Removing cultural barriers to climate change adaptation in Tuscany

Giulio Giovannoni
Department of Architecture, University of Florence, 50100, Florence, Italy
Email: giulio.giovannoni@unifi.it

Abstract
The paper investigates the role of cultural factors in hindering climate change mitigation and adaptation policies. The importance of historical landscape in Tuscany makes it difficult to accept transformations necessary to adapt to the new climate. After reviewing available data on climate transformations in Italy and taking stock of the status of mitigation and adaptation planning, some projects of renewable energy production facilities are analysed. The media debate and the legal and bureaucratic oppositions to them are discussed. The idea of landscape emerging from the debate is related to the musealised conception of the same that has been established in Italy. The concluding section discusses the policy implications of the present work.

Keywords: urban landscape; climate change adaptation; cultural barriers; Tuscany; Italy.

1. Introduction

We live in an increasingly urban and hot world. According to United Nations projections in 2050 68% of the world's population will live in cities (United Nations, 2019). Over the same period, the planet's average temperature is expected to rise between 1.5 and 2 degrees (IPCC, 2023). These two simple figures place at the forefront the need to rethink urban landscapes in order to adapt the living environment of the majority of the world population to exceptionally rapid change. This rapidity is at odds with the long time frames in which cities undergo change and transformation. Planning can only play a central role in such processes (Norman, 2022, IPCC, 2021). The long timescales of urban change partially depend on the symbolic and psychological meanings cities hold for their inhabitants (Lingiardi, 2017, Ulrich, 1979). This raises the issue of cultural barriers to climate change adaptation, a topic that is particularly relevant in Italy, as demonstrated by the numerous cases of nimbyism and 'administrative resistance' to mitigation and adaptation projects (Fanetti, 2012, Fraioli, 2022). This paper aims to investigate this issue, with specific reference to the cultural, political and administrative situation in Italy, and to put forward some working hypotheses aimed at identifying procedures and tools to promote socially sustainable climate change adaptation measures. The first section summarizes available data and research on climate change that has occurred so far in Italy and Tuscany. The second section reviews planning aimed at climate change mitigation and adaptation in the same area, showing its inadequacy to achieve zero CO_2 emissions by 2050 and to make the territory resilient to the changing climate. The third section presents some cases in which climate change mitigation and adaptation plans and projects face procedural and administrative difficulties that can be attributed to cultural barriers arising from a static and immutable conception of the landscape. The conclusive section draws policy implications from the present research.

2. Materials and Methods

The first part of the essay introduces the topic of climate change and of the relationship between planning and climate. After some general considerations on global trends, climate transformations in recent decades in Italy and Tuscany are examined, with an in-depth look at the city of Prato. These transformations are derived from statistical elaborations on

temperature and precipitation and from research conducted by research institutes specifically dedicated to the study of climate change and environmental protection in Italy, including the Euro-Mediterranean Centre on Climate Change and the Istituto Superiore per la Protezione e la Ricerca Ambientale (Ispra). The set of systematic studies on climate change in Italy conducted so far, albeit based on pre-2012 data, shows a considerable increase in the risks of extreme weather events and poses the urgent need for climate change adaptation and mitigation planning. The numerous disasters due to extreme rainfall, extreme heat and prolonged droughts that have occurred in recent years confirm the urgency and seriousness of the situation.

The second section reviews climate change mitigation and adaptation planning in Italy and in Tuscany. Planning at the national level was reviewed through existing literature on the subject. Data obtained from literature were checked and updated by consulting web portals of institutions and administrations responsible for climate change mitigation/adaptation planning. The analysis regarding the Tuscan area was conducted by consulting plans and policy documents prepared by local governments and by the Tuscany Region through their web portals. For reasons of time and research opportunities, we only focused on provincial capital cities. The choice was motivated by the fact that these accommodate most of the regional population, are the major greenhouse gas polluters, have a higher degree of vulnerability compared to the rest of the region, and have a political-institutional environment that is relatively committed to climate change mitigation and adaptation.

