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Deliverable D1.3 - Report on capacity building resources on climate change adaptation and disinformation campaigns

WP1 – Mapping citizens engagement practices to improve Climate Resilience

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Abbreviation and Acronyms

Acronym	Description
EU	European Union
EC	European Commission
WP	Work Package
CBR	Capacity building resource
CORDIS	Community Research and Development Information Service
ICT	Information and communication technology
SME	Small and medium-sized enterprises
NGO	Non-governmental organization
MOOC	Massive open online course
WoS	Web of Science
NBS	Nature-based solution



1. Executive Summary

This report on “Capacity building resources on climate change adaptation and disinformation campaigns” is presented in the context of the EU-funded AGORA project. AGORA aims to increase collective resilience to climate change by building community-based adaptation practices in diverse social, economic and political contexts. Focusing on pilot communities, AGORA fosters collaboration between social organisations, scholars, field experts, policy makers, entrepreneurs and citizens of all walks of life. One of the main outputs of the project will be a set of co-created digital tools, frameworks and technologies for climate adaptation tailored to local needs and countering disinformation related to climate change. To do this, it is necessary to explore what has been done previously and what the gaps are in this area.

Therefore, the report presents the results of the mapping and analysis of capacity building resources (CBRs) aimed, on the one hand, at enhancing knowledge, awareness and, consequently, appropriate behavioural change of citizens in relation to climate change adaptation and, on the other hand, at combating disinformation and misinformation on such topic. Specifically, resources created by projects funded by the European Commission in the last two Framework Programmes (Horizon 2020 and Horizon Europe) have been identified. The resources analysed include, among others, training materials, guidelines and interactive digital platforms, directed towards different target groups. Alongside these elements, a repository of fact-checking resources and scientific literature aimed at addressing misinformation and disinformation on climate issues is provided.

Our analysis revealed several needs and gaps in CBRs fostering climate adaptation and countering disinformation. For instance, we observed that there is a limited number of resources targeted at citizens in general; resources in local languages and addressing vulnerable groups are scarce; and, interestingly, there is a significant lack of resources that measure the impact of CBRs on citizens' behavioural change, hindering our understanding of whether these resources are effectively influencing behaviours and achieving their intended outcomes.

Lastly, this report provides a set of recommendations that will shape our approach to future activities. These include organizing events and workshops (WP2, WP5) and developing new capacity-building materials (WP5). Additionally, the mapped resources serve as a valuable knowledge base for enriching the content of the Digital Agora and the Academies (WP3).



2. Introduction: Meaning and Scope of Capacity building in the Climate Change Context

Capacity building, as defined by the European Climate Adaptation Platform (Climate-ADAPT)¹, refers to “the process by which individuals or organisations obtain, improve or retain the skills, knowledge, tools, equipment or other resources to do their work competently”. In the context of **climate change**, capacity building is crucial to address the many different challenges associated with this global issue. Current climate change challenges include, among many others: rising temperatures, heatwaves and extreme weather events affecting health, ecosystems and agriculture; melting ice caps causing sea level rise, coastal erosion and flooding; loss of biodiversity and its effects on ecosystems; scarcity of resources, especially water, with socio-environmental and geopolitical implications.²

Moreover, these challenges are multiplied due to **misinformation** and **disinformation**. Misinformation can be understood as incorrect information or the state of being misinformed,³ as well as the act of giving wrong information about something. It is false or misleading content shared without harmful intent though the effects can be still harmful.⁴ On the other hand, **disinformation** is false information **deliberately spread to deceive people**⁵, or secure economic or political gain and which may cause public harm.⁶ Therefore, it can be considered as a subset of misinformation.⁷

Global coordination of all sectors is essential to address these challenges, requiring committed local and regional action to drive the necessary changes.⁸ This involves not only acquiring knowledge but also building and/or enhancing practical skills. Therefore, CBRs are essential to achieve the necessary changes, both in individual and collective behaviour.⁹

¹ The European Climate Adaptation Platform Climate-ADAPT is a partnership between the European Commission and the European Environment Agency (EEA). Climate-ADAPT is maintained by the EEA with the support of the European Topic Centre on Climate Change Impacts, Vulnerability and Adaptation (ETC/CCA). <https://climate-adapt.eea.europa.eu/en/about>

² United Nations (2021). *Frequently Asked Questions on Human Rights and Climate Change*. Office of the United Nations High Commissioner for Human Rights. New York and Geneva, 2021. Retrieved from: https://www.ohchr.org/sites/default/files/Documents/Publications/FSheet38_FAQ_HR_CC_EN.pdf

³ Treen, K. M. D., Williams, H. T. P., & O’Neill, S. J. (2020). Online misinformation about climate change. *WIREs Climate Change* 11(5). <https://doi.org/10.1002/wcc.665>

⁴ European Commission (2020). On the European Democracy Action Plan. EU COM (2020) 790 final. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52020DC0790>

⁵ <https://dictionary.cambridge.org/dictionary/english/disinformation>

⁶ European Commission (2020). On the European Democracy Action Plan. EU COM (2020) 790 final. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52020DC0790>

⁷ Treen, K. M. D., Williams, H. T. P., & O’Neill, S. J. (2020). Online misinformation about climate change. *Wiley Interdisciplinary Reviews. Climate Change*, 11(5). <https://doi.org/10.1002/wcc.665>

⁸ Amundsen, H., Hovelsrud, G.K., Aall, C., Karlsson, M., Westskog, H. (2018). Local governments as drivers for societal transformation: towards the 1.5°C ambition. *Current Opinion in Environmental Sustainability*, 31, 23-29, <https://doi.org/10.1016/j.cosust.2017.12.004>.

⁹ Adger, W.N. (2010). Social Capital, Collective Action, and Adaptation to Climate Change. In: Voss, M. (eds) *Der Klimawandel. VS Verlag für Sozialwissenschaften*, Wiesbaden. https://doi.org/10.1007/978-3-531-92258-4_19



This report presents the **results of the mapping and analysis of CBRs** aimed, on the one hand, at enhancing knowledge, awareness and, consequently, appropriate behavioural change of citizens in relation to **climate change adaptation** and, on the other hand, at combating **climate change disinformation and misinformation**. Specifically, resources created by projects funded by the European Commission (EC) in the last two Framework Programmes (**Horizon 2020 and Horizon Europe**) have been identified. These include, among others, training materials, guidelines and informative or interactive platforms with different target groups. Alongside these elements, a **repository of fact-checking resources and scientific literature** aimed at addressing misinformation on climate issues is provided. The report also highlights best practices in these areas.

The document is then particularly useful to address these shortcomings in the upcoming activities of the AGORA project, which include organizing events and workshops (WP2, WP5) and developing new capacity-building materials (WP5). Additionally, the mapped resources serve as a valuable knowledge base for enriching the content of the Digital Agora and the Academies (WP3).

Following this Introduction, the rest of the report is divided into the following sections. The third section details the **working methodology** for identifying CBRs supporting climate adaptation and tackling disinformation and misinformation. The fourth section is devoted to **analysis and results**, following the scheme outlined in the methodology section. The fifth section discusses the **needs and gaps** identified in the previous analyses. Finally, we include a series of **recommendations** both for AGORA's internal work in the coming stages and for any entity, community, or individual interested in addressing the challenges associated with climate change and disinformation.

3. Capacity building resources to support behaviour change on climate change and tackle disinformation

This section is dedicated to the working methodology. In the following subsections, we provide a detailed explanation of the process of creating **four distinct databases** on which the subsequent analyses are based: **two CBR databases from EU-funded projects**, with a specific focus on climate change adaptation and addressing climate change-related misinformation and disinformation (subsection 3.1); **a repository of fact-checks** related to climate change (subsection 3.2); and **a repository of scientific literature** to combat disinformation campaigns on this topic (subsection 3.3).

