Journal of Climate Change, Disaster Risk and Resilience Studies

PRIME OPEN ACCESS

Volume 1, Issue 1

Research Article

Date of Submission: 04 Feb, 2026
Date of Acceptance: 13 Feb, 2026
Date of Publication: 27 Feb, 2026

Between Disaster and Renewal: A Sustainable Development Strategy for Bisaccia (Avellino, southern Italy)

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Citation: Porfido, S., Spiga, E., Nappi, R. (2026). Between Disaster and Renewal: A Sustainable Development Strategy for Bisaccia (Avellino, southern Italy). *J Clim Change Disaster Risk Resil Stud, 1*(1), 01-19.

Abstract
This study investigates the reconstruction of Bisaccia, a small inland town in the southern Apennines of Italy, following major natural disasters, with a focus on its urban and socio-economic development. Bisaccia was historically hit by strong earthquakes, particularly the 23 November 1980 event, and recurrent landslides due to the geological peculiarity of the area. These natural hazards significantly shaped settlement patterns and urban organization over time. We analyse how Bisaccia has historically responded to seismic and hydrogeological crises, identifying challenges and opportunities for sustainable development in inland towns. The research examines the interplay between disaster impact, urban planning, and socio-economic dynamics, highlighting the long-term consequences of reconstruction decisions. The methodology combines historical and urban analysis. Historical documents, reconstruction plans were analysed alongside a detailed photographic survey of the contemporary urban fabric. Particular attention is given to the post-1980 reconstruction designed by architect Aldo Loris Rossi, whose modern and visionary approach shaped the new town's atypical urban layout. By integrating historical, architectural, and urban perspectives, the study contributes to understanding resilience, spatial planning, and socio-economic sustainability in disaster-prone regions. The findings offer insights into how strategic reconstruction can balance heritage preservation, urban innovation, and longterm community development.

Keywords: Bisaccia (Southern Italy), Aldo Loris Rossi, Post-Earthquake Urban Reconstruction, Hydrogeological Instability, Natural Disaster Resilience, Sustainability

Introduction
Post-earthquake reconstruction is a complex and non-linear process influenced by political, technical, administrative, social, and economic factors, often leading to outcomes that diverge from initial objectives [1,2]. While Italy has developed extensive experience in post-disaster reconstruction due to its high seismicity particularly along the Apennine chain, the long-term sustainability of reconstructed inland towns remains a critical and unresolved issue [3-5]. Much of the existing literature has focused either on emergency management and structural safety or on national-scale reconstruction policies, leaving gaps in understanding how reconstruction shapes long-term urban identity, socio-economic resilience, and territorial development in small inland communities. Looking back to the last century, Italy had to face numerous seismic events with very different reconstruction processes. Notable examples include the Belice earthquake in 1968 in Sicily (Southern Italy, Imax X MCS, Me 6.4) [6-7], the Friuli earthquake in 1976, (Northern Italy Imax X MCS, Me 6.5) [5-7]. Ending with and the devastating Irpinia-Lucania earthquake in 1980 (Imax X MCS, Me 6.9) [6, 7, 9-12]. Italian post-earthquake reconstruction has followed markedly different models, ranging from off-site "new town" settlements to in situ rebuilding strategies aimed at preserving historical and social continuity. Although these approaches have been widely discussed [1, 2, 12], less attention has been paid to their combined effects in contexts where seismic risk overlaps with persistent hydrogeological instability, a condition typical of many inner Apennine areas. These territories are further characterized by depopulation, economic marginalization, and limited infrastructure, factors that amplify vulnerability and complicate recovery trajectories [10-19]. Within this framework, the town of Bisaccia (southern Apennines, Italy) represents an emblematic case. Recurrently affected by earthquakes and landslides, Bisaccia underwent a partial relocation after the 1980 Irpinia–Lucania earthquake, resulting in the coexistence of two urban settlements: the historic centre and a new town planned on a more stable site. This dual urban structure reflects both a response to natural hazards and an attempt at modernization, yet its long-term

socio-economic effectiveness and sustainability remain largely unexplored [20-27]. The main research gap addressed by this study concerns the lack of integrated analyses that combine geological risk, reconstruction policies, urban form, and socio-economic dynamics in inland towns. This article aims to fill this gap by examining how seismic and hydrogeological constraints have influenced Bisaccia's post-disaster reconstruction and urban evolution, and by assessing the implications of this process for sustainable territorial development. By integrating historical sources, geological data, urban analysis, and photographic documentation, the study offers a multidisciplinary perspective on reconstruction as both a risk-mitigation strategy and a potential driver of socio-economic revitalization. The contribution of this work lies in highlighting Bisaccia as a living laboratory for understanding how inland communities can transform disaster-induced reconstruction into an opportunity for sustainable development, including the enhancement of cultural heritage, urban identity, and alternative development paths such as sustainable tourism [16, 19]. We structured the paper as follows: Section 2 describes the materials and methods, including the multidisciplinary data sources and analytical approach; Section 3 presents the results detailing seismic and hydrogeological impacts and reconstruction phases; Section 4 discusses implications, limitations, and sustainable tourism potential; Section 5 provides final remarks summarizing key findings and outlooks; Section 6 recaps the aims and main outcomes of the research

Materials and Methods

The study integrates a wide range of multidisciplinary data, including historical data (archival documents, administrative records, and historical photographs); cartographic data (historical and contemporary maps used to track spatial transformations, including post-1980 reconstruction plans), seismological and geological data (regional seismicity and land instability) (Figure 1). These datasets contribute to knowledge of the urban and architectural development of the "old" and "new" townscapes. Databases were analyzed comparatively across different temporal phases to reconstruct the sequence of disaster impacts, responses, and territorial changes. Analytical criteria focused on damage assessment, population displacement, reconstruction policies, and socio-economic indicators [10, 11, 20-27]. Finally, the article contextualizes these findings within broader historical and scientific literature that outlines the political and economic transformations of Bisaccia and the inland Apennine region with a view of sustainability development. In addition, we compare the results of this peculiar Bisaccia condition with other locations in Italy such as Gibellina in Sicily and Hokudan in Japan and part of Taiwan. These examples provide a more relevant interpretation of the case study within a general context and highlights how 'disaster' can contribute to the development of tourism in these places.

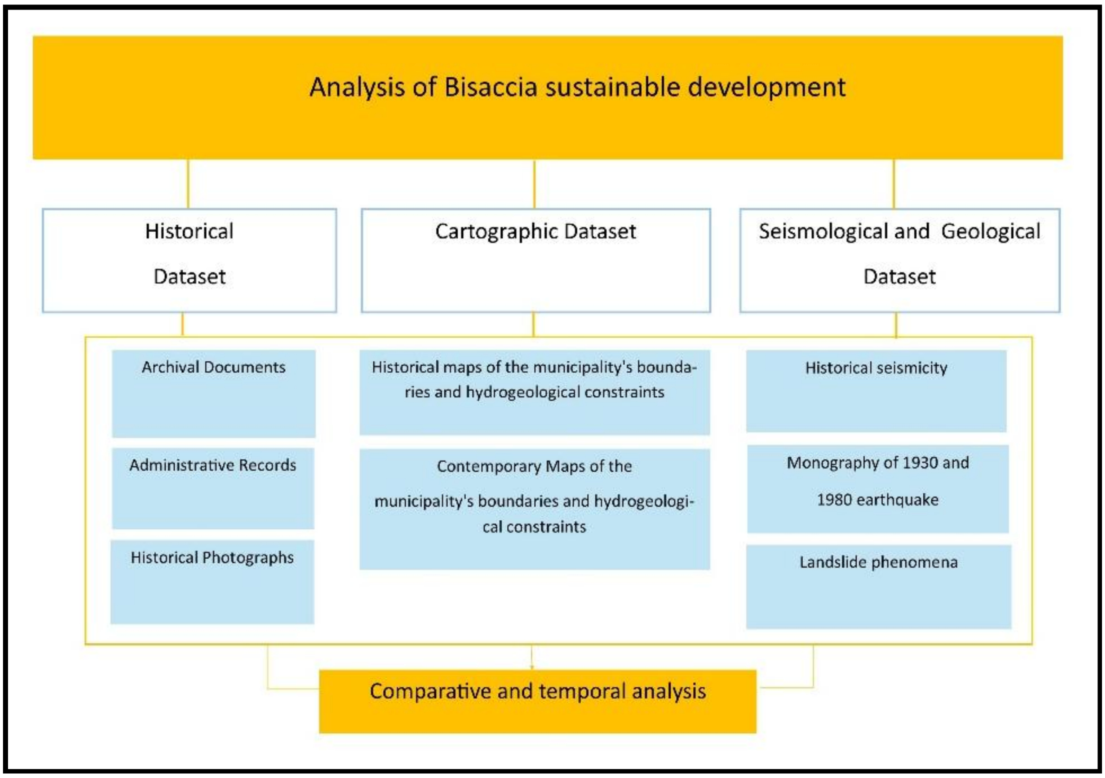


Figure 1: Flowchart illustrating the research methodology applied.

Data Sources and Analytical Approach

We organized the data sources into three different databases: a) historical data; b) cartographic data; c) seismological and geological data, organized as following:

a) Historical database including: archival documents, such as those collected and published in the catalogue of strong earthquake in Italy and in the Mediterranean area CFTI5Med [28] as well as Alfano's 1930 report [29] and detailed monographs published in recent years by Galli and Gizzi on the 1930 earthquake [30-32]; administrative records containing historical details on reconstruction in Irpinia, such as Mazzoleni and Sepe 's book [10] as well as the acts of the parliamentary commission of inquiry [33] and the documented reconstruction of administrative acts of the municipality of Bisaccia (1980-1996) published in 2020 by an administrator from the time of the 1980 earthquake [34]. Historical photographs documenting past earthquakes and reconstruction phases, including images of the reconstruction in Irpinia [10]. And the most recent images of the reconstruction in Irpinia, photographs taken after the 1980 earthquake until a few years ago by Spiga and Porfido [20, 21, 24, 35].

b) Cartographic database including collected historical and contemporary maps, such as historical maps of boundaries and hydrogeological constraints in the municipality. These include post-1980 urban reconstruction plans to track spatial and territorial changes (Figures 1) [12, 23, 36-38].