The third section analyzes the role that historical and cultural factors play in hindering climate change mitigation and adaptation processes in Tuscany and more generally in Italy. Firstly, we describe some cases of conflict over mitigation and/or adaptation projects. The cases were selected using journalistic sources and by talking to local technicians and administrators. The journalistic sources were identified using the search engine news.google.com and setting different keyword strings in order to intercept articles from national and local newspapers that dealt with different types of mitigation and adaptation interventions in the period between 01/01/2023 and 30/09/2023. Secondly, we analyze the role that historical and cultural factors play in these conflicts. The discussion of cases is made using the concept of sostalgia developed by Glen Albrecth (2005) and relating the idea of landscape that implicitly emerges from the debate with the static and musealised conception of the same that has been established in Italy through the protection laws enacted since the 1930s. The concluding section of the essay discusses the policy implications of the present work.

3. Results

3.1. Climate change in Tuscany and Italy and future urban scenarios.

As is well known, there is now almost unanimous consensus among scientists that the change in the Earth’s temperature observed in recent decades can be attributed predominantly to anthropogenic climate-altering emissions (NOAA National Centers for Environmental Information, 2023, Lynas, Houlton and Perry, 2021, Myers et al., 2021, Powell, 2019). The increase in the earth's temperature and the aggravation of the often disastrous impacts due to it have seen a significant acceleration in recent years (Portner et al., 2022). This determines the need for rapid adjustment of urban landscapes in order to ensure that inhabitants have an adequate living environment even in the new climatic conditions.

Building systems and urban layout are largely determined, especially in the historic city, by climatic conditions. It is a well-known fact that the historic Islamic city had various spatial and construction devices aimed at ensuring environmental well-being in very hot climates: narrow streets and tall buildings to increase shading, domed buildings to minimise the surface area exposed to the sun, extensive use of arcades to provide shaded open spaces, and the use

of materials such as unfired earth mixed with straw to improve insulation performance in masonry (Sahebzadeh et al., 2017). The correlation between variation in climate and in building systems has also been studied in typological analyses of traditional rural constructions, whose building features were adapted to the negative thermal gradient associated with altitude in various ways: reducing the size of openings, optimizing their exposure so as to maximise sunshine, increasing the slope of roof pitches, making the most of the heat produced by animals by positioning stables so as to heat the rooms above, etc. (Biasutti 1938).

The increase in Earth's global temperature, while still relatively small to date compared to the various change scenarios projected from now even to 2050 (IPCC, 2023, Vince, 2022, Smith, 2010), is already driving a shift in Earth's climate belts toward the poles (Jones, 2023, Fin, 2022). This is of course a simplification, and the reality is far more complex: for example, the arid part of the tropical belt is expanding both toward the equator and toward the poles; the Sahara Desert, whose area is roughly the same as the entire United States, is extending further both northward and southward; the eastern arid zone of the United States is moving eastward, at the expense of the wetter, more fertile zone (Jones, 2023). At the level of biological systems, this is evident from the migration of some species that are more free to move, particularly those belonging to the insect class, with sometimes disastrous consequences on the ecosystems that receive them, or even from the increase in their reproductive cycles due to rising temperatures. The situation is particularly alarming in Trentino-South Tyrol, where the multiplication of the bark beetle's reproductive cycles due to the excessively mild temperature has resulted in a spruce-fir ecatomy (Fin, 2022). This insect has also spread to the boreal forest of Finland producing similar problems (Zimmer, 2023). One of the main difficulties ecosystems face in adapting to the rapid rate at which the climate changes stems from the varying difficulty of their component species to move. Different living species could be classified according to their respective time required to move through space so as to follow the shift in climate zones brought about by the increase in Earth's temperature. Such a classification, in fact, could also be made in relation to different variables in urban landscapes that exhibit greater or lesser inertia to change-more specifically to the changes that would be required to align and adapt our cities to the new climate framework.

