Adaptation Communication of Italy

Submission to the United Nations Framework Convention on Climate Change

MINISTERO DELLA TRANSIZIONE ECOLOGICA

Contents

Introduction

This submission, prepared in accordance to Article 7, paragraphs 10 and 11 of the Paris Agreement and guidance from Decision 9/CMA.1, provides the first Adaptation Communication of Italy.

The Adaptation Communication will be updated in 2022 in conjunction with chapter 6 of the National Communication on Vulnerability Assessment, Climate Change impacts and Adaptation Measures, where a more detailed overview of domestic and international adaptation measures will be set out.

The Italian Adaptation Communication contains information regarding relevant policies, institutional arrangements and initiatives undertaken at the national and sub-national-scale. It also describes activities that Italy is supporting in developing countries at the international scale. ❑

1. National circumstance, institutional arrangement and legal framework

Italy - located at the centre of the Mediterranean basin - consists of a northern continental section, a central-southern peninsular section, two large islands (i.e., Sardinia and Sicily) and several archipelagos and minor islands.

For this geo-morphological reason, Italy is charachterized by a heterogeneous climate, which leads to differences in the immediate risks posed by climate change. Rising temperatures, coastal erosion, flooding and drought are some of the numerous risk factors already exacerbating the vulnerability of the country in different ways.

This Adaptation Communication document presents the most affected sectors which represent the most significant risks in the country.

Specifically, they refer to water resources, hydrogeological systems, agriculture, forest fires, urban areas, and health. ❑

1.1 Institutional arrangements and legal framework

In Italy, the Ministry of the Ecological Transition (previously Ministry of the Environment Land and Sea) is responsible for activities on climate change at the national level.

On 16 June 2015, by the Directorial Decree n. 86, Italy adopted the National Adaptation Strategy (NAS) (1) to climate change with the aim to set out a coherent national approach to deal with the impacts of climate change on natural systems and socio-economic sectors. The MiTE is currently working on the implementation of the NAS through the development of the National Adaptation Plan (NAP) (2).

The document updates background information about the impacts of climate change and outlines possible adaptation actions for specific sectors, including water resources, hydrogeological risks, agriculture, forest fires, urban areas, and health. In line with the long-term vision outlined by the EU Adaptation Strategy (2021), Italy aims to become a climate resilient society fully adapted to the inevitable impacts of climate change by 2050.

This is part of a wider process on climate change conducted in line with the European climate law. It will also inform the 2023 Global Stocktake, providing an opportunity to reflect on the progress on the long-term objectives of the Paris Agreement, and specifically on art. 2.1b and art.7.1.

Currently, the actual legal framework is represented by the NAS, that the Ministry is implementing through the preparation of a series of tools, including the NAP currently under approval. During an indipendent verification on compatibility with the strategic environmental assessment, an important input to the definition of adaptation priorities will be provided through the dialogue with stakeholders. ❑

2. Impacts, risks and vulnerabilities

As highlighted by the IPCC, the Mediterranean region is considered one of the 'hot spots' of climate change, with warming exceeding the global average increase by 20% and a reduction in precipitation in contrast to the general increase in the hydrological cycle in temperate zones between 30°N and 46°N latitude.

In Italy, the analysis of climate data measured by the main national and regional observation centers highlighted an increase of more than 1.1°C in the average annual temperature in the period 1981-2010, compared to the period 1971-2000. This climate trend affects the national territories by increasing magnitude and frequency of extreme impacts.

The following sections are based on the last report of the Euro-Mediterranean Center on Climate Change (CMCC) (3), which is providing continuous support to the Ministry in the development of the National Adaptation Strategy and Plan.

Advanced Satellite and land sensor data fusion in combination with CLOUD COMPUTING methods will be adopted to create a global monitoring network to prevent damages. ❑

2.1 Climate data and national indicators

Since 2006, the national system for collection, elaboration, and dissemination of environmentally

(1) National Adaptation Strategy (2015): https://pdc.minambiente.it/sites/default/files/allegati/strategia_nazionale_adattamenti_climatici.pdf
(2) National Adaptation Plan (TBD): https://www.mite.gov.it/pagina/piano-nazionale-di-adattamento-ai-cambiamenti-climatici
(3) Spano et al. (2020): https://files.cmcc.it/200916_REPORT_CMCC_RISCHIO_Clima_in_Italia.pdf

relevant climate data (SCIA) has been realized by the National Institute for Environmental Protection and Research (ISPRA).