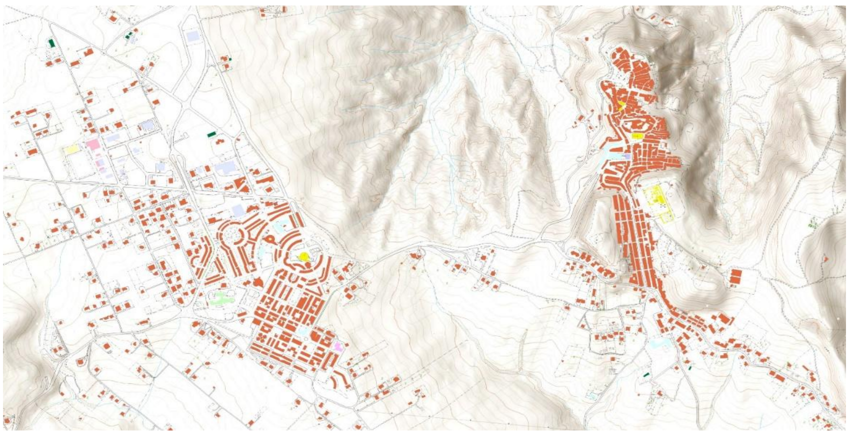
c) Seismological and geological databases including: the seismic history of Bisaccia analyzed by Rovida et al. 2022 in the seismic catalogue CPTI15 [6] and by Guidoboni et al., 2019 in CFTI15med catalogue [28] as well as from the analysis of detailed historical monographs [29-31, 39] for the 1930 earthquake and from detailed scientific studies relating to the 1980 earthquake [25, 40-42]; numerous scientific papers detailing geological and geomorphological setting with particular focus on landslide phenomena triggered by earthquakes in the Bisaccia area [38, 43-48]. Additionally, we analysed data from field surveys and documentation of both the "old" and "new" townscapes [24, 49]. The data were compared across temporal phases to reconstruct disaster impacts, assess damages, track population displacement, and identify socio-economic trends. This comparative method integrates spatial, historical, and geological perspectives to clarify the dynamics of reconstruction. Our analysis was carried out within a GIS environment using ArcGIS Pro (Esri software), which allowed us to process, generate, and interpret all collected data.

Results

Two villages called Bisaccia

Today there are two places that make up Bisaccia (Figure 2): the old and ancient village with its medieval plan, recovered around the Ducal Castle and the Cathedral (Figures 3, 4) and the new Bisaccia of the "Piano di Zona" (zone plan), the result of the intricate changes linked to the reconstruction after 1980, based on the urban plan designed by the architect Aldo Loris Rossi (Figure 2, 5), professor at the Federico II University of Naples, originally from Bisaccia [24]. Bisaccia has a rich and interesting historical-archaeological past, with the earliest evidence dating back to the Neolithic period, with numerous finds in its territory, including a necropolis dating back to the 9th8th centuries B.C., the most important remains of which are preserved in the local Civic Archaeological Museum (Figure 6, a, b) [23]. The remains of a rural villa and a sanctuary discovered in Oscata (village part Bisaccia) date back to the late Roman period. The historic centre dates back to the Longobard period, as evidenced by the wall structures near the square tower of the local ducal castle (VIII-XIII century) (Figure 3). The Norman cathedral was rebuilt several times after earthquake damage, the last time in 1747 (Figure 4).

a.



b.

Figure 2: Map shows the location of the study area (a); the main territorial features of the ancient village of Bisaccia (on the right) and "New Bisaccia" (on the left) of the Zone Plan designed by the architect Aldo Loris Rossi (b).

Figure 3: The Ducal Castle (VIII-XIII Century) of the old Bisaccia where is located the Civic Archaeological Museum (Photo by Spiga and Porfido [35]).

Figure 4: The Norman origin cathedral of the Old Bisaccia, the present church was completed in 1747 (Photo by Spiga and Porfido [35]).

Figure 5: The urban modern buildings of the new Bisaccia (Zone Plan -Piano di Zona) designed by Aldo Loris Rossi after the Irpinia-Basilicata Earthquake of 1980 (a). Detail of church constructed as example of a circular architecture (b). The aim is for it to be avvisual and symbolic reference point that unites the community around a central square. (Photo by Porfido and Spiga [24]; Spiga and Porfido [35]).

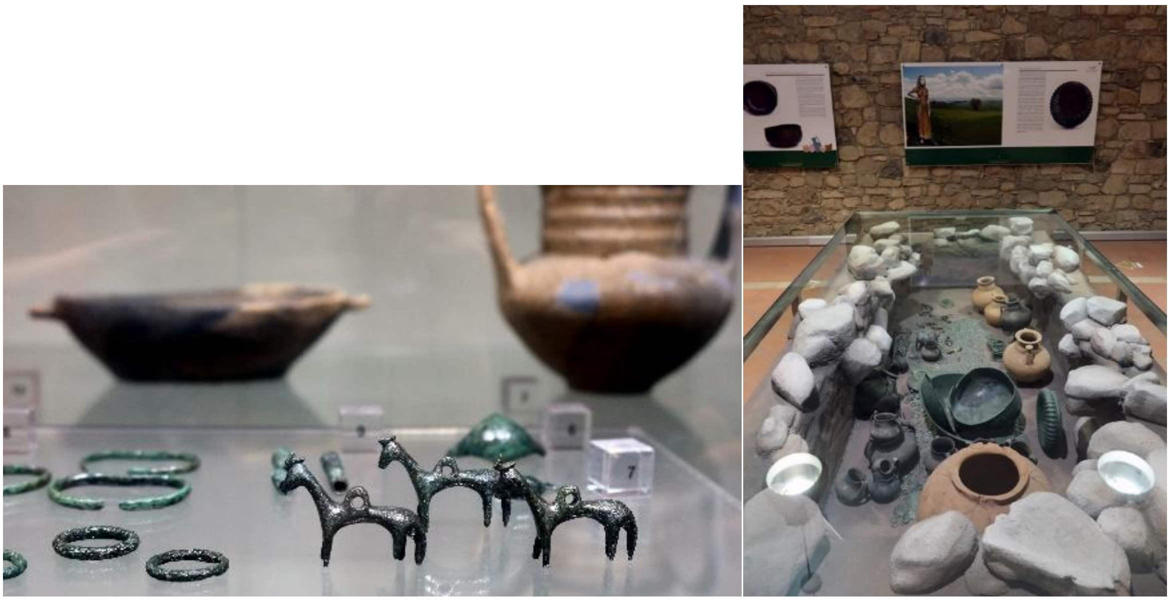


Figure 6: Civic Archaeological Museum in the old Bisaccia (Avellino): the figures show important artefacts, consisting of grave goods from numerous tombs dating back to the Early and Late Iron Ages (the late 9th–7th centuries BC), the Collection is mainly made up of ceramic artefacts and personal ornaments. (Photo by Spiga and Porfido [35]).

Bisaccia Between Hydrogeological Instability and Earthquakes

From a geological point of view, Bisaccia is characterized by a plate of Pliocene polygenic conglomerates, slightly cemented, resting on the "Varicolored Clays" formation, affected by extensive landslides of different typologies that have also occurred over the centuries [43, 44, 46, 50]. Figures 7, 8 show various gravity phenomena, including the extensive rotational/translational sliding phenomena (in yellow), the slow displacements mainly affecting the varicolored clays (dark green), and the extensive Deep-Seated Gravitational Slope Deformations (DSGSD) phenomenon affecting the entire ancient city center and the northern zone (orange dashed line), as currently reported by the new Idrogeo platform of Ispra [38]. The hydrogeological risk scenarios reported on this platform indicate that landslides could affect 28.6% of the population, 35% of buildings, 28.5% of industries and services, and up to 93.3% of cultural heritage of Bisaccia [38].

Figure 7: Overview of the Old Town of Bisaccia, with the Ducal Castle Tower in the centre and the Argille Varicolori geological formation in the foreground (Photo by Spiga and Porfido [35]).

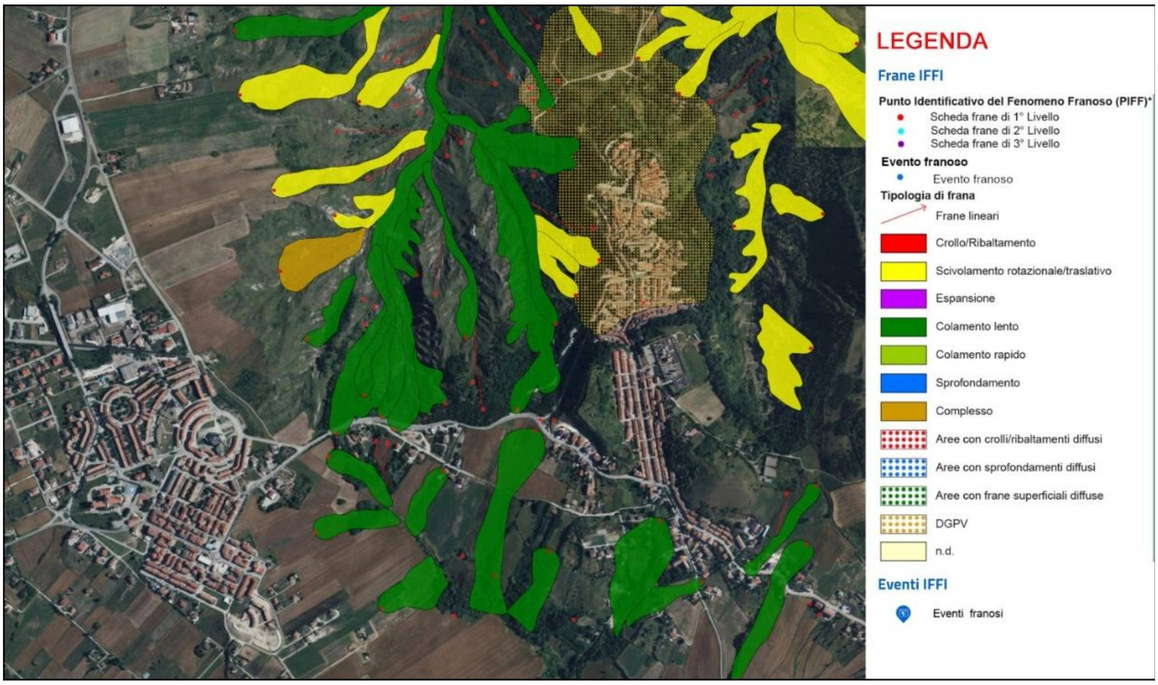


Figure 6: The ancient Bisaccia surrounded by numerous gravitational phenomena including the extensive Rotational/Translational Sliding Phenomena (in yellow), the Slow Displacements Mainly Affecting the Varicolored Clays (dark green), and the extensive DGPV phenomenon affecting the entire ancient city centre and the northern zone (orange dashed line), as reported by IDROGEO Platform of Ispra [38].

