THE MIGRATION, ENVIRONMENT AND CLIMATE CHANGE NEXUS:

exploring migrants' contribution in addressing climate change challenges in Italy's mountain areas

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ABBREVIATIONS

CRD	Climate Resilient Development
EDO	European Drought Observatory
IPCC	Intergovernmental Panel on Climate Change
ISPRA	Istituto Superiore per la Protezione e la Ricerca Ambientale (Institute for Environmental Protection and Research)
ISTAT	Istituto Nazionale di Statistica (Italian National Institute of Statistics)
NUTS	Nomenclature of territorial units for statistics
SDGs	Sustainable Development Goals
SNAI	Strategia Nazionale Aree Interne (Italian National Strategy for Inner Areas)
SPI	Standardised Precipitation Index
UNFCCC	United Nations Framework Convention on Climate Change

GLOSSARY

The following definitions of key terms used in this report are from the IOM Glossary on Migration (IOM, 2019), from the United Nations Framework Convention on Climate Change Glossary (UNFCCC, 2023), and from Italy's legal and institutional frameworks indicated in respective articles.

Adaptation: adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (UNFCCC, 2023).

Asylum-seeker: an individual who is seeking international protection. In countries with individualized procedures, an asylum-seeker is someone whose claim has not yet been finally decided on by the country in which he or she has submitted it. Not every asylum-seeker will ultimately be recognized as a refugee, but every recognized refugee is initially an asylum-seeker (IOM, 2019).

Climate migration: the movement of a person or groups of persons who, predominantly for reasons of sudden or progressive change in the environment due to climate change, are obliged to leave their habitual place of residence, or choose to do so, either temporarily or permanently, within a State or across an international border (IOM, 2019).

Disaster: a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts (IOM, 2019).

Disaster risk: the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (IOM, 2019).

Disaster risk reduction: policy objective to prevent new and reduce existing disaster risk and managing residual risk, all of which contribute to

strengthening resilience and therefore to the achievement of sustainable development (IOM, 2019).

Emigration: from the perspective of the country of departure, the act of moving from one's country of nationality or usual residence to another country, so that the country of destination effectively becomes his or her new country of usual residence (IOM, 2019).

Environmental migration: the movement of persons or groups of persons who, predominantly for reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are forced to leave their places of habitual residence, or choose to do so, either temporarily or permanently, and who move within or outside their country of origin or habitual residence (IOM, 2019).

Foreign resident: the Italian National Institute of Statistics (ISTAT) definition of "foreign residents" is based on changes of residence (registration/deregistration from the Anagrafe, a municipal registry) – the action by which a person establishes his or her residence in the territory of an Italian Municipality having previously been usually resident in another municipality or a foreign country. Undocumented residents are excluded (ISTAT, 2023, p.10).

Immigrant/Immigration: from the perspective of the country of arrival, a person who moves into a country other than that of his or her nationality or usual residence, so that the country of destination effectively becomes his or her new country of usual residence (IOM, 2019).

In-migration: the movement of national and international migrants into a community, region or country, within a country or across national borders.[1]

Inner area: according to the Italian National Strategy Strategy for Inner Areas (SNAI), inner areas are characterised by (a) being significantly distant from the main centres of supply of essential services (education, health and mobility); (b) having important environmental resources (water resources, agricultural systems, forests, natural and human landscapes) and cultural resources (archaeological assets, historical settlements, abbeys, small museums, trade centres); and (c) being a deeply diversified territory as a result of specific natural systems and human influence processes (Agenzia di Coesione, 2014, p.10).

1 Definition develop by authors.

Internal migration: the movement of people within a State involving the establishment of a new temporary or permanent residence (IOM, 2019).

International migration: the movement of persons away from their place of usual residence and across an international border to a country of which they are not nationals (IOM, 2019).

Labour migration: movement of persons from one State to another, or within their own country of residence, for the purpose of employment (IOM, 2019).

Metropolitan areas: territorial units defined by Italian law in substitution of former "departments". The list of these areas includes 14 cities: Bari, Bologna, Cagliari, Catania, Florence, Genoa, Messina, Milan, Naples, Palermo, Reggio Calabria, Rome, Turin, Venice (Senato della Repubblica Italiana, 2022, art. 114).

Migrant: an umbrella term, not defined under international law, reflecting the common lay understanding of a person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons. The term includes several well-defined legal categories of people, such as migrant workers; persons whose particular types of movements are legally defined, such as smuggled migrants; as well as those whose status or means of movement are not specifically defined under international law, such as international students (IOM, 2019).

Migration: the movement of persons away from their place of usual residence, either across an international border or within a State (IOM, 2019).

Mitigation: in the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forests and other sinks to remove greater amounts of carbon dioxide from the atmosphere (UNFCCC, 2023).

National: a person having a legal bond with a State (IOM, 2019).

Non-national: a person who is not a national or citizen of a given State (IOM, 2019).

Out-migration: the movement of national or international people out of a community, region or country, within a country or across national borders.[2]

Residence: the act or fact of living in a given place for some time; the place where one actually lives as distinguished from a domicile. Residence usually means bodily presence as an inhabitant in a given place (IOM, 2019).

Undocumented migrant: a non-national who enters or stays in a country without the appropriate documentation (IOM, 2019).

Vulnerability: the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity (IOM, 2019).

2 Definition developed by the authors.

EXECUTIVE SUMMARY

Today, the relationship between migration, environment and climate change is recognized as a multicausal relationship. Environmental factors are often interrelated with economic, political, cultural and social factors. Despite the importance of this issue and the relevance that this phenomenon will have in the near future, there is little evidence or reliable data on this topic in Europe. Acknowledging the lack of data and research on the link between climate change, migration and adaptation in European mountain areas, this paper is the first scoping study on the case of the Italian Apennines. Based on original data, collected through a mixed-methods analysis in southern Italy, this study not only illustrates research evidence but also offers an innovative approach to the **migration–climate change nexus**, which might inform territorial policies leveraging migration to support planned adaptation in mountain areas.

The present paper aims to answer the following three research questions:

(i) How is migration impacting fragile areas, specifically in the Italian mountain regions of the central-southern Apennines?
(ii) How do local communities perceive climate change effects, migration and territorial fragility in the Apennines?
(iii) How are changes in climate affecting migrants in southern Italian mountain regions?

To achieve these objectives, this study adopts a mixed-methods approach including **quantitative and qualitative analyses**. Because of the limited availability of secondary data, this paper is mainly based on primary data gathered between December 2021 and February 2022. The territorial focus of the work is the inner areas of the Central and Southern Apennines. Inner areas are rural areas characterized by their distance from main service centres providing education, health and mobility, as defined by the Italian National Strategy for Inner Areas. Demographic decline and population ageing are more pronounced in these territories than in the rest of Italy, although these are counterbalanced by an increase in in-migration (which has doubled in the last decade across all regions). Given the peripheral nature of inner areas, in many cases these areas overlap perfectly with mountain areas of the Italian

Apennines. The regions covered by this study are Lazio, Marche, Tuscany, Umbria, Abruzzo, Basilicata, Calabria, Campania, Molise, Apulia and Sicily.

The analysis includes three steps. First, an ad hoc survey was submitted to a statistically representative sample of the population living in the regions under analysis. Second, semi-structured interviews with a targeted sample of relevant subjects (mayors, activists, migrants, entrepreneurs and so on) were carried out in three selected inner areas. Third, by using the same sample of relevant subjects, three focus groups were conducted in the three inner areas previously selected. The three case studies are Valle Subequana, in the province of L'Aquila (Abruzzo), Alta Irpinia, in the province of Avellino (Campania), and Madonie, in the province of Palermo (Sicily). They were identified by using the following criteria: high vulnerability to climate change, relevant presence of migrants, classification as mountain areas.

The initial **contextual analysis** shows that Lazio, Tuscany and Umbria have the highest shares of migrants. The presence of international migrants is lower in southern regions. In particular, Sicily and Apulia show the lowest levels. At the municipal level, it is interesting to note that the top 10 municipalities with the highest shares of international migrants are not metropolitan cities but small municipalities. If internal migration of both nationals and non-nationals is considered, the latest data available (from 2020) show that most movements happen within the same province (59.7%). They are followed by movements between different regions (24.7%), and then by movements within the same region but in different provinces (15.6%; ISTAT, 2023). The majority of these movements are represented by nationals moving their residence (82.4%), while non-nationals moving their residence are only a residual part (17.6%). Because of the historic north/south divide that characterizes Italy, regions in the north receive the most internal migrants, while the south and the islands represent the most frequent regions of origin. The same divide can also be identified by analysing the geophysical dimension and the environmental fragility of Italian regions. While the hazards are relatively spread across the country, resilience and vulnerability follow the classical north/south pattern, with the southern part of Italy showing a higher level of vulnerability and a lower level of resilience.

Against this backdrop, the first investigation on the nexus between migration and climate change was carried out. Results of the **survey** demonstrate that the problem of climate change is perceived as relevant and as a global issue by most interviewees. Mountain areas of the Apennines are seen – by most respondents – as places affected by climate change. Among factors related to climate change that currently affect, or will affect in the future, the quality

of life of respondents, we find hydrogeological instability, extreme events, shortage of water and heat waves. Only a low percentage of respondents consider climate change as an opportunity. These people name (1) the creation of new job opportunities, (2) new opportunities in the agricultural sector, (3) growth in the number of associations related to climate change, (4) a rise in tourism-related activities, and (5) an increase in the care of territory as the most relevant opportunities. Concerning the perception of in-migration, a large share of the population interviewed (60% or more) answered that migrants would have skills relevant for the territory, contribute to repopulation, support the care and maintenance of these areas, and promote the agricultural sector. These results are consistent even if the sample is divided into national and non-national inhabitants. Among people who consider in-migration as a resource for the adaptation to climate change, many see ethnic and cultural diversity as a means to achieve this objective. Moreover, a higher number of residents in small and rural areas could increase the number of services and resources to prevent extreme events.

By looking at the subsample of international migrants (13% of respondents), we can see that the main motivations to move are work and family. These levels were different from the total sample, where the first motivation was family.

Results that emerged from the **qualitative analysis** show that people in the three selected inner areas are not fully conscious of the negative consequences of climate change, even though these are already present at the local level – in some places more than in others. Some municipalities have started being affected by the first adverse effects of climate change (such as droughts, scarce rains, fires and landslides) only in recent times, and very few policies or activities to prevent and address climate change effects have been brought forward so far. The few initiatives to address climate change are recent and, in some cases, have not yet produced tangible results. However, some areas (more than others) have started some interesting initiatives aiming to reduce environmental risk and the effects of climate change. Among them, it is worth mentioning Foresta Modello della Valle dell'Aterno and Contratto di Fiume, which are mainly aimed at addressing the hydrogeological risk affecting all the three areas.

In conclusion, this paper underlines the relevance of repopulating the Apennine areas, taking into consideration both components: people, in particular young people, who decide to remain in these places; and immigrants who decide to move to these areas. The link between demography and the ability to adapt to the environmental and social challenges posed by climate change is deemed

fundamental by participants in this study. Based on the data collected, a list of policy recommendations addressed at national authorities, local authorities, IOM and academic institutions is provided, along with a few good practices detected. Broadly, these recommendations cover the following guiding principles:

(a) Enhancing policy coherence, acknowledging the nexus between migration and environmental policies;
(b) Integrating environmental, repopulation and cohesion policies;
(c) Promoting information campaigns;
(d) Defining appropriate funding channels;
(e) Adapting the acquisition of new skills to each territory's needs;
(f) Promoting the advancement of knowledge and the exchange of good practices.

1.

INTRODUCTION

The relationship between migration, environment and climate change is multicausal. Environmental factors are often interrelated with economic, political, cultural and social factors. So, we need to recognize that environmental change will affect migration in the near future, specifically through its influence on economic, social and political drivers that themselves affect migration. At the same time, it is fundamental to consider the range and complexity of the interactions between these drivers (Foresight, 2011). According to the recently published Working Group II (WGII) report of the Sixth Assessment of the Intergovernmental Panel on Climate Change (IPCC), "increasing adaptive capacities minimizes the negative impacts of climate-related displacement and involuntary migration for migrants and sending and receiving areas (high confidence). This improves the degree of choice under which migration decisions are made, ensuring safe and orderly movements of people within and between countries (high confidence)" (Pörtner et al., 2022, p.27).

Despite the importance of the issue and the relevance that this phenomenon will have in future, there is little evidence on the migration, environment and climate change nexus in Europe. There is also a consensus that reliable data on the subject is limited (European Commission, 2022). We also recall here that Recommendation 33(b) of the Task Force on Displacement (TFD) of the Warsaw International Mechanism for Loss of Damage (WIM) of the United Nations Framework Convention on Climate Change (UNFCCC) invites parties to "enhancing understanding of human mobility (including migration, displacement and planned relocation), both internal and cross border, in the context of climate change" (UNFCCC, 2022, p.13).

Research on the migration, environment and climate change nexus has focused mostly on territories in the Global South, often framing migration as a consequence of climate change impacts and conceiving migrants either as vulnerable populations or as a security threat (Oakes et al., 2019), failing to acknowledge their agency. More recently, the Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cissé et al., 2022) attested the increasing impact of climate change on the everyday life of people in different continents, with a focus again on the Global South.

Extreme climate events, such as the ones affecting tropical regions, are referred to as both direct drivers (e.g. destruction of homes by cyclones) and indirect drivers (e.g. rural income losses during prolonged droughts) of involuntary migration and displacement. At the same time, climate migration is primarily internal, while many examples of climate-related displacement occur within national boundaries, with international movements occurring primarily within regions, particularly between countries with contiguous borders (Pörtner et al., 2022).

Considering the relationship between climate change and the United Nations Agenda 2030 Sustainable Development Goals (SDGs), the IPCC WGII's 2022 report states that, under all emissions scenarios, climate change reduces capacities for adaptive responses and limits choices and opportunities for sustainable development. This translates into greater constraints on societies, contributing to increasing poverty traps and food insecurity. People with climate-sensitive livelihoods and precarious conditions of life are often less able to adapt, with limited adaptation opportunities and little influence on decision-making. Emphasis is placed on the need to enable local environments that support sustainable development through mitigation and adaptation responses to climate change, thereby influencing inequalities, poverty and livelihood security, in order to foster climate justice and climate resilience (Douville et al., 2022). Focusing on possible pathways by which local communities and nations can pursue climate-resilient development (CRD), the IPCC 2022 report states the relevance of confronting complex synergies and trade-offs between development pathways, and the options, contested values and interests that underpin climate mitigation and adaptation choices. Prospects for transformation towards climate-resilient development increase when key governance actors such as citizens, civil society, knowledge institutions, governments, and investors are all involved in inclusive and place-sensitive approaches that can foster a set of appropriate enabling local conditions (Schipper et al., 2022).

We need to acknowledge that the dimensions of this phenomenon and the extent to which migrants and their families contribute to averting, minimizing and addressing the adverse impacts of climate change in the Global North are less well investigated and understood. When research has addressed this issue in the context of the Global North in recent years, the focus has been mainly on international movements, while internal migration, especially within Europe, still seems neglected. Though the Groundswell Reports I and II do not cover the most high-income countries, including in Europe and North America, the Groundswell Report projects internal migration for Eastern Europe and

Central Asia, which is one of the World Bank regions. The Groundswell Report projects 5.1 million people (2.3% of the total population) could be internal climate migrants in Eastern Europe and Central Asia (Clement et al., 2021).

The Working Group II report of the Sixth Assessment Report of the IPCC also recognizes that "migration and mobility are indirectly impacted by climate change through adverse effects on mountain livelihoods that are dependent on mountain ecosystem services" (Douville et al., 2021, p.18). Also, evidence shows that changes in the cryosphere in high mountain areas have shaped migration and mobility patterns during this century, particularly transhumant pastoralism, temporary or permanent wage labour migration, and displacement (Hock et al., 2019).

When the media and public opinion deal with the nexus between migration, environment and climate change – which has been happening more and more frequently in recent years – the topic is mostly linked to the perception of an international and cross-bordering "exodus" of people fleeing from the regions in the Global South most affected by this phenomenon (Lustgarten, 2020; Abouzeid, 2021).

For the scope of this research, Italy represents a relevant case study through its geographical position and socioterritorial characteristics. The country is affected by both the growing impacts of climate change and by old and new migratory phenomena, especially with respect to its inner areas and mountainous regions. As recalled by the Italian network of the European Climate Pact Ambassadors[3] and according to the Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA: Institute for Environmental Protection and Research) report (2018, p.45), 91 per cent of Italian municipalities are subject to hydrogeological instability, and over 3 million households live in these highly vulnerable areas. Compared to the recent past, the area potentially subject to landslides and the area potentially floodable in the medium scenario has notably increased, while 16.6 per cent of the national territory is mapped in the highest hazard classes (ISPRA, 2017). Moreover, Italy is located at the core of the Mediterranean zone, which is considered a hot spot of climate change: from 2010 to 2018, an annual average of 198 Italian municipalities were affected by disastrous climatic events, with 157 victims among their

3 See Associazione Italiana del Patto per il clima (EUCLIPA). Available at www.euclipa.it/, visited on 16 February 2023.

citizens, more than 45,000 people displaced by bad weather and over 4,000 deaths in 23 Italian cities between 2005 and 2016 due to heat waves (ibid.).

Italy is also a country that has been historically strongly affected by emigration, especially during the 20th century, with a parallel phenomenon of internal labour migration, mainly from southern to northern regions of the country. Over the last 20–30 years, the country has seen increasing inflow of international migration: labour migrants and, more recently, asylum-seekers and refugees (Gilli and Membretti, 2021; Membretti et al., 2017). Internal migration from urban to rural/mountainous areas has, once again, become a relevant subject of public debate in this country (Colucci et al., 2022) in particular considering a variety of new factors – as the search for new lifestyles or, recently, the COVID-19 pandemic – that can co-induce this kind of migration (Membretti, 2021a; 2021b; Corrado et al., 2014).

Past research suggests that, over the past century, mountainous regions of Europe have largely been perceived as territories of migration, ageing population and gradual abandoning of the land (Membretti and Iancu, 2017; Viazzo, 2012; Mihailescu, 2011; Rubio, 1989). In Italy, it is the mountainous regions that have historically been, and to some extent are currently, most affected by depopulation (Viazzo and Zanini, 2020; Batzing, 2005). These are among the most fragile territories from an ecosystem point of view (Castellari et al., 2014, p.139–140). During the past two decades, however, researchers have come to realize that a counterprocess has been occurring since the nineties, characterized by an increasing but scattered internal migration to several of these mountain regions, including in the remote regions. International and internal migration have become increasingly important processes in some European mountains such as the Alps and, to some extent, the Apennines (Membretti et al., 2020), within a wider movement of people towards rural areas (Kordel et al., 2018). In recent years, some areas of the Italian Alps and Apennines have been witnessing a reverse trend linked to repopulation processes by new inhabitants, often international migrants (Membretti and Lucchini, 2020). These new inhabitants can be considered as a key driver of change in these localities (Hoggart and Buller, 1994; Camarero et al., 2011; Woods, 2016).

As recent research shows (Kordel and Membretti, 2020; Perlik et al., 2019), internal migration – especially of international migrants – to mountain areas has increased due to economic, social and political factors (Morén-Alegret and Wladyka, 2020). This is strongly linked to the job market. The migrant population tends to reside in areas where there are intensive agricultural

activities, tourism and other opportunities for temporary employment. Often these, jobs can be characterized by precarious working conditions (such as low wages) and little social recognition (such as status). These jobs are less attractive to the local population (Natale et al., 2019; Solé et al., 2012). As shown by the European research project MATILDE,[4] there is an increasing impact of migration in European mountain regions, in demographic, economic, sociocultural and territorial terms. In many cases, in-migrants seem to play an important role in triggering economic, social and landscape changes in mountain areas (Dematteis, 2011; Varotto and Castiglioni, 2016). This contributes to increased sociocultural diversity in local communities (Membretti and Viazzo, 2017). In-migrants can be considered agents of revitalization, especially in small municipalities.

It is fundamental to recognize that mountains – which are increasingly becoming destination areas for migrants – are environmentally fragile ecosystems, particularly exposed to the impacts of climate change (ephemeral lakes and glacial lake outburst floods (GLOFs), mud and debris flows, wildfires, etc.). This is recognized in the scenarios described in the Working Groups I and II reports of the IPCC's Sixth Assessment Report and recent research carried out by the Global Mountain Safeguard Research Programme (UN-GLOMOS) (Schneiderbauer et al., 2022). Mountain destination communities offer alternative livelihood opportunities, residence and social protection to migrants. But their environmental fragility could also expose migrants to new risks. It is relevant to note that mountain areas have been identified as a priority of the Italian National Strategy for Inner Areas (Agenzia di Coesione, 2014). Notably, the policy identifies climate change challenges such as loss of biodiversity, land degradation, and hydrogeological instability among the social costs of the depopulation of inner areas. Moreover, the strategy recognizes newly arrived residents as fundamental actors for the survival and revitalization of such areas, as well as for the protection of their natural resources and the prevention of hydrogeological instability (ibid.).