3.1 Identifying Capacity Building Resources created by EU-funded Projects on Climate Change Adaptation and Disinformation

In order to explain the development of this task, the section is divided into three parts. First, we indicate the source used and how we **selected the EU-funded projects** of interest. In the second part, we describe the general process of **identifying the CBRs** on climate change adaptation and disinformation created by the selected projects. In the third part, we present the criteria for



elaborating **the corresponding database**, particularly the content of the main fields and the criteria used to complete them.

3.1.1 Search sources

For the search of **EU-funded projects** related to climate adaptation and disinformation, we employed the website of the **Community Research and Development Information Service (CORDIS)**¹⁰, including the following **specific filters** (as illustrated in Figure 1):

- Collection: Projects
- Framework Programme: Horizon 2020 & Horizon Europe
- Programme:
 - Societal Challenges
 - ENVIRONMENT
 - SOCIETY
 - Spreading excellence and widening participation
 - Science with and for Society
 - Global Challenges and European Industrial Competitiveness
 - Climate, Energy and Mobility
 - Food, Bioeconomy, Natural Resources, Agriculture and Environment
 - Widening Participation and Strengthening the European Research Area (ERA)
 - Widening participation and Spreading Excellence'

These categories are closely aligned with AGORA and its objective, which is ultimately to build a community of aware and informed citizens who can actively participate and contribute to climate action.

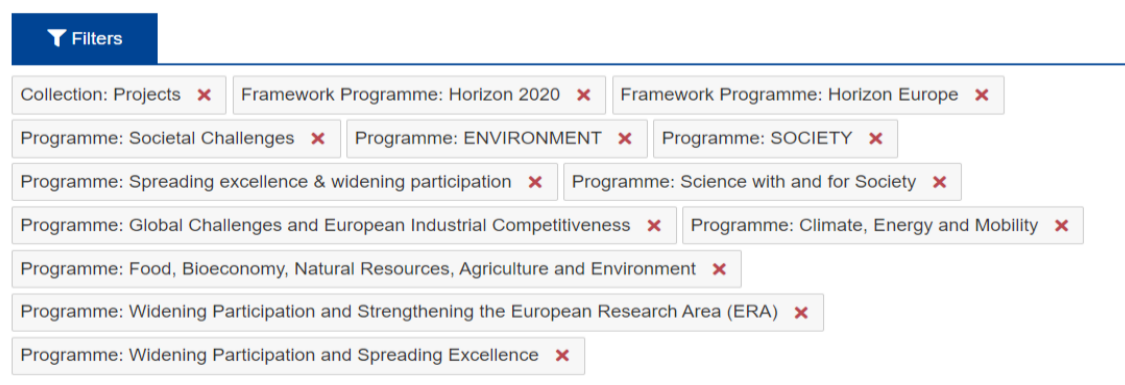


Figure 1. Filters applied on the CORDIS search. The search was performed in March 2023.

¹⁰ CORDIS is the European Commission's primary source of results from the projects funded by the EU's framework programmes for research and innovation, from FP1 to Horizon Europe (<https://cordis.europa.eu/about>).



3.1.2 Identification of projects and capacity building resources

To identify CBRs created by EU-funded projects, we followed a four-step approach.

1. First, we conducted a search on CORDIS. The search focused on **Horizon 2020 and Horizon Europe projects**. The keywords used while performing the search are the ones in Table 1. The search was conducted in March 2023. However, the platform has been subsequently updated, making some filters (Figure 1) no longer applicable.

Table 1. Keywords used for the CORDIS search and number of projects retrieved.

Keywords used	Number of projects
“climate change adaptation”	170
“adaptation to climate change”	53
“climate change adaptation” AND “behavioural change”	18
“climate change adaptation” AND “citizens” AND “behavioural change”	20
“disinformation” AND “climate change”	5
“misinformation” AND “climate change”	16

2. Secondly, we rapidly reviewed the projects identified to remove duplicates and exclude those commencing in 2023, as we noticed they had not yet developed any resources. After this initial filtering, we identified **176 projects** through the climate change adaptation search and **17 projects** addressing issues related to disinformation or misinformation about climate change.

3. Next, we examined each project individually to determine whether the project focused on climate change adaptation or countering disinformation about climate change. Interestingly, many of the identified projects, especially those funded using the “behavioural change” keyword, primarily focused on **climate change mitigation** (such as promoting more sustainable lifestyles, decarbonization, circular economy, air quality improvement, and energy footprint measurement). Therefore, **these were not considered for our analysis**.

4. Lastly, we examined the websites of the remaining projects to identify relevant CBRs. We scrutinized each project's website, paying particular attention to sections traditionally labelled as ‘**results**’, ‘**resources**’, ‘**library**’ and/or ‘**outputs**’, where materials of this nature are typically provided. Promising resources were collected and organised into a dataset in line with our project's goals and the needs of our pilot regions (Italy, Spain, Germany and Sweden), the Digital Agora and the Academies. Subsequently, this dataset was populated based on the criteria specified in the second part of this section. Note that **we did not consider the CBRs that**



were non-functional, i.e., no longer available after the project concluded or under development.

3.1.3 Fields in databases and criteria

Here, we present all the fields defined for characterising the **CBRs for climate change adaptation**, the content of the main fields, and the criteria used to complete them. Box 1 includes the entire set of fields.

Name of the EU-project; Link to project; Start year; End year; Location of the pilots (if applicable); Name of the capacity building resource; Link to resource; EU Policy Sector; EU Policy Sector #2; Climate-related hazards; Climate-related hazards #2; Type of resource; Which step to achieve adaptation does it cover?; Type of capacity building; Main Target Group; Research/Academia; Public sector; Private sector; Third sector; Journalism/Science communication; Education; Citizens in general; Does it support citizens' behavioural change?; Does it address vulnerable groups?; Main language; Other languages; Brief description of the resource; Interesting for AGORA WPX; Further comments.

Box 1. Data fields for capacity building resources created by EU-funded projects to support climate change adaptation.

Next, we provide details on the most relevant fields for the analysis. We drew inspiration from the above-mentioned Climate-ADAPT website to shape the categorization of some of our dataset fields.

Table 2 presents the various options within the main data fields.

Table 2. Main dataset fields for the capacity building resources created by EU-funded Projects to (1) promote climate change adaptation and (2) tackle disinformation on climate issues.

Field	Description
EU Policy Sector(s)	Climate change in general; Agriculture; Biodiversity; Buildings; Coastal areas; Disaster risk reduction; Energy; Financial; Forestry; Health; Transport; Urban; Water management
Climate-related hazards	Droughts/Water scarcity; Forest fires; Heatwaves; Heavy rain and flash floods; Sea level rise; All of them
Type of resource	Journal article; Report; Media outlet (newspapers, magazines, radio, TV, and websites: specific media or specific sections); Video/podcast/infographic/web blog; Publication repository; Fact-checks (specific website or specific tool for fact checking); Tool (app/interactive platform); Training (guideline/webinar/MOOC); Book/handbook/chapter; Case study/Use Case



Steps to adaptation	Preparing the ground for adaptation; Assessing/understanding the risks; Identifying adaptation options; Assessing adaptation options; Developing/implementing a strategy; Monitoring the adaptation action; All
Type of capacity building	Awareness raising; Knowledge building; Observations/predictions/projections; Education; Training; Networking; Technical assistance; Attention of groups at risk
Main target group	Research centres and Academia; Government, public administration (public sector); Local business, SMEs, industry (private sector); Local communities, associations, foundations, NGOs (third sector or civil society); Citizens in general; Journalists and science communicators; Education (all levels)
Brief resource description	Description of the resource by the creators if possible. Otherwise: summary based in the URL provided