The aim of SCIA is to establish among all the relevant institutions dealing with meteorological networks and observations, a common procedure for calculating, updating, and representing Italian climate data. During the same period, the National System for Environmental Protection set up a national Working Group on "Impacts, vulnerability and adaptation to climate change" with the objective to define a set of climate change impact indicators.

First, a portfolio of 150 potential indicators has been identified and, subsequently, a subset of 20 national indicators and 30 regional case studies have been elaborated up to now.

These indicators belong to various vulnerable sectors, such as water resources, soil, the alpine environment, terrestrial and marine ecosystems, coastal areas, urban areas, health, fisheries, forestry, energy, agriculture, and cultural heritage.

These actions have been implemented recognizing the essential value that archiving, and monitoring phases can bring in better identifying climate hazards at the national, regional, and local scale, as well as in the sectors most impacted by them. ❑

2.2 Water resources

Prolonged periods of drought, extreme events as well as changes in rainfall patterns, constitute risks to the quality and availability of water resources in Italy. These risks are most evident in the summer months and in semi-arid areas. Analysis carried out by CMCC on the influence of climate change on water availability in Italy focus on the district and on the river basin level and, highlight a reduction in both quantity and quality of water resources. In the coming decades, the increase in average temperature, evapotranspiration and low rainfall will contribute to a 40% decrease in flow by 2080.

A further reduction of 10-15% is also expected because of anthropogenic activities, such as increased water withdrawals. Strong competition for water resources between sectors - such as households, agriculture, industry, energy, tourism - is expected to be exacerbated by the impacts of climate change, and will affect both water quality and quantity, especially during the summer season.

For this reason, more planning is required to increase efficiency in the use of the resource and to find a balance between demand and availability of water as these issues will become increasingly important in the decades to come.

In this context, the renewal and adequate maintenance of water resources is necessary to improve water management (e.g., water losses of up to 50% in the agricultural sector), not only for human needs but also to ensure adequate water flow rates for ecosystems.

In addition, due to the increase of drought events expected in Italy, negative effects on water quality, flow reductions and inflow rates are also expected.

Furthermore, droughts, and the consequent reduction in flow rates, together with over-exploitation of water resources, make watercourses and coastal land reserves more exposed to the action of sea level rise, with consequent saltwater intrusion and increased salinity in the freshwater reserve. ❑

2.3 Hydrogeological risks

Due to the conformation of the territory and its geographical location in Europe, Italy is an area strongly affected by geological, hydrological, and hydraulic instability phenomena, which represent a significant threat both in terms of expected damages and safety.

The increase in localised precipitation phenomena plays an important role in aggravating the risk of geo-hydrological instability throughout all the peninsula. In this context, anthropogenic factors - such as soil consumption and sealing or occupation of river areas - combined with climate change hazards play a significant role in exacerbating risks.

The most affected areas in relation to this hazard are (and will be) on the Alps and on Apennines, both in terms of magnitude and seasonality of disturbances.

Moreover, the expected rise in intense rainfall contributes to a further increase in the hydraulic risk for small basins, and amplifies the risk associated with surface landslides in areas with more permeable soils (such as urban areas).

In general, on the Italian territory, the expected impacts of climate change will contribute to intensify the pressure on geo-hydrological instability, amplifying and aggravating an already very complex situation.

These risks associated to hydrogeological hazards highlight the need for Italy to structure effective and efficient adaptation measures in the short/medium/long term, based on a combination of different actions (such as the redesign of defence works for different types of instability, as well as actions aimed at increasing the resilience of the social system). ❑

2.4 Agriculture sector

The risk posed by climate change to the agricultural sector in Italy is significant for both plant and animal production.

As far as agricultural production is concerned, recent analyses using the Business-as-Usual

scenario (i.e., RCP8.5) have shown an expected reduction of 25% for maize in the period 2030-2040 compared to current yields, and a wheat reductions of up to 50% compared to current levels.