On one hand, such **development policies** aim to attract new residents to at-risk areas. On the other, local **policies and plans** for **climate change adaptation** fall short of integrating migration considerations. This report aims to address a critical knowledge gap, by exploring migrants' contribution to addressing climate change challenges in the Global North. It focuses on **mountainous inner areas of Italy**, especially fragile territories that are among the ecosystems considered

4 See MATILDE Project. Available at www.matilde-migration.eu. Visited on 16 February 2023.

to be the most vulnerable to climate change. Beyond contributing to knowledge on this underexplored topic, investigating the potential contribution of migrants in addressing climate change challenges in mountain areas falls in line with both international and national priorities.[5] The present report is structured as follows. Section 2 is a review of the recent literature on the nexus between migration and climate change. Section 3 describes the methodology used in the analysis and the case study. Section 4 presents results derived from the data gathered through the descriptive analysis (Section 4.1), the large-scale survey (Section 4.2), the survey on three case studies and the focus groups (Section 4.3). Section 5 discusses and summarizes relevant results. In the concluding section (Section 6), a set of policy recommendations with respect to the implementation of measures tackling the nexus between adaptation, migration and sustainable development in inner and mountainous areas of Italy are discussed.

5 See United Nations, *The 2030 Agenda for Sustainable Development*. United Nations, *The Paris Agreement (2015)*. European Commission, *A European Green Deal*. Ministero dell'Ambiente, della tutela del territorio e del mare, *Strategia nazionale di adattamento ai cambiamenti climatici* (2016). Available at www.mase.gov.it/notizie/strategia-nazionale-di-adattamento-ai-cambiamenti-climatici-0. Ministero dell'Ambiente, della tutela del territorio e del mare, *Strategia nazionale di Sviluppo Sostenibile*. Available at www.mase.gov.it/sites/default/files/archivio_immagini/Galletti/Comunicati/snsvs_ottobre2017.pdf. Italia Domani, *Piano Nazionale di Ripresa e Resilienza*. Available at www.mase.gov.it/pagina/la-strategia-nazionale-lo-sviluppo-sostenibile. Moreover, at the local level some regions are developing climate change adaptation plans: see Regione Abruzzo, www.italiadomani.gov.it/it/home.html. Available at www.regione.abruzzo.it/content/piano-di-adattamento-ai-cambiamenti-climatici-pacc-abruzzo.

2.

LITERATURE REVIEW

Over the years, the conceptualization of "climate migration" has moved from the concept of "survival migration" related to a specific threat to the concept of "adaptive" migration as a "strategy to adjust to actual or expected climatic changes and impacts" (Vinke et al., 2020, p. 630). Research indicates several migratory pathways could contribute to adaptation, such as evacuation, labour migration and remittances, humanitarian visas, temporary protection, planned relocations, and so on (Oakes et al., 2019). McLeman and Smit (2006) analysed the migration patterns that affected the population of the mid-east of the United States of America because of unusually harsh climatic conditions in the 1930s. More specifically, the authors focus on the role played by capital endowment in the decision to migrate or not. People's adaptive capacity depends on several factors, such as access to financial resources, education and health care, information, social resources, infrastructure, and technology (Pörtner et al., 2022; Koubi et al., 2022, Adger et al., 2007). Migration can contribute to many of these factors of adaptive capacity. Migration may lead to net gains in wealth, both in areas of origin and in host areas, also with respect to local development (Bianchi et al., 2021; Lucas, 2005) because voluntary migration can foster the financial and economic factors in one's capacity to adapt to climate change. Remittances can be more reliable capital flows than foreign direct investment (Kotovic and Kurecic, 2022; de Haas, 2005; Lucas, 2005). Remittances have several positive effects because they smooth the consumption of basic needs (such as food across seasons), sustain access to basic needs in times of livelihood shocks (such as drought) and finance the acquisition of physical, human, social and natural capital, and stimulate demand and local production (Banerjee et al., 2018; de Haan, 2000; Ellis, 2003). Moreover, returning migrants can improve the adaptive capacity of origin areas by bringing a new understanding of climate change risks and responses, transmitting goods and money, consolidating social networks and transferring new skills (Barnett and Webber, 2010).

Major global policy frameworks recognize that migrants have a role in climate change adaptation and disaster risk reduction. For instance, the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR, 2015) recognizes that migrants need to be included in disaster risk management at the local level. The Sendai framework also recognizes that migrants' skills and knowledge

can contribute to the resilience of communities (ibid.). Recommendations of the Task Force on Displacement of the Warsaw International Mechanism for Loss and Damage of the United Nations Framework Convention on Climate Change invites parties to consider issues related to human mobility when formulating national and subnational legislation, policies and strategies (UNFCCC, 2018). Objective 5 of the Global Compact for Safe, Orderly and Regular Migration recognizes that adaptation in situ or return of migrants might not be possible in some cases. At the same time, it underlines that the strengthening of regular migration pathways needs to be part of migration management tools (Ionesco and Traore Chazalnoël, 2022).

Migrants may be an important resource to improve the capacity of the hosting community to adapt to climate change because they often bring resources, such as their skills and labour, and use these to build livelihoods (Black, 1994). For instance, if in-migrants have secure access to land in the hosting area, they can share labour and new agricultural techniques, which, in turn, can increase local incomes, support local development and improve conservation practices (Caputo et al., 2021; Jacobsen, 2002). When considering mountainous and rural regions, it therefore seems important to devote specific attention to groups of in-migrants whose impact (social, economic, environmental, etc.) in such areas may be more significant and diversified. This is underlined by recent research conducted within the European Union Horizon2020 MATILDE project. Adaptation strategies in specific regions need to be referred to the characteristics, needs and effective agency of different categories of migrants, such as labour migrants, family reunification migrants, asylum-seekers, refugees and temporary protection holders, while keeping a focus on specific subgroups, such as unaccompanied minors, victims of trafficking in human beings, and others (Kordel and Membretti, 2020).

The European Union defines a migrant, in the European Union/European Free Trade Association (EU/EFTA) context, as a person who "establishes their usual residence in the territory of an EU/EFTA Member State for a period that is, or is expected to be, of at least 12 months, having previously been usually resident in another EU/EFTA Member State or a third country".[6] However, as recalled by Kordel and Membretti (2020), such definitions are predominantly serving statistical and administrative purposes, while they seem unable to capture the complexity of contemporary migration processes, such as those related to multiple residences, multilocal forms of living or circular movements, for example, by international

6 European Commission, EMN Asylum and Migration Glossary, "Migrant" definition. Accessed on 23 August 2023. Available at https://home-affairs.ec.europa.eu/networks/european-migration-network-emn/emn-asylum-and-migration-glossary/glossary/migrant_en.

labour migrants in mountain regions. When considering mountainous and rural areas, to recognize this growing complexity of movement trajectories, Milbourne and Kitchen introduced the term "rural mobilities", encompassing "movements into, out of, within and through rural places; (..) linear flows between particular locations and more complex spatial patterns of movement (..) journeys of necessity and choice; economic and life-style based movements; hyper- and im-mobilities" (Milbourne and Kitchen, 2014, p. 385–386).

Climate change will increase the vulnerability of mountain areas – fragile territories exposed to several hazards – threatening infrastructure, livelihoods and well-being, especially in the agricultural sector, which could negatively affect viability and productivity of land, including pastures, and alter consumption patterns, which in turn could influence the decision to migrate or stay (Pörtner et al., 2022; Schneiderbauer et al., 2022). Local communities in mountain areas are vulnerable to climate change effects mainly because they may have a low adaptive capacity and limited livelihood options (Maraseni, 2012). Seasonal and long-term out- and circular migration are usually adopted by some households as a strategy to respond to environmental pressure and compensate for income losses caused by climate change impacts.

The IPCC WGII report 2022 stresses how adaptation responses to climate impacts in mountain regions vary significantly in terms of goals and priorities, scope, depth and speed of implementation, governance and modes of decision-making and the extent of financial and other resources to implement them. At the same time, it has been observed that adaptation responses in mountains are largely incremental and mainly focus on early warning systems and the diversification of livelihood strategies. However, it is also recognized that there is limited evidence of the feasibility and long-term effectiveness of these measures in addressing climate-related impacts and related losses and damages (Adler and Wester, 2022). As Siddiqui and colleagues (2019) report for the Hindu Kush Himalayan region, migration can be seen as a way to adapt to climate change, but investment in climate change adaptation is rarely the first priority of migrant households in mountainous areas. Therefore, the current strategies of adaptation seem insufficient to address future risks in mountain regions. Managing climate risks will depend more on addressing the root causes of vulnerability, such as poverty and marginalization, and promoting and supporting adaptation decision-making processes that engage with and incorporate people's concerns and values and address multiple risks (Adler and Wester, 2022). These processes could consider the diverse range of human migration pathways in the context of environmental change already well documented in mountainous regions, such as displacement, labour migration, planned relocation and pastoralism (IOM, 2021).

In Europe, existing research and literature – as well as public opinion and policymakers – have been engaged for decades on migration from rural and mountainous regions towards urban, metropolitan and coastal areas, considering these massive outflows to some extent as irreversible and definitive (Löffler et al., 2014; Viazzo, 2012). Attention to the dramatic out-migration from the countryside and the mountains has often led to the latter been perceived as an area in the process of being abandoned and emptied, destined to return largely to the wild. In this return of nature as the dominant force, many have also seen a tendency towards a natural, internal rebalancing of the territories abandoned by humanity, which may in time rediscover their own equilibrium (Pereira and Navarro, 2015). In the last twenty years, however, a growing body of scientific literature has been contributing to change the representation of Italian (and European) mountains, highlighting not the out-migration phenomenon, but rather the in-migration of international migrants, and not an opposition but rather an interconnection between mountains and cities. These renewed flows of people, goods, capital, knowledge and information have generated a new socioterritorial system that has started to be defined as "*metro-montane*" (Barbera and De Rossi, 2021; Dematteis, 2018).

On the academic side, the change in perspective was triggered by the collection and dissemination of important scientific data that highlighted a reversal of the trend in demographic dynamics, starting from the early 1990s at the level of the whole Alpine arc. This phenomenon was associated by scholars not with an increase in the birth rate in those territories but rather to the arrival of new residents, in other words to a positive migration balance (Varotto, 2003; Viazzo and Zanini, 2020).

On the other hand, mountains have been rediscovered over the last two decades by public opinion and have raised the interest of many, both in terms of the imagery connected with them, and of their importance for the overall development of the country, in relation to the many and often fundamental resources they contain (primarily in terms of ecosystem services) (Schneiderbauer et al., 2022; Dalla Torre et al., 2021). In the context of climate change, the Fifth Assessment Report of IPCC WGII identified a knowledge gap on climate change impacts in mountain regions. Consequently, in 2016 the IPCC commissioned a Special Report on the Ocean and Cryosphere in a Changing Climate, which has a chapter on high mountains (Hock et al., 2019).

This unprecedented attention to the issue of mountains is taking on further significance because of the influence of the COVID-19 pandemic and the potential offered by sparsely populated territories with respect to society as a whole (Membretti, 2021; Corrado and Dematteis, 2016). As a consequence, in

the last 10 years Italy – just like other European countries such as France and Austria – has seen a growing body of studies focusing on mountains (among others: Corrado, 2012 and 2015; Cretton et al., 2012; Dematteis, 2011; Membretti, 2015; Corrado et al. 2017), and in particular on international and internal immigration both of wealthy (Steinicke et al., 2012; Bartaletti, 2013; Corrado et al., 2014; Löffler et al., 2016) and poor people (Dematteis, 2010 and 2011; Membretti, 2015; Membretti and Viazzo, 2017; Membretti et al., 2017; Perlik et al., 2019) towards mountainous areas.

As reported by Corrado (2020), in the 1990s in Italy and Europe, post-Fordist restructuring contributed to transforming the socioeconomic fabric of many rural and mountain areas, favouring a "re-spacialization of migration" linked to the creation of new job opportunities, particularly in agriculture, tourism, construction and personal services. The gradual arrival of international migrants looking for economic opportunities in the mountains – especially in less touristic areas – has been linked to the presence of cheaper housing, but also to a better quality of life and environment, to greater social security than in the metropolises, in places characterized by direct, community-based relations (Membretti and Lucchini, 2018). As already highlighted by the pioneering research of the pan-Alpine ForAlps network (Membretti et al., 2017), from a demographic point of view, the settlement of international migrants is the main factor counteracting depopulation, declining birth rates and increasing average age in European highlands. Their contribution to mountain economies has also often allowed entire production systems to survive and, in some cases, grow, leading in many cases to the creation of "ethnic" niches in employment, with related impacts in terms of, for example, the recovery of vacant or abandoned houses, but also the maintenance of services that would otherwise have been closed or drastically downsized due to lack of users.

Despite its relevance, the phenomenon that Perlik and Membretti (2018) have defined as "highlanders by necessity" – referring to the broader category of "labour migrants" – has developed out of public opinion and policymakers' sight. The reason for this is to be found in the recency of the onset of studies and research on this topic, due to the little attention that it enjoys in the public debate.

It was not until the so-called "migration crisis" of 2015,[7] and the policy of extra-urban territorial dispersion of asylum-seekers implemented by the Italian Government, that the first thematization of the international migrant as one of the factors in the field of mountain transformation processes took place. The attention was, now, focused on the subjects that Dematteis et al. (2018) had defined as "highlanders by force" – international migrants constrained by national policies of temporary resettlement (mainly from urban poles to rural regions) to live for years in the highlands of the country, waiting for a decision on their international protection status. The settlement of this category of migrants in the Alps and Apennines (particularly in the period 2015–2018) has also highlighted, in addition to obvious critical aspects related to local fragilities and the lack of national coordination of migrants' redistribution policies, important forms of territorial resilience around the bottom-up reception projects of the System of Protection for Asylum-seekers and Refugees (SPRAR) network, which, at the same time, have been characterized as experiments in local community revitalization.

The international research that gave rise to the volume *Alpine Refugees* (Perlik et al., 2019) and the subsequent European Union project MATILDE on these issues have shown that these "highlanders by choice" (*nuovi montanari* in Italian) have often played an important "regenerative" role for the area: not only building bridges between newcomers and the local community, but also enhancing the migrants' presence in the mountains as a factor of innovation, a resilience stimulus and an opportunity for new connections with urban areas (Lardies-Bosque and Membretti, 2022).

In the context of this growing research on new inhabitants of the mountains, it seems that climate change and climate variability have been rarely considered so far, at least considering the Alps and the Apennines. When this phenomenon, also referred to as "vertical migration" (borrowing the term from ecological studies; Mercalli, 2020), was analysed in recent times, the focus was on forms of internal migration, in some ways similar to amenity migration (Treccani, 2012).[8]

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7 According to the IOM *Glossary on Migration*, "migration crisis" is defined as "the complex and large-scale migration flows and mobility patterns caused by a crisis which involve significant vulnerabilities for individuals and affected communities and generate acute and longer-term migration management challenges", as occurred in 2015 in the Central Mediterranean (IOM, 2022, p.137).

8 The expression "amenity migration" refers to a migratory tendency towards peripheral locations, mainly mountainous and affected by depopulation, that offer a better quality of life in terms of environmental and cultural resources. See amenity migration in www.treccani.it/enciclopedia/ricerca/amenity-migration/.

Recently, Mercalli and Corrado (2021) have discussed the trend in Italy of people moving away from big cities (typically, in the Padana plain) towards the Alps and Apennines because of rising temperatures and increasingly frequent heat waves in the plains. So far, the phenomenon – they argue – seems limited to summertime, but it may become more relevant and longer in future due to the greater frequency and duration of African anticyclones on the Mediterranean basin and in central Europe. In this way, the trend could contribute to the repopulation of mountains.

There is certainly a lack of literature (at least in English) on the relationship between climate change and internal migration (of both national and international migrants) towards mountainous areas in Europe and Italy in particular. More specifically, literature only rarely:

- Considers how climate impacts influence the migration decisions of people from climate-vulnerable communities of origin to other climate-vulnerable communities of destination;
- Sheds light on whether and under what conditions these "vertical migrations" can contribute to climate change adaptation (e.g. the re-establishment of conditions for a dynamic human–environment balance, in the face of a changed climatic, environmental and socioeconomic situation) in mountain communities, or how they can increase vulnerability for contexts that are already fragile;
- Considers how new inhabitants – particularly those who have difficulties with language and understanding of communication at the local level, as is often the case with international migrants – may themselves be at risk from the expected or unexpected consequences of climate change in the places they have moved to;
- Considers how newcomers – when excluded from the access to social protection measures, like often is the case of international migrants – may also be excluded by institutions, because of residence status, from measures of prevention of climate-related risks;
- Examines how rural and mountain commons (land, woods, water, built heritage and so on) can represent a field for experimenting social innovation and new forms of adaptation to climate change by different populations, moving towards a shared and common care of these goods and assets by new and old inhabitants (Dalla Torre et al., 2021).

To start addressing this gap in the literature – contributing to a different representation of the phenomenon at the level of public opinion and decision makers – this research project aims to investigate the links between migration, environment and climate change in the light of the consolidated analysis of migratory flows towards Italian mountain areas.

3.

RESEARCH METHODOLOGY

▶ 3.1 Research design

The specific research questions the project aimed to answer were:

- How is migration impacting fragile areas, especially the Italian mountain regions of the central-southern Apennines?
- How do local communities perceive climate change effects, migration and territorial fragility in the Apennines?
- How are climate-related effects affecting migrants in southern Italian mountain regions?

To answer these questions, this study adopted a mixed-methods approach. Because only limited secondary data were available, the present study was mainly based on primary data gathered between December 2021 and February 2022.

The first step of the research consisted of an initial contextual analysis, which described the study area and selected three case studies using data from Italian National Institute of Statistics (ISTAT) and other official Italian sources of statistical information.

In the second step, a structured survey questionnaire was applied to a statistically representative sample of people living in the central-southern Apennines to:

(i) Collect information on the perception of the main environmental risks at the local level in mountainous and inner areas;
(ii) Explore the perception of the presence of in-migrants in these territories and the assessment of their socioeconomic impacts;
(iii) Assess the perception of opportunities and risks that the presence of in-migrants may entail in addressing the environmental challenges of these territories and their climate change adaptation.

In the third step, based on targeted sampling, 27 semi-structured interviews were conducted with local informants (e.g. mayors, activists, migrants,

entrepreneurs) living in three selected inner areas (Valle Subequana in the province of L'Aquila, Alta Irpinia in the province of Avellino and Madonie in the province of Palermo). Through this in-depth analysis, we investigated migrants' current and potential role in supporting climate change adaptation of local communities in the mountainous and inner areas of the territories and the overall impact of migration on sustainable development.

Finally, the fourth step of the research consisted of three focus group discussions with 4–5 participants from each selected area, involving local experts and businesspeople to further investigate concrete examples and practices put in place by local communities of the Apennines to enhance climate change adaptation together with the active inclusion of migrants in fragile territories, along with the current and future roles of migrants for the sustainable development of mountain/inner regions, focusing on the added value represented by the enhancement of migrants' skills. Section 3.3 describes each research tool.

► 3.2 Study area

The project focused on the inner areas of the Apennines. These are a range of mountains that consist of several smaller parallel chains extending for about 1,350 km along the entire length of Italy (from Liguria to Sicily). The Apennines have a maximum width of about 250 km and can be divided into three sections, namely: the Northern, Central, and Southern Apennines (Fondazione Symbola, 2018, p.22). The present analysis focuses on the Central and Southern Apennines.[9] The regions covered by this study are Lazio, Marche, Tuscany, Umbria, Abruzzo, Basilicata, Calabria, Campania, Molise, Apulia and Sicily. Moreover, we focus, on the inner areas of these regions. Italy's inner areas are rural areas characterized by their distance from the main centres providing education, health and transportation services.[10] According to the

9 The Central Apennines are subdivided into the Abruzzi Apennines in the south and the Roman Apennines or Umbria-Marche Apennines in the north. The Southern Apennines are subdivided into four major mountain groups, namely the Samnite Apennines, the Lucan Apennines, the Campanian Apennines and the Calabrian Apennines.

10 Education includes schools with a full range of secondary education; health includes at least one grade 1. emergency care hospitals; mobility includes at least one Silver category railway station (medium/small systems with an average degree of uptake for metropolitan/regional services and short-distance journeys).

latest census data (2011), the inner areas make up 53 per cent of Italian municipalities (4,261), are home to 23 per cent of the Italian population (13,540,000 inhabitants) and cover 60 per cent of the national territory.[11] Demographic decline and population ageing are more pronounced in the inner areas than in the rest of Italy, although this is counterbalanced by an increase in in-migration (which has doubled in the last decade across all regions).[12] Given the peripheral nature of inner areas, it is clear that in many cases these areas overlap perfectly with mountainous areas of the Italian Apennines (Map 1).