It should be pointed out that rising temperatures do not simply imply a shift in latitude and altitude of climate zones, but a broader and more general upheaval of the climate. Currently [May 2024] the level of CO_2 in the atmosphere is about 426 ppm, up from 316 ppm in 1959 (Pro Oxygen, 2024). The level of 500 ppm today corresponds to the most ambitious and optimistic scenario for limiting future emissions and is roughly the same as it must have been during the Miocene, when the temperature was about 4°C higher, sea levels were about 40 meters higher than today, and lush forests grew in Antarctica and the Arctic (Vince, 2022). Therefore, it is evident, as indeed we are continually told by climatologists, that we are venturing, or rather have already ventured, into unknown territory, in which it is not possible to speak simplistically about a shift in Earth's climate zones, nor to apply any more of the knowledge and experience accumulated in relation to them. That said, it is all too obvious and evident, that we are witnessing an unmistakable as well as rapid trend of increasing intensity of four categories of phenomena, which immediately need structural adaptations of urban landscapes: heat waves, floods, fires and drought. In her book The Nomadic Century, Gaia Vince (2022) calls these phenomena "the four horsemen of anthropocene."

Table 1, prepared by the City of Prato, shows the change in average and maximum temperatures, rainy days, and total mm of water rained annually between 1990 and 2022. These data show a very significant increase in temperature and an equally pronounced transformation in rainfall data, from which it appears that while the amount of water falling each year has remained essentially unchanged, the number of rainy days has decreased

significantly, which explains the increasingly frequent phenomenon of so-called 'water bombs.' It is clear that we are witnessing an alternation of periods of drought, often associated with heat waves and fires, and very heavy rainfall, which in turn is associated with increasing frequency with landslides and floods. This trend has seen an impressive acceleration in recent years and it is reasonable to assume that it will continue to grow in frequency and intensity in the coming years.

Table 1. Temperature and precipitation in Prato from 1990 to 2022.*

	Temperatures (°C)				Rain	
Year	Absolute		Mean			
	max.	min.	Max.	min.	mm	days of rain
1990	34,4	-4,5	19,8	11,4	899,5	119
1991	33,5	-7,4	18,7	10,4	1.199,0	111
1992	37,0	-3,6	19,4	11,2	1.153,4	122
1993	36,0	-5,9	19,3	10,1	911,6	115
1994	36,8	-2,7	20,0	11,1	881,4	94
1995	34,6	-3,7	18,7	9,8	908,4	116
1996	33,5	-6,8	18,6	9,9	1.080,4	121
1997	35,2	-1,1	20,5	10,1	951,2	118
1998	38,1	-5,0	19,5	10,1	902,0	113
1999	34,6	-4,1	19,6	10,5	1.000,2	125
2000	36,0	-5,7	20,0	10,9	1.004,8	115
2001	38,0	-5,7	20,0	10,2	921,6	132
2002	36,0	-5,9	19,9	10,5	971,4	139
2003	40,4	-3,8	21,2	10,6	809,0	106
2004	35,2	-3,3	19,2	9,9	928,0	140
2005	37,5	-5,2	18,6	9,3	951,8	128
2006	35,7	-4,4	19,9	10,1	810,4	133
2007	36,4	-3,2	19,9	10,2	770,0	113
2008	35,0	-3,4	19,5	10,3	908,4	147
2009	39,0	-6,0	21,1	11,6	815,8	78
2010	37,0	-5,7	19,3	10,8	1.255,2	108
2011	40,2	-2,6	21,3	11,5	694,6	59
2012	39,5	-3,7	21,0	11,5	763,4	83
2013	38,1	-1,6	20,1	11,5	1.076,0	109
2014	36,4	-0,5	21,2	12,5	1.410,8	110
2015	38,5	-0,1	21,3	12,2	723,6	71
2016	36,0	-1,8	21,1	12,1	1.035,2	99
2017	40,8	-3,1	21,6	11,5	808,4	72
2018	38,0	-5,1	21,4	12,4	927,0	100
2019	39,9	-3,5	21,6	12,2	1.017,2	95
2020	37,9	0,3	21,4	12,0	934,4	94
2021	39,9	-2,5	21,1	11,7	884,8	82
2022	40,0	-0,3	22,5	12,8	734,0	65

* The table is available in the 'climatology' section of the portal of the Prato Municipality's statistics office: https://www.comune.prato.it/it/statistica/aree-tematiche/climatologia/pagina2298.html (accessed on 08 May 2024).