In fact, higher atmospheric concentrations of CO2 can promote photosynthetic activity and water use efficiency of crops, but at the same time can negatively affect the nutritional quality of products, reduce the protein content of cereals and the concentrations of iron and zinc, with significant consequences on nutritional values.

The assessment of climate risk for irrigated agriculture due to climate change is strongly linked to the specific crop needs and climatic conditions of each geographical area.

Specifically, the Regions that will be most negatively affected are the Southern Regions (e.g., Sicily, Sardinia, and Apulia), while some Central and Northern Regions could be positively affected.

Regarding the negative impacts of climate change on the livestock, climate change will have repercussions on health, production, and reproduction.

Increasing rising temperatures will subject the livestock to heat stress events (amplified in term of magnitude and frequency), with significant consequences for productivity in this sector.

To mitigate the expected risks to the agricultural sector, ad hoc information networks could improve producer and consumer awareness to (i) increase the resilience and sustainability of production, (ii) ensure the quality of agricultural products, (iii) amplify environmental protection, food safety and consumer health. ❑

2.5 Forest fires

Forests cover 35% of the national territory and play a fundamental and multifunctional role in providing both economic and environmental benefits.

The wide range of ecosystem services provided by forests include support services (such as nutrient cycling), preparatory and regulatory services (such as regulation of the water cycle or carbon sequestration capacity), and cultural services (such as the ones related to tourism). In this context, ecosystem services are threatened by the effects of current and future climate change.

Rising temperatures and decreasing average annual precipitation as well as the increased frequency of extreme weather events - such as heat waves or long-term droughts - interact with the effects of abandonment of cultivated areas, pastures, and ex-managed forests, thus bringing an increased risk of fire hazards.

Today, in Italy, about 81% of the national forest area is affected by hydrogeological constraints. The incidence is higher in some regions of Central and Southern Italy where it reaches up to 50% (e.g., Abruzzo, Campania, Puglia, and Sicily). During the period 1980-2018, a total of approximately 4 million hectares were affected by fire.

The national estimates, are much higher than the total record of the five Mediterranean countries most

affected by the phenomenon (Italy, Portugal, Spain, France, and Greece).

Italy accounts for about 19% of the total number of fires and approximately 23% of the area affected. In the future, due to the exacerbation of climatic conditions, the fire risk is expected to increase by more than 20% and the fire season is expected to lengthen by between 20 and 40 days in the coming years.

This phenomena could induce an increase in burnt areas of between 21% and 43%, depending on the emission scenario considered.

To date, only 18% of the national forest area is currently managed through forest management plans.

The national adaptation plan is working on expanding efficient fire protection actions. ❑

2.6 Urban areas

Urbanised areas are considered a climate 'hot spot' because of the complex system that characterises them, but also for the number of citizens that populates them. In Italy, urban centres host 56% of the population. Due to the morphology of the territory (i.e., impermeable surfaces and limited green areas), urban centres experience temperatures 5-10°C higher than the surrounding areas.

In 2019, there were 29 more days of intense heat than in the period 1961- 1990, and climate projections predict an increase in these phenomena, especially regarding extreme weather phenomena, such as heat waves or floods. In this context, the most fragile segments of the population (children, the elderly, and people with disabilities) are the first victims in the urban context and are most at risk.

The expected intensification of extreme weather phenomena, especially heat waves (and urban heat island phenomenon) and intense precipitation over the coming decades, is one of the main amplifiers of climate risks in cities. In relation to heat in cities, there is a strong link between extreme hot temperatures and air quality. When heat waves occur, there is an increase in hospital admissions for cardiovascular diseases and strokes, as well as an increase in respiratory diseases due to the relationship between O3 and PM10 concentrations and temperature.

Thus, an increase in magnitude and frequency of heat will bring an increase in mortality rates. In addition, Italian cities are particularly exposed to the risk of flooding. 91% of Italian municipalities are at risk of landslides and floods, and more than 7 million people live and/or work in areas defined as 'high risk'.

In this context, the climate risk related to flooding is projected to increase in all scenarios considered compared to the current condition, affecting the safety of people, infrastructure, goods, and services.

As in the case of heat, the most exposed people are also the most fragile (such as people with low mobility, low income, elderly people and/or children). ❑

2.7 Health

According to the World Health Organization (4), Italy will be strongly affected by climate change health impacts.