- To provide a comprehensive overview of the **policy sectors** addressed by EU projects, we leveraged the classification of EU policy sectors available on Climate-ADAPT¹¹. When we conducted our data compilation, this categorization included Agriculture, Biodiversity, Buildings, Coastal areas, Disaster risk reduction, Energy, Financial, Forestry, Health, Transport, Urban, and Water Management. It is worth noting that at the beginning of June, Climate-ADAPT organised a webinar presenting updates on the platform, which included the addition of six new policy sectors that were omitted from our analysis: Business and industry, Cultural heritage, ICT, Land use planning, Mountain areas and Tourism¹². Nevertheless, we do not think it has significantly impacted the analysis. After a brief review, we found no indication that these themes were the primary focus of the identified resources.
- Concerning **climate-related hazards**, we formulated the categories by considering the most pertinent hazards that impact Europe as identified by the **European Environment Agency**¹³: droughts and water scarcity, heavy rain and flash floods, forest fires, sea level rise, and heatwaves. Additionally, we included an ‘All’ option since many resources address climate change holistically, without an exclusive focus on a single hazard.
- Regarding the **type of resource**, we dynamically configured the typology based on the analysis of the identified resources. Materials used for capacity building include tools like apps, multimedia materials such as videos or podcasts, project reports, and more.
- Furthermore, we found it relevant to investigate the **steps to adaptation** covered by the identified resources in order to spot potential gaps. To achieve this, we adhered to the

¹¹ <https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/sector-policies>

¹² <https://climate-adapt.eea.europa.eu/en/metadata/videos/providing-knowledge-for-all-steps-of-the-adaptation-policy-cycle-2013-new-features-for-boosting-adaptation-in-european-regions>

¹³ <https://experience.arcgis.com/experience/5f6596de6c4445a58aec956532b9813d>



definitions provided by **Climate-ADAPT's Adaptation Support Tool**¹⁴, which encompasses the following steps:

- **Step 1 – Preparing the ground for adaptation.** It includes the need to obtain and assure high-level political support, set up a structured process with adequate coordination mechanisms and clarify roles and responsibilities, estimate human and financial resources needed, identify and collect available information and communicate and raise awareness.
 - **Step 2 – Assessing climate change risks and vulnerabilities.** This step aims for a comprehensive picture of current and future climate risks and related opportunities as a basis for adaptation strategies and plans. It includes gaining a better understanding of climate risks, developing frameworks for assessing climate impacts, vulnerabilities and risks, addressing knowledge gaps and dealing with uncertainties, as well as identifying main adaptation concerns and setting a strategic direction.
 - **Step 3 – Identifying adaptation solutions.** This step focuses on identifying and describing relevant adaptation solutions, as well as finding examples of good adaptation practices.
 - **Step 4 – Assessing adaptation solutions.** In this step, the assessment (in terms of effects, time, costs, benefits and efforts) and prioritisation of adaptation options takes place. Moreover, it also encompasses the preparation of a strategy document and getting political approval.
 - **Step 5 – Implementing adaptation.** This step includes the development of an adaptation action plan, organising governance of implementation across sectors and levels, integrating adaptation into instruments and sector policies and designing a multilevel coordination and supportive governance framework.
 - **Step 6 – Monitoring and evaluating adaptation.** This step aims to understand the motivating factors behind monitoring, reporting and evaluation. These drivers and purposes will have an impact on deciding who should be involved, how roles and responsibilities are allocated and how coordination between relevant actors is organised. These, in turn, influence the selection of appropriate methods for carrying out monitoring, reporting and evaluation and the extent and ways in which the results can be used and communicated to inform policy and practice.
 - Within this field, we also added an 'All' option to accommodate resources that covered all or a wide range of the previously mentioned adaptation steps.
- As for the **type of capacity building**, we base it on the capacity building definition provided by Climate-ADAPT¹⁵, which outlines various modes of capacity building, including:

¹⁴ <https://climate-adapt.eea.europa.eu/en/knowledge/tools/adaptation-support-tool>

¹⁵ <https://climate-adapt.eea.europa.eu/en/metadata/adaptation-options/capacity-building-on-climate-change-adaptation>



- **Awareness raising.** For instance, CBRs to enhance public understanding of climate change and combat mis/disinformation.
 - **Education.** CBRs created by schools, universities and other education providers.
 - **Training.** CBRs that aid end-users to develop a skill to support a better delivery of adaptation processes within a region or to be better protected against disinformation campaigns.
 - **Knowledge building.** CBRs constructing new knowledge and advancing existing knowledge through the exploration, analysis and synthesis of existing information.
 - **Networking.** Sharing platforms (such as repositories), communities of practices, and platforms that connect different stakeholders.
 - **Observations, predictions and projections.** CBRs about existing and expected weather, climate-related (extreme) events or slow onset events, as well as citizen's observations generated via citizen science apps.
 - **Technical assistance.** CBRs that provide tailored support to individuals, organisations or entities to help them address a specific challenge.
- The **target group field** is particularly important to determine which of these resources can be used by citizens from all walks of life, as this is our main interest. The dropdown menu for the **main target group** includes (1) Research centres and academia; (2) Government, public administration (public sector); (3) Local business, SMEs, industry (private sector); (4) Local communities, associations, foundations, NGOs (third sector or civil society); (5) Citizens in general; (6) Journalists and science communicators; (7) Education (all levels).

Filling in the field 'Main target group' with one specific option was not easy. To achieve a more accurate description, we introduce seven fields referring to **specific target groups**. Both in the data set and in the corresponding graphic results, we use the next corresponding **shortened labels**: (1) Research/Academia; (2) Public sector; (3) Private sector; (4) Third sector; (5) Citizens in general; (6) Journalism/Science communication; (7) Education.

The answer options are Yes/No/Maybe. 'Yes' is chosen when the answer is unequivocally clear, such as for resources explicitly created for a specific target group. 'No' is selected when it is apparent that the particular group is not the target audience. For instance, when a resource is directed towards secondary school students, 'No' is indicated for research, policy and journalism, while 'Yes' is marked for education and 'Maybe' for citizens in general, NGOs and associations. Since 'Maybe' was used in numerous cases, we decided to focus our analysis only on positive answers, i.e., those marked with 'Yes'.

- To assess whether a resource **supported behavioural change**, our initial step was to review the project objectives to determine if behavioural change was among them. If so, we delved into the project's results to examine whether they had studied the impact of the resource or



project in fostering citizens' behavioural change. Unfortunately, identified projects did not measure their impact on behavioural change, leaving us with minimal insight into their effectiveness. Nonetheless, some could **indirectly support or influence a change in citizens' behaviour**. For instance, they raised awareness and increased understanding of climate change adaptation¹⁶ and disinformation¹⁷. The corresponding final list of CBRs created by EU-funded projects is included in **Annex 1**.

Similarly, the dataset of CBRs for tackling disinformation campaigns included the following fields (Box 2).

Table 2 is also used to describe the main fields for CBRs aimed at tackling disinformation. The corresponding final list of CBRs created by EU-funded projects is included in **Annex 2**.

Name of the EU-project; Link to project; Start year; End year; Location of the pilots (if applicable); Name of the capacity building resource; Link to resource; Type of resource; Type of capacity building; Main Target Group; Research/Academia; Public sector; Private sector; Third sector; Journalism/Science communication; Education; Citizens in general; Does it promote citizen's behavioural change?; Main language; Other languages; Brief description of the resource; Further comments

Box 2. Data fields of capacity building resources created by EU-funded projects aimed to tackle disinformation.

3.2 Identifying and Characterising Fact-Check Resources

The **identification of fact-checking resources** dedicated to debunking climate change misinformation was achieved by leveraging the **expertise of our consortium**, particularly ATC, IIASA and CMCC. In addition, all partners contributed through **desk research**, primarily through Google searches using specific keywords.

ATC conducted online research using keywords in **English**. The aim was to identify resources with a dual role: (1) to be used by citizens in different countries, so their content is mainly in English, and (2) to contribute to the development of soft skills related to the topic under examination (climate change and disinformation).

The research was conducted using keywords such as “**climate change**”, “**disinformation**”, “**misinformation**”, “**fake news**”, which related to climate change and misinformation. The results were evaluated according to the requirements of the project, the value of the material identified and the validity of the organization that created it.