The above data are in line with the more general picture regarding climate change in Italy. The Euro-Mediterranean Centre on Climate Change report finds, for the period 1961-2012, changes of 1° C every 10 years in the annual maximum and minimum temperature values, an increase in warm nights by about 14 days in 10 years and in warm days by about 21 days in 10 years (Spano et al., 2020). Alongside this generalised warming of the climate there is evidence of a statistically significant increase in the intensity of precipitation events in both the North and the South of Italy. These data are in line with reports prepared by other research and land-government institutions, including the Italian Atlas of Climate and Climate Change

(Esposito et al. 2015), the ISPRA report on variations and trends in temperature and precipitation extremes in Italy (Fioravanti et al., 2013). All of them highlight significant increases in the risks of extreme weather events such as exceptionally intense and spatially concentrated rainfalls, heat waves, ruinous forest fires, and periods of prolonged drought. More recently, the annual report on climate change already occurring in Italy provided by Legambiente confirms the picture outlined above (Nanni, Minutolo, eds., 2022). These changes immediately require decisive action through urban planning aimed at mitigating, as far as possible, the effects on human health, the built and environmental heritage, food security and the economy as a whole. In the following section we will analyze the state of planning for climate change mitigation and adaptation in Italy, with a special focus on Tuscany.

3.2. Climate change mitigation and adaptation planning in Tuscany and Italy

The Paris Agreement on Climate Change, adopted at COP21 in December 2015, set the goal of limiting global warming to below 2°C and also committed subscribers to continue efforts to contain it to 1.5°C. The agreement also commits governments to increase their capacity to adapt to the effects of change that have already occurred and that, albeit to varying degrees depending on the ability to cut future emissions, will continue to occur in the decades to come (UNFCCC art. 2b, 2020). Since the conclusion of the agreement, the situation has further worsened. Extreme weather events occurred during 2023, are in some cases in the upper range contemplated by models and have caused concern and even astonishment among many scholars. It is possible that our fragility to extreme weather events has been underestimated, which is why some scholars argue that Paris agreements are inadequate to avoid the most severe consequences and that it is absolutely necessary to contain global warming well below 1.5°C (Carrington et al., 2023).

Italy is highly vulnerable to the climate crisis and to extreme weather events (European Environment Agency, 2019). There are several reasons for such vulnerability: geological instability of much of its territory; high population density; coastal extension and high urbanization of it; location in the centre of the Mediterranean, a hotspot of climate change, and astride the North African and North European climate zones, the clash of which often results in extreme weather phenomena. According to a study by the Euro-Mediterranean Centre on Climate Change, the risk from extreme weather events increased for the entire country by 9 percent during 1999-2018 compared to the previous 20 years (Spano et al., 2020). Urbanised areas are the most vulnerable, especially in relation to heat waves and heavy rainfall.

On the institutional level, the growing awareness about the impacts of climate change is attested by the number of Italian local governments (114, corresponding to 47.6 percent of the population, by May 10, 2024) that signed the Climate Emergency Declaration (Climate Emergency Declaration, 2024). In any case, although Italy is one of the signatory countries of the Paris Agreement and despite the growing awareness of the high vulnerability of the Italian territory, legislation and planning for mitigation and adaptation to climate change are still very incomplete. Planning activity in Italy is based on four territorial levels: national, regional, provincial and municipal. Following the constitutional reform of 2001, regions have acquired important competencies in the field of energy and environmental policies (De Gregorio Hurtado et al., 2015), as well as in the field of planning, whose tools and procedures are now highly differentiated at the regional level (Mazzeo et al., 2021). In essence, state and regions have competing competencies in climate change mitigation and adaptation and are in charge of providing the regulatory framework to be followed by local authorities.