Due to temperature increases, there is a significant real risk of a re-emergence of previously endemic agents, such as tick-borne encephalitis, Lyme disease, Mediterranean spotted fever, and West Nile fever.

The health sector could be also affected in the short term by the arrival of communicable tropical diseases, such as dengue, chikungunya, Zika, Crimean-Congo fever or Rift Valley fever, and diseases occurring in animals, including bluetongue and oily skin disease.

In relation to emerging mosquito-borne outbreaks, several cases have been reported recently in the Mediterranean basin.

In this context, in 2007, a Chikungunya outbreak (CHIK) as well as outbreak caused by tropical virus occurred in the Emilia-Romagna region of Italy. Likewise, an increasing number of outbreaks of West Nile disease, with occurrences of human cases, have been reported since 2008, mainly in the North-eastern regions of the Italian territory.

In addition, in the international context, Italy has the highest heat- related effects on daily mortality considering overall summer temperatures. However, there is heterogeneity among Italian territories.

Overall, Italy is also strongly characterized by population movements: there are about 5 million resident immigrants in Italy, representing about 8.4% of the total resident population.

Of this total, there are about 150,000 refugees, most of whom are economic migrants moving from areas affected by drought and desertification.

To address the risks related to climate change and health, in addition to the implementation of the NAS through the development of the NAP, specific cooperation projects driven by the Ministry of Health are being implemented to strengthen adaptive and preventative measures to cope with environmental health and climate change-related hazards. ❑

3. National adaptation strategies, policy plans and actions

The National Adaptation Strategy (NAS) provides a national vision to address future risks of climate change across multiple socio-economic and natural systems, identifying a set of adaptation actions and directions to address these impacts.

THE STRATEGIC AXES OF ACTION OF THE NATIONAL ADAPTATION STRATEGY (NAS)

(4) WHO (2018): https://apps.who.int/iris/bitstream/handle/10665/260380/WHO-FWC-PHE-EPE-15.52-eng.pdf?sequence=1&isAllowed=y

The strategy defines five strategic axes of action aimed at:

- improving current knowledge on climate change and its impacts;
- describing the vulnerability of the Italian territory and identifing adaptation options;
- promoting participation and raising awareness;
- supporting information on adaptation;
- specifying the tools to identify the best adaptation options.

To implement the strategy, a National Adaptation Plan (NAP) is under development with the aim of apporting a more operational and concrete document to support national, regional, and local institutions in the definition of their own sectoral and local adaptation paths.

The principal objective of the plan is to update the complex framework of national knowledge on adaptation and to make it more effective in the design of adaptation actions at different levels of government and in different sectors of intervention.

In this sense, the plan will create a common base of data, information, and methodologies to be shared with all Italian authorities and administrations involved in the implementation of local and sectoral adaptation measures.

In parallel, several Italian projects have been carried out in the small islands and in the national parks.

These initiatives developed by the public stakeholders, may foresee the involvement of the private sector in the planning and in the implementation of the interventions.

In August 2021, Italy launched the first experimental program of interventions for adaptation to climate change in urban areas, aimed at increasing the resilience of urban centers (5) to risks generated by climate change, with reference to heat waves, extreme rainfall, and drought. This experimental programme, currently in progress, is the first public Italian project for municipalities with a population over 60,000 inhabitants, aimed at encouraging local planning for adaptation.

In particular, the programme has allocated about 80 million euros for the implementation of green and blue infrastructures in urban areas as well as grey adaptation measures.

The experimental programme also includes several adaptive capacity-building options aimed at improving local knowledge, drafting municipal climate change adaptation planning tools, and raising awareness and participation for a network of stakeholders.