Gravitational movements which, not surprisingly, were reactivated and extended after the numerousseimic events that had the Southern Apennines as their epicentre. The town is in a seismic zone, classified in the first seismic category by Delibere Giunta Regionale Campania no. 5447 of 7.11.2002. It has been severely hit by earthquakes in 1158, 1349, 1456, 1694, 1732, 1930 and 1980, as detailed on the municipal website [23]. Of the strongest earthquakes to have affected Bisaccia, causing high levels of damage (I ≥ VIII MCS), the 1694 earthquake is notable, as it had its epicentre in Irpinia and Basilicata. Other notable earthquakes include those centred in Irpinia in 1732 and 1930, and the devastating earthquake of 1980 [6,40-42], (Figure 9). In 1694, Campania and Basilicata were severely struck by the earthquake (epicentral intensity I_0=XMCS; M=6.8), which almost completely destroyed Bisaccia: around 200 houses and several churches collapsed: the cathedral, the bishop's palace and the convent of the Minor Conventuals were severely damaged and partially collapsed, eight deaths and numerous injuries, causing an intensity level of IX MCS (Figure 10). The earthquake triggered landslides and ground failures [6, 28, 35].

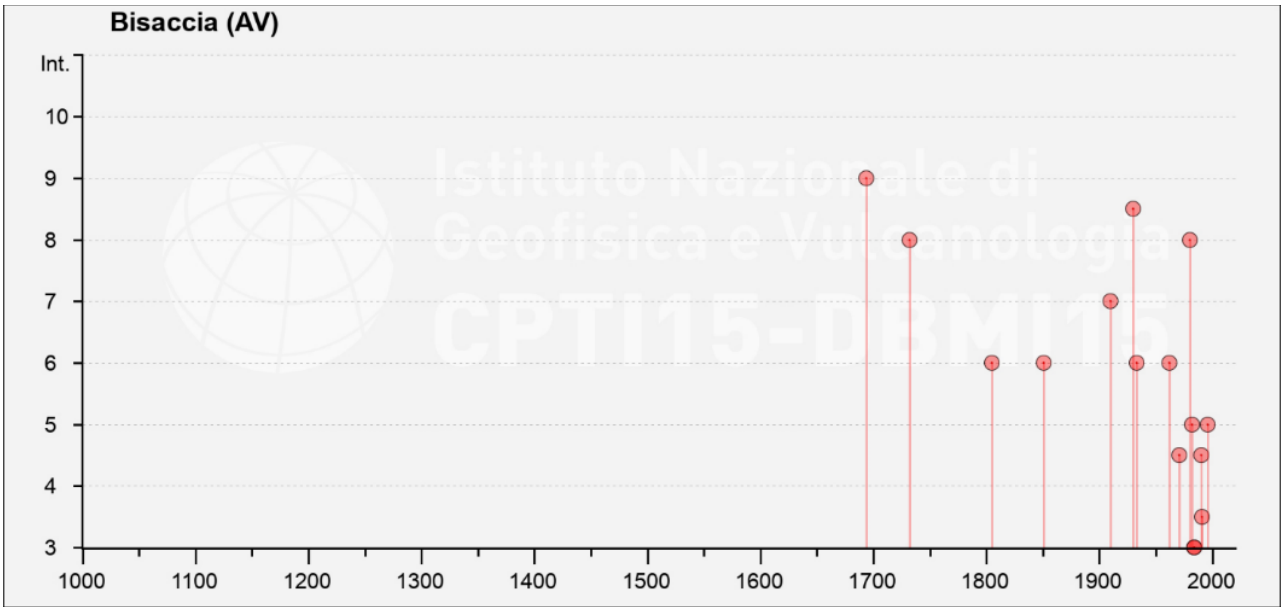


Figure 9: The seismic history of Bisaccia (Avellino province), as recorded in the INGV Seismic Catalogues, indicates significant damage levels of I≥VIII MCS following the powerful Apennine earthquakes of 1694, 1732, 1930, and 1980 from CPTI15 [6].

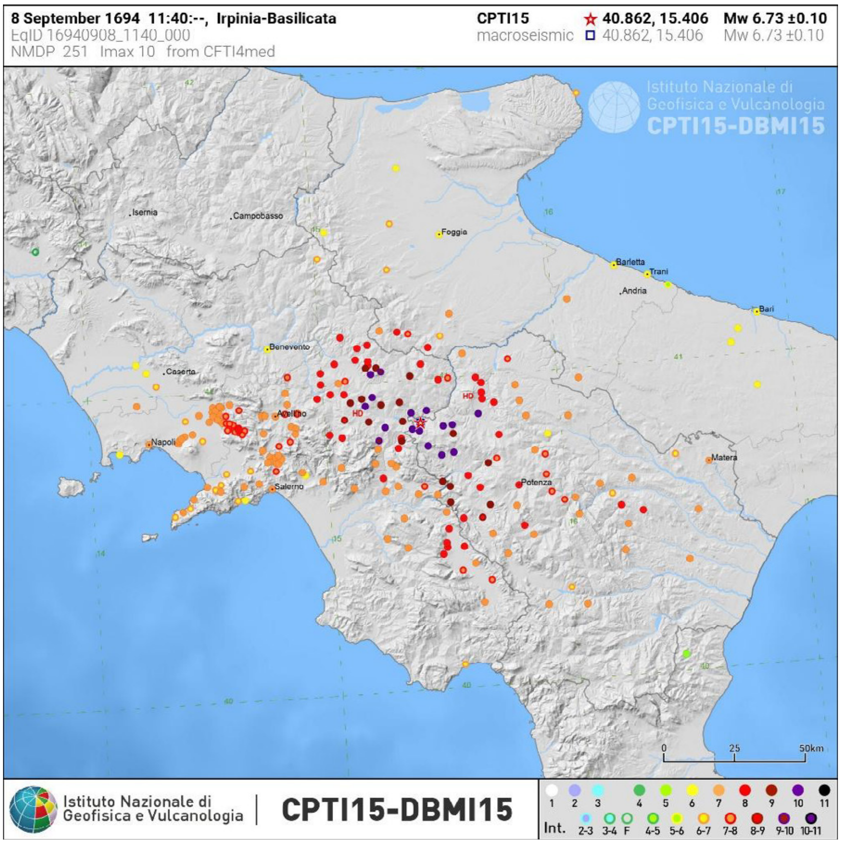


Figure 10: The 1694 Irpinia-Basilicata earthquake, macroseismic field: in descending order from XI MCS to VIII MCS, the highest intensities are represented by black, purple, dark red and light red dots, respectively. Bisaccia reached the IX MCS from CPTI15 [6].

Severe damage was also caused to the architectural heritage by the 1732 Irpinian earthquake (I0= X-XI MCS; M=6.7): "…the mother church and fifteen houses have all fallen; and the church and convent of S. Francesco and the remaining houses have been rendered uninhabitable, but only one person died there..." [51]. Reaching an estimated intensity of VIII-degree MCS (Figure 11).

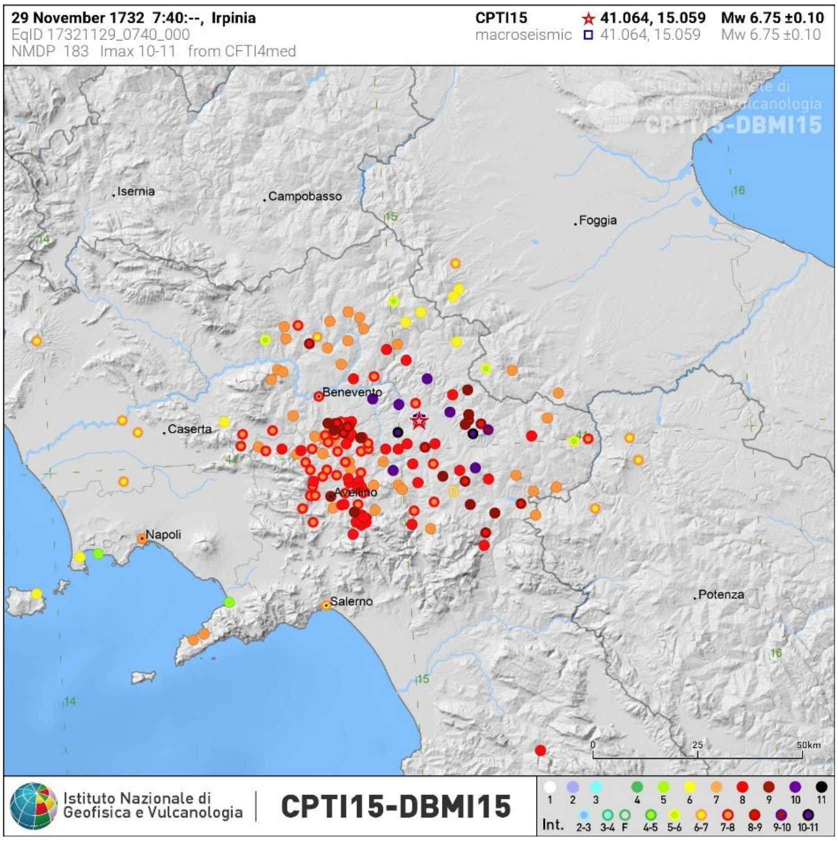


Figure 11: The 1732 Irpinia Earthquake Macroseismic Field [6] : in Descending Order from XI MCS to VIII MCS, the Highest Intensities are Represented by Black, Purple, Dark Red and Light Red Dots; the Intensity of the VIII MCS was Estimated for Bisaccia from CPTI15 [6]).