In 2019, the national government submitted the National Energy and Climate Plan (NECP) to the European Commission (Ministero dello Sviluppo Economico, 2019). The plan sets

national targets and measures by 2030 on energy efficiency, renewables and CO2 emissions cuts, as well as goals on energy security and connectivity, competitiveness and unification of energy markets, and sustainable mobility. The NECP is in fact the main national tool for mitigation policies. Adaptation policies, on the other hand, are based on the National Strategy for Adaptation to Climate Change (NSACC), approved in June 2015 by the Ministry of Environment and Land and Sea Protection (Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2014). This provides for the adoption of a National Climate Change Adaptation Plan (NCCAP), which has begun to be developed based on a participatory process, but has not yet been approved. Thus to date there is no regulatory and legislative framework for climate change adaptation, so municipalities, provinces and the regions themselves are basically acting on a voluntary basis (De Gregorio Hurtado, 2015).

At the regional level, by November 2019 plans aimed at climate change mitigation and/or adaptation had been adopted only by eight regions (Pietrapertosa et al., 2021): the Mitigation Plan by the autonomous province of Bolzano (which has similar competencies to regions); the Integrated Mitigation and Adaptation Strategy by the Emilia-Romagna Region; the Regional Adaptation Strategy by the Sardinia and Lombardy Regions; and the Environmental Energy Plans (EEPs) by the Valle D'Aosta, Liguria, and Friuli Venezia Giulia Regions and by the Autonomous Province of Trento, that although not specifically dedicated to climate change mitigation/adaptation, contains binding targets aimed at cutting CO2 emissions. Provinces were not very active in planning for climate change mitigation and adaptation, only four (corresponding to 6 percent of the population) having developed a plan.

Municipalities undoubtedly were (and are) the most active and dynamic institutional level, mainly due to their numerous adherence to the Covenants of Mayors, the network of cities promoted by the European Commission to fight climate change. Joining this network is an important step, as it commits the adhering municipality to draw up a Sustainable Energy Action Plan (SEAP) within two years and assume emission reduction obligations based on a baseline emission inventory, as well as to monitor progress in biennial reports. Until 2015, the greenhouse gas reduction target was 20 percent by 2020. Since then plans were renamed Sustainable Energy and Climate Action Plans, the reduction target was increased to 40 percent by 2040, and adaptation targets were also introduced.

3.3. Local and institutional opposition to climate change adaptation and mitigation

The state of CC mitigation/adaptation planning demonstrates a progressive awareness among the main local governments in Tuscany of the climate emergency in which we find ourselves and of the need to drastically reduce greenhouse gas emissions and to adapt cities and territories to the new climate situation. However, while a number of mitigation and renewable energy production projects have been promoted, mostly by private operators, adaptation policies are still more or less stuck on declarations of intent. However, in Tuscany, and more generally in Italy, almost all interventions aimed at renewable energy production (wind farms, photovoltaic plants, and biomass production plants) encounter significant obstacles and opposition, at the bureaucratic level and in local communities. I argue that these obstacles are due to a misconception of the idea of landscape.

This emerges, for example, in the case of wind farms, on which we will dwell here. According to Terna's data, the total energy generated in Tuscany in 2020 by all existing wind power plants was 250.2 GWh, corresponding to about 1.5 percent of total energy production from both fossil and renewable sources (Terna, no date). According to the inventory of wind farms built in Tuscany, as of the beginning of September 2023, there were ten wind power plants in the region, four of which were located in the province of Pisa, two in the province of Arezzo, and one in each of the provinces of Florence, Livorno, Massa, and Grosseto, with a total combined power of 140.3 MV (Wikipedia, 2024a). According to the same inventory as

of the same date, seven more plants with a total capacity of 66MV had been authorised and an additional ten plants with a total capacity of 426.6 MVh were in the planning stage. The implementation of the set of wind farms both authorised and in the planning stage would expand the total wind power capacity in Tuscany by 3.5 times and would significantly contribute to the goals of climate neutrality and energy security. However, as mentioned above, renewable energy plants face a lot of opposition, both at the bureaucratic level and from local communities and interest groups.