Map 1. *Inner areas of Italy*

Source: Italian National Strategy for Inner Areas (SNAI).

Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Organization for Migration.

11 See the dataset on the 15th general census on the ISTAT website, available at www.istat.it/it/censimenti-permanenti/censimenti-precedenti/popolazione-e-abitazioni/popolazione-2011.

12 See the European Network for Rural Development. Available at https://enrd.ec.europa.eu. And: Agenzia per la Coesione Territoriale, *Webpage of the Strategia nazionale per le aree interne (SNAI)*. Available at www.agenziacoesione.gov.it/strategia-nazionale-aree-interne/?lang=en.

► 3.3 Research tools

3.3.1 Contextual analysis

The first step of the research – the quantitative analysis – used secondary data at the regional, provincial and municipal levels to provide an initial description of the phenomenon. We provide a preliminary picture of migrant presence in specific areas to justify the next step of the analysis and focus on selected areas to gather more information at the local level. We also provide information about migration, including internal migration of Italian nationals. Considering this geographic basis, the first step of research provides a general picture of the spatial distribution and main sociodemographic data related to in-migrants. To do so, we relied on secondary data provided by ISTAT and the SNAI.

To map climate-related hazards and build relevant indicators, the data were scaled between 0 and 1 according to the area in each hazard category and for all the degrees of susceptibility to hazards. The reason for this choice was that the data were to be presented in relative terms. In this way, we can assess whether there are areas that are relatively more risk-prone than others in the areas in question, allowing for comparison between different territories. Furthermore, different hazards have different units of measures and scales, and this would not allow the creation of clear and unidirectional multi-hazard indicators. Finally, we aggregated information through cluster analysis, identifying "hot-spot" municipalities.

For this research, we will provide some insights into the geophysical dimension and the environmental fragility of these regions, with a particular focus on their mountain territories and selected hazards (e.g. floods, landslides and drought). In general, mountain areas are characterized by multi-hazard conditions mainly caused by hydro-geophysical processes (Beniston, 2003; Kargel et al., 2021; Zimmermann and Keiler, 2015). Even if not all mountain hazards are directly linked to climate change (for instance, earthquakes), it is important to note two things: (1) the particular hydroclimate characteristics of mountain areas in combination with their topography and the characteristics of the ecosystem, connected with an intensification of human activities have led all mountain areas to be impacted by climate change (Adler et al., Kohler et al., 2010; Slaymaker et al., 2009) and (2) other common natural hazards and stressors, even those not directly linked to climate change, can make a territory more vulnerable. For instance, in a multi-hazard scenario, an earthquake can weaken slopes, increasing the risk of landslides or mudflows after a heavy rainfall

event. Mountain areas are prone to hazards such as landslides, glacial and snow hazards, floods, drought, and wildfires (Stäubli et al., 2017) that are susceptible to intensification because of climate variability and change (Haeberli et al., 2014).

Several approaches to hazard risk assessment have been developed in the literature. From a socioeconomic point of view, it is important to integrate both the physical characteristics of the territories with the socioeconomic ones. Only in the presence of human lives, property and infrastructure does an extreme event interact with underlying drivers of vulnerability to result in losses and damage. In this report, we adopt a mixed approach developed by Marin and colleagues (2021) that combines natural and man-made environmental information. One of the strengths of this approach is that it avoids arbitrariness in the indicator selection process composing the different variables. The indicators are defined as weighted synthetic indicators, based on how many times an attribute appears in the literature. Furthermore, it allows disentangling of the different components of the risk, providing both multi-hazard or hazard-specific analyses sharing a common methodology.

In summary, climate risk *R* is given by:

$$R_{h,a}=H_{h,a}+E_{h,a}+V_a+(1-Res_a)$$

where *h* is the type of hazard considered, and *a* is the area under analysis. is the probability of the hazardous event, *h*, in the territory *a*; is the socioeconomic exposure, defined here as the potential magnitude of the socioeconomic damage from a disaster. Finally, and are the vulnerability and resilience of a given area. Vulnerability considers all the inherent characteristics of a territory that affect its capacity to cope with the adverse effects of climate change (Adger, 2006). Resilience, in this context, is interpreted as the capacity to resist a shock by keeping the socioeconomic functions unaltered, regardless of the occurrence of hazards (Rose, 2017).

Climate-related hazards are countless, and considering all of them is out of the scope of this report. According to a report published by Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC) on climate change risk analysis (Spano et al., 2020), in the high emission scenario (RCP8.5),[13] by the end of this century Italy will show an increase of +5°C in average

13 The "representative concentration pathways" (RCP) are potential trajectories of greenhouse gas concentration adopted by the IPCC for climate modeling.

temperature, a change in precipitation patterns, and more frequent extreme weather events (for instance, an increase in the annual number of dry days and/or in rainfall intensity) in comparison to the beginning of the century. The study focused on those hazards that might produce particularly detrimental effects in mountainous areas, compromising the well-being of mountain communities. Agriculture, a relevant sector in mountain areas, is highly vulnerable to extreme weather events (Nelson et al., 2009). So, this study focused on floods (both in terms of basins overflowing and pluvial floods), landslides and droughts.[14]

Finally, for the definition of resilience and vulnerability indicators, we followed Marin et al. (2021) and aggregated all the variables at the Nomenclature of Territorial Units for Statistics (NUTS-3) level and standardized them between 0 and 1, where 1 indicates the highest resilience and lowest vulnerability and 0 indicates the lowest resilience and highest vulnerability. In detail, given that several composite indicators were developed for assessing the vulnerability and resilience of territories to several stressors, we account for all the indicators that are used to build the resilience and vulnerability composite indicators in the literature. If a variable appeared at least 15 per cent of the time in a piece of literature, it was included in the composite indicators with a relative weight given by the frequency of its appearance (Modica et al., 2019). In the end, two composite indicators were developed that integrated the knowledge produced on vulnerability and resilience in the literature. Clearly, given the fact that the two concepts share common characteristics, some variables might be included in the indicator of both resilience and vulnerability. Table 1 shows the selected variables and weights for both indicators.

14 It should be noted that wildfires are another hazard linked to climate change that may particularly affect mountain areas in the near future. However, because of a lack in the harmonization of indicators at the Italian level, we did not include this hazard in our analysis.

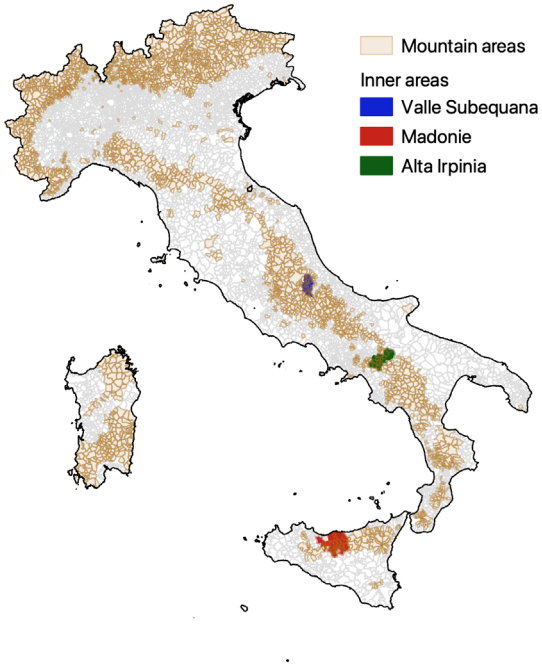
Table 1. *Vulnerability and resilience indicators*

	Vulnerability	Weight		Resilience	Weight
1	Wealth (average income per household)	11.70	1	Wealth	19.13
2	Age (dependency ratio)	9.10	2	Unemployment rate	13.91
3	Education (ratio of people aged 15–24 who do not attend a regular course of study to the overall 15–24 population)	9.10	3	Poverty	7.81
4	Poverty (households with potential economic discomfort)	8.43	4	Institutional capacity	6.95
5	Population pressure (population density)	8.43	5	Education	6.95
6	Health (hospital beds per 10 000 inhabitants)	7.79	6	Social capital (synthetic index defined as in Nannicini et al., 2014)	6.95
7	Extension of agriculture (percentage of agricultural land)	7.14	7	Debt (debt of the public administration per capita)	6.10
8	Unemployment rate	5.19	8	Productivity (sales per employee)	6.10
9	Building characteristics (Herfindahl-Hirschman index for residential, non-residential buildings (functional mix))	5.19	9	Health	6.10
10	Inequality (Gini index)	4.55	10	Density of business (number of local units per km2)	5.23
11	Institutional capacity (average of Z-scores of employees in the public administration; state education and public health over total population)	3.91	11	Homeownership (affordability index)	5.23
12	Dependency on agriculture (heads of cattle per person)	3.24	12	Government effectiveness (paid expenditure/ committed expenditure of municipal governments)	5.23
13	Political rights (turnout of 2014 European Union Parliament election)	3.24	13	Sectorial dependence (Herfindahl-Hirschman concentration index of employees in the economic sectors)	4.34
14	Urbanization (land use per capita)	3.24			
15	Ecosystem conversion (percentage of agricultural area actually being used)	3.24			
16	Family structure (ratio of the number of single-parent households to the total number of households)	3.24			
17	Female condition (male employment rate over female employment rate)	3.24			

3.3.1.1 Contextual analysis of the three case studies

After this macrolevel analysis, we shifted to a more microlevel analysis by examining three case studies selected in the regions mentioned above based on the following criteria: (1) high vulnerability to climate change; (2) relevant presence of migrants; and (3) classification as mountain areas. The three selected areas are Valle Subequana in Abruzzo, Alta Irpinia in Campania, and Madonie in Sicily (Map 2).

Map 2. *Case studies in Italy*



Source: Developed by the authors.

Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Organization for Migration.

The inner area Valle Subequana is located in the province of L'Aquila. It includes 24 municipalities. According to the latest ISTAT data, its total population counts 8,442 inhabitants, with an average of 352 residents per municipality (minimum 86 and maximum 874). The mean altitude is 782 metres. It is located within the Gran Sasso Monti della Laga national park and the Velino-Sirente regional park. This area has historically been affected by seismic events – for example, the recent L'Aquila and Central Italy earthquakes (2009 and 2016). Concerning climate-related hazards, Valle Subequana is characterized by a medium landslide

risk and a low flood risk. Furthermore, the province of L'Aquila shows a high level of drought risk. Overall, Valle Subequana is characterized by a medium-high level of climate-related vulnerability.

The inner area Alta Irpinia is located in the province of Avellino and includes 25 municipalities. Its total population is 59,670 inhabitants, with an average of 2,387 residents per municipality (minimum 297 and maximum 7,563). The mean altitude is 676 metres. It is a complex territory, characterized by a strong and common historical, landscape and cultural identity, with tourist and productive vocations. It is also physically fragmented, partly due to its extent and to the number of municipalities. This area has historically been affected by seismic events (e.g. the 1980 Irpinia earthquake). Regarding climate-related hazards, it is characterized by a high landslide risk and a low flood risk. Furthermore, the province of Avellino shows a low level of drought risk. Overall, the area of Alta Irpinia is characterized by a medium-high level of climate-related vulnerability.

The inner area Madonie is located in the province of Palermo and includes 21 municipalities: this area is the most populated of the three under study (60,486 people). The mean resident population per municipality is 2,880 (minimum 397 and maximum 8,485). The mean altitude is 715 metres. The territory of this inner area is mainly mountainous, with hilly areas and valleys. The landscape is characterized by the presence of extensive forests rich wooden heritage. The importance of its natural and cultural heritage has led to the establishment of a regional park and a geopark recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO). However, the area is highly vulnerable and fragile, which requires continuous care and maintenance works, especially in the context of natural hazards such as earthquakes, heavy snow and landslides. Madonie lies in a seismic area. Concerning climate-related hazards, it is characterized by a low landslide and flood risk. It suffers from intense potential drought risk, which is high in the whole province of Palermo. Overall, the area of Madonie is characterized by a medium level of climate-related vulnerability.

Overall, the three areas under analysis are characterized by the presence of different environmental phenomena that might affect their communities and the surrounding environment.

3.3.2 Survey

A survey was conducted. The respondents were people residing in the three selected areas of the Central and Southern Apennines. A total of 774 respondents were surveyed. The sample is statistically representative with respect to the main independent variables of gender, age (over 18 years old) and region of residence (the more populous regions are more strongly represented in the sample (see Table 2)). The survey was carried out in December 2021.

Table 2. *Regional distribution of survey respondents*

Regions	Frequency	Percentage
Tuscany	43	5.6
Umbria	44	5.7
Marche	41	5.3
Lazio	80	10.3
Abruzzo	46	5.9
Molise	35	4.5
Campania	118	15.2
Apulia	98	12.7
Basilicata	54	7.0
Calabria	56	7.2
Sicily	159	20.5
Total	**774**	**100.0**

Source: Authors' analysis of sample data.

The survey questionnaire consisted of 34 questions divided into three main sections. The first section contained questions on the perception of environmental risks and related positive and negative factors affecting the quality of life in the municipality where the interviewees lived (questions 1–13). The responses were recorded with a five-point Likert-type scale. The second section asked about the respondent's perception of migrants (questions 14–17). The questions included in this section also gather information about the nexus between migration and climate change, as well as the adaptive capacity of the population. The responses were recorded with a five-point Likert scale. The third section covered respondents' demographic, economic and social characteristics (questions 18–34).

Of the 774 respondents who completed the survey, 50 per cent were female. The geographic distribution of survey respondents is described in Table 2 and includes respondents living in central Italy (27%), southern Italy (53%) and the islands (20%). Some 42 per cent of survey respondents were between 18 and 44 years old; 58 per cent were over 45 years old. Half had a high-school level education (52%) and half were employed (50%). Table 3 reports the demographic, economic and social characteristics of the sample. It is important to note that 13 per cent of the survey respondents were of foreign origin (the most common countries of origin were, in decreasing order, Romania, Albania, Morocco, the Russian Federation and Switzerland).

Table 3. *Demographic, economic and social characteristics of respondents*

Characteristics	Dimension	Frequency	Percentage
Sex	male	383	49.5
	female	388	50.1
	Not specified	3	0.4
Age	18–24	74	9.6
	25–34	109	14.1
	35–44	142	18.3
	45–54	149	19.25
	55–64	149	19.25
	over 65	151	19.5
Education	Primary school	14	1.8
	Middle school	121	15.6
	High school	399	51.5
	University degree	173	22.4
	Postgraduate	67	8.7
Marital status	Single	216	27.9
	Married	477	61.6
	Divorced	47	6.1
	Widowed	34	4.4
Children	Yes	477	61.6
	No	297	38.4
Country of origin	Italy	671	86.7
	Other	103	13.3

Characteristics	Dimension	Frequency	Percentage
	Romania	16	2.1
	Albania	10	1.3
	Morocco	8	1.0
	Russian Federation	8	1.0
	Switzerland	8	1.0
	Ukraine	4	0.5
	Chad	3	0.4
	United Kingdom	3	0.4
	Poland	3	0.4
	Senegal	3	0.4
	Togo	3	0.4
	Venezuela (Bolivarian Republic of)	3	0.4
Employment	Employed	386	49.9
	Unemployed	102	13.2
	Student	57	7.4
	Homemaker	86	11.1
	Retired	142	18.3
	Other	1	0.1
Family income (EUR)	< 25 000	335	43.3
	25 001–50 000	242	31.3
	50 001–75 000	50	6.4
	75 001–100 000	17	2.2
	100 001–150 000	4	0.5
	> 150 000	6	0.8
	No answer/do not know	120	15.5
Total		774	100.0

Source: Authors' analysis of sample data.

Some 62 per cent of the sample usually travel from the place of residence to reach the workplace or the place of study. In 58 per cent of cases, respondents were born in the municipality where they reside. Some 42 per cent of the sample who had moved to the study site from another place stated that the main reason was family (50%) or work (30%).

3.3.3 Semi-structured interviews

The third step of data collection used an initial sample of 52 relevant key informants (e.g. mayors, activists, migrants, entrepreneurs, researchers) who live and work in the three selected inner/mountain areas of the Central and Southern Apennines (see Section 3.3.1.1) to conduct semi-structured interviews**.** These interviews were carried out using the online platform surveymonkey.com and were self-reported. The plan was to interview about 10 people for each territory. Given time constraints and the unavailability of some people, 27 semi-structured interviews were completed: 10 in Valle Subequana, 6 in Alta Irpinia and 10 in Madonie, plus an additional 1 with a researcher on inner areas to have an external, but informed, view on the topic.

The semi-structured interviews were based on a set of five questions focusing on the initiatives undertaken in each area to address the consequences of climate change, the dynamics of migration flows towards these mountain areas and the migration, environment and climate change nexus.

3.3.4 Focus group discussions

The fourth step of data collection used an initial sample of 52 relevant key informants (see Section 3.3.3) to conduct three focus group discussions remotely. The aim was to include seven or eight people in each focus group. The unavailability of some key informants reduced the actual number of participants to four key informants in Valle Subequana, four key informants in Alta Irpinia and five key informants in Madonie.

To facilitate the focus group discussion, three main inputs were provided to participants. The first was about policies or initiatives (institutional or even informal) that are currently in place in the area and about what policies could be implemented in the future to adapt to climate change impacts. The second input investigated what policies or initiatives (institutional or even informal) are in place in the area to attract in-migrants, and which ones should be implemented in the future. The third input aimed to understand how in-migrants can impact the natural resources in the medium to long term and the

care of the territory, especially in the context of the climate crisis and what local policies or interventions would be necessary to increase the attractiveness of the area towards migrants.

Several insights have been gathered, and some of them confirmed previous points that emerged in the semi-structured interviews. The objective of this final step was to add relevant information and to use case studies to understand policies and good practices that can be eventually replicated in other contexts.

The focus group in the Valle Subequana area involved three female participants and two male participants from the municipalities of Fontecchio, Gagliano Aterno, Tione degli Abruzzi and Fagnano Alto. Three participants were between 27 and 47 years old, while two were between 55 and 65 years old. The participants included a retiree, a mayor, two researchers and a municipality employee. Among the participants, there was also a Councillor for Culture at the Municipality and a member of the association "Foresta Modello della Valle Aterno".

The focus group in Madonie involved five male participants from the municipalities of Bompietro and Geraci Siculo. Four participants were between 19 and 23 years old, while the fifth participant was 65 years old. The participants included a former mayor, three students, and an employee of the local community service. Four participants were also members of the association "Consulta Giovanile".

The focus group in Alta Irpinia involved two female participants and two male participants. Two of them from Sant'Angelo dei Lombardi and Castelvetere municipalities, while the others did not provide information on their residence. Two participants were between 30 and 35 years old, while the other two were between 40 and 45 years old. The participants included a member of the association "Slow Food Campania", a local reporter and a teacher, while the fourth participant did not provide information on their employment.

The results are illustrated in detail in Section 4.

► 3.4 Limitations

The main limitations of this analysis are related to the (un)availability of data at a granular and specific scale. Secondary data, mainly gathered from ISTAT, are useful to provide a general overview of the phenomenon. However, an in-depth analysis requires gathering primary data. Hence, this study used surveys, semi-structured interviews and focus group discussions. Since the issue to be analysed in this report was very specific, secondary data about the perception of residents in inner and mountain areas of the Central and Southern Apennines were not available. The survey, carried out on a very large sample, together with a focus on three selected areas, helped us answer the research questions as described above. However, qualitative tools (semi-structured interviews and focus groups) are not without drawbacks. First, it is sometimes challenging to find people who are willing/available to be interviewed, and completing a questionnaire takes time. More specifically, for the purpose of the present analysis, we encountered three main difficulties: (1) reaching people during end-of-year holidays, (2) reaching international migrants,[15] and (3) making people understand the relevance of the topic.

15 International migrants often are less available to answer surveys because of language gaps or a lack of landline phones as used for interviews. In these case studies, we had some contacts with international migrants recently moved to Italy, but in the end they did not participate in the interviews nor in the focus groups.

4.

RESULTS

In this section, we present the results of the initial descriptive analysis of migration in the Italian areas under investigation (Section 4.1). Next, we present the findings of the quantitative survey (Section 4.2) and qualitative interviews along with comments on the three focus groups (Section 4.3).

▶ 4.1 Descriptive statistics

Descriptive statistics in the following tables and maps show the share of foreign residents[16] (as of 1 January 2021), at regional, provincial and municipal levels. The index of the share of foreign residents was estimated as the ratio of foreign resident population to total resident population using data provided by ISTAT. Table 4 and Map 3 show that the share of foreign residents at the regional level is particularly concentrated in the central regions. In particular, Lazio (10.94%), Tuscany (10.69%) and Umbria (10.62%) show the highest shares of the foreign residents, which are about 4 per cent higher than the sample mean (Table 5). The share of foreign residents is lower than the sample mean in southern regions (Map 3). In particular, Sicily and Apulia show the lowest levels of foreign residents.