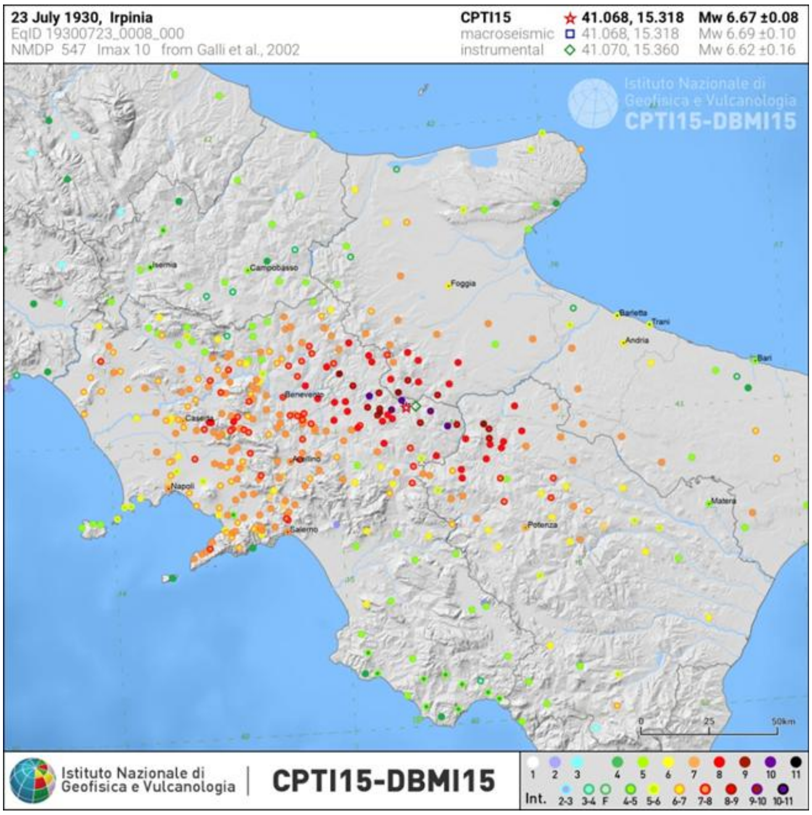


Figure 12: The 1930 Irpinia earthquake macroseismic field [6]: in descending order from XI MCS to VIII MCS, the highest intensities are represented by black, purple, dark red and light red dots; the intensity of the VIII-IX MCS was estimated for Bisaccia from CPTI15 [6].

Less serious was the damage caused by the seismic event that mainly affected the Vulture area (Basilicata region) in 1851 (I_0=XMCS; M=6.5), many cracks in the walls of the houses were caused by the earthquake, with estimated intensity of VI MCS [6, 52]. In the 20th century, Bisaccia suffered the effects of seismic events, including the highest energy earthquakes of 1930 (I_0=XMCS; M=6.6 (Figure 12) causing the death of 1404 people [28] and 1980 (I_0= XMCS; M=6.9) causing about 3000 victims, which in addition to causing considerable damage of I=VIII-IX and I=VIII MCS, respectively, contributed to the extension and propagation of extensive pre-existing landslide phenomena [35, 40-48]. Both earthquakes had a considerable impact on the environment in fact, in some areas of the town, numerous deep cracks were observed, which also affected the road network, causing differences in elevation of tens of centimeters and exacerbating the already precarious instability of the steep slopes bordering the town [46-48]. The earthquake of 23 July 1930 in Irpinia caused in Bisaccia 150 houses to collapse and 1400 to be damaged, with 18 deaths and many injuries. The greatest damage was in the eastern part of the town, as reported in the Official Document [53]. "Bisaccia - The whole eastern area in landslide, which includes the districts of Piazza, in part, Campanile Vecchio, Rupe Andreone and S. Chirico. This area is bounded on the left of the impluvium line by Via Campanile Vecchio, the outer boundary of maps 456, 462, 163, 470, 485 Largo Santoro, Vicolo Vescovado Vecchio, Largo Piazza, excluding the section of Via dei Fiori up to map 629, the outer boundary of maps 620, 610, 530, 527, 830, 324, 299, 317, 298, 282, the first section of Via Rupe Andreone up to the small road below maps 261 and 264 , the outer line of maps 210, up to the convent garden" [37-53]. After the 1930 earthquake, it was decided to move the town to Boscazzulo-Cappella a locality of Bisaccia, about 1.5 km to the west of the town historical centre, precisely because of the numerous geological instabilities and the resulting damage to the urban fabric. This move, however, did not take place until after the 1980 earthquake, even though Bisaccia had been hit by other gravitational phenomena in the meantime, such as the one in early 1965, which also led to the evacuation of numerous buildings [30,31,46]. For the reconstruction of Bisaccia and of the most damaged towns hit by the 1930 earthquake, such as Aquilonia, Scampitella, Villanova del Battista, Lacedonia, Vallesaccarda, Anzano di Puglia, Ariano Irpino, Melfi, Montecalvo Irpino, Barile, Castel Baronia, Flumeri, etc., the Fascist government of the time opted for the construction of new buildings [54-55]. The new constructions were called " casette asismiche- aseismic small houses", dwellings of a few square metres, built on a base of cement concrete and consisting of one, two or more rooms, as well as a kitchen and toilets, located mainly in areas not far from the ancient residential nucleus [29, 39, 56]. Many aseismic houses were also built in Bisaccia, some of which, 95 years after the earthquake, are still recognizable and used as dwellings beyond historical memory (Figure 13 a, b, c) as in the neighboring towns of Aquilonia, Scampitella, Trevico, Villanova del Battista and Carife [35, 55]. The issue of post-1930 reconstruction has been discussed and addressed extensively in the provided bibliography, which should be consulted for further details [28-31, 54].

Figure 13: Bisaccia (Avellino province): the new constructions after the 1930 earthquake called " Casette Asismiche- Aseismic Small Houses". The Aseismic Houses show in figs a, b, c D date back to the 1930 post-earthquake fascist period and are still inhabited today (Photo by Spiga and Porfido [35, 55]).

The November 23, 1980 earthquake, the most powerful seismic event in Italy in the last hundred years, became the de facto political-administrative tool for the reconstruction of the town. In fact, although the earthquake did not cause extremely significant damage to the housing stock, which was classified as VIII MCS [40]. (Figure 14), it once again highlighted the extremely unstable conditions of the outer edges of the conglomerate plateau on which most of the historic centre is built (Figures 7, 8).The mayor of Bisaccia in 1980 was the Senator of the Italian Republic, Salverino De Vito, of the Christian Democratic Party, worked hard to rebuild the village elsewhere with government funding [33, 34]. The geological instability identified and documented at the time of the earthquake by numerous technical reports by groups of geologists and engineers, including academics from the Italian Universities of Ancona and Naples, reiterated the need to relocate part of the town: "Any option other than moving part of the historic centre of Bisaccia to another area would, in the opinion of the authors, mean postponing to another date the serious problem of Bisaccia, which has been dragging on for many decades. It would be truly illogical not to consider the serious risks to which the population is exposed, both in terms of landslides and seismicity. If we do not want to wait until in the coming decades a disaster on the scale of those that have recently struck the towns of Conza, Lioni, Pescopagano, etc., will finally and tragically close the issue "[57]. It is important to note that the ancient town of Bisaccia consists of a medieval settlement characterised by houses mostly made in natural stone with poor mortar, with modest or almost non-existent foundations. This is typical of urban settlements in the Italian Apennines and makes them highly vulnerable to earthquakes [10, 33, 35, 41, 42, 46, 54, 59]. In addition to the buildings' poor quality, the damage to homes was exacerbated by their location along the steep edges of the conglomerate plateau. This plateau sits on a clay subsoil characterised by numerous fractures and fault systems and landslides, as highlighted by geological surveys carried out after the 1980 earthquake. [43-46, 48, 57]. It is not by chance that the historical map (Figure 15) shows that the whole area was subject to hydrogeological restrictions namely is a land protection regime based on Royal Decree 3267/1923, as implemented by regional laws. It requires specific authorization for any intervention that could alter the stability of the land or the water regime, such as forestclearing, construction or soil modifications) [35, 37]. The various municipal administra-tions that succeeded one another after the earthquake decided to rebuild the town in the area of Boscazzulo-Cappella, which had already been identified after the 1930 earthquake and was more stable from a geological point of view, called ‘Piano di Zona- Zone Plan ‘.

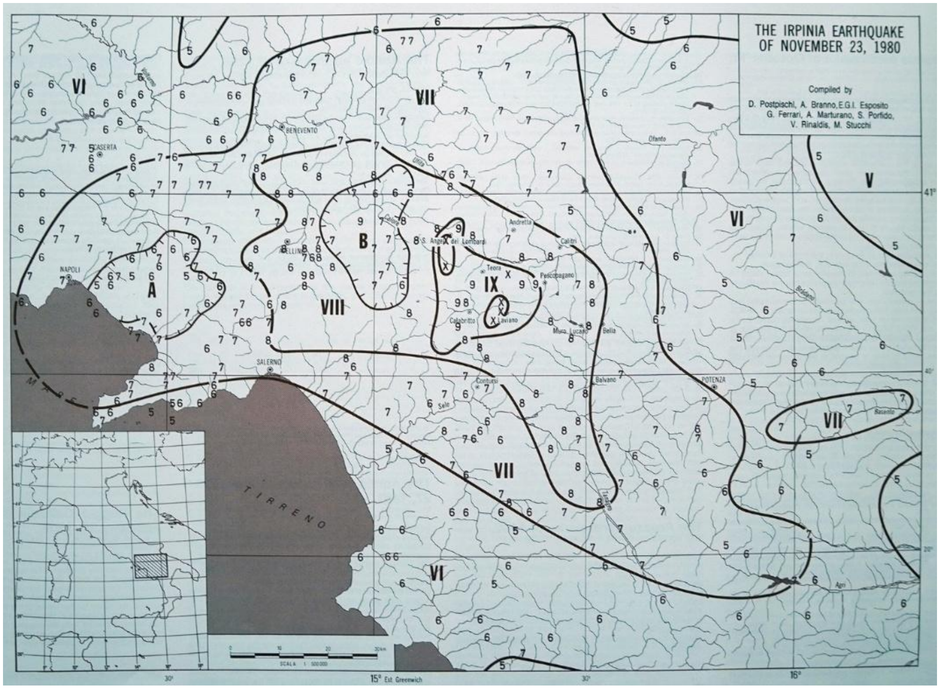


Figure 14: Isoseismal lines of the Irpinia-Basilicata 1980 earthquake. Isoseismal lines enclose areas of equal damage intensity, ranging from degree X in the central areas to degree V in the outermost areas. Bisaccia suffered degree VIII MCS of damage (After Postpischl et al [40]).

