Environmental factors in ancient town settlements: case studies in South Italy

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ABSTRACT: The paper describes a study about an historical centre of south Italy, where a number of investigations have been made aimed mainly at improving future development of historical centres by re-qualifying environmental and climatic performances. A number of characters belonging to both the urban patterns and the construction technologies are illustrated showing evidence of the importance of a new methodology of investigation. The town characters have then been compared with other two case studies for a classification of invariance and peculiarities of these ancient settlements of south Italy.

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INTRODUCTION

One of the biggest problem in Italy is represented by the rehabilitation of old historical centres of artistic interest, where a number of questions arise mainly due to the need of creating, for social and employment opportunities, an appropriate context. The latest will thus become at the same time liveable, healthy, comfortable, environmentally caring, and respecting the ancient cultural and architectural values.

The selection of new materials, new urban organisation, and new working activities for a renovated centre, which can at the same time save its old identity, can be severely appropriate only in case of a strict connection with the existing built environment. The adaptation of buildings is shown not only in terms of cultural and social roots of the site, but also and mainly in terms of materials as well as technical characters of the locality itself, which are in the end the main responsible for the creation of that sort of sensation, of atmosphere and of architecture.

In order to achieve such an aim, the first step which has to be taken is represented by a deep and great knowledge of the existing reality, both in terms of settlement conditions and technical characters. (Fig. 1) The reasons of their birth and their feature generation have to be searched, so as to understand the future possible vocation of the area aimed at both social and environmental development. It is obvious that such a study needed a team of experts, starting from the historian and the sociologist, passing through the geographer and the economist, and finally arriving to urbanist, landscape expert, architect, technologist and engineer.

1. FACTORS AFFECTING SETTLEMENT AND CONSTRUCTIVE CHOICES

In fact as far as the factors affecting the choices of an old settlement are concerned, at least three different classes can be identified and studied, which are included in morphological, technical and cultural reasons. In particular some of the choices can be found at an urban scale and depend on the primary ideas and aims of the settlers during the first inhabitants' nucleus. While others are strictly directed to the construction of the buildings themselves and their technologies and architecture. As far as morphological reasons are concerned, the main factors affecting the architecture and the spatial quality of the old centres have been identified by a number of authors [1] in the following items: shelter needs, defensive problems, climatic characters, site features, environmental conditions. Among the technical factors, some of the world-widely recognised as principal are the material availability, the knowledge of technologies and the expertise of handwork and craftsmen. Last but not least, the cultural values can be identified as the economic, religious and social factors. In fact it could have happened that one material or one particular
technology was employed out of the regional availability and usual local application, since the social or the religion value required a particular care for such buildings as churches or royal palaces. Usually economic reasons led to the selection of nearby materials and techniques, when regionalism and local availability meant saving money, time and resources for transport and acquisition from farthest areas. In our third millennium this simple equation does not exist any longer, but even in old times the economy could follow different paths.

2. THE METHOD EMPLOYED

As it is usually applied during such an analysis, the study aimed at the knowledge of urban as well as architectural characters of the old settlements starts at a bigger scale including the surrounding context, the social development and the environmental conditions. The following stage will then go more deeply into each of the problem by digging among any of the elements which can be useful for the identification of the actual concrete essence of the buildings. Thus it is easy to understand why and how a number of technical and material elements of the architecture have that proper appearance rather than another one. It is useless to say that such deterministic and unidirectional view of the problem is unacceptable any time we deal with human factors, but a scientific approach to the problem, i.e. analysing, comparing, experimenting with a number of different tools and methods, and then measuring as deep and as accurate as possible all the phenomena, can help for achieving such a complex objective [2]. (See Table I)

These notes will illustrate a small champion of the scientific procedure which has to be introduced in the study of an ancient settlement. Sieti, a small Municipality of south Italy, near the Tirrenean coast of Salerno, has been studied and has afterwards been compared with other two realities of small historical centres in the surroundings, where a number of common characters have been identified and the original reasons of the choices for their existence and features have been searched. The study has been focused on the technical and environmental reasons of the selection of settlements, of construction and of allocation of buildings, but of course the aforesaid other fields of motivation should also be taken into account in a future and complete study, so as to reach a deeper knowledge of the centre.

3. DESCRIPTION OF THE TOWN OF SIETI (CASE STUDY I)

The studied ancient town of Sieti [3] is located in a small valley, not far from the sea, circa 10 km, in between the Picentini mountains, and it is actually part of a bigger Municipality, Giffoni Sei Casali, which is in fact composed by six different small villages, each one with its characters, habits and site disposition. In particular Sieti is divided in two nucleus, the higher on the top part of the hill – Sopra Sieti -, and the lower, Sotto Sieti: these two historical settlements were born during the XVI and XVII century, as part of a nobler community, revealed by the evidence of a great number of Palaces of artistic value, within the town itself. However the study is not focused on the birth of the big emergent palaces, but it is concentrated on the reasons which had led to the organisation of the building texture of the whole village, in terms of shape of the roads, configuration of the houses, orientation of the main facades, plan size and height of the fabrics. These characters, together with the constructive ones, were in fact due to the settlement choices applied - accordingly to the
aforesaid cultural, morphological and technical reasons - during the initial manufacture of the small town. The analysis had shown a number of results concerning the architectural choices, and the technical and material characters which had created the present feature of the historical centre.