¹⁶ <https://climate-adapt.eea.europa.eu/en/metadata/adaptation-options/awareness-campaigns-for-behavioural-change>

¹⁷ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52018JC0036>



Emphasis was given on accessibility and the overall impact of the resources in terms of soft skills enhancement. Thus, we promoted open-access resources (free material), with varying levels of discourse addressed to both experts and non-experts. Additionally, a determining criterion was whether the resources provide insights into the narratives used by climate change deniers accompanied by scientific debunks for each narrative.

Initially, **most of the resources we found were in English**. Later, we expanded our search to **include other languages** relevant to our pilot regions (Italy, Spain, Germany and Sweden), taking advantage of the presence and expertise of Partners in these countries, specifically, German-speaking countries (Germany, Austria), Spain and Italy.

In the case of **Austria**, keywords related to fact-checking and to climate change to identify relevant fact-checking websites and resources in German were used, such as “Faktencheck”, “Fakten”, “Mythen”, “Fehlinformation”, Disinformation” AND “Klima”/“Klimawandel”.

In the same vein, the keywords used for finding resources in **Spanish** were: “fact check” AND “cambio climático”, “desinformación” AND “cambio climático”, “verifica” AND “cambio climático”. The search terms sometimes yielded results that did not directly correspond to a fact-checking resource. Still, they included small news items or articles that addressed the topic without providing specific insights or tools. This type of overly generalised articles was dismissed. It is also worth mentioning that we had previous knowledge of well-known fact-checking resources in Spain, which were included before the search.

In the case of the **Italian** websites, the keywords used were both in Italian as well as in English, as in many cases, people in this region use anglicisms and therefore the words in English can easily be understood and linked to multiple sites. Among the various concepts that were used to identify the fact-check websites, the most common ones were: “disinformazione”, “fake news”, “notizie false o bufale”, “fake news crisi climatica”, “crisi climatica”, “bufale sul climate change”. Based on the initial screening, the sites that tackled these concepts were considered, and a more in-depth analysis was conducted to test the degree to which it focused on fighting disinformation. Additionally, an in-depth analysis of the websites that were recommended in the official climate change adaptation platforms of each country was also conducted. For instance, in the case of the Italian pilot, the research also included an evaluation of the projects and platforms suggested within the *Piattaforma Nazionale di Adattamento ai Cambiamenti Climatici*.¹⁸ Lastly, other websites that focus on fact-checking were identified thanks to suggestions made by experts in these fields, particularly from Academic institutions (e.g. *Università degli Studi della Campania “Luigi Vanvitelli”*), non-governmental organizations such as WWF or *Legambiente* in the specific case of Italy.

¹⁸ See official website: <https://climadat.isprambiente.it/> [last accessed November 14th 2023]



In many instances, it was evaluated that the website provided detailed data regarding the climate change crisis and the potential effects in various regions and related areas. However, it did not solely focus on debunking fake news. In those circumstances, the site was not considered in the final review as it was deemed necessary to **focus primarily on those websites whose objective specifically addressed disinformation** and had areas of the platform where users could interact and fact-check any false claims.

In this context, it was also evaluated which websites this platform officially suggested and whether they had a specific relevance in debunking information. In most cases, the websites were not specifically dedicated to this objective, although they had subsections and topics that focused on bridging the knowledge gap.

For the development of the fact-checking resources database, we began with an initial list from various countries, later expanding it with contributions from all partners in their respective countries and languages. We then defined the attributes to characterize each resource. Similar to the elaboration of the fields in the CBRs database, these fields were dynamically defined as the classification work progressed. When we had a large number of resources analysed, we were able to define the definitive fields in the database; these are shown in Box 3.

Organisation; Country; Social sector creating the resource; Name (resource)/Title (paper); Date (for papers/publications); Type of resource; Main target group; Research/Academia; Public sector; Private sector; Third sector; Journalism/Science communication; Education; Citizens in general; Climate change specific; Geographical scope; Main language; Other languages; Brief description of the resource; Resource link.

Box 3. Data fields used in the analysis of fact-checking resources.

Moreover, Table 3 introduces three new fields that complement those already defined in Table 2, namely the table corresponding to the CBRs created by EU-funded projects, along with their descriptions. As can be observed, a relevant field is dedicated to the sector that created the resource.

Table 3. Three specific fields of the database of fact check resources.

Field	Description
Country	Country hosting the entity. We included an 'International' option for when two or more countries were involved.
Social sector creating the Resource	Research centres and Academia; Government, public administration (public sector); Local business, SMEs, industry (private sector); Local communities, associations, foundations, NGOs (third sector or civil society); Citizens in general; Journalists and science communicators; Education; Think Tank
Geographical scope	Local, Regional (e.g., Scandinavia), National, International



The internal criteria defined for the items where doubts could arise, in addition to those discussed in the previous section, were as follows:

- **Climate Change Specific (Yes/No).** We used ‘Yes’ only when the resource is devoted to climate change (e.g., not a climate change section of a website but a website specifically devoted to climate change).
- **Target groups.** Resources created by mainstream media were marked as ‘Yes’ for all target groups unless they were very specific. For example, a mainstream site called Politico would be marked as ‘Maybe’ for all groups except policy, which is its specific target. Websites with a dedicated section for climate change, such as NASA, were marked as ‘Yes’ for all groups, with the main target group potentially being the public sector.

3.3 Scientific literature to tackle mis/disinformation related to climate change

For our search for articles on climate change misinformation and disinformation, we used the **Web of Science (WoS) Core Collection** as our main source. Some articles we were aware of before the search were among the results of the developed database.

Regarding other databases, we used WoS and not Scopus, considering the possibility of obtaining a very high number of duplicate articles. Specifically, both databases have similar characteristics in terms of two types of biases: on the one hand, both favour Natural Sciences and Engineering, as well as Biomedical Research, to the detriment of Social Sciences and Arts and Humanities; on the other hand, they favour English-language journals to the detriment of other languages.¹⁹

Considering that the topic of disinformation is approached more from the field of social sciences, the first type of bias may imply that we find fewer articles than published. This matters in that we may be missing some relevant research, albeit it is not a problem from the point of view that we are not seeking to do any comparative studies. What we are looking for is to compile in a repository a list of **rigorous and useful papers** addressing the issue of misinformation and disinformation with regards to climate change. This list will be a resource that AGORA and other projects, organisations or individuals working on this issue can turn to for information to guide them in the development of their activities (Annex 4). As for the second type of bias, the fact that most of the articles were written in English is not an obstacle since professional researchers generally consult the academic literature. The problem would be if the geographical localisation of the issues addressed were limited to one area or a small set of countries. In any case, a broader literature review would involve consulting other databases.

¹⁹ Mongeon, P., Paul-Hus, A. The journal coverage of Web of Science and Scopus: a comparative analysis. *Scientometrics* 106, 213–228 (2016). <https://doi.org/10.1007/s11192-015-1765-5>



As for the search methodology, the prioritised search field is **the abstract** through two sets of keywords, namely, “**climate change**” AND “**disinformation**” and “**climate change**” AND “**misinformation**”. The results are 44 publications for the first search and 137 for the second one, totalling 181 results. From the total of these publications, we eliminated duplicates, leaving 167. Among these, we selected those that aligned with our interests. Although search terms sometimes appear in the abstract, they are not always essential to the corresponding publications. Therefore, for the selection process, **we also checked the title and keywords**. In addition, we considered that, in these three fields (title, keywords, and abstract), there may be terms closely related to climate change and dis/misinformation, such as ‘global warming’ or ‘fake news’. This process involved two people working in parallel; many identifications coincided. We selected the set of papers according to the Task 1.3 objective, bearing in mind that we were looking for a basis for creating the necessary CBRs fighting disinformation-related climate change. In instances where they did not agree or there was doubt, we collectively examined the three fields and reached a consensus on the selection. The final number of papers was 79.