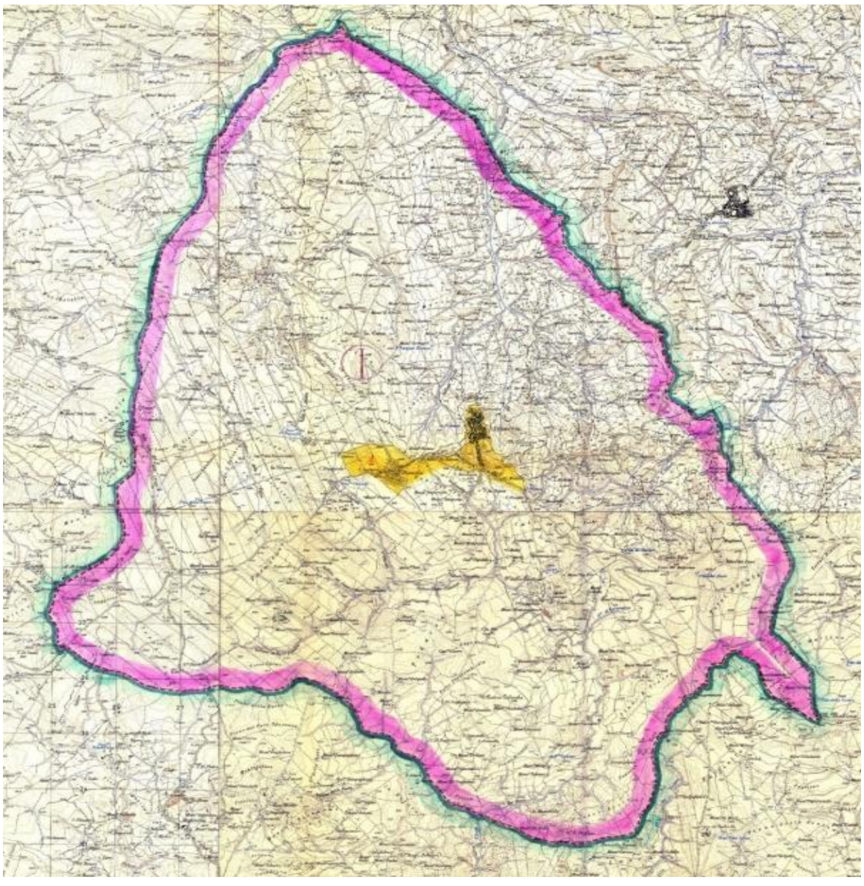


Figure 15: Historical map of the hydrogeological constraints (a land protection regime based on Royal Decree 3267/1923, implemented by Regional Laws) of the municipality of Bisaccia. In green, the boundary of the municipal territory coincides with the fuchsia band that delimits the area subject to hydrogeological restrictions [35, 37].

The territory is constantly affected by hydrogeological instability and therefore re-quires continuous maintenance. Recently, the Municipality of Bisaccia has implemented various consolidation and redevelopment measures, particularly within sustainable local development projects. These projects involve hydrogeological, static and anti-seismic consolidation of buildings in the historic centre, as well as infrastructure and urbaniza-tion measures. The work has also been carried out on provincial roads (SP 303) crossing the municipal territory and on hydrogeological restoration projects for streams such as the Vallone dei Corvi, which are financed and managed by the Province of Avellino. The new Bisaccia of the Zone Plan, built almost entirely according to the urban plan drawn up by the architect Aldo Loris Rossi of the University of Naples, originally from Bisaccia, is a peculiar, "visionary" architectural layout, reminiscent of a utopian, futuristic city where reinforced concrete prevails (Figure 16 a, b). His work reveals the influence of Frank Lloyd Wright's architecture, particularly his use of circular layouts. Significant examples include the church and the multi-functional centre. Figure (16 a, b). The church caused quite a stir and provoked strong criticism due to its imposing shape and size. Some felt that this was unsuitable for the character of the town. The church is the geometric and symbolic centrepiece of the circular square, repre-senting the nucleus of the new Bisaccia. The load-bearing structure consists of reinforced concrete walls forming the church's solid base [59]. The multi-functional centre, which was designed in 1981, is structured as a covered square overlooked by seven functional units. Each unit opens onto the central core, which serves as a hub for public events. It also shows the influence of the theoretical concepts proposed by Le Corbusier and early 20^(th) century Soviet circular architecture. The building's structure was constructed using rein-forced concrete and bricks, while its partitions were built using hollow bricks and a common or hydraulic pozzolana mortar, it was also used as a vaccination centre during the Covid pandemic. [49, 58, 59].

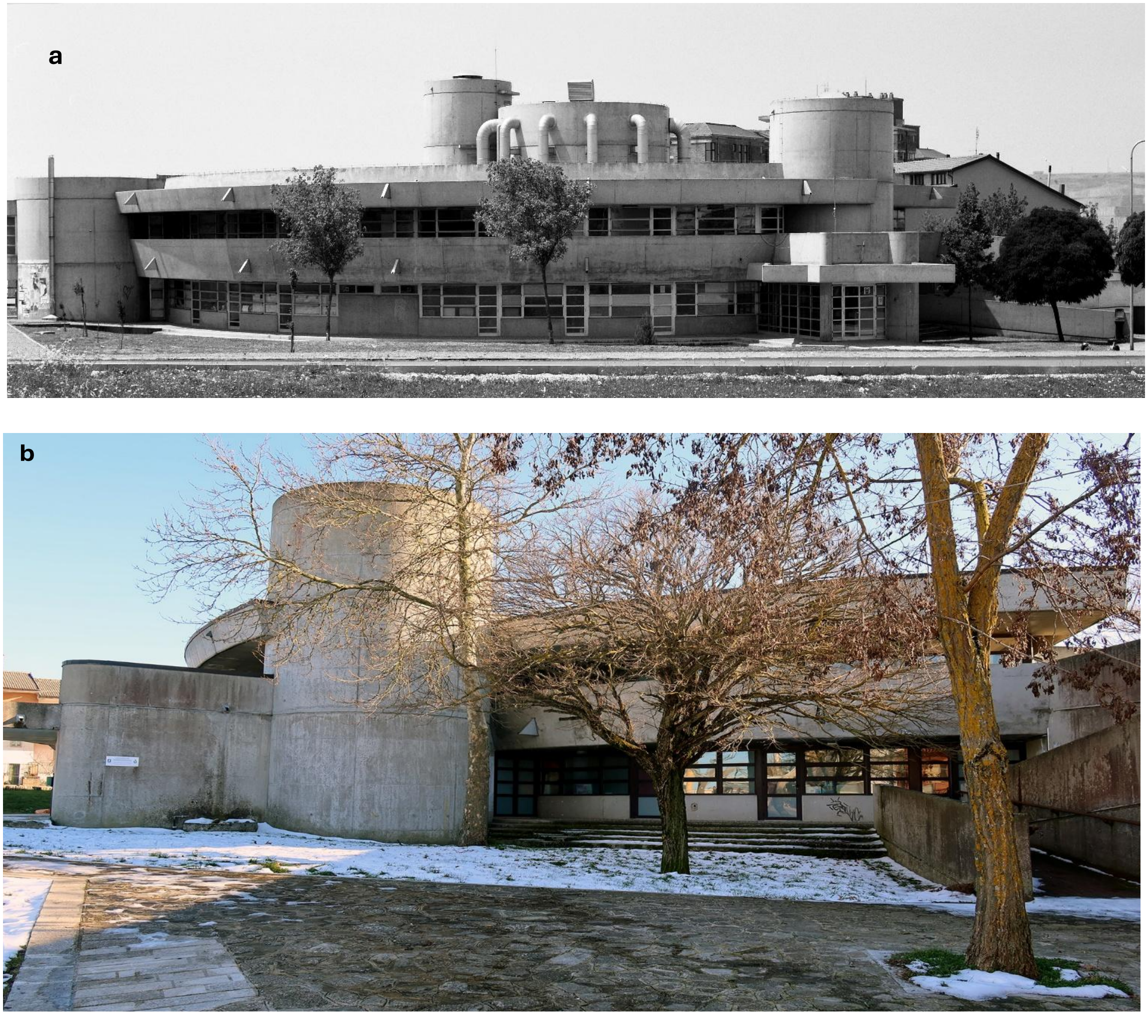


Figure 16: Example of a circular architecture: the Multi-Functional Centre designed by Aldo Loris Rossi for Bisaccia in the aftermath of the 1980 Earthquake (a, b). The 1.051 m^2 seismic resistant architectural complex provides ample space and functionality to accommodate a wide range of different activities and services. (Photo by Spiga and Porfido [24]).