It is interesting to look at the media debate that has developed around these projects. We will focus in particular on two interventions: that of Monte Giogo di Villore, in the Tuscan Apennines-the mountain ridge that crosses the northern part of the region in a northwest/south-east direction-and that of Montauto, a place in southern Tuscany that is popular among elite tourists. Both projects were met with strong opposition and were widely debated in national and local newspapers. In the case of the Monte Giogo di Villore wind farm, counter initiatives were led by Leonardo Rombai, a professor emeritus of historical geography well known for his research on the Tuscan territory and president of the Tuscan section of the 'Italia Nostra' association. In an interview with a national newspaper, Rombai associated this project with the "business eagerness of major works," pointing out that it would "irreversibly alter what remains of pristine land and biodiversity." The Apennines, Rombai says, cannot be regarded as "a resource for industrial development." Among the grounds for the appeal to the administrative court filed by Italia Nostra are: geomorphologic, ecological, forestry and aesthetic changes to ridge, failure to fit into the landscape, visual impact on listed cultural heritage, and impact on tourist trails. (Rombai, 2023).

The media debate concerning the Montauto wind farm was even more heated, this area being known for its beauty and wilderness and encountering the attentions (and reactions) of numerous VIPs, including Vittorio Sgarbi, undersecretary for culture in the Meloni government, a renowned art historian and television journalist. In an interview with a newspaper Sgarbi called the wind farm "a criminal project, an abominable thing," whose implementation was the result of madness and would have disastrous impacts on Italian tourism (Mugnaini, 2023). Again, the local branch of Italia Nostra appealed to the administrative court. This same association was simultaneously engaged in several other legal and media battles against interventions aimed at renewable energy production and at climate change adaptation, including forest fire prevention cuts in the coastal pine forest of Tombolo and the construction of a photovoltaic plant in the province of Grosseto. Interestingly, Italia Nostra, throughout its nearly seventy-year history, has gathered around its ranks the elite of Italian culture and aristocracy. Although some of its environmental 'battles' had considerable relevance during the years of economic boom and of housing speculation, it, unlike other associations, has a strongly elitist character. Many of its media campaigns and legal battles are the result of an ideological view of the landscape, on which I will elaborate later. In the case of Montauto's intervention, for example, Legambiente, another major Italian environmental association, expressed its disagreement with Italia Nostra. In the words of one of its members, Angelo Gentili, given during a newspaper interview, "Cutting fossil fuels is fundamental and necessary. [...] Legambiente is not against renewable forms of energy and says yes to wind power and yes to photovoltaic. A shovel does not constitute a monstrosity." (La Nazione, 2023).

Beyond the positions expressed by different interest groups on individual interventions, the fact remains that cultural and bureaucratic obstacles to the implementation of climate change mitigation and adaptation projects in Italy remain huge. Although the business community is dynamic and has submitted many permit applications for renewable energy plants-potentially capable of making Italy carbon-neutral in a few years-most of these applications remain frozen for years and only a very small number are finally approved (Fraioli, 2022).

We could dwell on a great many other cases, including the total ban on photovoltaic roofs in much of the municipality of Florence and the regular aversion that solar farm projects encounter in the media and the courts. The debate that emerges in all these cases highlights the role played by cultural and affective factors that certainly bind us to the existing urban and rural landscape inhibiting an already difficult and problematic, but all the more urgent and necessary, adaptation to new conditions.

4. Discussion: removing cultural barriers to climate change mitigation and adaptation

From the debate on climate change mitigation and adaptation projects emerges an idea of landscape understood as fixed and unchanging--a kind of landscape-museum--and not as a flexible and adaptable living environment, to be continually transformed according to changing social, economic, environmental and climatic conditions.

In the absence of an awareness of the urgent need to adapt our living environment to the new climate, the market will take care of it, through the choices of millions of small property owners and buyers, but even more so through the choices of insurance companies and real estate operators, who will inevitably try to minimise the risks associated with climate change. As of the end of May 2023, the leading U.S. insurance company, has decided not to insure properties in the entire state of California against fire risk in order not to jeopardise its financial stability (Oladipo, 2023, Hao and Said, 2023). This resounding but at the same time entirely rational decision has, if nothing else, the advantage of providing the Golden State's political, economic and social system with a huge incentive to take all possible steps to counteract through planning and land management the phenomenon of forest fires, which has been out of control for a few years now.