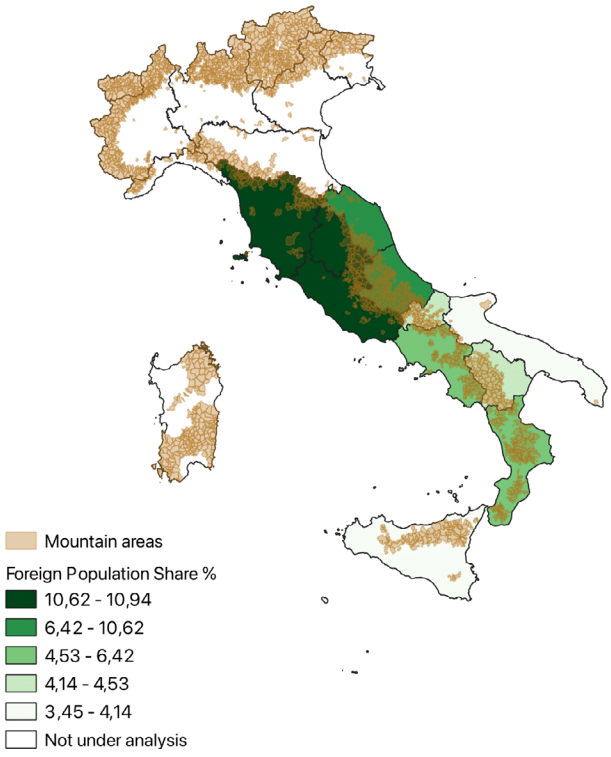
16 As indicated in the IOM Glossary, the expression "foreign resident" refers to both nationals and non-nationals that have established their residency in the territory of an Italian municipality having previously been resident in another municipality or a foreign country.

Table 4. *Foreign resident population and percentage in Italian regions, 2021*

Regions	Foreign resident population	Foreign resident percentage
Lazio	625 572	10.94
Tuscany	392 108	10.69
Umbria	91 875	10.62
Marche	127 104	8.47
Abruzzo	82 526	6.42
Calabria	102 887	5.48
Campania	257 053	4.53
Basilicata	22 832	4.17
Molise	12 290	4.14
Sicily	191 920	3.96
Apulia	135 356	3.45

Source: Authors' analyses of ISTAT data.

Map 3. *Share of foreign population in Italian regions*



Source: Authors' analyses of ISTAT data.

Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Organization for Migration.

Table 5. *Share of foreign population in Italian regions – descriptive statistics, 2021.*

Variable	Mean	Standard deviation	Minimum	Maximum
Foreign residents (percentage)	6.62386	2.992862	3.446865	10.93505

Source: Authors' analyses of ISTAT data.

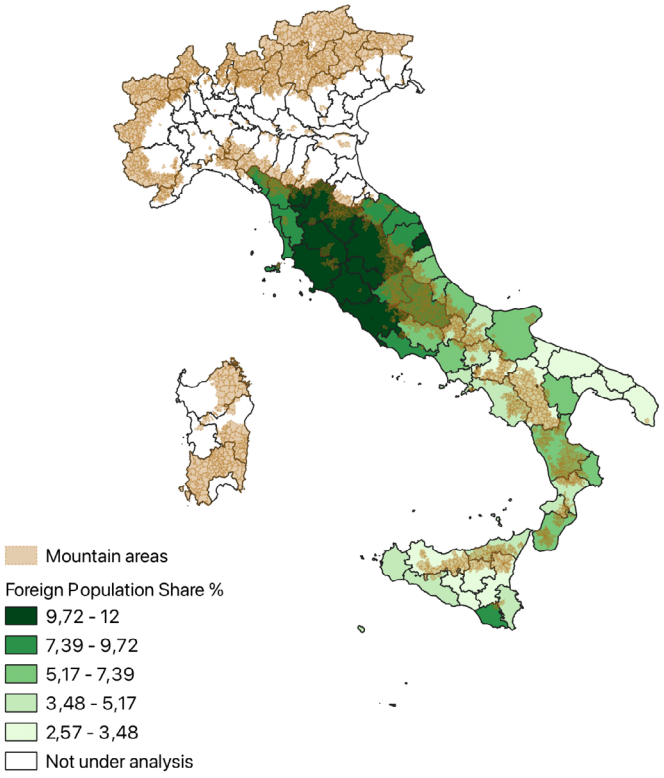
Results at the provincial level (Table 6 and Table 7) confirm that foreign residents are more concentrated in the centre of Italy than in the south. The top 10 provinces with the highest share of the foreign residents belong to the three regions mentioned above: Lazio, Tuscany and Umbria. However, the provincial-level analysis shows some exceptions in southern regions, such as the provinces of Ragusa (Sicily) at 13th place (9.59%), Crotone (Calabria) at 25th place (6.30%) and Reggio di Calabria (Calabria) at 26th place (5.86%). These provinces feature shares of foreign residents similar to those found in central provinces.

Table 6. *Foreign resident population and percentage in Italian provinces, 2021*

Top 10 provinces	Foreign resident population	Foreign resident percentage
Firenze	118 319	12.00
Roma	504 279	11.93
Perugia	69 459	10.80
Siena	28 186	10.70
Arezzo	35 526	10.55
Prato	26 612	10.39
Terni	22 416	10.11
Grosseto	21 739	9.95
Viterbo	30 494	9.94
Pistoia	28 769	9.89

Source: Authors' analyses of ISTAT data.

Map 4. *Share of foreign population in Italian provinces*



Source: Authors' analyses of ISTAT data.

Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Organization for Migration.

Table 7. *Share of foreign population in Italian provinces – descriptive statistics, 2021.*

Variable	Mean	Standard deviation	Minimum	Maximum
Foreign residents (%)	6.486771	2.827522	2.572101	11.99989

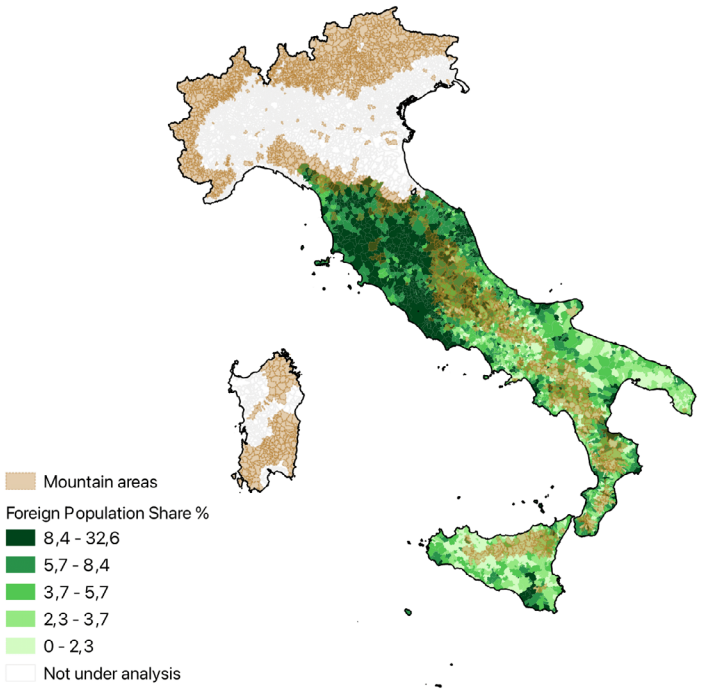
Source: Authors' analyses of ISTAT data.

The municipal-level analysis (Map 5, Table 8 and Table 9) confirms that the proportion of foreign residents is higher in the municipalities in the centre of Italy, especially in Lazio, Tuscany and Umbria. Southern municipalities show the lowest shares of foreign population. It is interesting to note that the top 10 municipalities with the highest shares of the foreign resident population are not metropolitan cities but small municipalities.[17] Moreover, only one of the

17 See the definition of "Metropolitan areas" in the Glossary.

top 10 municipalities with the highest share of the foreign resident population – Castel Del Monte (L'Aquila, Abruzzo) – is an inner area.[18] However, the municipal-level analysis shows some exceptions in southern regions. Two of the top 10 municipalities with the highest shares of foreign residents (Acate at 32.60% and Santa Croce Camerina at 23%) are in the province of Ragusa (Sicily), despite Sicily being one of the regions with the lowest shares of foreign resident population. This could be because this area offers good opportunities for employment in the agricultural sector. Notably, almost 50 per cent of agricultural-sector employees in Sicily are international migrants (Cortese and Palidda, 2020).

Map 5 . *Share of foreign population in Italian municipalities*



Source: Authors' analyses of ISTAT data.

Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Organization for Migration.

18 See the definition of "inner areas" in the Glossary.

Table 8. *Foreign resident population and percentage in Italian municipalities, 2021*

Top 10 municipalities	Region	Resident population	Foreign resident population	Foreign resident percentage
Acate	Sicily	10 945	3 568	32.60
Montieri	Tuscany	1 155	338	29.26
Stimigliano	Lazio	2 322	598	25.75
Monterotondo Marittimo	Tuscany	1 275	318	24.94
Monticiano	Tuscany	1 516	373	24.60
Castel del Monte	Abruzzo	441	108	24.49
Civitella San Paolo	Lazio	1 941	449	23.13
Santa Croce Camerina	Sicily	10 789	2 483	23.01
Giano dell'Umbria	Umbria	3 756	848	22.58
Santa Croce sull'Arno	Tuscany	14 465	3 199	22.12

Source: Authors' analyses of ISTAT data.

Table 9. *Share of foreign population in Italian municipalities – descriptive statistics, 2021.*

Variable	Mean	Standard deviation	Minimum	Maximum
Foreign resident population (%)	5.553321	3.879074	0	32.59936

Source: Authors' analyses of ISTAT data.

Only one of the top 10 municipalities with the highest share of foreign resident population is an inner area (Castel del Monte in the inner area Valle Subequana). Table 10 displays the top 10 inner areas with the highest share of foreign resident population. The foreign resident share of the top 10 inner areas is much higher than the mean of the total inner areas. However, when urban and inner areas subsamples are considered separately, the average share of the foreign resident population is still similar to the original sample mean (Table 11). Within the inner-area subsample, only 15 of 691 municipalities have a share of the foreign residents higher than 20 per cent. Table 12 shows Pearson's correlation between the percentage of inner areas located in each province belonging to regions under analysis and the provincial share of foreign

residents. The percentage of inner areas is estimated as the ratio of the number of inner areas located in each province to the total number of municipalities belonging to the same province. The result shows a weak negative correlation (confirmed by Figure 1), but it is not statistically significant. However, this result must be interpreted with caution because there is high heterogeneity among Italian territories, and different characteristics of various areas can be attractive for migrants. In addition, the distribution of international migrants is not concentrated in either rural or urban spaces within inner areas.

Table 10. *Top 10 inner areas with the highest share of foreign population, Italy, 2021*

Top 10 inner areas	Region	Total resident population	Foreign resident population	Foreign residents percentage
Castel del Monte	Abruzzo	441	108	24.49
Attigliano	Umbria	1 984	385	19.41
Camini	Calabria	751	143	19.04
San Pio delle Camere	Abruzzo	669	124	18.54
Montegabbione	Umbria	1 140	204	17.89
Varco Sabino	Lazio	176	31	17.61
Roghudi	Calabria	966	159	16.46
Penna San Giovanni	Marche	981	157	16.00
Riofreddo	Lazio	721	109	15.12
Gagliano Aterno	Abruzzo	238	35	14.71

Source: Authors' analyses of ISTAT data.

Table 11. *Descriptive statistics of foreign resident population, Italy, 2021: urban and inner areas*

Foreign residents percentage	Observed	Mean	Standard deviation	Minimum	Maximum
Urban areas	2 452	5.6911859	3.9674796	0	32.59936
Inner areas	691	5.0640095	3.5066011	0	24.4898

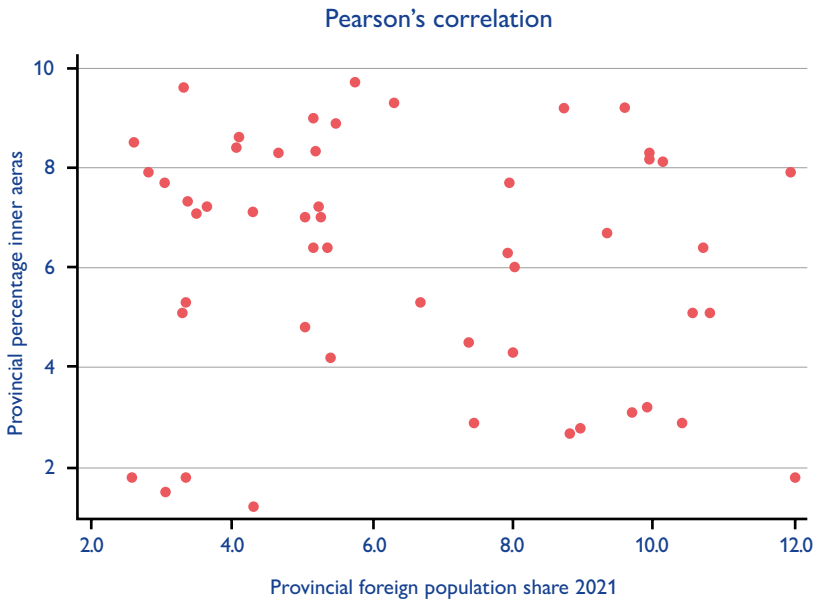
Source: Authors' analyses of ISTAT data.

Table 12. *Pearson's correlation between the percentage of inner areas and foreign population percentage, Italy, 2021*

Variable	Inner areas percentage	Foreign resident share
Inner areas percentage	1.0000	
Foreign population share	-0.1262	1.0000
p-value	0.3726	

Source: Authors' analyses of ISTAT data.

Figure 1. *Pearson's correlation between provincial percentage of inner areas and provincial share of foreign residents, Italy, 2021*



Source: Authors' analyses of ISTAT data.

ISTAT provides data about the number of migrants by nationality (national or non-national) and the regions of origin and destination for migration internal to Italy. The most recent data are available for 2020 (Table 13). It is important to report that most movements happen within the same province (59.7%), followed by movements between different regions (24.7%), and then by movements within the same region but between different provinces (15.6%; ISTAT, 2023). Internal migration can be divided into Italian nationals moving their place of residence (82.4%) and non-nationals moving their place of residence (17.6%). Dividing the number of movements per nationality by the resident population per nationality, it is possible to calculate the share of national and non-national internal migration. According to the latest data, this index is 2.0 for national component and 4.6 for the non-national

component (ibid.). This means that, in relative terms and compared to the resident population, the internal mobility rate of non-nationals is more than double that of Italians.

Table 13. *Internal migration in Italy by nationality (2011–2020)*

	Internal migration		
Year	National	Non-national	Total
2011	1 119 683	238 354	1 358 037
2012	1 276 940	279 387	1 556 327
2013	1 113 155	249 144	1 362 299
2014	1 073 757	239 419	1 313 176
2015	1 081 744	202 457	1 284 201
2016	1 101 791	229 589	1 331 380
2017	1 101 319	233 203	1 334 522
2018	1 113 581	244 851	1 358 432
2019	1 201 080	284 217	1 485 297
2020	1 098 379	235 301	1 333 680

Source: Authors' analyses of ISTAT data.

Another relevant aspect is the relationship between regions of origin and destination regions (Table 14). Regions in the north of Italy receive the most internal migrants (55.4%). The centre (20.5%), the south (17.3%), and the islands (6.8%) represent a smaller proportion (ISTAT, 2023). The south and the islands represent the most frequent regions of origin (39.0%; ibid.).

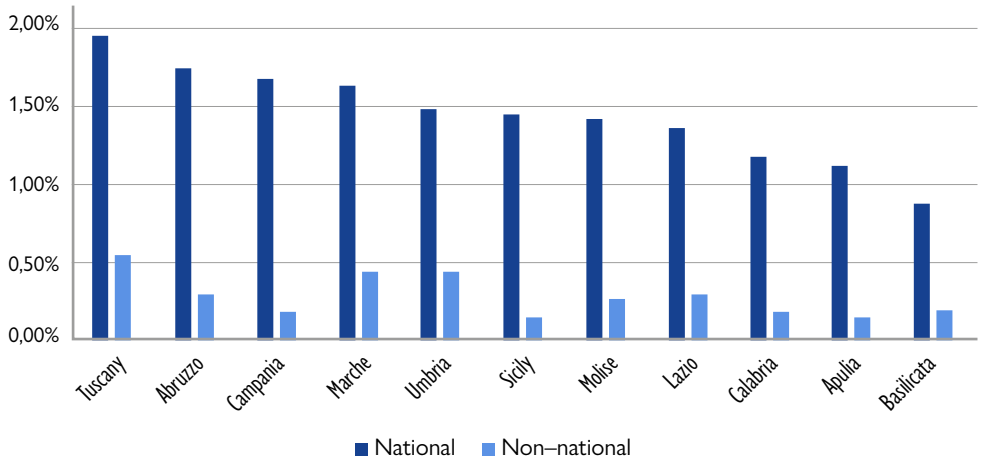
At the regional level, for each origin region under analysis, the share of in-migrants by nationality (national and non-national) compared to the total resident population was calculated (Tables A1 and A2 in Appendix 1). Tuscany and Abruzzo recorded the highest share of internal in-migration of Italian nationals. Tuscany and Marche are the regions with the highest share of internal in-migration of international migrants (Figure 2). Campania and Tuscany are in the first two positions for national out-migration, while Tuscany and Marche are the regions with the highest share of internal in-migration of international migrants (Figure 3).

Table 14. *Residence transfers across macroregions of Italy in percentage by origin and destination*

Macroregion of origin	Macroregion of destination					
	North-west	North-east	Centre	South	Islands	Total
North-west	8.0	5.5	3.9	4.5	2.8	24.8
North-east	4.8	4.7	2.9	3.1	1.5	16.9
Centre	4.8	4.2	4.2	4.7	1.4	19.3
South	8.6	7.2	7.4	3.9	1.0	28.1
Islands	4.4	3.0	2.2	1.0	0.2	10.9
Total	30.6	24.7	20.5	17.3	6.8	100.0

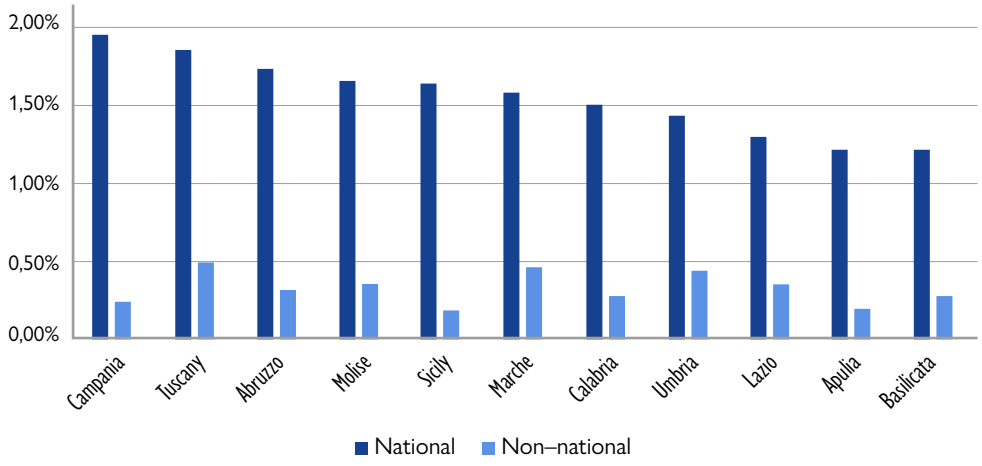
Source: ISTAT, 2020

Figure 2. *Internal in-migration over resident population by nationality and region (%, 2020)*



Source: Authors' analyses of ISTAT data.

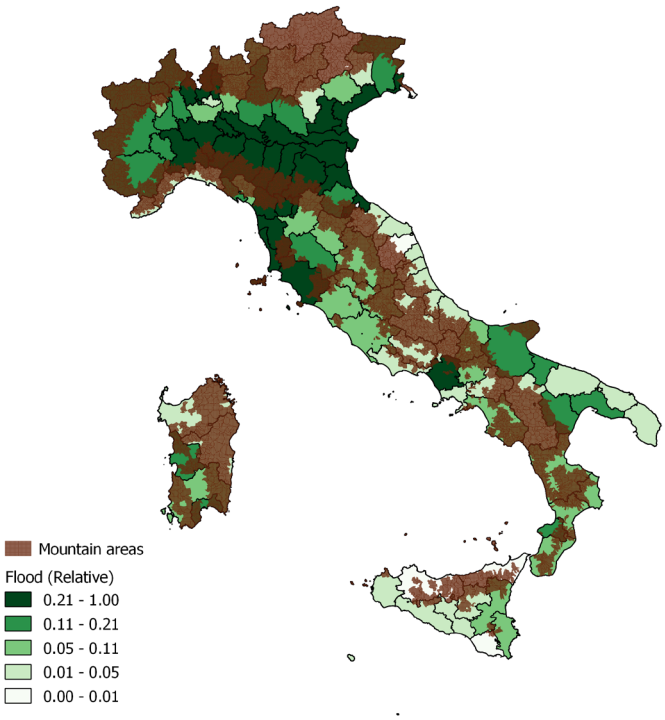
Figure 3. *Internal out-migration over resident population by nationality and region (%, 2020)*



Source: Authors' analyses of ISTAT data.