In addition, we simultaneously found some scientific publications in the search of fact-checking resources. After comparing these publications against the scientific literature database and eliminating duplicates, we were able to add two handbooks. Thus, we retrieved a **collection of 81 scientific publications** on misinformation and disinformation on climate change.

Other sources of scientific literature

The above-mentioned WoS search was complemented by another search using the **Google Scholar and Scopus databases** to address any gaps that may have arisen. To maintain consistency in compiling the results, we employed the **same keywords**: “climate change” AND “disinformation” and “climate change” AND “misinformation”. From the search results, we retrieved a total of 121 valuable resources, including papers and books. We excluded 48 of them as they had already been identified from the research in the WoS platform.

ATC selected 33 non-duplicate scientific resources. We added another 5 resources dealing with misinformation or climate change, whose inclusion was deemed necessary for an optimum approach to the issue. The criteria taken into account for their selection were the citations and the value of their findings for the AGORA project. Therefore, **the total number of scientific papers amounted to 119** (79 from WoS, 38 from Scopus and Google Scholar and 2 identified during the search for fact-checking resources). The list of scientific publications is provided in **Annex 4**.

It should be mentioned that a relatively **small number of scientific resources focusing on disinformation spread, as well as education and disinformation**, has been retrieved. This limitation



may be attributed to the keywords used for the respective topics. Additionally, no search was conducted on specialized topics on climate change, such as global warming or forest fires.

4. Results: mapping and analysis

In the following subsections, we delve into the results obtained from our analysis. We employ a quantitative approach to examine various fields (e.g., type of resource, target group addressed, type of capacity building, among others). At the end of each section, we highlight some of the most innovative and relevant resources discovered during our mapping exercise. Hereafter, the results are presented.

4.1 Existing capacity building resources for climate adaptation

We found **63 CBRs** for climate adaptation (Annex 1), according to the search done in CORDIS and explained in section 3.1.2. In accordance with the fields indicated in

Table 2 (section 3.1.3), the results obtained are as follows:

Result 1. EU Policy Sector

Of the 63 resources analysed, 34.4% focused on climate change in a broad, non-sector-specific context (Figure 2). Additionally, CBRs related to **water management** accounted for 20.3% of the total, followed closely by those addressing **urban adaptation** needs at 15.6%. However, we observe that some of the EU policy sectors, as provided by Climate-ADAPT, were not addressed. For example, the **'Health'** sector, which is strongly linked to climate change adaptation, underscores a potential gap that can be covered in AGORA. In addition, the impacts of climate change on health have been identified as one of the main climate adaptation issues in the Spanish pilot. Other sectors not addressed are **'Biodiversity'** and **'Transport'**.

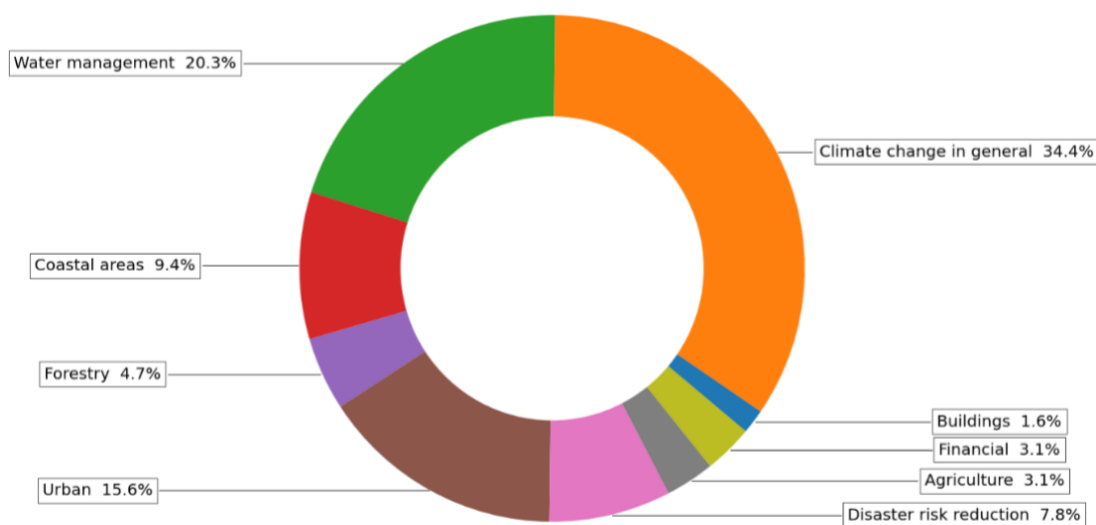


Figure 2. Distribution of capacity building resources for climate adaptation by the EU policy sector (N=63).



Result 2. Climate-related hazards addressed

As highlighted in Figure 3, almost half of the resources identified (46%) targeted climate change in general. We observed that **heavy rains and flash floods** were a prevalent case, accounting for approximately 40%, often in conjunction with **heatwaves** (12.7%), **droughts and water scarcity** (14.3%) and, in a smaller fraction, **sea level rise** (6.3%). **Forest fires**, in contrast, were the central theme in only 9.5% of the resources. This emphasis on resources dedicated to flooding shows a substantial European concern for better adaptation to the environmental, social and economic impacts of such events. According to an EU report²⁰, **floods** are not only highlighted as the most frequent but also the costliest disasters in Europe. Flash floods, in particular, are identified as a common risk across all EU Member States, providing insight into why numerous EU projects focus on researching this hazard. Additionally, there is an upward trend in the number of summer days with strong and very strong **heat stress** across Europe. Regions like southern Spain experienced 50-60 days of very strong heat stress, with some areas registering up to 70 days throughout the summer of 2022²¹. These abnormally high temperatures not only heighten the likelihood of wildfires but also contribute to drought conditions. As we observe in Figure 3, EU-funded projects also touch upon these topics to some extent, highlighting the shared interest in enhancing adaptation to these hazards. Heatwaves, floods, and water scarcity are also identified as key issues in the AGORA pilot regions (Italy, Spain, Germany, and Sweden).

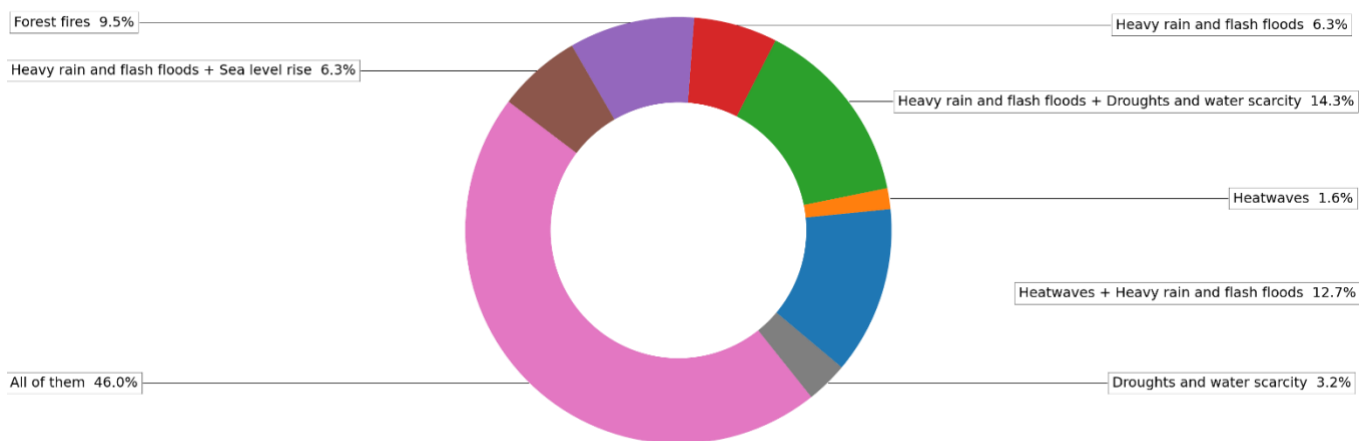


Figure 3. Climate-related hazards addressed by the identified capacity building resources (N=63).