Figure 2: Technology of the wall construction

In particular one of the main results of this analysis had shown the original need of interacting with the climate of the site, in the selection of the area for constructing and in the texture shaping: in fact from the study of the solar access to the valley, the particular zone among the others which appears to be always sunned, during both winter and spring for a long part of the day, is exactly the built one. The other part of the village, the lower part and all the empty spaces happen to be often shaded, and thus not good for living. The climate of the area is mainly characterised by long and cold winters, with frequent rains and sometimes snow, due to the altitude of the area, about 800 metres on sea level, and to the particular configuration of the valley which collect cold winds from the nearby tall Picentini Mountains which surround the town. Therefore a good isolation during winter and spring all over the built environment is usefully welcomed by the inhabitants. It is also true that the valley itself, chosen for the original settlement, is slightly opened towards the direction of the Tirrenean sea. This phenomenon helps during autumn when the warm sea breezes can reach in part the small town fabrics and thus mitigate the humidity and the cold in the beginning of winter. The shape of the built texture of Sopra Sieti, the higher part of the town, is also following the sunny areas, and it resembles a long and thin shove, lying softly along the slopes levels of the valley itself. (e.g. Fig. 1)

From this study, made also with the aid of wind analysis, investigation on rain phenomena and humidity effects on the built environment, it has been possible to achieve a preliminary result, concerning the reasons of a number of choices made in the ancient times so as to reach a mitigate microclimatic conditions for the settlement of its inhabitants such as: solar access, distance from the sea, position within the mountains, shape of the land, morphology of the ground.

A deeper analysis at a fabric scale had then identified the constructive characters of the buildings, and thus tried to find a number of reasons for the selection of materials and the employment of techniques. The more common elements of construction, recognised as the wall erection for the structural external envelope of the vertical part of the buildings, have been realised with the local and strong kind of limestone, which was locally available in the nearby mountains. (Fig. 2) The wood employed for the construction of the middle floor ceilings and for the roof structural system had been also easily available within the number of the nearby forests, which still now represent one of the most beautiful landscape attraction of the whole area of the Picentini Mountains. The choices, as it has been seen, were in fact mainly depending on the local availability and on the tradition of technical expertise of craftsmanship, trained for manipulating easily and magisterially these draft and raw materials into structural, decorative and finishing elements of construction.

Other elements of the local architecture types which had also been affected by the climatic as well as cultural and environmental reasons, can be identified in the orientation of the diverse facades, in the kind of foundations employed (direct with stone thick walls), in the rectangular and simple shape of the fabrics, in the presence of the courtyard as a filter between cold winds and internal spaces, in the limited number of floors which allows to reduce heat loss and wind effect on higher levels. (Fig 3)
The construction choices were also depending on the availability of materials and on the kind of technical expertise of local artisans, but some of the elements, such as for example the chimneys in the shape of wind towers and the tiled-roof ending employed as rain drainage, can be actually considered as bioclimatic devices. (Fig. 4).

The main elements identified as responsible for the common answer to the climate were the invariance construction characters such as the envelope and the window types. Other elements which are on the other hand accountable for the identity and differentiation of each of the small historical centres have been defined as the peculiarities, which are of course different for each of the three case studies.

The comparison had thus shown a number of invariances and peculiarities of the case studies, among which for example the following characters: for the case study no 1 (Sieti) some of the invariances were: big walls, courtyard, dense texture, orientation, small windows, humidity protection, entrance doors. And the peculiarities: porches, chimneys, covered balconies.

For the case study no 2 (Salento) examples of invariances were: big walls, orientation, courtyards, dense texture, small windows, humidity protection, towers, entrance doors. And the peculiarities: facade asymmetry, first floor risen from ground. (fig 5)

For the case study no 3 (Monteroduni) some invariances could be recognised as: big walls, orientation, courtyard, dense texture, small windows; peculiarities: tilted roofs, uncovered façades in the sunny areas, green colour of the stone. (Fig. 6)

CONCLUSION

A number of different results can be achieved form such a study, here shortly illustrated, which had been made with the help of a number of scientific methods. The next step of such a research would be that of identification of the actual strong essence of each historical centre in Italy, so as to allow a more appropriate intervention of rehabilitation which will take into account both environmental qualities of the surrounding landscape and territory, and healthy and comfortable future vivibility for the inhabitants of those small towns. The aforesaid knowledge of any of the material and technical elements of the fabric texture of these centres has thus to be as complete as possible, before beginning any action towards a
restoration, so as to save, together with visual and artistic values of these evidence of the past cultural history of humanity, also the concrete and material signs of its pathway on the earth. The proposed method of investigation can be useful as a tool for requalifying Historical Centres in terms of sustainability: in fact thermal inertia, glass use, stack effect and other environmental performances of the shown examples of traditional architecture can be employed and increased so as to improve quality of life for users.

**Figure 8**: Monteroduni: a typical urban feature.

**REFERENCES**


[3] This town has been object of a Degree Thesis in Architecture by the student Maurizio Arienzo during the academic year 2001-2002, in the University of Naples.