Below, a list of examples of project on adaptation which have been developed at the domestic and transnational level:

LIFE MASTER ADAPT (domestic level)

MASTER ADAPT MAinSTreaming Experiences at Regional and local level for ADAPTation to climate change

The LIFE MASTER ADAPT project "Mainstreaming experiences at regional and local level for adaption to climate change" aims to identify and test innovative tools of multi-level governance, to support regions and local authorities in defining and developing adaptation strategies and policies.
MASTER ADAPT aims to provide a common methodology to support Regions to identify the main vulnerabilities and priorities and, in particular, to draw up guidelines for the governance of adaptation in urban areas.
The Project started in October 2016, and it ended in June 2020; its approach will be highly transferable and replicable in other areas.
Link: *https://masteradapt.eu/?lang=en*

CReIAMO PA (domestic level)

CReIAMO PA
Per un cambiamento sostenibile

The CReIAMO PA project Italy aims to disseminate data and knowledge to fill information gaps in central administrations and local authorities.
All the Italian regions and several municipalities participate to the training activities carried out for strengthening administrative capacity on adaptation in the framework of CReIAMO PA project Line 5 "Strengthening of administrative capacity for climate change adaptation".
This is done through the establishment of networks between regional and local authorities on specific topics. .
Link: *https://creiamopa.minambiente.it/index.php/priorita/priorita-3/linea-5*

(5) *https://www.mite.gov.it/notizie/al-il-primo-programma-l-adattamento-ai-cambiamenti-climatici-nei-centri-urbani*

JOINT_SECAP (Transnational level)

The JOINT_SECAP project "Joint strategies for Climate Change Adaptation in coastal areas" started in January 2019 and ended in June 2021. The project built a common methodology for the definition of Joint Sustainable Energy and Climate Action Plans (SECAPs) focused on sharing knowledge on climate change adaptation strategies and mitigation measures.
Eight Italian and Croatian partners worked on target areas on the two sides of the Adriatic Sea, within the Interreg Italy-Croatia Program, with the aim of: gathering data and assessing climate change risks, planning joint adaptation actions; raising citizens' awareness about risks and appropriate measures related to climate change; creating a web platform in which case studies, climate and energy measures, data on risks which is available for free to all interested stakeholders and citizens.
Link: https://www.italy-croatia.eu/web/jointsecap

CLARITY (Transnational level)

The CLARITY project provides an operational ecosystem of cloud-based climate services to calculate and present the expected effects of climate change-induced and -amplified hazards at the level of risk, vulnerability, and impact functions.
CLARITY offers what-if decision support functions to investigate the effects of adaptation measures and risk reduction options in the specific project context and allow the comparison of alternative strategies. Four demonstration cases showcase CLARITY climate services in different climatic, regional, infrastructure and hazard contexts in Italy, Sweden, Austria, and Spain, focusing on the planning and implementation of urban infrastructure development projects.
The project started in June 2017 and ended in August 2020.
Link: clarity-h2020.eu

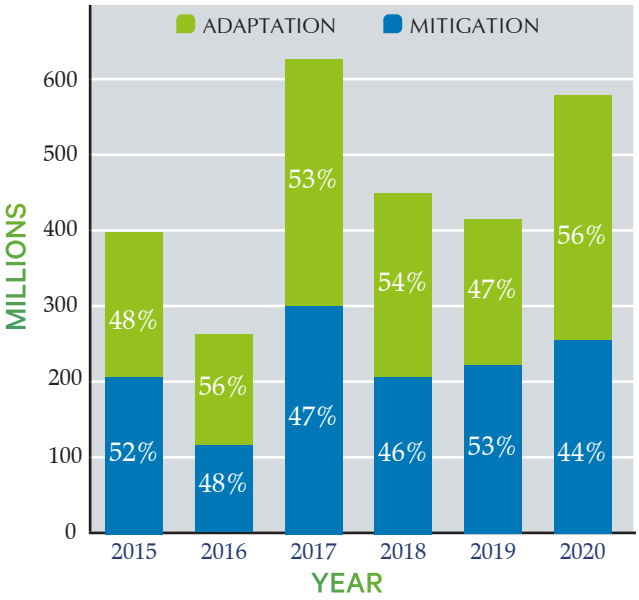
4. Provision of support to developing country Parties

Italy is committed to continue to support our developing countries partners and especially the most vulnerable one in implementing resilience and adaptation measures. In the provision of public financial resources to developing countries, Italy aims to strike a fair balance between mitigation and adaptation over time.

To date, since 2015, Italy's climate finance was evenly split between mitigation and adaptation objectives. In particular, 48% of Italian climate finance, as reported in the Biennal report ot the UNFCCC has been allocated to mitigation and 52% to adaptation.