Aldo Loris Rossi was a strong, determined and energetic personality with a combative and controversial streak. He was constantly searching for strategies to mitigate or resolve environmental and territorial issues through new architectural and urban planning forms, as well as new ways of enjoying the environment. Although he was deeply influenced by Frank Lloyd Wright's organic architecture, Rossi never neglected other sources of inspiration, such as expressionism, futurism, neoplasticism and constructivism, all of which were closely connected to the themes of the Modern Movement [60]. Law no. 219 of 14 May 1981 contained further measures in favor of populations affected by the 1980 earthquake and promoted various reconstruction works in several Irpinia municipalities, employing different approaches. The urbanization plan for the new Bisaccia is part of this context. Aldo Loris Rossi's work in Irpinia has a deeper meaning, regardless of the value of the interventions. It is rooted in the creation of the post-industrial 'city of the future' conceived by the 20th century utopian movement and realised through the construction of many buildings designed by a single architect as part of a plan by the same person [61]. Although the seismic resistant construction did not meet with the approval of the population, especially those made of reinforced concrete, it is a clear and decisive testimony of the change after the catastrophe (it could be compared to a modern Cerreto Sannita, destroyed by the earthquake of 1688 and rebuilt in the valley with a regular architectural layout, which is still functional today due to its earthquake-proof characteristics [42, 49, 60, 62]. The post-earthquake reconstruction work (Figures 1, 2, 5, 16, 17) also included the IACP social housing scheme, again designed by Aldo Loris Rossi, with modern but not very functional buildings made of reinforced concrete, oversized in relation to real needs, which will probably be completed this year. An affair that has lasted more than forty years, beginning in 1981 with the financing of no fewer than 83 social housing units, later reduced to 79 in 1987, with subsequent modifications over the years reducing the number even further. Finally, in 2014, the last project was approved, which provided for the urban and structural rehabilitation of only 18 flats [50, 63]. A collection of photographs taken by Porfido and Spiga [49] over the last few years recently published in a photographic monograph [49] documents the process of demolition and reconstruction, offering valuable insights into the use of public resources (Figures 18, 19).

Figure 17: Modern buildings constructed after the 1980 Irpinia-Basilicata earthquake. The urban layout of the New Bisaccia was designed by Aldo Loris Rossi. The New Bisaccia -Zone Plan is a tangible response to the need for post-earthquake reconstruction, and it is also notable for its innovative architectural solutions (Photo by Spiga and Porfido [24, 35]).

Figure 18: The Social Houses (IACP) in Bisaccia were Initially designed by Aldo Loris Rossi after the 1980 earthquake (Zone Plan). An affair that has lasted more than forty years, beginning in 1981 with the financing of no fewer than 83 Social Housing Units, later reduced to 79 in 1987, with subsequent modifications over the years reducing the number even further. Finally, in 2014, the last project was approved, which provided for the urban and structural rehabilitation of only 18 flats. This Photo shows the demolition phase (Photo by Porfido and Spiga [49]).

Figure 19: a, b, c photos show the social houses (IACP) in Bisaccia designed by Aldo Loris Rossi after the 1980 earthquake for the Zone Plan. Following a series of changes that resulted in the demolition of the initial IACP settlement, in 2014 the reconstruction phase began. This was only completed a few years ago.

Discussion

Post-earthquake reconstruction is a highly complex and ongoing topic of debate shaped by a variety of factors. These include primarily the geographical location and socio-economic condition of the affected communities, the impact of the earthquake itself, and the lack of effective, long-term strategies to promote economic development and local employment.The process of reconstruction after an earthquake is invariably lengthy and involves several stages, often categorized as the emergency phase, the transition phase, and the main reconstruction phase [8-11]. Contemporary historiography has extensively examined these issues, emphasizing the contradictions that often arise due to political interference in reconstruction efforts, which can lead to persistent criminal phenomena [12, 33, 34, 63, 65]. It should be reiterated that Bisaccia is in the inland Apennine area, consisting mainly of mountainous, rural regions along the Apennine ridge. These regions suffer from depopulation and lack infrastructure and services.

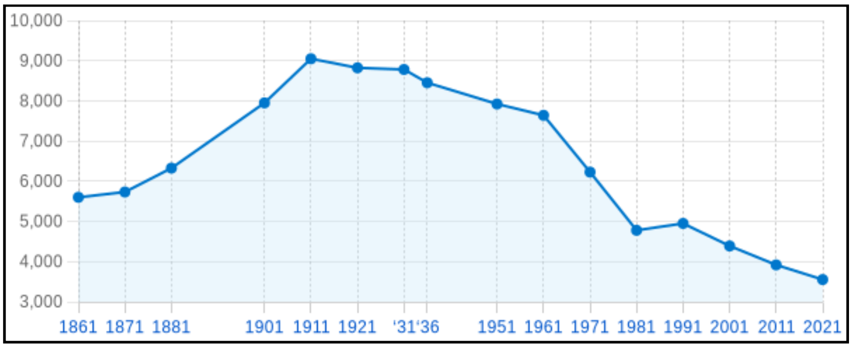


Figure 20: This graph illustrates the demographic trends of Bisaccia from 1861 to 2021. A significant increase in population occurred in the first thirty years of the 20th century, followed by a significant decrease up to the present day (resident population according to Censuses Municipality of Bisaccia from Istat Data [64]).

From a socio-economic perspective, Bisaccia, like most inland areas of the Apennines, has experienced depopulation and its resulting economic consequences. This is evident in Fig.20, which illustrates population trends from 1861 to 2021. The population peaked at 9,000 in the first three decades of the 20(th) century, after which it gradually declined until 1981, almost halving in size. Following the 1980 earthquake, there was a modest increase, and Bisaccia now has a population of 3,808 [64]. The town of Bisaccia's new area plan ended up being oversized due to the overly optimistic prediction of a significant population increase, which was particularly prevalent among politicians at the time. These complex situations require the involvement of the population, structural political interventions and, above all, economic investment, as is widely reported in the literature [64-67].The National Strategic Plan for Internal Areas 2021-2027 [Piano Strategico Nazionale delle Aree Interne 2021-2027 (PSNAI) [67]. Has also been the subject of considerable controversy notably because of a passage that many local governments deemed 'unacceptable'. Specifically, the document states that 'these areas cannot set themselves any goals to reverse the trend, but neither can they be left to their own devices'. They need a targeted plan to accompany them on a path of chronic decline and ageing.' Considering this, politicians and especially local administrators should seek alternatives beyond occasional weekend tourism or food festivals. Instead, they need to foster sustainable tourism that acknowledges and capitalizes on the distinctive features of the territory. Bisaccia, like much of the Upper Irpinia region, is affected by these challenges. Addressing them is crucial to promote growth and rejuvenation in these inland areas. Starting from this premise, we presented the iconography of Bisaccia's reconstruction following the 1980 earthquake. We highlighted how earthquakes and hydrogeological instability have influenced the city's urban development, albeit in an extremely concise manner. These phenomena have had a strong and dramatic impact on the town's decision to relocate. However, thanks to the resilience of its inhabitants, two versions of Bisaccia have coexisted: 1) the historic old town with its cathedral and ducal castle; 2) the new, modern centre (Figures 2, 5, 16, 17). This has not yet been fully appreciated by the local population and is the expression of a visionary and utopian project by the architect Aldo Loris Rossi [24, 34, 59, 63, 65]. It took a very long time to complete and is undesirable for a community that should have the opportunity to 'revive' in a dignified way after a disaster, in fact, discussions about the earthquake are still evident in the population more than forty years later, as highlighted in Delli Bove's writings [34]. It is only in recent years that this architect has been reevaluated, particularly within academic circles. In fact, an exhibition and conference were held in Bisaccia on 10 May 2025, with a proposal to establish the first contemporary architecture park inspired by his work [59, 71]. We could call the coexistence of these two realities added value, but it should be given equal dignity and elevated to the forefront. This could create the conditions for those 'sustainable' tourist routes that are often discussed but never implemented. While the overview we have provided is certainly not exhaustive, the photographic images that we have selected deliberately show the reconstruction rather than damage. They are intended to give the reader a glimpse of the urban development of villages, with a view to safeguarding the territory and cultural heritage. Furthermore, they document the reconstruction process, revealing the human impact on the natural landscape and our ability or inability to correctly interpret a place's environmental destiny [24, 35, 49]. In addition, it must be said that the inland areas, although they have had a great opportunity for reconstruction and development, have never received a real boost towards a truly different economy, an economy that should have been the driving force behind agriculture, an economy that should have taken into account the new realities. In a town like Bisaccia, where the historic centre is still struggling to recover itself, where abandonment is still rife and where the new is not understood by the inhabitants, it was necessary to focus on an idea of sustainable tourism, perhaps based on the geological peculiarities on which the town is built, based on a path of guided geological excursions that highlight the peculiarities of the area, from the geomorphology to the erosion phenomena and the active landslides present. Examples can be found in Italy througt thematic cultural routes [72] and all over the world, for example in Japan, where there are fault museums, at Hokudan, a museum that attracts thousands of tourists [73]. The museum has displays on the devastation caused by the 1995 earthquake, with the main display in a long hall that exposes a preserved section of the Nojima fault. Also, the Earthquake Museum of Taiwan is dedicated to the M 7.3 magnitude earthquake that struck central Taiwan in September 1999 [74]. There are also very important examples in Italy: in Gibellina (Sicily), destroyed by the 1968 Belìce earthquake, the Cretto of Gibellina by the artist A. Burri, commissioned by the farsighted mayor, is a powerful and evocative example of the preservation of memory beyond the tragedy that is only apparently buried by concrete [75, 76]. Similarly, the two sites representing Bisaccia could become a 'diffused museum' or 'open-air museum' by creating permanent laboratories for university geology and architecture students to explore themes such as natural hazards and different construction methods. If properly organized with tourist information panels, it could also be of interest to the public. In fact, Bisaccia could serve as a laboratory for studying geological and seismic risks, raising awareness among the local population and in neighboring countries with similar characteristics. In this sense, Bisaccia is a real-life laboratory where we can learn useful lessons from the past to help us deal with future seismic events and more. Last but certainly not least, towns such as Bisaccia, located in the heart of the southern Apennines but not far from major urban centres such as Naples, could play a fundamental role, especially given the serious bradyseismic crisis affecting the Campi Flegre (Phlegraean Fields) and parts of Naples. Rather than considering relocation to areas far from the original centres in the event of a red alert the population could be temporarily relocated to these mostly uninhabited locations so that people do not lose contact with their homes and loved ones and can return home within a few hours [77]. Despite the limitations imposed by the vastness of the subject, our work aims to encourage local authorities and the public to promote the territory that can certainly be described as unique and irreplaceable. This is in line with the wise advice of Vito Teti in his book "La restanza" (2022) [78]. Which proposes a new approach to narrative and action in rural areas. This involves taking initiatives that go against the grain, investing in the present and in residents, while avoiding welfare dependency.