²⁰ <https://civil-protection-knowledge-network.europa.eu/eu-overview-risks/natural-disaster-risks/flooding>

²¹ <https://climate.copernicus.eu/european-heatwave-july-2023-longer-term-context>



Result 3. Type of resource

It is evident that **tools** (such as apps or interactive platforms) and **training materials** (guidelines, webinars, MOOCs) represent a significant portion, with a combined total of 55.6%, as shown in Figure 4. These resources are valuable for different target groups since they offer the possibility to input data and explore and learn what has already been done in other projects, fostering the sharing of knowledge and experiences. **Reports**, including policy briefs, constitute another significant segment at 23.8%. However, it is essential to note that these resources are usually tailored for more specialized audiences. The low percentage in the **media materials** (videos, podcasts, infographics) category suggests an opportunity to produce engaging content, making information about climate change and climate adaptation accessible to a wider audience.

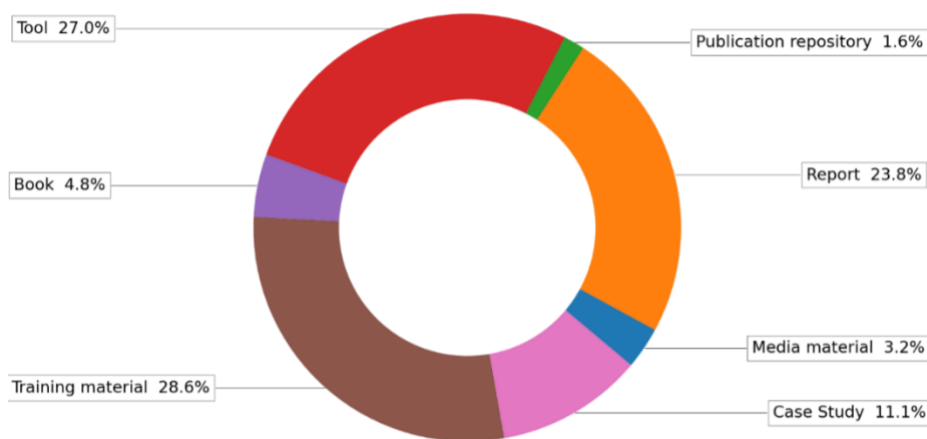


Figure 4. Distribution of capacity building resources for climate change adaptation by type (N=63).

Result 4. Steps to adaptation covered by the CBRs

Each CBR was classified according to the steps of the Adaptation Support Tool²² that they covered. Figure 5 shows that nearly half of them (44.4%) support '**Step 1 – Preparing the ground for adaptation**', suggesting a significant emphasis on the initial stages of the adaptation process. This category includes CBRs that help end-users in collecting information, communicating and raising awareness. Additionally, it encompasses CBRs aimed at guiding end-users in obtaining high-level political support for adaptation and setting up the adaptation process in a structured way, for example, by engaging with diverse stakeholders.

However, we observe a drop in CBRs focused on '**Step 2 - Assessing climate change risks and vulnerabilities**' and '**Step 3 – Identifying adaptation options**', accounting for 19.1% and 17.5%,

²² <https://climate-adapt.eea.europa.eu/en/knowledge/tools/adaptation-support-tool/>



respectively. The following steps, which focus on **assessing the adaptation options** (Step 4), **implementing adaptation** (Step 5), and, lastly, **monitoring and evaluating adaptation** (Step 6), account for approximately 16%. It is especially concerning that only 3.2% of the CBRs aim to monitor and evaluate the adaptation actions since this could mean that the adaptation processes are ineffective and could potentially lead to maladaptation scenarios.

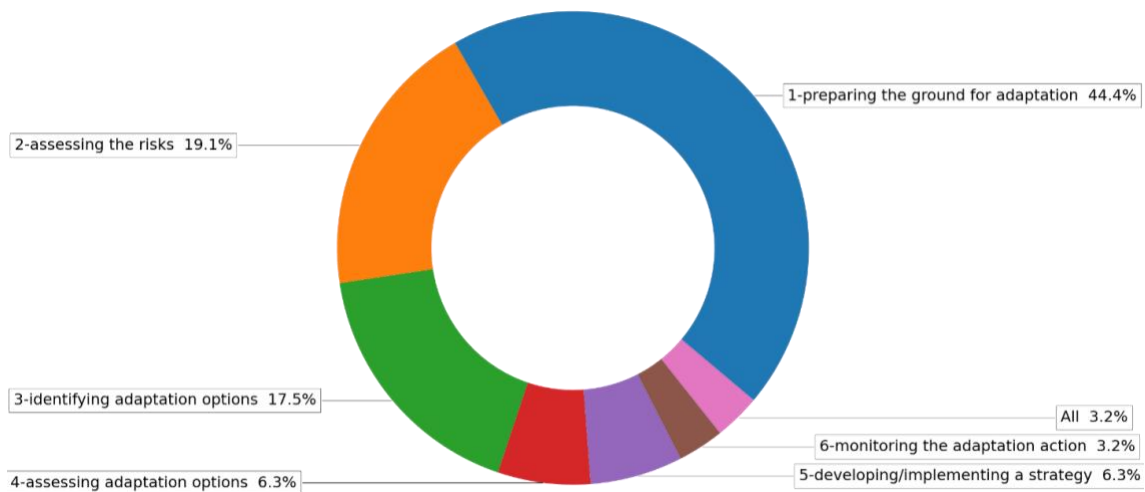


Figure 5. Distribution of capacity building resources based on the adaptation steps they cover (N=63).

Result 5. Type of capacity building

As mentioned before, in this report, we understand ‘capacity building’ as the definition given by Climate-ADAPT. As illustrated in Figure 6, CBRs focused on ‘**Training**’ represent the largest share at 39.7%. These CBRs are specifically designed to equip end-users with the practical skills and knowledge necessary to support the adaptation process in a city or region. ‘**Knowledge Building**’ follows closely, representing 25.4%, signifying a strong emphasis on constructing and advancing knowledge through the exploration, analysis, and synthesis of existing information. This category includes diverse resources such as policy briefs, reports on drivers and barriers to climate adaptation, and tools for assessing adaptation processes. ‘**Networking**’ resources, facilitating the connection of different stakeholders, make up 12.7%. ‘**Awareness Raising**’ and ‘**Observations/Predictions/Projections**’ each contribute 9.5%. The former includes materials designed for a broader audience, aiming to enhance public understanding of climate change and its consequences. The latter category incorporates maps, models projecting future climate change scenarios, and citizen science apps, where citizens can provide data and participate in the co-creation of future adaptation plans or strategies.

The limited representation of ‘**Education**’ and ‘**Technical Assistance**’ CBRs aligns with our search parameters, specifically targeting Horizon 2020 and Horizon Europe projects. On the one hand, our search did not consider materials produced for and/or by schools or universities; on the other, EU



projects usually do not offer technical assistance to tackle specific challenges once the projects have come to an end.

