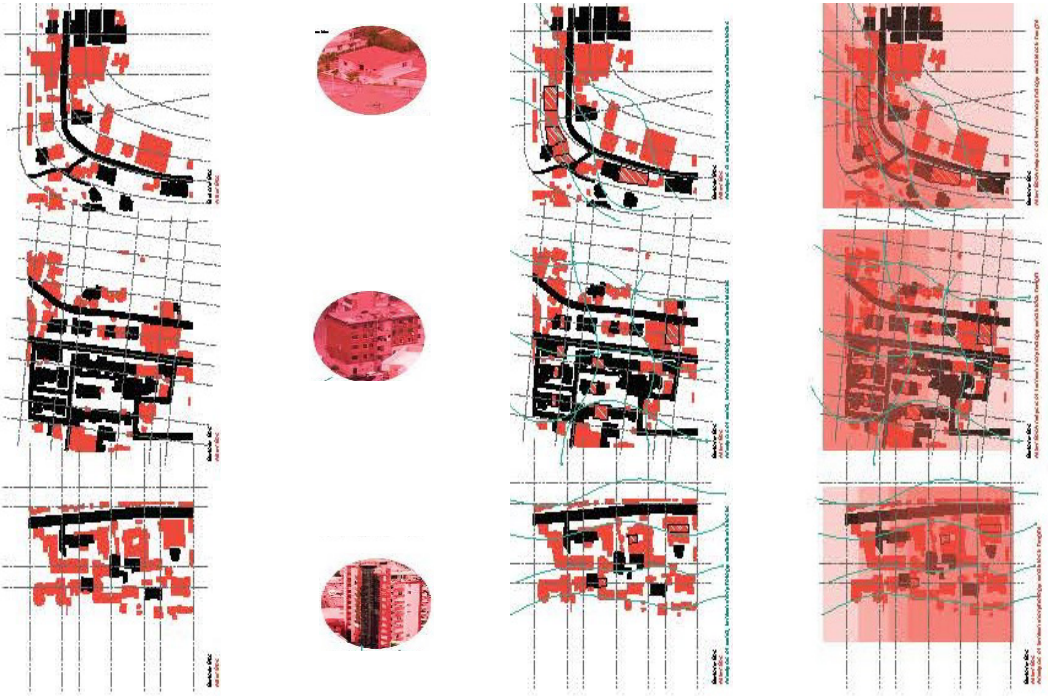
environmental characteristics of the zone - based on blocks and plots - to achieve environmental sustainability through natural elements and existing buildings considering the last pandemic better management and overall contribution on efficiency. The pandemic as crisis leads on opportunities in terms of being proactive when thinking and designing the same way this pandemic exposed the differences and popped up the inequalities reflected also on architecture, society, environment and economics. The crisis and natural catastrophes should serve as an alert on design and planning in order to avoid or at least manage easier the situations like last pandemic.

## Conclusions and discussion

This study contributes to strengthening the communication channel between each of these themes mentioned and the field of urban morphology with a particular emphasis in city of Lezha and the zones studied through the workshop.

This depends on the ability to effectively analyze existing urban forms and design new urban forms, and to better understand the characteristics of each of these elements and how they can be combined. Especially the post-pandemic period served as a positive parameter/ dominator that raised questions and problems in urban morphology, our cities, possible threats and opportunities. The solutions are variable depending on specific areas and their characteristic, but the main issue remains the same – the approach towards sustainable solutions that offer efficient and quality ways of living or upgrading the city into long term propelling mechanism.





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