Final Remarks

The results of this work highlight a complex interaction of natural hazards, resilience, and socio-political decisions of the Bisaccia urban evolution (Figure 20). The following flowchart (Figure 21) summarizes the main phases of our study on the reconstruction of the town of Bisaccia, a city suspended between natural disasters and modern reconstruction. It shows the sequence of key processes that influenced the relocation and redevelopment of the town following the 1980 earthquake, with the coexistence of the old and new Bisaccia, suggesting the proposal to invest in sustainable tourism based on the town's geological and cultural heritage.

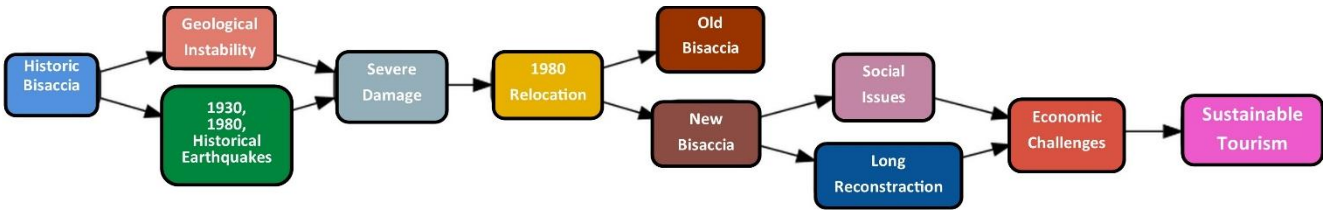


Figure 21: Flowchart summarized the main phases of our study on the reconstruction of the town of Bisaccia.

The main phases include:

- Dual urban identity: the coexistence of two urban realities, the "old" medieval historic center and the "new" Bisaccia, represents an example of resilience and territorial transformation.
- Influence of natural disasters: earthquakes and hydrogeological instability have had a significant impact on urban development, leading to the decision to rebuild part of the town in a more geologically stable area, after 1930 and 1980 earthquakes [30-32, 34, 35,37, 39, 42, 50, 53, 55, 57]
- Visionary project of urban reconstruction post 1980 earthquake: the new Bisaccia, designed by architect Aldo Loris Rossi, an example of utopian and futuristic architecture for an inner town in the Apennine [24, 49, 50, 58, 59].
- Opportunities for Sustainable Tourism: the aim is to enhance the area's geological and historical features through sustainable tourism itineraries (e.g. geological field trip, trekking routes of varying difficulty and guided tours highlight the different architectural styles present in the two Bisaccia, drawing inspiration from national and international examples such as Gibellina's Gretto and earthquake museums in Japan and Taiwan [73-76].
- Critics of Post-Disaster Management: reconstruction has highlighted contradictions linked to political interference, administrative inefficiencies, and the lack of long-term economic strategies for local development [33, 34, 62, 66-72].
- Memory and Resilience: the persistence of disaster memory and local narratives is considered a key factor for urban resilience and should be integrated into recovery policies [10-12, 26].

Conclusions

The case of Bisaccia exemplifies the multifaceted challenges typical of small inland towns confronted with hydrogeological and seismic disasters, where heritage preservation, risk mitigation, and socioeconomic sustainability must be balanced [79]. The dichotomy observed between the "old" and "new" Bisaccia aligns with findings in similar contexts, such as Gibellina, where relocation and reconstruction produced spatial and social fragmentation [80]. This reinforces the idea that reconstruction should not only address physical safety but also promote social integration and place attachment [81]. The integration of geological data with urban planning praxis in Bisaccia echoes the growing consensus in hazard studies. In the urban context, it is important to emphasize an approach that considers both hydrogeological instability and seismic risk [82]. Drawing on the expertise of local universities and research centres (e.g, CNR and INGV). Such an integrated hazard assessment is critical for safer and more sustainable urban development in vulnerable inner areas. The memory of the disaster and local story, observed in Bisaccia, supports the thesis according to which socio-cultural factors are powerful drivers of urban resilience and should be integrated into recovery policies [80]. This is in line with contemporary theoretical expectations that emphasize community participation and governance in disaster recovery [84]. The mixed outcomes of reconstruction in Bisaccia, advances in seismic resilience alongside socioeconomic challenges, highlight the complex trade-offs faced in post-disaster contexts, especially for small towns with limited resources [85].

While seismic resistant construction has advanced, socio-economic revitalization lags without a robust economic base or comprehensive sustainable development strategy. Enhancing sustainable tourism rooted in local geological and cultural assets could revitalize the territory and foster community identity. Develop the proposal for Bisaccia as a temporary civilian reception center during national emergencies (e.g., the bradyseismic crisis in Campi Flegrei). This gives the inland areas a new, vital, and strategic national function, transcending the mere tourist dimension and enabling the productive regeneration of unused public real estate assets, such as the IACP settlements. Finally, Bisaccia's case contributes to broader lessons for reconstruction in disaster-prone regions, advocating holistic, multidisciplinary approaches that unify hazard science, urban design, and community engagement, ensuring rebuilding is not only technically sound but socially meaningful and economically viable.

Author Contributions: Conceptualization, P.S., E.S., R.N.; methodology, S.P., E.S., R.N.; investigation, S.P., E.S. R.N.; writing-original draft preparation, S.P., RN; writing-review and editing, R.N., S.P; All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding

Data Availability Statement: The data that support the findings of this study are available from the authors upon reasonable request.

The authors declare no conflicts of interest

Acknowledgements: We would like to express our heartfelt gratitude to Efisio Spiga, who sadly passed away in July. His work as a photographer and researcher was integral to everything we did. We will never forget him.

References

1. Lizarralde, G., Johnson, C., Davidson, C. (2010). Rebuilding after disasters: From emergency to sustainability. Taylor & Francis Group, 2010, pp. 296, ISBN 9780415472548.
2. Clemente, M., Salvati, L. (2017). Interrupted landscapes: Post-earthquake reconstruction in between urban renewal and social identity of local communities. Sustainability, 9(11), 2015.
3. INU Edizioni. (s.d.). 005. Rivista monografica online (ISBN 978-88-7603-096-3).
4. Caramaschi, S., & Coppola, A. (2021). Post-disaster ruins: the old, the new and the temporary. In The New Urban Ruins (pp. 125-144). Policy Press.
5. Westaway, R. (1992). Seismic moment summation for historical earthquakes in Italy: tectonic implications. Journal of Geophysical Research: Solid Earth, 97(B11), 15437-15464.
6. Rovida, A., Locati, M., Camassi, R., Lolli, B., Gasperini, P., & Antonucci, A. (2022). Catalogo parametrico dei terremoti italiani (cpti15). INGV versione 4.0.
7. Allen, G., & Unwin, J. C. (2002). Three earthquakes: Political response, reconstruction and the institutions: Belice (1968), Friuli (1976), Irpinia (1980). In J. Dickie, J. Foot, & F. M. Snowden (Eds.), Disastro! Disasters in Italy since 1860 (pp. 186–233). Palgrave Macmillan.
8. Geipel, R. (1982). Disaster and Reconstruction: the Friuli (Italy) Earthquakes of 1976 (Taylor and Francis, London, ISBN 0-04-904006-5.
9. Alexander, D. (1984). Housing crisis after natural disaster: the aftermath of the November 1980 southern Italian earthquake. Geoforum, 15(4), 489-516.
10. Mazzoleni, D., & Sepe, M. (Eds.). (2005). Rischio sismico, paesaggio, architettura: l'Irpinia, contributi per un progetto. Naples, Italy: CRdC-AMRA.
11. Gribaudi, G., Mastroberti, F., & Senatore, F. (Eds.). (2021). Il terremoto del 23 novembre 1980: Luoghi e memorie. Editoriale scientifica.
12. Caporale, R. (1989). Toward a cultural-systemic theory of natural disasters: the case of the Italian earthquakes of 1968 in Belice, 1976 in Friuli and 1980 in Campania-Basilicata. Preparations for, Response to, and Recovery from Major Community Disasters, 253-271.
13. Amodio, T. (2022). Territories at risk of abandonment in Italy and hypothesis of repopulation. Belgeo, 4.
14. Battaglini, E. (2017). The sustainable territorial innovation of inner peripheries: The Lazio region (Italy) case. International Studies: Interdisciplinary Political and Cultural Journal, 19(1), 87–102.
15. De Rossi, A. (2018). Riabitare l'Italia. Le aree interne tra abbandoni e riconquiste. Donzelli.
16. Golini, A., & MV, L. P. (2019). Italiani poca gente. Il Paese ai tempi del Il Paese ai tempi del malessere demografico, Roma, 2019, LUISS University Press.
17. Rossi-Doria, M. (2005). La polpa e l'osso. Agricoltura, risorse naturali e ambiente. L'Ancora del Mediterraneo.
18. Nesticò, A., Fiore, P., & D'Andria, E. (2020). Enhancement of small towns in inland areas. Sustainability, 12, 6359. 19. LaborEst Città Metropolitane. (2023). Aree interne (N. 26). ISSN 1973-7688.
20. Porfido, S., & Spiga, E. (2020). Ricostruzione 1980–2020 Ed. Blurb: San Francisco, CA, USA, 1.ISBN 978-1-71-571504-5
21. Porfido, S., & Spiga, E. (2022). Ricostruzione 1980–2020 (Vol. II). Blurb. ISBN 978-1-71-572142-8.
22. Festa, G., Iuliano, G., & Saggese, P. (2020). Irpinia 1980–2020. Delta 3 Edizioni.
23. Comune di Bisaccia. (2025). Documentazione istituzionale (website).
24. Spiga, E., & Porfido, S. (2020). Bisaccia. Piano di zona. Blurb. ISBN 978-1-71-555296-1.