Hazard measures were estimated using ISTAT data for landslides and floods and data for droughts from the European Drought Observatory (EDO). Landslide and flood data were provided in terms of the size of the areas affected by different degrees of damage (from low to high) at the municipal level. We then aggregated data at the NUTS-3 level. To enable comparison, we provide here the given risk class for each class size. We also scaled all the information from 0 to 1, where 1 is the maximum risk. The measurement of droughts came from the Standardised Precipitation Index (SPI-3) of the EDO. The EDO provides monthly SPI-3. We then defined an average annual indicator. We assessed the annual average for the last two decades separately and calculated the difference between these two periods. This measure then provides a relative measure of water scarcity with respect to the conditions in the past two decades. Finally, we scaled all the information from 0 to 1, where 1 is the relatively most dry region. We also defined an indicator to jointly capture landslide and flood risk.

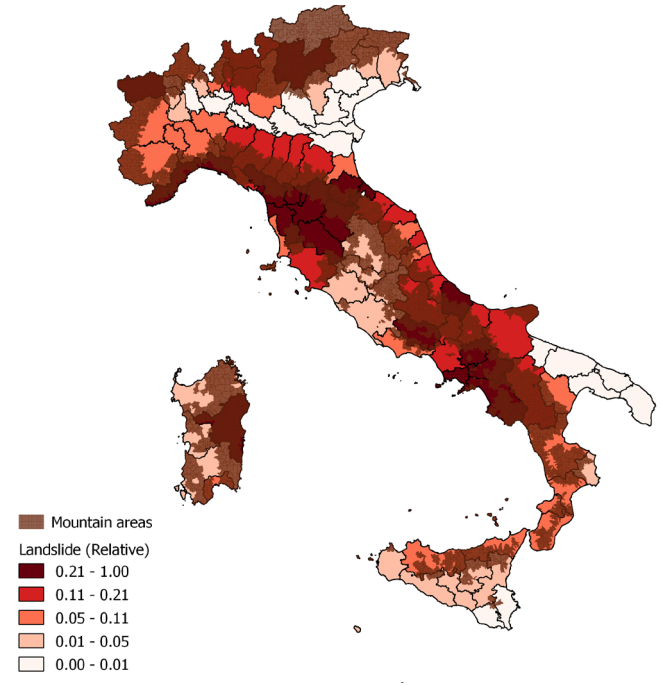
Map 6. *Flood risk in Italy (provincial level)*



Source: Authors' analyses of ISTAT data.

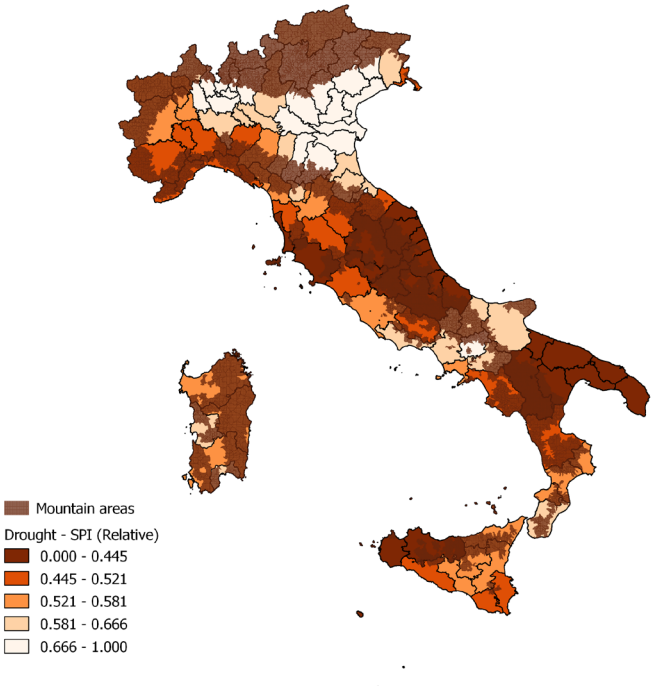
Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this maps do not imply official endorsement or acceptance by the International Organization for Migration.

Map 7. *Landslide risks in Italy (provincial level)*



Source: Authors' analyses of ISTAT data.

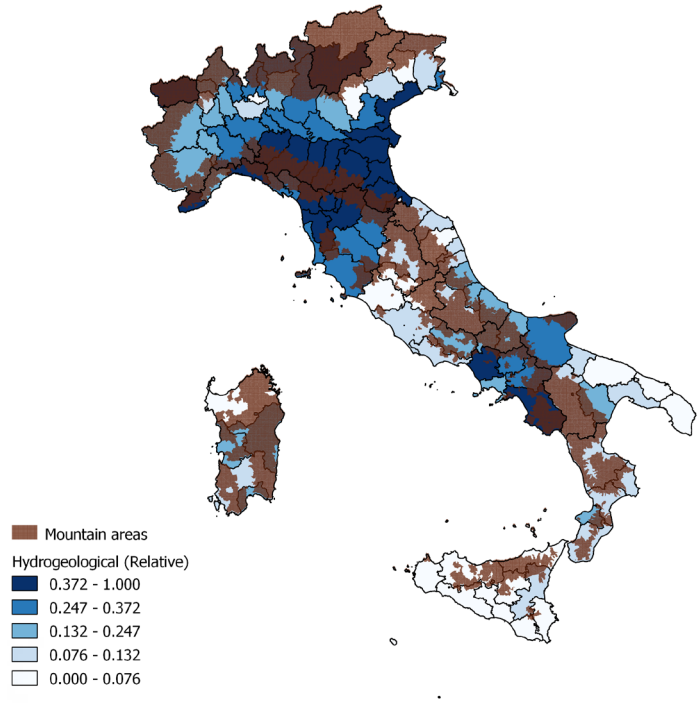
Map 8. *Drought risk in Italy (provincial level)*



Source: Authors' analyses of EDO data.

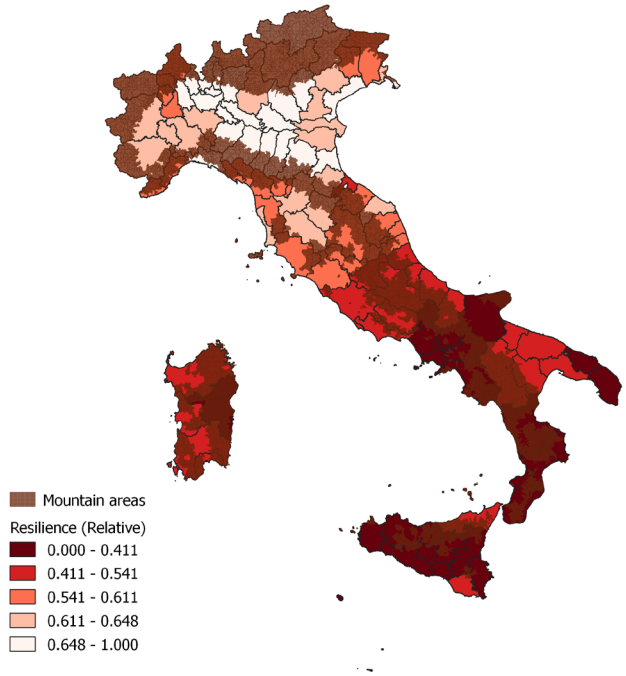
Note: These maps are for illustration purposes only. The boundaries and names shown and the designations used on these maps do not imply official endorsement or acceptance by the International Organization for Migration.

Map 9. *Hydrogeological risks (landslide and flood) in Italy (provincial level)*



Source: Authors' analyses of ISTAT data.

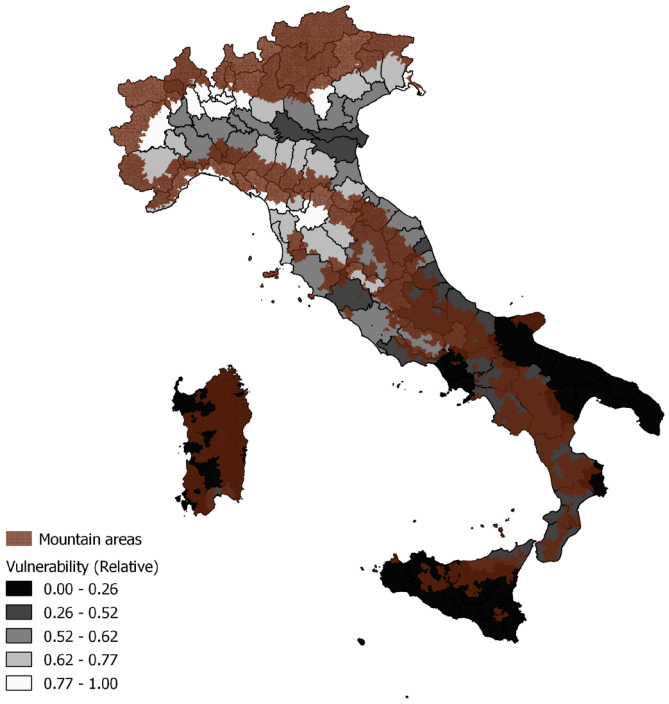
Map 10. *Resilience in Italy (provincial level)*



Source: Authors' analyses of ISTAT data.

Note: These maps are for illustration purposes only. The boundaries and names shown and the designations used on these maps do not imply official endorsement or acceptance by the International Organization for Migration.

Map 11. *Vulnerability in Italy (provincial level)*



Source: Authors' analyses of ISTAT data.

Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Organization for Migration.

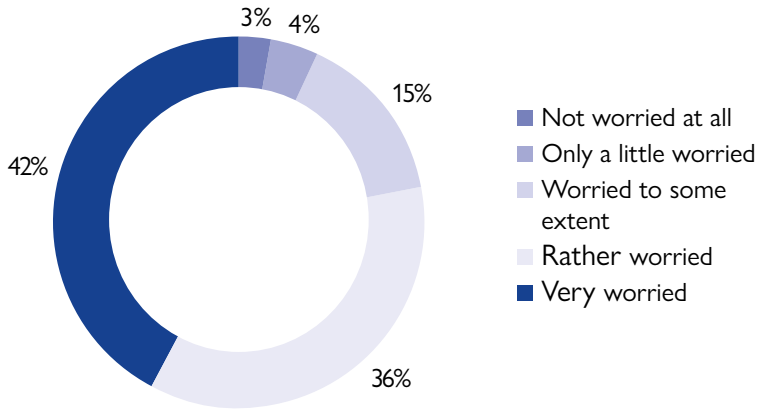
Finally, we present the resilience and vulnerability characteristics at the provincial level (Map 10 and Map 11). While the hazards are relatively spread across the country, resilience and vulnerability follow the classical north–south pattern of Italy, with the southern part of Italy showing a higher level of vulnerability and a lower level of resilience.

▶ 4.2 Survey results

4.2.1 Perception of environmental risks

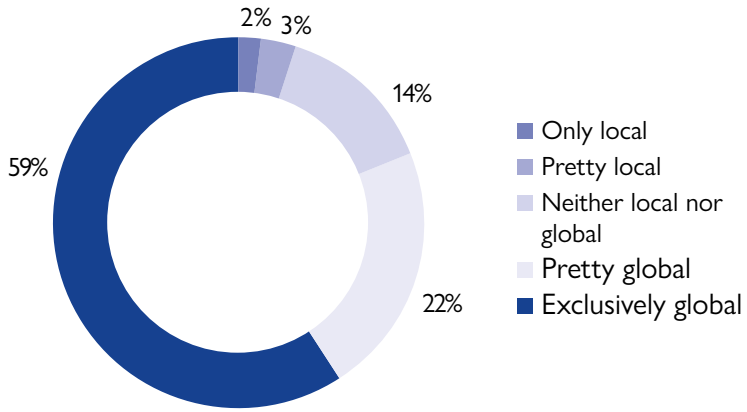
To understand the perception of environmental risks among the interviewees, respondents were asked how worried they were about the problem of climate change (Figure 4). There are no doubts as to the relevance of the problem. Some 42 per cent stated that they are very worried about climate change, and 36 per cent answered that they are rather worried about it. Moreover, most respondents perceive climate change as a global problem (59%; Figure 5).

Figure 4. *Frequency of answers to question 1:"In recent years, the problem of climate change has become increasingly evident. Using a scale from 1 (not at all) to 5 (very worried), how worried would you be about the problem of climate change?"*



Source: Authors' analyses of sample data.

Figure 5. *Frequency of answers to question 2: "Do you perceive climate change as a more local or more global problem? Consider a scale from 1 (more local) to 5 (global)"*

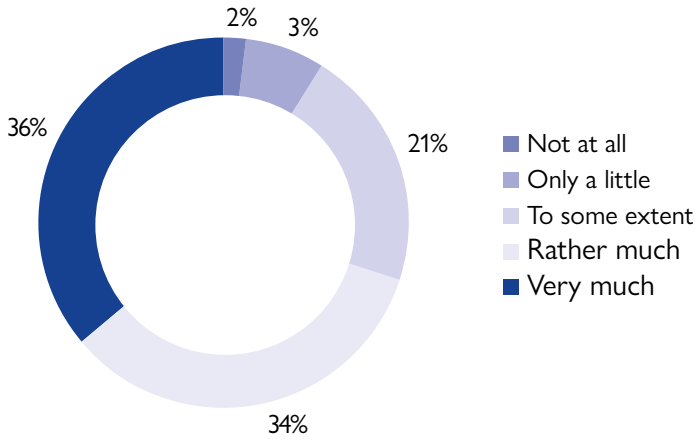


Source: Authors' analyses of sample data.

Moving from the broader aspect of the problem to analyse the impacts of climate change on respondents' everyday quality of life (question 3), we find that 34.5 per cent answered "important" and 28 per cent "very important".

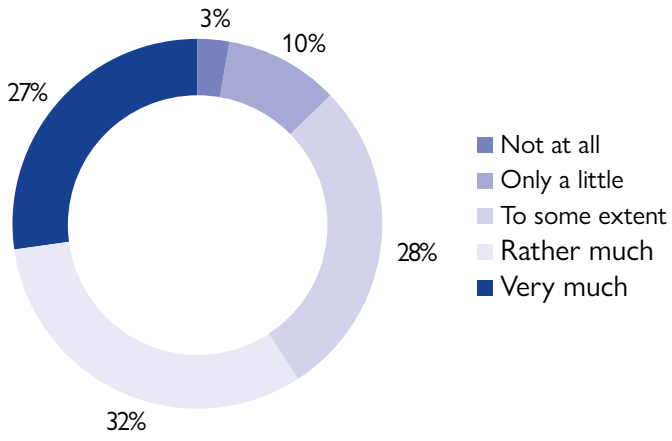
Mountain areas of the Apennines are perceived, by a large percentage of respondents, to be places affected by climate change (Figure 6). Some 34 per cent of the sample answered "moderately" and 36 per cent reported "a lot". When we asked the same question, but for the specific area where the respondent lived (question 5), 32 per cent of the respondents answered "moderately" and 27 per cent stated "a lot" (Figure 7).

Figure 6. *Frequency of answers to question 4:"In your opinion, how much are the Italian mountain and hilly areas affected by climate change?" (Five-point Likert scale from 1 = "not at all" to 5 = "very much")*



Source: Authors' analyses of sample data.

Figure 7. *Frequency of answers to question 5:"And in particular, how much is the territory in which you live affected by climate change?" (Five-point Likert scale from 1 = "not at all" to 5 = "very much")*



Source: Authors' analyses of sample data.

When asked which social group seems to be most vulnerable to the impact of climate change (question 6), interviewees identified children (41%) and old people (31%).

We tried to better understand the perception of respondents in terms of how urgently certain issues would need to be addressed within the community where they live (question 7; Table 15). The most urgent issue was to the economic and working situation: 83 per cent of respondents identified it as urgent or very urgent. Hydrogeological risk and poverty follow in second and third position, and with climate change next in the ranking (79%). In-migration in inner areas is considered urgent or very urgent by 60 per cent of respondents, compared to 72 per cent of respondents considering youth out-migration from inner areas as urgent or very urgent.

Table 15. *Ranking of issues considered urgent (4) and very urgent (5) by respondents*

Items	Frequency	Percentage of answers at level 4 (urgent) or 5 (very urgent)
Economic and working situation	641	82.8
Hydrogeological risk	621	80.2
Poverty	618	79.8
Climate changes	510	78.8
Drought	577	74.5
Social inequality	578	74.6
Youth out-migration from inner areas	559	72.2
Ageing of the population	517	66.8
Loss of biodiversity	506	65.4
Abandoning of the territory	502	64.9
Depopulation	491	63.4
Migration to inner areas	466	60.2

Source: Authors' analyses of sample data.

The following questions investigated the factors that affect or may affect the respondents' future quality of life. These factors can have a negative or positive impact on the quality of life and are context-specific (questions 8 and 9). As far as negative impacts are concerned, hydrogeological instability, extreme

events, shortage of water, and heat waves are considered to most strongly affect future quality of life (Table 16). The positive factors include incentives for renovating and improving the energy efficiency of buildings; environmental risk prevention; and enhancement of the territory and development of services to support tourism (Table 17).

Table 16. *Summary of negative factors that can affect, now or in the near future, respondents' quality of life*

In descending order: the percentage of respondents who rated each item 5/5, where 5 represents the highest value of negativity that can be attributed to one factor.

Items	Frequency	Percentage of respondents who consider the item could have a strong effect
Hydrogeological instability	288	37.2
Extreme events	277	35.8
Shortage of water	273	35.3
Heat waves	262	33.9
Absence of equipped and usable green areas	194	25.1
Lack of associations and activities related to the environment	187	25.2
Re-wilding of the territory	191	24.7

Source: Authors' analyses of sample data.

Table 17. *Summary of positive factors that can affect, now or in the near future, respondents' quality of life*

In descending order: the percentage of respondents who rated each item 5/5, where 5 represents the highest value of positivity that can be attributed to one factor.

Items	Frequency	Percentage of respondents who consider the item could have a strong effect
Incentives for the renovation and energy efficiency of buildings	287	37.1
Environmental risk prevention	285	36.8
Enhancement of the territory and development of services to support tourism (slow and sustainable)	282	36.4
Presence of plants for the production of energy from renewable sources	281	36.3
Presence of parks, gardens and equipped green areas	259	33.5
Residential incentives	236	30.5
Usability of the territory	232	30.0
Presence of environmental protection associations	194	25.1
Presence of columns for charging electric vehicles	178	23.0

Source: Authors' analyses of sample data.

Finally, the respondents were asked to indicate the extent to which they agreed with each in a series of statements (question 10). Respondents agreed somewhat with most of the proposed statements. However, answers to the statement "I am thinking of moving elsewhere in the future to try to reduce my exposure to extreme weather events (such as floods, droughts, and so on)" seem to be very clear: 31 per cent of respondents agreed only a little with it and another 35 per cent disagreed strongly with it (Figure 8).

Figure 8. *Distributions of answers to question 10, by item: "Kindly indicate how much you agree or disagree with the following statements:"*

Source: Authors' analyses of sample data.

Question 12 assessed the respondents' perceptions of whether climate change could also represent an opportunity and not only a risk for the area where they live. Some 37 per cent of respondents reported that climate change did not offer opportunities in their communities. Only 10 per cent of respondents perceived that climate change could also offer opportunities in their communities. The following question, number 13, was an open-ended question linked to question 12 and inquired about the opportunities posed by climate change to the area where the respondents live.

The main responses were as follows:[19]

- Creation of new job opportunities – new employees and new types of jobs (33%)
- New opportunities for the agricultural sector (14%)
- Growth in the number of associations related to environmental protection (9%)
- Tourism-related activities (7%)
- Increase in the care of the territory (7%).

This final information about opportunities related to climate change is the most relevant in terms of the frequencies of answers. Many respondents are convinced that measures taken to adapt to the effects of climate change will create new job opportunities, and hence will contribute to a decrease in unemployment in these areas. Moreover, they think that new kinds of jobs can emerge, such as jobs related to reforestation, agriculture, the protection of the environment, and "slow and sustainable" tourism. Interviewees stated that the management of territories could also benefit from the repopulation of small municipalities. It is also important to notice that these answers are similar to the findings from the focus group discussions in three selected areas (see Section 4.3).