This reflects the efforts towards mainstreaming and integration of adaptation considerations into the development support. In fact, Italy is deeply involved in supporting developing countries across a range of sectors, according

TYPE OF SUPPORT
Italy climate finance 2015-2020



› *Source: elaboration of data from the UNFCCC BR3, BR4 and reporting from Italy to the European Commission through the Governance Regulation, 2021*

to the partners' needs and priorities (i.e. land tenure and sustainable agriculture projects, infrastructure investments, humanitarian aid), besides specific adaptation and resilience projects.

Italy contributed from 2015 to the Adaptation Fund with 51 million euros of voluntary funding. The direct and innovative relationship between the Fund and the beneficiary communities is of extreme value, increasing the ownership of the actions among the beneficiary countries and the implementing agencies.

Thus, Italy aims to answer the call of developing countries, especially the most vulnerable, for adaptation finance. Italy climate finance is more than 90% grant based. ❑

5. Gender and climate change

Italy has nominated its National Gender & Climate Change Focal Point to the UNFCCC.
The NAS includes a reference to gender inequalities.

With the adoption of the Recovery and Resilience plan for Italy, the Italian government has recognised the need to give specific emphasis on gender inequalities within the strategic actions dedicated to sustainable development and green transition, so that the potential of women can be enhanced in terms of education and inclusion.

In conclusion, Italy embarked on a climate strategic path that intends to promote greater coherence between sustainable development policies to combat climate change, considering gender empowerment.

In term of broader initiatives on gender and climate change (i.e., mitigation and adaptation), Italy is conducting several activities to close the existing gaps.

In this regard, the following International Energy Agengy (IEA) initiatives are particularly significant to mention: participation to the Gender Advisory Council and to the Clean Energy Education, Empowerment (C3E) Programme and information campaign #DonneInClasseA. ❑

C3E INTERNATIONAL
ADVANCING GENDER EQUALITY TOGETHER
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

DONNE IN CLASSE A

6. Co-design processes in the context of national climate change strategies and plans

Adaptation actions, from identification of measures to monitoring, requires an appropriate participatory governance structured through the involvement of different administrative units and stakeholders.
In this context, at the beginning of 2012, Italy engaged the national scientific community to define the state of knowledge on climate change issues and to outline a co-design path towards the adoption of the Italian National Adaptation Strategy.

The work of this technical roundtable was supported by representatives of ministries and other institutions, such as the Ministry

for Agricultural and Forestry Policies, the Ministry of Infrastructure and Transport, the Ministry of Health, the Ministry of Cultural and Environmental Heritage, the Ministry of Education, the Ministry of Economic Development, the Ministry for Regional Affairs, the Civil Protection, Committee of the Regions, National Association of Italian Municipalities and the Union of Italian Provinces.

The contribution of different stakeholders ensured the strategy to be fully shared between the political decision-makers and the scientific community.

More stakeholders were involved through an online questionnaire in 2012, three ad hoc consultations in 2013, and a public consultation in 2014. The assimilation of the comments received has guided the structure of the Italian NAS, expanding its contents by introducing intersectoral points of view.

In structuring the Italian National Adaptation Plan, different entities belonging to regions and local authorities have been involved with the aim to include the main risks emerging from the local contexts.

To favour the inclusion of the contents and to collect the indications from all the stakeholders involved, two public consultations have been held. The first was conducted between February and March 2017, through a survey made available online on the MATTM website.

The goal of these consultation was to activate co-design processes to assess the public's perception of adaptation, to identify the criteria for evaluating the actions to be included in the NAP and to build governance models for adaptation. In particular, two main segments of analysis were explored in this consultation.

The first aimed at identifying the relative relevance of the various evaluation criteria proposed, in order to determine whether some of them should be preponderant when evaluating the various families of actions. The second aimed at identifying an order of value of the different families of actions. The second public consultation was conducted in 2018 through the publication of the first draft of the documents produced and the acquisition of comments from all stakeholders. These consultations complement the dialogue conducted with the main research bodies, the various Ministries, the Regions, and the environmental associations.

All the documents produced were also subject to a scientific review involving highly qualified members of the scientific community in the various sectors covered by the plan.

The various stages allowed the plan to be integrated and, where appropriate, be modified based on the indications received by the different stakeholders. ❑

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