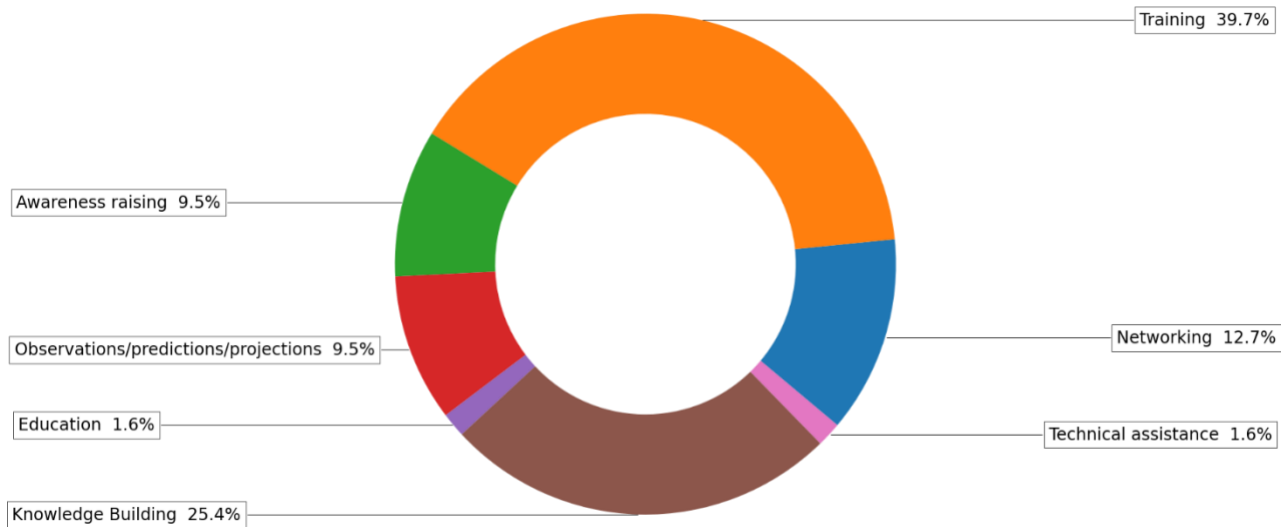


Figure 6. Distribution of capacity building resources for climate adaptation by type of capacity building (N=63).

Result 6. Main target group

Figure 7 shows that CBRs were directed towards **government institutions and public administration** by far, accounting for 73.4% of the total. This could be related to the fact that these entities are often responsible for the implementation and management of climate adaptation policies and strategies.

Importantly, it is worth noting that less than 10% of the CBRs are directed towards **citizens** and the **third sector**. This figure is of concern since the active involvement and support of citizens are vital for driving meaningful change towards a more resilient society. Additionally, the **private sector** receives a mere 3% of CBRs, indicating an area where further attention may be needed.



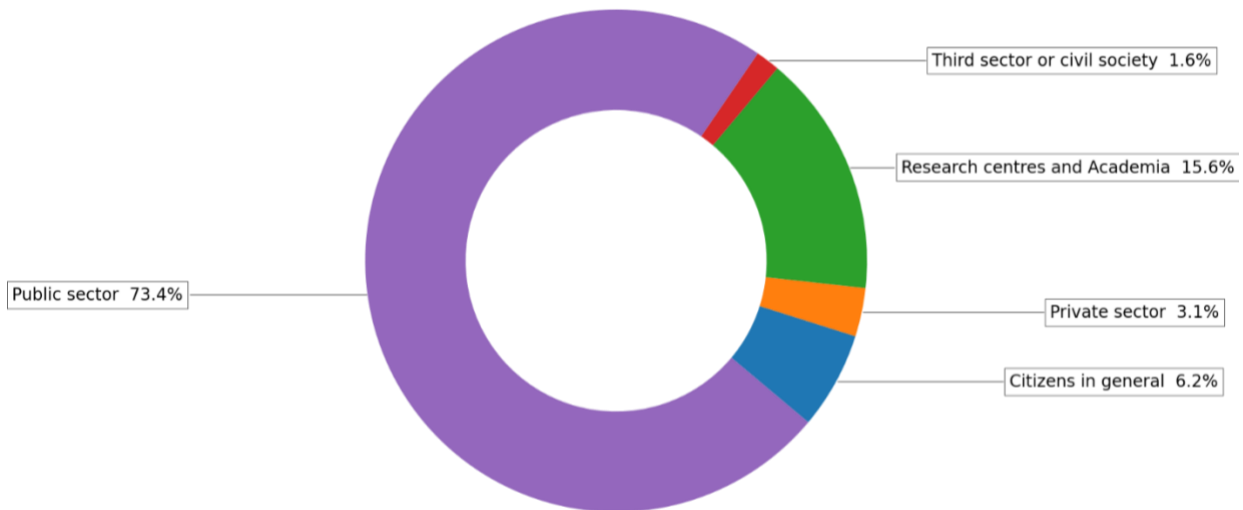


Figure 7. Main target groups addressed by capacity building resources for climate adaptation (N=63).

Selecting one target group per CBR is difficult since many CBRs can be directed towards various target groups. To overcome this barrier, we marked a ‘Yes’ for the different target groups that could be targeted with the same resource. The results are as follows.

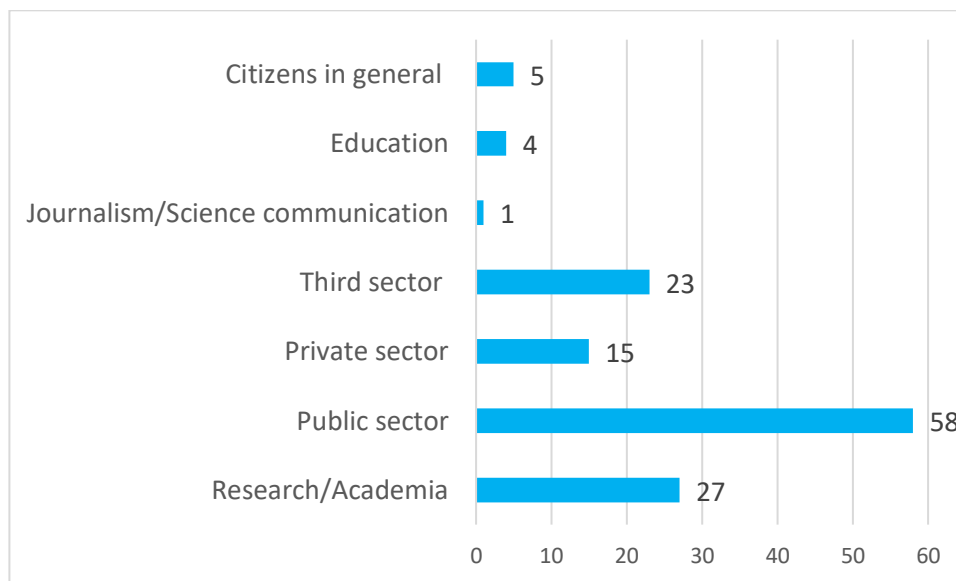


Figure 8. Number of capacity building resources for climate adaptation that can be useful for each target group (N=63; data showing counts).

Figure 8 clearly illustrates that **governments and public administration** remain the largest recipients of capacity building resources (58 resources out of 63 could be of interest or useful to them), followed by **researchers and academics**. Notably, there has been an increase in the allocation of resources to the **third sector** or civil society group, which includes local communities, associations, foundations and NGOs. This increase can be attributed to the fact that many of the CBRs intended for public administration also hold significant relevance for them. These resources often address critical aspects of climate change adaptation that are of mutual interest to both government bodies



and third sector organizations concerned with environmental issues and their impacts on society. Interestingly, only 5 CBRs are useful for **citizens in general**.

Additional insights from our analysis

It is worth mentioning that, within the dataset of 63 identified CBRs, only 6 resources had versions available in languages other than English. Furthermore, a mere 11 of the CBRs made explicit reference to vulnerable groups. These findings underscore additional gaps revealed by our analysis.

In pursuit of effective climate adaptation strategies, we believe that a crucial consideration is the accessibility and inclusivity of CBRs. A critical aspect of this is the availability of resources in local languages since not all stakeholders possess proficiency in the English language. Therefore, translating and adapting these resources into local languages can significantly enhance their reach and engagement.

Moreover, it is also necessary to produce more resources that are intentionally designed to target vulnerable groups who are disproportionately impacted by the effects of climate change²³. As such, it is important to take them into account, amplify their voices and ensure that their unique needs and perspectives are integrated into adaptation measures. This proactive approach prevents further marginalization of these already at-risk groups and boosts the efficacy of adaptation initiatives.