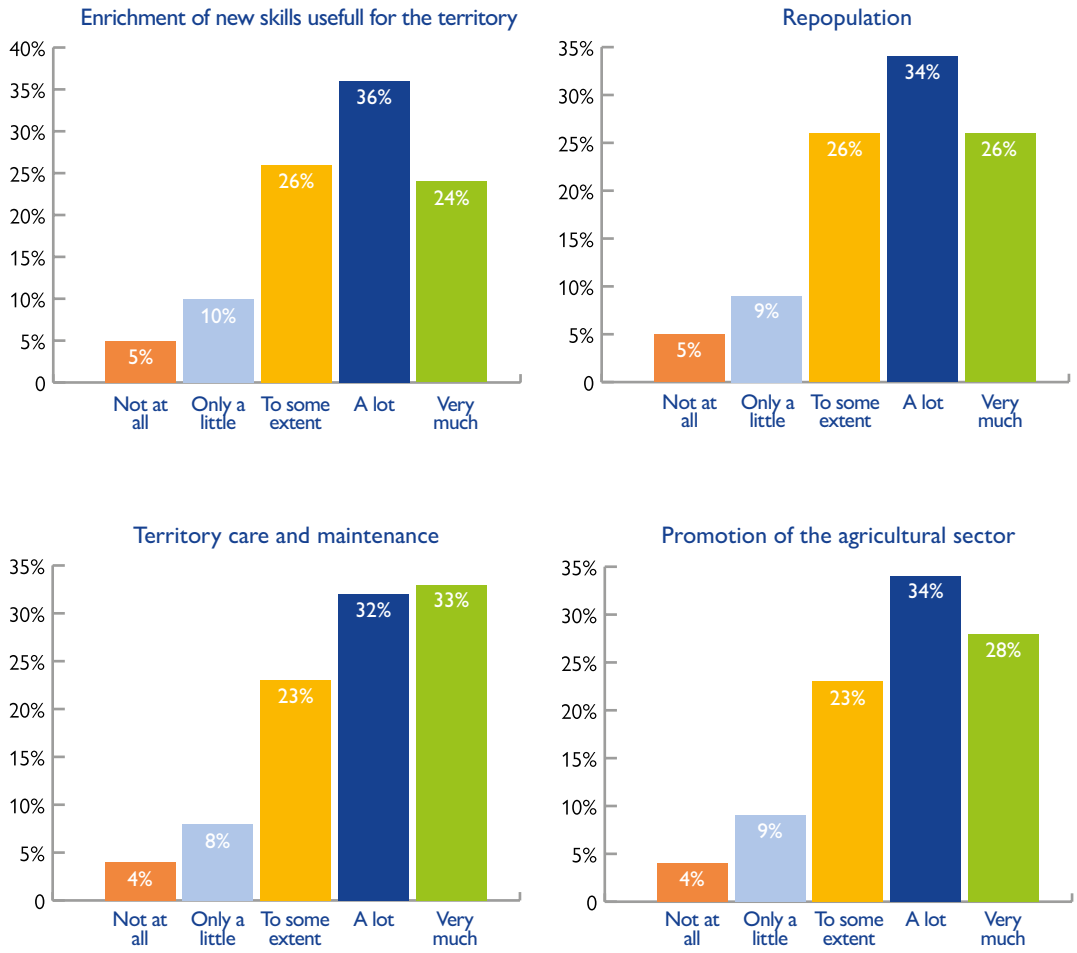
4.2.2 Perceptions of migration

This section of the questionnaire aimed to gather information on respondents' perception of in-migrants' contribution to adaptation to climate change (question 14) and amplification of negative effects of climate change (question 15). A significant percentage of respondents agree that in-migrants (both

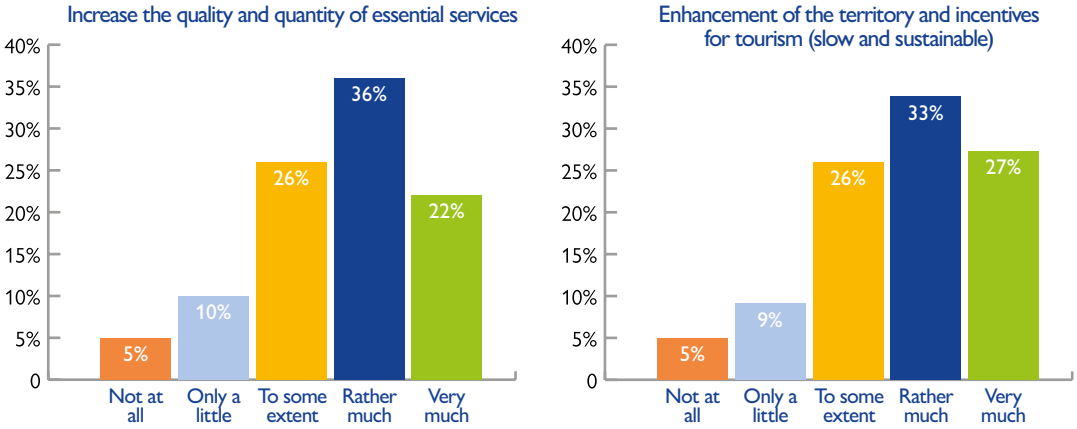
19 Since only people who answered positively to question 12 also answered question 13, we gathered 129 answers.

nationals and non-nationals) have skills relevant to the territory, contribute to repopulation, support the care and maintenance of the territory and promote the agricultural sector (Figure 9).[20] This means that residents/respondents perceive in-migrants as a resource that may manage and prevent negative effects due to climate change, and this is possible due to better territory management. This finding was corroborated by the reflections developed within focus groups.

Figure 9. *Distributions of answers to question 14, by item: "How much do you believe that the increased presence of new inhabitants – nationals and non-nationals – in your territory can help mitigate/prevent the negative effects of climate change with respect to the following aspects?"*



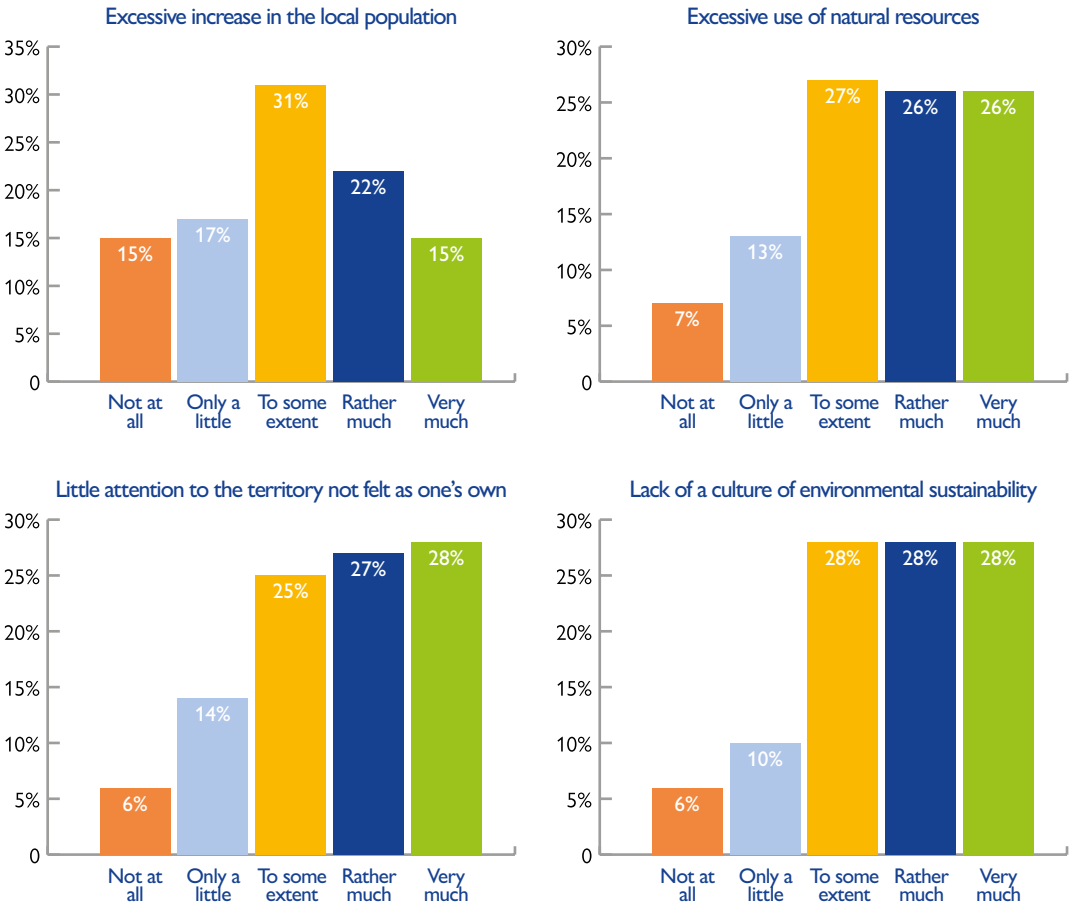
20 Very similar results are found also by splitting the sample into two subsamples (nationals and non-nationals). The only difference is the higher percentage of positive answers for the item "promotion of the agricultural sector" in the non-national group (75% versus 62%).



Source: Authors' analyses of sample data.

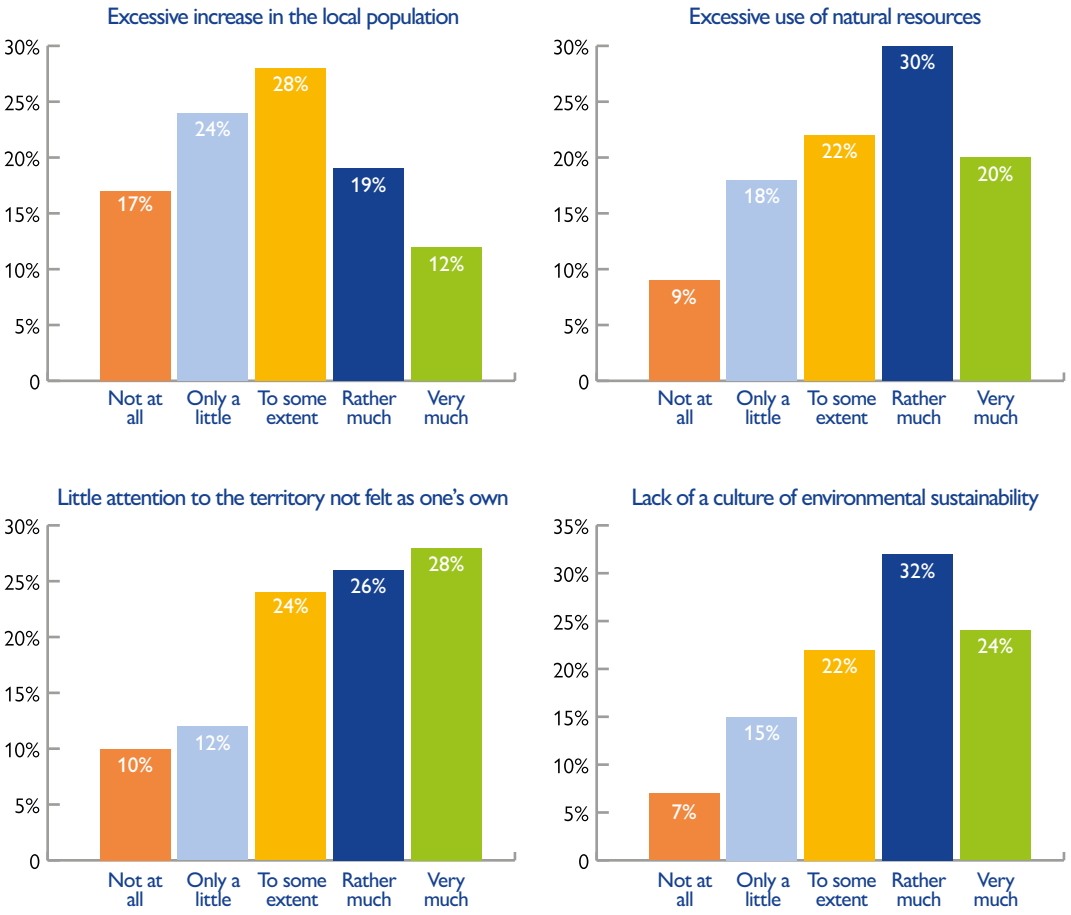
While 37 per cent of respondents considered that an excessive increase in local population could amplify the negative impacts of climate change, another 31 per cent of respondents remained neutral. Nearly 52 per cent of respondents identified the excessive use of natural resources, another 55 per cent identified in-migrants paying little attention to the territory not felt as one's own and 56 per cent perceived a lack of a culture of environmental sustainability among in-migrants as contributing to exacerbating the negative impacts of climate change (Figure 10). By splitting the sample into nationals and non-nationals, percentages of positive answers increase for each item, and negative perceptions, of course, decrease when only non-nationals are considered (Figure 11).

Figure 10. *Distributions of answers to question 15, by item: "How much do you think the increased presence of these new inhabitants could contribute to increase the negative effects of climate change with respect to the following aspects?"*



Source: Authors' analyses of sample data.

Figure 11. *Percentages of answers to question 15, by item (subsample of in-migrants): "How much do you think the increased presence of these new inhabitants could contribute to increase the negative effects of climate change with respect to the following aspects?"*



Source: Authors' analyses of sample data.

Next, we presented interviewees with an open question to gather information about how the presence of in-migrants could contribute to increasing adaptation to climate change at the territorial level (question 17). Some considerations can be drawn from this question. Even if only a few answers are available,[21] the results can be summarized in a few relevant points:

- Ethnic diversity and open-minded people within the communities (17%)
- Cultural diversity as a resource (17%)
- More services and more resources to prevent extreme events (12%).

Respondents seem to be conscious of the means through which territories could better adapt to climate change. First, respondents pointed out that the presence of communities from different origins, whether they are nationals or non-nationals, can foster dialogue and cultural openness within the local community. Cultural diversity is considered a positive driver for economic growth in the economic literature (Rodríguez-Pose and von Berlepsch, 2019), so this can also be related to adaptation to climate change. Another means is the presence of a higher number of resident people who will produce an increase in the quantity and quality of essential services and available resources. This can help to better manage extreme events.

4.2.3 Sociodemographic characteristics

Some features of the sample have been examined in the previous sections (see Table 3). As a complement to this information, we gathered some data about respondents' commuting habits, their municipality or region of origin and their motivations for migration. In this part, we also asked them whether they actively participate in associations related to environmental protection, climate change or migration.

If we look at the subsample of international migrants (13%, some 103 respondents) we can see that the main reasons to move to new areas were work (47%) and family (36%). For the total sample, the main reason was family. Other differences were related to the climate change-related opportunities in the areas where they live. International migrants answered neutrally far more than the total sample. Only 9 per cent of international migrants reported that

21 Since only 25 per cent of the sample answered this question, we gathered 115 completed answers.

climate change can also represent an opportunity for their territories (in the total sample, the percentage was around 24). Another question that confirmed this to some extent is question 16, in which we asked whether the presence of migrants (both nationals and non-nationals) can contribute to increasing adaptation to climate change at territorial level. Some 31 respondents answered in the negative, and only 9 per cent answered positively.

► 4.3 In-depth local case studies: interviews and focus groups

The present section discusses the main findings that emerged from the semi-structured interviews and the three focus group discussions,[22] which revolved around the same topics with the aim of delving into them. It also reports some direct quotes (translated from Italian by the authors) from the participants when they are particularly informative.

Question 1

In the Italian inner and mountain areas, it is now increasingly important to deal with the management of risk and with the mitigation of climate change, as well as with the adaptation of the community to new conditions that these phenomena produce. Could you tell us what kind of policies or initiatives (institutional or even informal) have been implemented in recent years by your community in this area?

In general, our results show that respondents in these areas still do not have a strong awareness of climate change issues. So, initiatives in this sense are still scarce. Participants in the focus groups generally agreed that the effects of climate change are becoming evident in their territories.

Interviewees revealed that these areas suffer especially from water scarcity, a problem that had emerged in some areas only in the last year and was perceived as being caused by climate change.

A respondent resident in the Valle Subequana area said:

22 Some vocabulary used in the interviews in this section do not reflect the terminology used in the rest of the report because it is verbatim.

> *"In our territory, climate change has not produced any particularly critical issue so far. However, last summer, climate change provoked a significant drought in our area, which caused inconveniences both to farmers and to the municipal administration, which rents some fields destined to pasture."*

The warming climate is jeopardizing agricultural production (especially wine production) in Alta Irpinia. Moreover, these territories are affected by hydrogeological instability (e.g. surface erosion, landslides, floods and water stagnation), and the few formal (e.g. consolidation of the slopes) and informal (e.g. cleaning of embankments by the local community) measures adopted mainly aim to reduce this type of risk. Some of the initiatives put in place in the Madonie area, which include both physical interventions and awareness-raising activities, were described as follows:

> *"The geological fragility of the territory of Geraci Siculo produces a high hydrogeological risk. The actions carried out in recent years are mostly consolidation of the slopes of the inhabited centre. Promotion of greater social and environmental awareness, support local associations, cleaning of embankments, greater attention to surface water runoff and the adoption of an alert system represent the main actions put in place."*

The main initiatives that the participants reported in all three areas, related to the mitigation of climate change, were recycling, development of renewable energy sources and investments in photovoltaic, care for and maintenance of the forests, environmental awareness campaigns and actions for the protection of existing natural resources. The situation is quite heterogenous, with some areas being more active than others. What is common across the three cases instead is a limited understanding of the difference between climate change mitigation and climate change adaptation.

In Valle Subequana, in addition to common initiatives, such as the adoption of renewable energy production sources, collection of solid waste and composting, improvement of the efficiency of public lighting systems and adherence to environmental energy protocols for new buildings, others stand out for being particularly interesting. These are the Green Community membership, the "Foresta Modello della Valle Aterno",[23] the "Contratto di fiume", and a census of abandoned lands to be assigned to people who request to make them

23 A "model forest" is made up of forest territories where all possible conflicts between stakeholders (local authorities, businesses, associations, families and individuals) are resolved by seeking shared solutions. The active involvement of citizens is one of the key principles of the model forest and is achieved through the creation of a "territorial association". In October 2018, the Abruzzo Region formally joined the International Model Forest Network and in February 2019 it designated Valle dell'Aterno, together with the 15 municipalities that have applied to the network, as a pilot area for the implementation of the project.

productive. The municipalities of Fontecchio and Gagliano Aterno (Valle Subequana) are exceptions, and they deserve a particular mention since they are bringing forward some interesting initiatives to address the negative effects of climate change and to develop environmental sustainability strategies. Both municipalities are working on the creation of an energy community, which is an association between citizens, businesses, local authorities, or firms that have decided to join forces to provide themselves with systems for the production and self-consumption of energy from renewable sources,[24] producing many collective benefits. The association «Foresta Modello della Valle Aterno" (Fontecchio) is defining a bottom-up plan for the management of the forest and the reduction of fire risks. A member of the association explained:

> *"The 'Foresta Modello della Valle Aterno' association, that we borrowed from a Canadian experience, provides for a bottom-up plan of land management, economic revitalization and environmental sustainability. Some activities are dedicated to forests and deal with the issues concerning climate change, such as water stress, fire risk, and rarefaction of some species of truffles that are threatened by droughts."*

Unfortunately, a lot of land in these three inner areas has been abandoned over the years, which means that there is a great quantity of dry weeds that increases the risk of fires. When talking about this, participants in the focus groups highlighted that extreme events have been caused by a combination of climatic hazards and human negligence. The project "Foresta Modello della Valle Aterno" is defining the guidelines for the management and maintenance of the forest to reduce the risk of fires. Another initiative, which has been implemented in other parts of Italy, is the "*Contratto di fiume*": a strategic planning initiative aimed at the environmental regeneration of the catchment area of a watercourse. It should be mentioned that some participants in the focus groups showed some skepticism regarding this initiative, mainly because of the lack of broad participation involving the community. The focus group in the Madonie area reported a different situation than in Valle Subequana. Participants claimed that there are no policies or initiatives in place aimed at addressing risk management and adapting to the negative consequences of climate change.

24 Such initiatives are in line with the Renewable Energy Directive (RED II) of the European Commission and, in this framework, they could also be scalable or replicated in other areas. Available at https://joint-research-centre.ec.europa.eu/welcome-jec-website/reference-regulatory-framework/renewable-energy-recast-2030-red-ii_en.

Question 2

a. Inner and mountain areas are suffering from depopulation and population ageing: attracting new inhabitants could be a crucial strategy for an inner area like yours. Can you tell us what you are doing – or planning to do in the future – in your area to attract new residents? In particular, are there any interventions aimed to welcome and include new inhabitants?

b. Climate change also causes migration flows of people – globally and nationally – looking for a better quality of life. What is your perception of this phenomenon in your area? In recent years, have you noticed the arrival of new inhabitants who have moved to your territory from cities or other areas (in Italy or abroad) particularly exposed to climate change? What are you doing to welcome them?'