25.Gizzi, F. T., & Potenza, M. R. (2020). The scientific landscape of November 23rd, 1980 Irpinia-Basilicata Earthquake: Taking stock of (almost) 40 years of studies. Geosciences, 10(12), 482.
26. Barca, F., Casavola, P., & Lucatelli, S. (2014). Strategia Nazionale per le aree interne. Definizioni, obiettivi e strumenti di governance.
27. Matarazzo, N. (2019). Le aree interne della Campania: spazi e nuove tendenze del popolamento. Il caso dell'Irpinia. Studi e ricerche socio-territoriali, 9(1), 3-50.
28. Guidoboni, E., et al. (2019). CFTI5Med. Scientific Data, 6, 80.
29. Alfano, G. B. (1931). Il terremoto irpino del 23 luglio 1930. Osservatorio meteoritico-geodinamico di Pompei.
30. Galli, P., Molin, D., Galadini, F., & Giaccio, B. (2002). Aspetti sismotettonici del terremoto irpino del 1930.
31. Gizzi, F. T., & Masini, N. (2011). Dalle fonti all'evento. Percorsi, strumenti e metodi per l'analisi del terremoto del 23 luglio 1930 nell'area del Vulture.
32. Ministero dei Lavori Pubblici, Direzione generale dei Servizi Speciali, (1932). L'Azione del Governo Fascista per la riconstruzione delle zone danneggiate da calamità. Roma 346 pp.
33. Commissione Parlamentare d'Inchiesta. (1991). Relazione conclusiva e propositiva (Vol. I, Tomo I). Senato della Repubblica.
34. Delli Bove, G. (2020). Atti, fatti e altre parole – Bisaccia. Self printing.
35. Spiga, E., & Porfido, S. (2023). Iconografia di una ricostruzione: L'esempio di Bisaccia (Avellino) dopo il terremoto del 23 novembre 1980. In Atti del Convegno "La geologia ambientale al servizio del Paese".
36. Regione Campania. (2020). Carta tecnica regionale (1:5000).
37. Regio Decreto-Legge 30 dicembre 1923, n. 3267.
38. ISPRA. (2023). IdroGEO. Available online: https://idrogeo.isprambiente.it/app/ (accessed on January 2025).
39. Castenetto, S., & Sebastiano, M. (2002). Il ''terremoto del Vulture''23 luglio 1930 VIII dell'Era fascista. Servizio Sismico Nazionale, Roma, 350p.
40. Postpischl, D., Branno, A., Esposito, E., Ferrari, G., Marturano, A., Porfido, S., ... & Stucchi, M. (1985). The Irpinia earthquake of November 23, 1980. Atlas of isoseismal maps of Italian earthquakes, 114, 152-157.
41. Porfido, S., et al. (2021). Photographic reportage on the rebuilding after the Irpinia-Basilicata 1980 earthquake. Geosciences, 11(6).
42. Porfido, S., Alessio, G., Gaudiosi, G., Nappi, R., & Michetti, A. M. (2023). The November 23rd, 1980 Irpinia-Lucania,
Southern Italy Earthquake: Insights and Reviews 40 Years Later (p. 330). MDPI-Multidisciplinary Digital Publishing Institute.
43. Fiorillo, F., Parise, M., & Wasowski, J. (1996). Slope instability in the Bisaccia area (Southern Apennines,(Italy). In Proceeding of the 7th International Symposium on Landslides (pp. 965-970). Kaare Senneset.
44. Parise, M., & Wasowski, J. (1999). Landslide activity maps for hazard evaluation. Natural Hazards, 20, 159–183. 45. Serva, L., Esposito, E., Guerrieri, L., Porfido, S., Vittori, E., & Comerci, V. (2007). Environmental effects from five
historical earthquakes in southern Apennines (Italy) and macroseismic intensity assessment: Contribution to INQUA EEE Scale Project. Quaternary International, 173, 30-44.
46. Fenelli, G. B., Picarelli, L., & Silvestri, F. (1992). Deformation process of a hill shaken by the Irpinia earthquake. In A. Faccioli & A. Pecker (Eds.), Slope stability in seismic areas (pp. 47–62).
47. Porfido, S., Esposito, E., Guerrieri, L., Vittori, E., Tranfaglia, G., & Pece, R. (2007). Seismically induced ground effects of the 1805, 1930 and 1980 earthquakes in the Southern Apennines, Italy. BOLLETTINO-SOCIETA GEOLOGICA ITALIANA, 126(2), 333.
48. Pizza, M., et al. (2023). Environmental effects caused by the Mw 6.9 1980 Irpinia-Basilicata earthquake. Zenodo. 49. Porfido, S., & Spiga, E. (2022). The Bisaccia IACP. Blurb.
50. IACPAV. (2009). Relazione sintetica descrittiva. Programma di riqualificazione Bisaccia.
51. Anonimo. (1733). Distinta relazione del danno cagionato dal terremoto del 29 novembre 1732. Napoli.
52. Porfido, S., Esposito, E., Luongo, G., & Marturano, A. (1988). I terremoti del XIX secolo dell\'Appennino Campano-Lucano. Memorie della Società Geologica Italiana, 1105-1116.
53. Gazzetta Ufficiale del Regno d'Italia. (1930).
54. Bellomo, M., & D'Agostino, A. (2017). Minor centres through identity and green development. The study case of Aquilonia. UPLanD-Journal of Urban Planning, Landscape & environmental Design, 2(1), 165-186.
55. Spiga, E., & Porfido, S. (2020). Via Casette asismiche. Blurb.
56. Sistema Irpinia. (s.d.). Aquilonia: le casette asismiche. Available online: https:/ sistemairpinia.provincia.avellino.it/ index.php/it/eventi/aquilonia-palazzine-bene-comune-le-casette-asismiche-di-aquilonia-da-residuo-urbano.
57. Crescenti, U., Nanni, T., Praturlon, A., & Tomassoni, D. (1980). Geological report for the municipality of Bisaccia. Institute of Applied Geology of Ancona.
58. Locci, M., & Rossi, A. L. (1997). Aldo Loris Rossi: la concretezza dell'utopia. Testo & immagine.
59. Reccia, I. (2023). Aldo Loris Rossi: l'utopia circolare. Il caso studio di Bisaccia Nuova (Tesi di laurea magistrale). Università di Napoli Federico II.
60. Castagnaro, A. (2019). Aldo Loris Rossi: Architecture as a prosthesis of nature. Arkeda Magazine, 8, 98.
61. Ministero della Cultura. (s.d.). Censimento delle architetture contemporanee.

62. Capozzoli, A., Paoletti, V., Porfido, S., Michetti, A. M., & Nappi, R. (2025). The 1688 Sannio–Matese Earthquake: A Dataset of Environmental Effects Based on the ESI-07 Scale. Data, 10(3), 39.
63. De Silva, F., & Antoniciello, M. (2023). SULLE MACERIE DI UN'IDEA DI CITTÀ: UNA PROPOSTA PER LA RIGENERAZIONE URBANA A BISACCIA. Aree Interne, N. 26/Giugno 2023 Iscr. Trib. di Reggio Cal. n. 12/05- ISSN1973-7688- ISSN online 2421-3187.
64.Tuttitalia.it. (2025). Statistiche demografiche del Comune di Bisaccia. https://www.tuttitalia.it/campania/30-bisaccia/ statistiche/popolazione-andamento-demografico/
65. Picone, G. (2023). Paesaggio con rovine. Mondadori. Milano, Italy, p. 226, ISBN 978-88-04-72480-3.
66. Lombardi, G. (2021). Irpinia earthquake and history. Geosciences, 11, 50.
67. Rossi-Doria, M. (1982). Scritti sul mezzogiorno. L'Ancora del Mediterraneo Editor, ISBN-10. 8883250796
68. Ricciardi, T. (2019). Spopolamento e desertificazione nell'Appennino Meridionale: il caso dell'Alta Irpinia.
69. Lucatelli, S., Luisi, D., Tantillo, F., & l'Italia, A. R. (2022). L'Italia lontana: una politica per le aree interne. Donzelli editore.
70. Presidenza del Consiglio dei Ministri. (2021). Piano strategico nazionale delle aree interne 2021–2027. (PSNAI) https://politichecoesione.governo.it/it/documenti-ed-esiti-istituzionali/documenti-strategici-di-inquadramento/programmazione-2021-2027/piano-strategico-nazionale-delle-aree-interne-2021-2027-psnai-e-allegati/
71. Mostra-Convegno. (2025). Aldo Loris Rossi a Bisaccia. Castello Ducale di Bisaccia.
72. Sannazzaro, A., et al. (2025). Revitalizing inner areas through thematic cultural routes. Sustainability, 17(10), 4701.
73. Hokudan Earthquake Memorial Park. (2025). Available online: https://www.japan-experience.com/all-about-japan/kobe/attractions-and-excursions/hokudan-earthquake-memorial-park
74. 921 Earthquake Museum of Taiwan. (2025).https://www.reddit.com/r/geology/comments/1n3zcn5 chelungpu_fault_preservation_park_and_921/).
75. Mattia, M., Napoli, M. D., & Scalia, S. (Eds.). (2021). Belìce punto zero. INGV. ISBN: 9791280282019
76. Petino, G., Napoli, M. D., & Mattia, M. (2022). Landscape, memory, and adverse shocks. Land, 11, 754.
77. Regione Campania. (2025). Pianificazione nazionale di emergenza per il rischio vulcanico dei Campi Flegrei. Flegrei(https://www.regione.campania.it/regione/it/campi-flegrei/pianificazione-nazionale-di-emergenza-per-il-rischio-vulcanico-per-i-campi-flegrei)
78. Teti, V. (2022). La restanza. Einaudi. ISBN 9788806251222
79. Alexander, D. (2013). Natural disasters (3rd ed.). Cambridge University Press.
80. Dell'Aquila, V. (2017). The reconstruction of Gibellina. Urban Studies, 54(2), 452–468.
81. Cutter, S. L., Burton, C. G., & Emrich, C. T. (2010). Disaster resilience indicators for benchmarking baseline conditions. Journal of Homeland Security & Emergency Management, 7(1).
82. Berti, M., & Simoni, S. (2020). Integrating geological and urban planning data. Journal of Hazardous Materials, 389, 121911.
83. Lindell, M. K. (2013). Disaster studies. In S. G. Hanson (Ed.), Handbook of disaster research (pp. 9–28). Springer.
84. Paton, D., & Johnston, D. (2017). Disaster resilience: an integrated approach. Charles C Thomas Publisher.
85. Lhomme, S., Serre, D., & Le Coze, J. C. (2015). Resilience and disruption. International Journal of Disaster Risk Reduction, 14, 68–76.