In a state like Italy, and even more so in a region like Tuscany, the problem of cultural and affective barriers to the adaptation of the urban and rural landscape to the new and as far as possible future climatic conditions is particularly strong and evident. In fact, in this political decision-making context, resistance and friction to change are also determined by the fact that the cultural, pictorial and literary history of the urban and agricultural landscape have a very special weight and significance. There is an element of rationality in this attitude to preservation, both economically (for example, for the purpose of tourist exploitation of heritage) and psychologically. Studies in environmental psychology teach us that the landscape in which one is born and raised and with which one has a prolonged and lasting familiarity is an essential component of our psychological well-being (Lingiardi, 2017). Substantial alteration of it can be highly traumatic for each of us.

Philosopher Glen Albrecht coined the term solastalgia to describe the existential and emotional stress brought about by an environmental change that leads to profoundly altering the connotations of the landscape in which one lives (Albrecht 2005, 2007). This is described as "the homesickness you have when you are still at home." One could easily apply the term solastalgia to literary and musical works that described the alteration of the environment brought about by the 'building boom' in post-war Italy. Among these, Italo Calvino's *La speculazione edilizia* [The Building Speculation] (1963) and Adriano Celentano's song *Il ragazzo della via Gluck* [Gluck Street's Boy] (Wikipedia, 2024b) come to mind. However, while climate change mitigation and adaptation interventions may be perceived as worsening the aesthetic qualities of the environment in which they are implemented, it should be noted that solastalgia has been recognised by the medical journal *The Lancet* as a useful concept in understanding the impact of climate change itself on human health and well-being. It has also been used in various empirical research measuring the psychological consequences of environmental crisis situations (fires, floods, heat waves, droughts) attributable to climate change (Watts et al., 2015). So, on the one hand there is certainly a rational and 'self-protective' component (in that it is aimed at the preservation of one's psychological well-

being) in a certain amount of conservatism in urban and rural landscape management; on the other hand, it can produce inaction and immobility that could even prove disastrous in the current climate context.

Studies in environmental psychology are helpful in understanding some of the psychological dynamics that are potentially present in these attitudes. Alongside the 'healthy' tendency to preserve our living environment, we have in fact a much more dangerous and harmful propensity to fictitiously 'adjust' in our imagination an undesirable or even frightening reality, removing it and thus avoiding having to deal with the anxieties and psychic 'pain' that would result. According to several psychologically based researches, climate change would fall into this case (Hoggett, 2021, Hamilton, 2013, Norgaard, 2011, Stoll-Kleemann, O'Riordan and Jaeger, 2001). This is justified by the frankly very worrisome scenarios foreshadowed by studies and models on climate evolution in the not-too-distant future, such as 2050 or 2100, such as to heavily impact our future and even more so that of our children and grandchildren.

So the protection of the landscape 'as it is' to which we are affectively attached should be mediated with the adaptation of this same landscape to the new climate, in order to avoid in the near future even greater disruptions of our living environment. Instead, in the Italian and even more so in the Tuscan bureaucratic and administrative system, 'the instinct' for the integral protection of a landscape conceived as a museum prevails. Let us then try to imagine some mitigation and adaptation interventions that we might have to resort to in order to make our settlements more resilient. As known, in the literature on the subject, a distinction is made between mitigation and adaptation interventions. The former serve to make the effects of climate transformation less severe by reducing greenhouse gas emissions or enhancing the storage of climate-altering gases. The latter aim to contain the damage done by adapting cities and land to the new climate and weather situation. These two types of actions are equally urgent and necessary and cross different scales: from wide-area land-use planning, to urban and neighbourhood planning, to architectural design. Both mitigation and adaptation actions strongly require cross-sector and interdisciplinary approaches.