Few initiatives have been developed in this sense and, despite the increasing depopulation of these areas, the local administrations are not trying to attract migrants through specific policies. The existing initiatives are related to the improvement of local facilities (e.g. the implementation of broadband Internet access to allow remote working, the availability of kindergartens and the improvement of at-home care services) that are mainly aimed to retain natives, avoiding their out-migration, and simultaneously attracting new inhabitants. A respondent who lives in the Madonie area had an interesting perspective. He thinks that specific policies to attract migrants might not be needed. It would be rather important to implement strategies to raise the quality of life of these places, which would make them attractive for potential newcomers as well, besides virtuously influencing the well-being of local communities:

> *"I do not think that different policies should be adopted for old and new inhabitants. In order for a place to be attractive, it is absolutely necessary that its inhabitants recognize themselves as part of the community and that the quality of life is high. Promoting knowledge and care of historical, natural, cultural, artistic and social heritage have contributed to developing a new awareness of the territory and its identity."*

This points to another relevant issue in these territories, namely, promoting attachment and a sense of belonging to the place, which might improve the care for it and retain people within it. Other initiatives in this regard are temporary incentives (mainly aimed at in-migrants), that are not intended to attract and retain migrants in the long term, as was explained well by a respondent resident in the Madonie area:

> *Inner areas need physical infrastructure such as safe and well-maintained roads and virtual communication like fast Internet. Inner areas lose young and recently graduated people, yet they welcome foreigners with various incentives and social safety nets. But foreigners tend to leave after that."* [25]

However, during the COVID-19 pandemic and thanks to the increasing availability of broadband in these inner areas, some people previously living in cities moved to these territories. The feeling of the respondents was that these people decided to move to these areas looking for a better quality of life (including higher quality agri-food products), to enjoy natural landscapes and quiet territories with more pleasing aesthetics, nicer environments, better air quality and lower urban pressure, but that they did not necessarily move due to climate impacts. Participants in the focus groups acknowledged that a small reverse trend against a backdrop of depopulation was triggered by the COVID-19 pandemic.

The case of Valle Subequana is particularly interesting because, despite its remoteness and dimension, this area seems to be able to attract migrants, as testified by this quote:

> *The Municipality of Fontecchio welcomed over 10 international resident communities with a population of about 300 inhabitants who are planning to stay for a long time. Thanks to return migration or the arrival of new citizens, this municipality has been a centre open to dialogue between different cultures. In particular, some associations are working on projects of culture-based social cohesion and local development, in order to improve mutual knowledge, understanding and exchange of craft skills that will become an effective basis of interest for attracting new citizens. Furthermore, during the pandemic period, there was a 5 per cent increase in the number of foreigners and non-residents looking for a healthier way of life and a higher quality of human relationships in inner areas. Climate change in our territory has paradoxically led to an improvement in the quality of life. Shorter and less rigid winters, together with high air quality, higher quality of food and social relations, have attracted people looking for an alternative to the urban dimension."*

It must be noted, however, that, although the improvement in the quality of life subjectively perceived by the respondent may be short-lived, the long-term negative impacts of warming due to climate change largely outweigh the short-term positively perceived impacts (e.g. attraction of new residents due to a milder climate).

Among the municipalities of Valle Subequana, Fontecchio stands out in this regard. This municipality was implementing policies to attract migrants long

25 By "foreigners" the interviewee here means in-migrants.

before the pandemic struck. One of these is the "Case&Bottega" project, where houses in the historic centre, working spaces and common services were sold for 1 euro to also attract artists and creative people. The "Case&Bottega" policy was also adopted in some other municipalities of Alta Irpinia – for example, the "1 euro houses" policy in Madonie. This initiative consists in selling ruined houses in the historic centres at the symbolic price of 1 euro, with the only commitment on the part of the buyers being to renovate the buildings within a few years. Some other buildings have also been used as workspaces for people who can work remotely, with the specific aim to retain these people also after the pandemic crisis. Moreover, in some municipalities, these houses have been bought by in-migrants. In some cases, the local administration supports international migrants to find accommodation and work to guarantee their social inclusion, but formal planning aimed at welcoming international migrants does not exist yet.

Participants of the focus group discussions – who live in other municipalities of the Valle Subequana area that have not implemented any policies to attract migrants – widely acknowledged the efforts made by Fontecchio. This sheds light on the fact that policies, once implemented, can be effective in attracting migrants in small villages, provided that they are defined through a community-based participatory approach. What also emerged from the focus group is that policies cannot be truly effective if they are not supported by awareness-raising campaigns among residents about the social inclusion of in-migrants and about the cultural enrichment and potential socioeconomic advantages that new inhabitants may bring to the territories. As a complement to this project, Valle Subequana also aims to attract young artists and creative people, offering services to help them move there and find accommodation and providing parenting support (e.g. a kindergarten was added to the school). Notwithstanding these initiatives, this trend is still slow: international migrants are mainly employed in manual jobs and national migrants coming from the cities, also due to the pandemic, are mostly retired.

> *"There has been a slow but steady flow of immigrants from Eastern Europe and Africa, but there is not a real plan to welcome them. They come here especially for carrying out manual work because there is a shortage of labour in the area. But the numbers are still low. Italians, mostly retirees, moved to these areas mainly because of COVID-19. They moved because they felt cramped in the city. However, some young people may settle down permanently in these territories and start new agricultural firms."*

Even Alta Irpinia put in place an interesting project to (temporarily) attract migrants and make them actively contribute to producing common goods for the place. One relevant project is the following:

> *In April 2020, in collaboration with the University of Valle d'Aosta, we offered a scholarship linked to the « Ritornanti al Futuro" project. It is an anthropological research project aiming to both retain the local population and make our places attractive for new inhabitants. In 2022, we will offer scholarships for specific sectors such as circular economy, sustainable development and so on. We want to select people at a national level who want to stay in our territories and generate something that will remain in these areas."*

Another initiative which is not directly aimed at attracting migrants, but might nonetheless have some impacts, is called SIBaTer ("Bank of the land"). The SIBaTer project is divided into two interventions: the census of uncultivated lands and the enhancement of registered assets, and their assignment to cooperatives and companies. New opportunities, including for migrants willing to work in the agricultural sector, may arise from SIBaTer. A similar project, which is still in progress, was put in place in the Madonie area: it is a "Bank of local land" (*Banca della terra locale*) to be implemented within the scope of the SNAI, which might indirectly go in the direction of making the area more attractive.

Question 3

The care and maintenance of the territory are essential for the prevention of environmental risks, including those related to climate change, especially in mountain areas. What policies/activities/practices has your community implemented in this area in recent years? And what is the involvement, the role, the added value that the new inhabitants already have – or might have – in the development and adoption of these initiatives?

The findings from question 3 were similar to those obtained for question 1: few initiatives have been implemented to address environmental risks. The general feeling of respondents was that there is a lack of awareness of this issue (especially among older people), and a lack of economic resources and professionals in charge of environmental risk management. In the Madonie area, for instance, it was highlighted that on several occasions, lands neglected by landowners (because of depopulation and the progressive abandonment of agricultural activities) have caused landslides or serious wildfires that have devastated these areas. Even if the wildfires were mostly due to arson, the extent of damages could have been avoided if municipalities had upheld the rules regarding land care by enforcing the sanctions foreseen on those who did not comply within the allotted time. This is extremely important because rising temperatures may further amplify the risk of wildfires.

A key informant from the Madonie area explained the major measures that have been undertaken:

> *"We have a large territory, and the areas of greatest environmental value belong to the municipality and are burdened by grazing, which is still carried out by numerous local pastoral farms. The human presence in these territories is fundamental in the prevention of risks that, in addition to landslides, affect biodiversity, especially with regard to endemic species of high environmental value. Supporting pastoralism and mountain agriculture represents a decisive action for the control of the territory. Establishing a specific delegation to the municipal state property and the appointment of a councillor (a shepherd) in the council ensures continuous and constant management of the entire municipal area. The Sicily 007/14 and 2014/20 operational programmes within the European Fund for Regional Development (ERDF) made it possible to implement a series of projects – already implemented and/or in progress – concerning the accessibility and the enhancement of nature trails and traditional pastoral structures, recovery of degraded areas of particular environmental value and regulation of waters to ensure, even in the most extreme situations, the survival of particular biocoenosis existing in the numerous wetlands in the territory. The creation of water points and the improvement of accessible points for fire prevention purposes, together with the cleaning of the escarpments in the points of greatest environmental sensitivity and the systematic surveillance, are the main actions implemented with the support of local civil protection (Protezione Civile). The exchange of knowledge and experiences and the meeting of different sensitivities, and not only of environmental vision, are elements that can be decisive for improving the policies and actions to be adopted."*

In general, what stood out from key informant interviews is that the main problems related to environmental risk are fires (mostly caused intentionally in Madonie and Alta Irpinia, rather than by climate change) and landslides (mainly due to the negligence of the landowners in the maintenance of lands). Many plots of land have been abandoned over the years and the lack of maintenance of land and forests increases the risk of fires and landslides. Neglected land is less able to absorb heavy rains and floods, which will be further exacerbated by climate change. This led one key informant from Alta Irpinia to conclude that: "*the most serious problem is land abandonment, which amplifies serious environmental risks such as fires, landslides, floods, and so on in the medium and long term.*"

In addition, some informal activities in collaboration with local administration have been carried out. These have aimed to raise awareness about the importance of constant maintenance and to share best practices of cultivation to make lands able to better absorb heavy rains. For 15 years, «Slow Food Campania", in collaboration with local administrations, has been carrying out awareness campaigns, both among producers and public. A member of this association from Alta Irpinia said:

> *Slow Food Campania works with farmers to spread relevant agricultural practices that allow the soil to better absorb water, and some positive results have already been achieved. Also, a "social oven" (forno sociale) was built, which allows to optimize the use of the same amount of wood and reduces emissions. The whole community uses the oven, and it has also become a meeting point for the community".*

The general feeling of the respondents is that migrants might contribute to land maintenance, especially because these areas suffer from the shortage of labour, and migrants could carry out many activities related to the prevention of environmental risks, activities which are disregarded by local inhabitants at present. Similar reflections were brought about within the focus groups.

Question 4

Do you believe that a greater presence of new inhabitants – nationals and non-nationals – in your territory can contribute to increasing the negative effects of climate change in the medium-long term? If so, how? Think about aspects such as, for example, an increase in anthropogenic pressure, excessive exploitation of natural resources (water and so on), a lack of attention to the territory not perceived as one's own, and a lack of a culture of environmental sustainability.

Almost all respondents agree on the fact that a greater presence of new residents would not exacerbate the negative effects of climate change. There are two main reasons for this view. First, these municipalities are characterized by an increasing depopulation. So, even if new inhabitants were to move to these areas, these territories would have enough resources. Migrants are mostly regarded as adding value to their destinations. One of the key informants from the Valle Subequana said:

> *None of these expected risks are on the horizon for our community. The new inhabitants are added value, interesting comparison and constant dialogue. Sense of belonging, knowledge and intention to revitalize the landscape and the community are equally felt by old and new inhabitants."*

Second, some interviewees also believed that (especially international) in-migrants could contribute to raising local residents' awareness of environmental risks and climate change. From the perspective of the participants in the focus groups, some international newcomers in particular have a culture based on direct contact and a respectful relationship with the environment.

So, they could be an example for residents in inner areas. Respondents also underlined how this would help slow the decline of population in these areas. A respondent from Valle Subequana area said:

> *I do not think that a greater presence of inhabitants can have a negative effect. At the beginning of the 1900s, over 1,600 people lived in my town, while today we are about 300 people. Consumption was different, and the presence of forests also guaranteed the supply of firewood for heating. But if the current resident population doubled it would be beneficial also from an environmental point of view, especially for the attitude of younger generations who show greater care and interest for the common good."*

At the same time, it needs to be acknowledged that this perspective is somehow at odds with findings that emerged from the representative survey, where more than 50 per cent of the respondents perceived that in-migration could amplify climate change effects. A larger portion of the survey respondents also think that migrants may lack a culture of environmental sustainability. We must recognize that the perspectives coming from key informant interviews and focus group discussions are from a much smaller sample, and that may be influenced by both context-specific or self-selection bias effects (people aware of these topics). There are, however, some key informants who also have a different perspective. For example, one key informant from the Madonie area thinks that the increasing number of residents in the area would lead to excessive exploitation of already limited natural resources, such as water, and an increase in environmental pollution. A key informant from Valle Subequana clarified that it is not migration per se that would be detrimental to resource availability, but bad management of the flow of in-migrants:

> *The risk of negative effects is clear when any repopulation process is not managed with the necessary expertise. The coexistence of different management levels and policies, ranging from micro (participatory integration of new inhabitants) to macro (increase in services, management of water resources, and so on) is fundamental."*

Some potential issues related to a clash of different cultures were raised during the focus group discussions. A key informant who participated in the focus group in Abruzzo highlighted that the issue is not overexploitation of the local resources due to in-migration, but rather in the difference in the cultural attitude towards the environment between local and in-migrant populations. This is why all participants stressed that awareness-raising campaigns are needed for the enrichment offered by cultural diversity.

Question 5

Do you believe that the greater presence of new inhabitants – Italians and foreigners – in your territory can contribute to managing the negative effects of climate change? In your opinion, can the presence of new inhabitants contribute to increasing the adaptability and resilience of your community to climate change in your area? If so, how? Think about aspects such as, for example, the enrichment of new skills useful to the territory, the repopulation of inner areas, greater care, enhancement and maintenance of the territory, and the increase in the quality and quantity of essential services.

Many respondents believe that in-migrants (nationals and non-nationals) might contribute to repopulation but also to the economic revitalization of these territories. These areas are suffering from a shortage of labour, including in roles necessary for the care of the environment. In-migrants might contribute to the maintenance of the territory. Moreover, many respondents believe that new inhabitants might be a source of new skills and competencies, including best practices for managing the negative effects of climate change. Some respondents have witnessed the direct contact and respectful relationship that many migrants (both nationals and non-nationals) often have with the environment. So, interviewees believe that new inhabitants could share good practices with the residents that could help to better address the negative consequences of climate change. Two respondents in Madonie area argued:

> *"I am convinced that the presence of new inhabitants can contribute to improving the liveability of these places. The exchange of knowledge and skills enriches both natives and newcomers, determines new solutions and can introduce new demand and supply of services into the system. It also strengthens the awareness and care of the beauty of the places."*

And:

> *"I think that the greater presence of new inhabitants would contribute to increasing the negative effects of climate change, but at the same time, new inhabitants could repopulate the abandoned villages and contribute to the renovation of ruins, aiming at environmental sustainability, more careful care of the territory and common spaces, and an increase in the quality and quantity of services offered. This could lead the community towards a more decisive 'green' turn."*

A respondent in Alta Irpinia area stated:

> *I live in an area that has been experiencing an increasing depopulation over the years. Even the school struggles to stay open. There are few services26 in these areas. The presence of new inhabitants could enrich these areas in several ways. Awareness-raising and sharing of good practices related to the safeguarding of the territory, hospitality and inclusion are necessary to this purpose."*

And a respondent in the Valle Subequana area concluded:

> *The peaceful coexistence of local communities and new inhabitants is a vital resource for addressing depopulation and guaranteeing greater dynamism and recovery of social and economic activities. The presence of new inhabitants in our area has also determined the restarting of initiatives that had been neglected over time because of the shortage of people who could dedicate themselves to the organization by assisting the work of the public administration that suffers from a shortage of personnel in small mountain towns."*

Within the focus group discussions, the arrival of migrants is perceived as promoting the diffusion of sustainable practices, the revitalization of economic fabric and the maintenance of the land. They are considered vital for repopulation and for creating a critical mass needed to maintain ecosystem services. Participants in focus groups (especially in Sicily) think that the attraction of migrants would be an indirect outcome of policies aiming to make these places more liveable for the local residents.

This research also reveals a hindrance due to local policymakers. Key informants' general feeling is that municipal administrations are not working to attract migrants and integrate them into climate change adaptation. The discussion highlighted the necessity to improve residents' well-being first and then attract new inhabitants. All key informants agree on the fact that the arrival of migrants, coupled with local inhabitants, is essential to revitalize these areas from the point of view of the care and preservation of the territory and enhancing ecosystem services. The latter could also represent a promising field in which to create new job opportunities, for example, through policies that promote the (remunerative) care of the territory or the placing on the market of these ecosystem services (for instance, payments for ecosystem services).

26 The interviewee refers here to public services.

5.

DISCUSSION

Based on the findings of this study, some key takeaway messages can be inferred.

While most respondents are worried or very worried about climate change, only some of them perceive that climate change impacts their community and affects the quality of their life. They also consider this to be a global rather than a local issue. This points to a low level of awareness about this topic, explaining why many respondents perceive climate change mostly as a global threat rather than a phenomenon that also affects their communities and daily life. These results are in line with a recent survey conducted by the European Investment Bank (EIB) in 27 European Union member States and in China, the United Kingdom and the United States (EIB, 2022). In Italy, only 39 per cent of the respondents considered climate change to be the biggest current challenge for the country, but 88 per cent think that climate change and its consequences are the biggest challenges for humanity in the 21st century (ibid.). Also, findings from the key informant interviews and focus group discussions presented here show that various stakeholders in the three selected inner areas are not fully conscious of the negative consequences of climate change, even though these are already being observed at the local level, more in some places than in others. Consequently, few policies/activities to address climate change impacts have been implemented. The few initiatives to address climate change that have recently been implemented are yet to produce tangible results. Some areas, however, have started some interesting initiatives to manage environmental risks, including the adverse effects of climate change. A major factor that influences policies and programming on the environment, including climate change, is cooperation between informal actors, citizens, and non-profit associations, with the support of local administrations.

Generally, **respondents can prioritize urgent necessities for their communities.** Climate change is largely associated with wildfires, landslides and floods, and contextually associated to land neglect or abandonment: the crisis of the agricultural sector and an imbalanced relationship between human activities and the environment, due to little care for and poor management of the soil, are considered to be at the root of land degradation. Moreover, climate change is likely to accelerate or dramatically exacerbate the consequences of

the depopulation process that has occurred in these territories over the last fifty years. However, **interventions to halt these trends should concern the whole development model**: in fact, current development pathways, combined with climate change impacts, are considered to be leading away, rather than towards, sustainable development goals. Some global trends, including rising income inequality, growth in greenhouse gas emissions, land use change, food and water insecurity, human displacement and reversals of long-term increasing life expectancy trends are undermining the progress towards the SDGs and the efforts for climate change mitigation and adaptation. These development trends, in fact, contribute to worsening poverty, injustice and inequity, and environmental degradation and climate change can exacerbate these conditions by hampering human and environmental well-being.

The findings of this study show that there is an **awareness of positive factors that can affect, now or in the near future, respondents' quality of life.** For example, incentives for environmental risk prevention, development of essential and ecosystem services (including in light of a better urban–rural interaction), and renewable-energy adoption and production. This opinion is confirmed by 61 per cent of Europeans and 75 per cent of Italians interviewed by the EIB survey (EIB, 2022, p.51). Many respondents in the current study fairly agree that individual behaviour can help address climate change. This indicates that people are not only aware of the issues related to climate change impacts, but they also recognize the value of individual contributions to the overall goal. When designing specific policy measures in this field, it is therefore of paramount importance to leverage individual-level behavioural change, promoting pro-environmental behaviours through clear and evidence-based information, service delivery, incentives and, above all, participation in the planning, implementation and monitoring of interventions.

A small percentage of respondents also identified opportunities from climate change. This is not a paradox. For a short time, climate change could have positive impacts in some locations or sectors for certain stakeholders. However, this is further evidence of a limited awareness of the issue. Widespread information campaigns that focus on nuances of climate change and its more hidden implications are therefore much needed to convey the message that medium- or long-term opportunities can come from climate action rather than from climate change.

A significant percentage of interviewees believe that in-migrants can support climate action. A widespread positive perception was detected among participants in the study. Concerning the migration, environment and

climate change nexus, the study shows that there is a low but potentially increasing understanding of how migration could contribute to the development of these areas. However, when designing policies or planning initiatives aimed at addressing the impacts of climate change, local authorities seem to be missing the migration perspective. On the one side, they do not take into consideration how climate change could impact migrants; on the other, they overlook the potential role that in-migrants could indeed play in addressing the adverse impacts of climate change. This results in a disconnect between different policies and initiatives. For example, local authorities develop strategies to attract migrants but do not always take in-migration into account when designing climate change adaptation policies for these areas. Some respondents think that in-migrants might be an important resource for repopulating and revitalizing their territories, provided that they are made attractive first and foremost for native residents, improving their liveability. Some also consider the presence of in-migrants as being associated with cultural enrichment and contact with pro-environmental cultures, with the offer of stimuli for innovation and the learning of good examples of sustainable environmental practices. To a certain extent, respondents perceive that in-migrants can contribute to the care of the territory and its safety in the face of the growing risks linked to climate change. Regarding the impact of in-migrants on climate change and local resources, new inhabitants are not thought to lead to an over-exploitation of local resources and hence to having a negative impact on the consequences of climate change. However, half the respondents in the representative sample that includes migrants perceive that newcomers will amplify climate change impacts. Newcomers are not seen as competitors concerning jobs, nor concerning the use of local natural resources, which are considered more than sufficient for much larger populations than the current ones (with the exception of water, the only resource considered scarce and at risk in some contexts). At the same time, it should be underlined that, considering the skills that migrants possess, a different perception of international migrants emerges. They are believed to possess skills essentially linked to manual work, while the new national inhabitants (internal migrants or those returning from the cities), who are perceived as having innovation skills, know-how and even an aptitude for entrepreneurship not suspected by respondents to be found in international migrants. Meanwhile, the development of international migrants' competencies or their acquisition of new skills useful to the territory are closely intertwined with successful inclusion paths, which take in-migrants themselves out of the condition of "ghettoization" that often sees them relegated to certain occupational niches with limited professional qualifications. Building on this and on the awareness observed among the respondents, policymakers may, on the one hand, leverage the positive perception of the role of migration,

when it is there, or promote a change in negative misconceptions when these are present and, on the other hand, promote the inclusion of migrants in co-planning and co-programming of measures on the matter. Bringing locals and migrants together to recognize how they can contribute to and benefit from climate action and to climate-resilient development for their territory would be highly beneficial both for communities and for the overall objective of such policy action.

Concerning the main focal points of this study – migration and its role in depopulating territories and in their climate-resilient development – ongoing municipal-level initiatives either act on one or the other, without an integrated response. Interventions or activities aimed to address the impacts of climate change (see, among others, the experience of Slow Food Campania for some examples of climate action) are not generally inclusive of migrants. On the other hand, there are initiatives to retain residents in place or to attract new ones (e.g. Case&Bottega), including migrants, but they do not seem to, at least explicitly, consider climate change. As highlighted above in the discussion of the results of the qualitative analyses (Section 4.3), there are therefore at present some disconnects between climate change programming and migration programming at various levels in the areas under study. Efforts are to be made to strengthen policy coherence between different dimensions and axes at the local and regional levels, fostering inter-institutional coordination and overcoming sectoral approaches to embrace a more holistic approach, in turn to design more effective policies. There is a shared need for integrated institutional interventions that place the demographic issue at the heart of the debate on the sustainable development of fragile and marginalized areas, especially in the face of the challenges posed by climate change. The need for integrated institutional interventions extends to policymaking on climate change. Adaptation policies and initiatives aimed at addressing climate change impacts should integrate considerations on migration, in coherence with the demographic and socioeconomic policies designed to promote the sustainable development of these fragile areas.

In the post-COVID-19 period, some of these inner, depopulating areas might attract some people looking for "safer" living conditions and/or a better quality of life. In this sense, the pandemic seems to offer encouragement to investing in remote areas far from cities, towards which new migration flows could be directed in a planned manner. The "1 euro houses" project, which was implemented in some of the municipalities of the case studies as presented in Section 4.3, may go in this direction. Some other initiatives explicitly attracting smart workers and foreseeing specific incentives for in-migrants, including

those with specific skills, have been undertaken so far, including in Abruzzo. Santo Stefano di Sessanio has granted a monthly contribution for three years, a one-off financing for the start-up of a business activity, and the provision of a dwelling at a symbolic rent. The initiative is aimed at citizens under 40 who are willing to move their residence to the municipality.[27] Other similar experiences, which are highly replicable and potentially up-scalable, are found all over Italy (e.g. Santa Fiora in Toscana). To become feasible, these measures require the present gaps in infrastructure (e.g. physical and digital ones) and in essential services to be reduced. Many participants in this study agree on the need to initiate and support policies, especially at the institutional level, that are capable of promoting a renewal of infrastructure of their territories – to improve infrastructure in terms of essential services, infrastructural and digital connections, facilitated taxation, access to local resources and their sustainable exploitation. The target of these policies consists of all those (by birth or by new residence, national or non-national migrants) who decide to stay or come to live in inner and mountain areas, contributing to the rebirth and resilience of these places in the face of current challenges.

The repopulation of the Apennine areas – understood as a mix between the willingness to stay (also called *restanza*; Teti, 2022) of local inhabitants (especially young people) and attractiveness toward migrants – may be an effective adaptation strategy to manage the challenges posed by climatic and environmental change. The link between population dynamics and the ability to adapt to the environmental and social challenges posed by climate change is deemed fundamental by participants in the study. A territory that is inhabited, lived in, and innervated by new, caring relationships, is perceived as a good strategy, at least at the local level, to promote forms of adaptation capable of enabling migrants to contribute to and benefit from the protection of the traditions and ways of life of local communities, within a shared portion of space. The rural and mountain common goods, the shared management of natural resources and the local cultural heritage thus appear to be the major areas in which a strategy of climate change adaptation can be developed. From this perspective, it is precisely in-migrants that are perceived as one of the intervening variables.

27 See the dedicated website, available at https://lifeinabruzzo.com/sustainable-living-offer-santo-stefano-di-sessanio-needs-you.

6.

CONCLUSIONS AND POLICY RECOMMENDATIONS

This report aims at filling a critical knowledge gap by exploring migrants' contribution to addressing climate change challenges in the Global North. The report focuses on mountainous inner areas of Italy, especially fragile territories considered to be among the environmental systems most vulnerable to climate change. The findings of this research report show an uneven presence and distribution of migrants in the central-southern Apennines, with concentrations in some areas. Overall, however, it is evident that migrants are mainly concentrated in central Italian regions. In line with the phenomenon of re-spatialization of internal migration flows (Kordel and Membretti, 2020), the mapping carried out in this research adds to existing knowledge of the phenomenon by highlighting the relevant role of small and very small municipalities concerning the new settlement of migrants.

The fact that migrants are settling in environmentally and socioeconomically fragile areas raises important questions about the management of effective measures, not only for social inclusion but also for the promotion of the general safety of new and existing inhabitants. These actions need to be taken to encourage sustainable development paths, resulting from the interaction between the parties involved and geared towards preserving and caring for areas at high risk of degradation.

The essential points that emerge from this research can be summarized as follows:

- The inner and mountain areas of the Apennines are fragile from an ecosystem, climatic and socioeconomic point of view, particularly in southern Italy: their vulnerability is likely to increase because of the effects of climate change;
- Despite their vulnerability, these territories have attracted significant shares of internal and international migrants;
- Policies to attract migrants and repopulate fragile mountain areas have been implemented by some local authorities, but these are perceived as insufficient;

- Existing local adaptation policies and initiatives on climate change lack a migration perspective. They do not take into account how climate change can affect migrants living in these areas, nor the potential role that migrants could play in addressing the adverse impacts of climate change. So, there is a mismatch between development policies (which aim to attract migrants) and adaptation policies (which do not take migrants into account);
- The inhabitants of these areas are quite aware of the risks related to climate change, but to a great extent they focus on the global dimension of the phenomenon. On a local scale, they are concerned about some specific risks which may impact their daily life (e.g. mobility, water shortages and so on). But they are unaware of the connections these may have with climate change;
- The residents of the Apennine areas essentially perceive in-migrants more as a resource to address depopulation than for climate change adaptation. Repopulation is seen as positive and as providing opportunities for local communities;
- Attachment and sense of belonging among all residents of these areas (existing and newly arrived) are perceived as potential drivers to engage people in better management of natural resources and climate action;
- The cultural diversity brought by national and international migrants is generally considered an added value and a possible driver for local populations to adopt more sustainable practices.

In light of the results illustrated above and considering the plethora of stakeholders with a strong interest in Italy's mountain areas, migration and climate change, and the recommendations provided in other relevant studies (e.g. EIB, 2022 and EC and EEA, 2022), this research presents the following recommendations:

(a) Enhance policy coherence, acknowledging the nexus between migration and environmental policies

The study outlines that migration and environmental policies, and particularly climate change-related policies, suffer from a detrimental structural separation. However, these are cross-cutting issues and they easily intersect each other: the repopulation of vulnerable territories such as inner areas, boosted both by climate change and by the re-emergence after the COVID-19 pandemic, is an essential element in enabling environmental protection and land care. Moreover, the presence of migrants is associated with the revitalization of the

economic fabric, cultural enrichment, and the sharing of pro-environmental and sustainable practices. There is also a common understanding that climate change is a global issue that requires a multilevel response and the involvement of local, regional and international stakeholders. An approach that favours policy coherence should integrate climate change mitigation and adaptation policies with migration considerations, consistently with demographic, socioeconomic, and natural resource management policies, and foster multi-stakeholder dialogue and multilevel governance.

(b) Integrating environmental, repopulation and cohesion policies

The interviews and focus groups highlighted the urgency of land protection in fragile areas prone to out-migration and depopulation. Abandonment by new generations is identified as a major problem because it has a direct impact on the availability of resources for land care and management; poor management increases the risk of wildfires. Environmental policies should focus on supporting pastoralism and mountainous agriculture, encouraging sustainable and innovative farming practices; these are also essential elements for the protection of endemic species and biodiversity. Support for national agencies such as Protezione Civile and incentives for environmental risk prevention, promotion of ecosystem services and the transition to clean energy sources are desirable initiatives. At the same time, repopulation and social cohesion policies play a fundamental role: policies aimed at attracting new inhabitants must go along with policies to improve local living conditions, including by leveraging on the role of young people and the sense of belonging to local communities. Social cohesion is a paramount factor in stimulating a "care" economy towards the territory. In this sense, cohesion and local development projects with new inhabitants are welcome: bringing locals and newcomers together to define the contribution of each is encouraged, and particularly promoting environmental initiatives that are more inclusive towards migrant communities. These kinds of initiatives are preferred to incentives for in-migration, which are considered to be short term and so are less appreciated. Last, the need for cooperation between different actors and stakeholders emerged clearly, not only within the territory but also by exploring synergies with other initiatives in the Euro-Mediterranean region, and by promoting transnational activities to support sustainable development and climate adaptation.

(c) Promoting information campaigns

While a significant majority of the respondents declared feeling concerned about climate change, only a small percentage believe it will directly impact their quality of life. This points to the importance of information campaigns to raise awareness of the implications of climate change, but also of the opportunities for economic and social revitalization represented by a tailored and coherent response to the issue. Likewise, on the topic of migration the need was also expressed for more information campaigns to bring a change in the narrative and foster a social perception of in-migrants as being able to support greater cohesion. This should also concern the mutually beneficial relationship between environment and migration, particularly in inner areas: new inhabitants enhance land protection, and inclusive environmental initiatives foster the integration of new inhabitants.

(d) Defining appropriate funding channels

The need to define appropriate forms and channels of financing is also a crucial issue for policy development. Investments should be aimed at socioeconomic revitalization, ecological transition and climate change adaptation. Therefore, opportunities and public funds allocated by the National Recovery and Resilience Plan should be explored, as well as the potential involvement of the diaspora, including Italian out-migrants, to invest in sustainable and climate-resilient projects with a positive social and environmental impact. One-off financing for start-up businesses in areas prone to depopulation is also encouraged.

(e) Adapting the acquisition of new skills to each territory's needs

Topics such as capacity-building and the acquisition of new skills useful for the territory also emerged as urgent needs. A mapping of the skills and competences of national and international migrants in the areas of sustainable development and climate change can be very helpful in this respect; alongside this, it is important to map each territory's needs in terms of skills and profiles required. Capacity-building initiatives or the attraction of coherent profiles should be structured on this basis.

(f) Promoting the advancement of knowledge and the exchange of good practices

Promoting knowledge and data collection on the potential contribution of migrants in addressing climate change challenges in the Global North is an essential support for designing mitigation and adaptation strategies. Comparative research at the European level could provide innovative insights and suggestions. Moreover, the promotion of peer-to-peer learning and the

exchange of good practices between different areas and territories, also at a transnational level, are paramount for the advancement of knowledge, with significant effects on social cohesion.

Based on these principles, more detailed recommendations are the following:

For national authorities:

- Ensure coherence among policies addressing or having an impact on inner areas, particularly with respect to environmental, repopulation and cohesion policies;
- Harmonize national strategies (e.g. the National Strategy for Inner Areas, the National Climate Change Adaptation Strategy, the National Strategy for Sustainable Development), mainstreaming migration into and across all policy planning. Design implementation plans for such strategies, identifying migrants as stakeholders and agents of sustainable development;
- Promote multi-stakeholder and multilevel governance;
- Support local authorities and environment agencies, including through incentives, for environmental risk prevention, biodiversity protection, development of ecosystem services and the transition to clean energy sources;
- Encourage sustainable and innovative farming practices, supporting integrated land management and pastoralism;
- Improve physical and digital infrastructure of inner areas to facilitate mobility and ameliorate local conditions;
- Promote a change in the narrative of how migrants are perceived, to create an even more conducive environment for migrants' integration in inner areas;
- Adopt one-off financing for start-up businesses in areas prone to depopulation;
- Take stock of the potential contributions of migrants and diasporas (including the Italian diaspora) by designing financial instruments allowing them to invest in sustainable and climate-resilient opportunities in these territories (e.g. PIR,[28] diaspora bonds, and so on);
- Explore, together with IOM, opportunities to engage the Italian diaspora abroad.

28 PIR refers here to "piani individuali di risparmio a lungo termine" (long-term individual savings plans), a type of financial investment scheme introduced in 2017 to encourage the growth of Italian businesses.

For local authorities:

- Ensure coherence among migration policies (e.g. those aiming to attract in-migrants) and climate change adaptation strategies at the local level, including migrants as stakeholders;
- Recognize the nexus between environmental, repopulation and social cohesion policies;
- Develop local adaptation strategies and design implementation plans for such strategies, identifying migrants and ask stakeholders and agents of sustainable development;
- Integrate the migration component into local development plans, including climate change adaptation and disaster risk reduction strategies;
- Elaborate repopulation policies by prioritizing the improvement of local living conditions (e.g. investments in public services) to attract rather than short-term incentives for in-migration;
- Promote projects for social cohesion and local development, particularly on environmental issues, including towards new inhabitants and aimed at fostering dialogue between local and migrant communities. Encourage the sense of belonging and "care" economy initiatives;
- Promote local information campaigns on the environmental implications of climate change and socioeconomic opportunities;
- Promote information campaigns to improve the social perception of in-migrants and their potential contribution to environmental policies;
- Seize the opportunities and funding allocated by the National Recovery and Resilience Plan to Italy's mountain areas to channel investments for their socioeconomic revitalization, ecological transition and climate change adaptation;
- Promote peer learning and capitalization of best practices between different areas and territories in the Mediterranean.

For IOM:

- Promote interregional and transnational cooperation between stakeholders to support sustainable development, climate adaptation and migration policy;
- Leverage the "sense of belonging" and attachment to these territories, explore the potential interest of the Italian diaspora in investing (through dedicated financial instruments, e.g. guarantee

funds, diaspora bonds, savings accounts, investment funds and so on) in sustainable projects with a positive social and environmental impact in Italy's mountain areas;

- Design pilot initiatives providing migrants (including the Italian diaspora) with opportunities to engage in national and transnational activities (capacity-building, skills transfer, investment schemes) that support sustainable development and climate adaptation processes in Italy's mountain areas;
- Map each territory's needs in terms of skills and profiles required; structure tailored capacity-building and skills acquisition initiatives on this basis;
- Map the skills and competencies of (international and internal) migrants living in Italy's mountain areas, as well as the Italian diaspora abroad, in fields related to sustainable development and climate change;
- Explore synergies with other initiatives in the Euro-Mediterranean region;
- Provide platforms for peer learning and exchange of adaptation practices among local communities (ensuring migrants' participation) and local authorities. Ensure that the cultural diversity brought by migrants, particularly about sustainable environmental practices and climate change adaptation strategies, is highlighted and shared.

For academia/think tanks/research centres:

- Conduct further research on the potential contributions of migrants in addressing climate change challenges in the Global North, as this topic is still largely underexplored and available data are limited;
- Conduct similar research in other countries in the Euro-Mediterranean region to compare with the Italian experience and gain additional useful insights for future interventions;
- Contribute to map territorial needs in terms of skills and profiles required to design adequate local development policies.

APPENDIX 1: CONTEXTUAL ANALYSIS

Table A1. *Share of regional internal out-migration per nationality (%, 2020)*

Region	National	Non-national
Abruzzo	1.74	0.31
Basilicata	1.27	0.25
Calabria	1.50	0.28
Campania	1.91	0.23
Lazio	1.37	0.33
Marche	1.58	0.45
Molise	1.68	0.36
Apulia	1.27	0.18
Sicily	1.66	0.19
Tuscany	1.85	0.52
Umbria	1.42	0.44

Source: Authors' analyses of ISTAT data.

Note: This index is computed as the ratio between migrant to the resident population.

Table A2. *Share of regional internal in-migration per nationality (%, 2020)*

Region	National	Non-national
Abruzzo	1.75	0.29
Basilicata	0.87	0.19
Calabria	1.17	0.17
Campania	1.68	0.17
Lazio	1.37	0.30
Marche	1.64	0.44
Molise	1.42	0.26
Apulia	1.12	0.15
Sicily	1.46	0.14
Tuscany	1.96	0.54
Umbria	1.49	0.43

Source: Authors' analyses of ISTAT data.

Note: This index is computed as the ratio between migrant to the resident population.

Table A3. *Municipalities of inner areas selected*

Inner areas (regions)	Municipalities
Valle Subequana (L'Aquila)	Acciano, Calascio, Capestrano, Caporciano, Carapelle Calvisio, Castel del Monte, Castel di Ieri, Castelvecchio Calvisio, Castelvecchio Subequo, Collepietro, Fagnano Alto, Fontecchio, Gagliano Aterno, Goriano Sicoli, Molina Aterno, Navelli, Ofena, Prata D'Ansidonia, San Benedetto in Perillis, San Pio delle Camere, Santo Stefano di Sessanio, Secinaro, Tione degli Abruzzi, Villa Santa Lucia degli Abruzzi.
Alta Irpinia (Avellino)	Andretta, Aquilonia, Bagnoli Irpino, Bisaccia, Cairano, Calabritto, Calitri, Caposele, Cassano Irpino, Castelfranci, Conza della Campania, Guardia Lombardi, Lacedonia, Lioni, Montella, Monteverde, Morra De Sanctis, Nusco, Rocca San Felice, Sant'Andrea di Conza, Sant'Angelo dei Lombardi, Senerchia, Teora, Torella dei Lombardi, Villamaina.
Madonie (Palermo)	Alimena, Aliminusa, Blufi, Bompietro, Caccamo, Caltavuturo, Castelbuono, Castellana Sicula, Collesano, Gangi, Geraci Siculo, Gratteri, Isnello, Montemaggiore Belsito, Petralia Soprana, Petralia Sottana, Polizzi Generosa, Pollina, San Mauro Castelverde, Scillato, Sclafani Bagni.

APPENDIX 2: BEST PRACTICES

Below are a few examples of best practice identified by this research.

(a) Foresta Modello Valle dell'Aterno[1]

A "model forest" seeks a shared, bottom-up and collective management of a forest territory between stakeholders, including the active involvement of citizens. A model forest is achieved through the creation of a territory association.

(b) Contratti di fiume[2]

The "contratto di fiume" (river contract) is an agreement between subjects who have responsibilities in water management and use, spatial planning, and environmental protection. As defined by the Italian Environmental Code, and translated by authors, river contracts are a "voluntary instrument of strategic and negotiated planning that pursues the protection, the correct management of water resources and the valorization of river territories together with the safeguard against hydraulic risk, contributing to local development" (Senato della Repubblica, 2023, 68-bis).

(c) Case&Bottega[3]

"Case&Bottega" is a project implemented by the municipality of Fontecchio. The core idea of the project is to use some properties for social housing, combining them with craft workshops, land for community gardens and woodland portions for sustainable tree cutting and grazing. Community services for the producers are also integrated in the infrastructure. The project aims to promote repopulation by combining urban regeneration and socioeconomic impact.

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1 See www.forestamodellovalleaterno.it

2 See www.contrattodifiume.it.

3 See www.comune.fontecchio.aq.it/il-progetto-casabottega.

(d) Ritornanti al futuro project[4]

"Ritornanti al futuro" is an initiative resulting from the collaboration between the municipality of Gagliano Aterno and the "Montagne in Movimento" applied anthropology research group. Its objective is to provide a space for dialogue to reflect on the cultural and socioeconomic opportunities of mountain villages.

(e) SIBaTer – Bank of land

"SIBaTer" is a project of institutional support to the implementation of the land bank, managed by the National Association of Italian Municipalities with the technical support of its foundation, the Institute for Local Finance and Economy. The beneficiary municipalities are from eight regions of southern Italy (Abruzzo, Apulia, Basilicata, Calabria, Campania, Molise, Sardinia and Sicily) and they receive technical support for the identification and census of uncultivated and/or abandoned land (and related real estate units), both municipally owned and privately owned in the municipal territory, and for the valorization of the surveyed lands by assigning them to young people, associations and cooperatives.

4 See www.virtuquotidiane.it/cronaca/ritornanti-al-futuro-a-gagliano-aterno-una-nuova-ricetta-per-riabitare-i-borghi.html.

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