Transformations aimed at climate change mitigation mainly aim to contain emissions by improving the energy performance of the building stock, or to produce energy from renewable sources by building new energy production facilities. While the former generally have a limited landscape impact, the latter are at the centre of the nimbyism phenomena highlighted above, which, more generally, characterise much of the public and private interventions of urban and building transformation (Stoll-Kleemann et al. 2001, Bianchi, 2023). The words expressed by Undersecretary for Culture Vittorio Sgarbi against the installation of new wind farms, and the actions taken by him to prevent their implementation, are emblematic and demonstrate the inherently cultural and ideological roots of the problem.

In the urban context, adaptation will be mainly aimed at managing the water cycle and at contrasting heat waves. The metaphor of the sponge city summarises the urban planning approach needed to mitigate the effects of the increasing meteorological polarization consisting of alternating phases of prolonged drought and phases of intense and potentially devastating rain. A general multiplication of hydraulic risk will also necessitate typological transformations aimed at clearing the floors of buildings subject to flooding in high-risk areas, as well as the abandonment of those parts of the city that are excessively exposed. Problems arising from heat waves, where well managed, will result in a significant transformation of the urban landscape through the adoption of more reflective materials than traditional ones and the widespread creation of shading systems on facades, roofs and urban public spaces. It is also likely that the plant species we are accustomed to in our cities will have to be replaced with others more apt to the new climate. Once again there are numerous cases of cultural and administrative resistance to these types of landscape transformations.

All of this once again brings to light the cultural roots of bureaucratic inertia that makes permitting processes for renewable energy plants and for climate change adaptation projects particularly lengthy and cumbersome. In fact, underlying the administrative behaviour of the public administration is a static conception of the urban and rural landscape, which is implicitly believed to have attained a virtually perfect and final arrangement in its configuration immediately prior to the great demographic and urban port-WWII development. This approach has its roots in the landmark landscape and historical heritage protection laws enacted in Italy in 1939, during the Fascist regime. It is significant in this regard that Article 1 of Law 1497 of 1939 uses expressions such as "natural beauties considered as natural pictures," "viewpoints or belvederes, accessible to the public, from which the spectacle of those beauties is enjoyed," "complexes of properties that make up a characteristic view having aesthetic and traditional value". This idea of a definitive landscape, to be admired comfortably from the benches of the belvedere, is transmitted in the daily administrative practice of municipal landscape commissions and Superintendencies for cultural heritage, whose supervisory activities have resulted in the production of purified landscapes that are in fact 'made perfect.'

The purification of the landscape carried out, especially in Tuscany, since the Second World War, has resulted in the removal of all those elements that were in conflict with this static, abstract, idealised and ahistorical -or rather referred to imaginary historical situations and depending on the case vaguely and generically medieval, Renaissance, pre-industrial- idea of landscape. One can borrow the term 'fantasy restoration,' used to describe the nineteenth-century interventions promoted by Viollet le Duc and aimed at restoring medieval monuments according to canons that were as abstract and perfect as they were distant from their historical and material reality, and apply it to the administrative behaviour of landscape protection agencies. The 'fantasy landscape' realised in Tuscany is in fact a perfected and purified one, quite distant from the historical and material reality of the landscape prior to its purification (Giovannoni, 2017). It is quite evident how this landscape, because of its rigidity, is completely incompatible with the need to adapt our living environment to the rapid transformation of climate.

5. Conclusions and policy implications

Climate change poses unprecedented challenges to the adaptation of urban and territorial systems because of the rapidity with which it is taking place and the intensity of the transformations already detectable at the level of the water cycle, heat waves, and fire risk. Our cities are the spatial synthesis of ways of inhabiting space that are often rooted in cultures and traditions thousands of years old and have long transformation times that tend to be incompatible with new scenarios. This paper has shown that in Italy, more than in other countries, there are cultural and psychological barriers that strongly hinder the necessary process of adaptation. The operational and policy implications of the analysis conducted so far are twofold: first, we should combat, especially on a cultural and communication level, the museification of the landscape, emphasizing and stressing its dynamic and adaptive character; second, it is necessary to conceive procedural and regulatory innovations aimed at simplifying climate change mitigation and adaptation planning and at realigning, as far as possible, urban and regional policies to the current operational context so that they can provide a timely response to current climate challenges.

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