4.1.1 Capacity building resources for climate adaptation useful for citizens

Hereafter, we present the results of our analysis of CBRs targeted at “**citizens**”. When considering citizens, we include the **third sector** (local communities, NGOs, associations, etc.), i.e., organised citizen groups and **citizens in general** (non-organised individuals), in line with the AGORA distinction between local communities and citizens. As shown in Figure 8, we identified 23 CBRs that were useful for this group. Among those 23 resources, there are 5 that are particularly useful for citizens in general. Note that Figure 8 illustrates that one CBR can be useful for different target groups.

Since the number of CBRs is only 23, the following results are shown with absolute values instead of percentages for the sake of clarity.

Result 1. Climate-related hazards addressed

Figure 9 shows that most resources directed towards citizens address climate change in a general context, lacking a specific focus on a single climate-related hazard. When examining climate-related hazards, a notable emphasis is placed on **heavy rain and flash floods**, mentioned in 10 out of 23 resources, followed by **heatwaves**. Remarkably, we observe that we have identified no CBRs about forest fires aimed at citizens.

²³ <https://unfccc.int/sites/default/files/resource/Considerations%20regarding%20vulnerable.pdf>



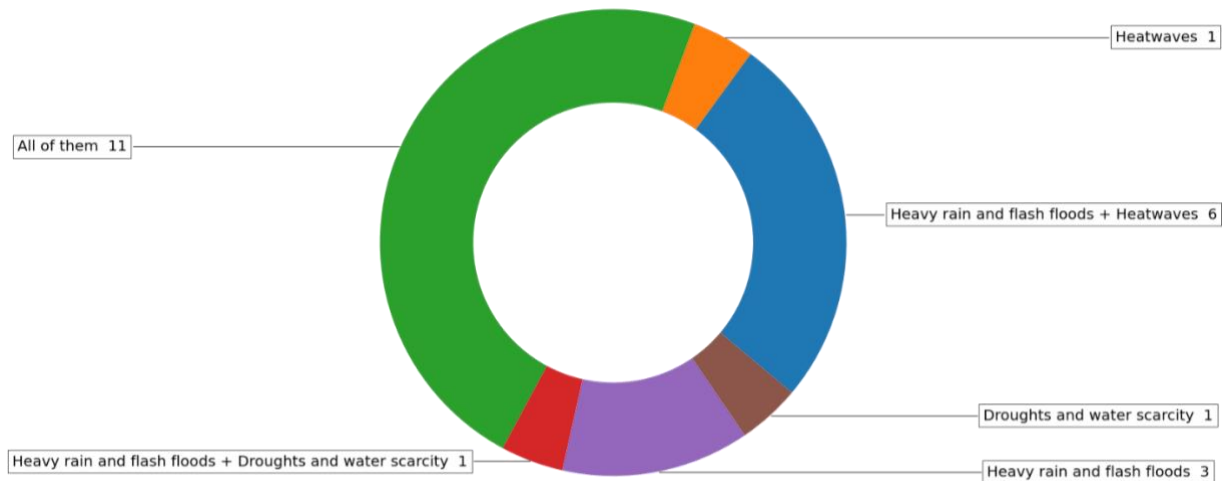


Figure 9. Number of capacity building resources for climate adaptation based on the climate-related hazard addressed (N=23).

Result 2. Type of resource

As illustrated in Figure 10, CBRs directed towards the third sector, educators or the general public often take the form of **tools** (9), such as apps or interactive platforms, or **case studies** (4) typically presented as Storymaps generated in ArcGIS with visually engaging designs. Other identified resources were represented by **reports** (3), **training materials** (3) and **books or handbooks** (2).

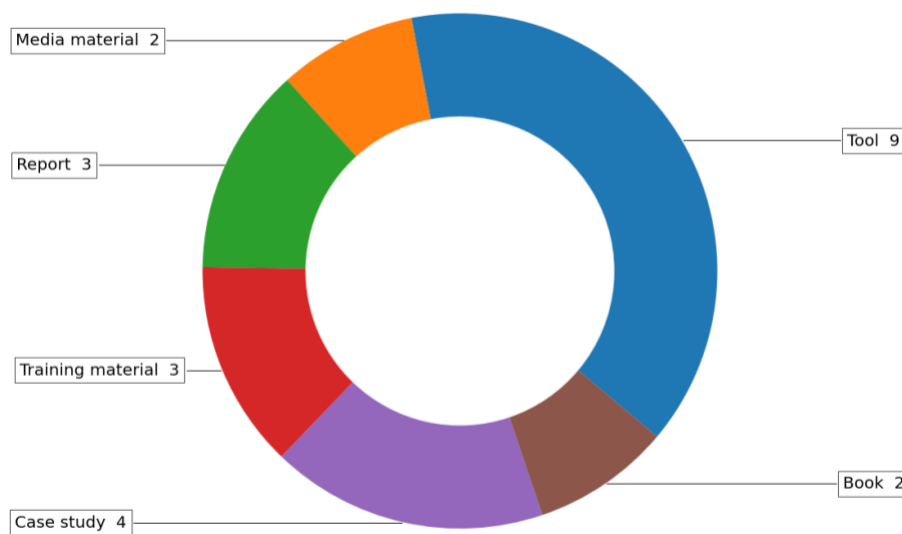


Figure 10. Number of capacity building resources for climate change adaptation by type of resource (N=23).

Result 3. Step to adaptation

As also observed in the previous analysis of overall CBRs (Figure 5), most of the resources targeted towards citizens belong to **'Step 1 – preparing the ground for adaptation'**, aiming at collecting information and raising awareness (see Figure 11). A total of 10 resources belonged to this group. The second largest group covered **'Step 3 – identifying adaptation options'**, including resources that compile mostly NBSs implemented in several regions or cities and serve as inspiration for other



cities involved in creating more resilient environments. We observed that **Step 4 and Step 6 have no representation** regarding CBRs directed to citizens. Therefore, we see a need to involve citizens in the overall process, and not only in the earlier stages.

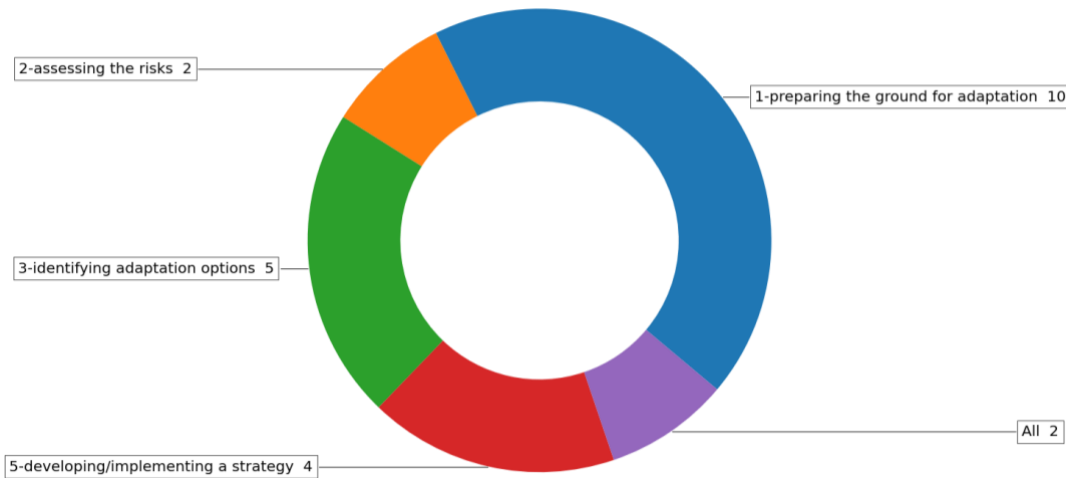


Figure 11. Number of capacity building resources covering each step for adaptation (N=23).

Result 4. Type of capacity building

Figure 12 indicates that **‘Training’** (9), followed by **‘Awareness-raising’** (5) and **‘Observations, predictions or projections of climate change’** (4), are the opted-for modes of building citizen’s capacity. We also identified 3 **networking platforms**, as well as 1 focusing on **‘Knowledge building’** and 1 on **‘Education’**.

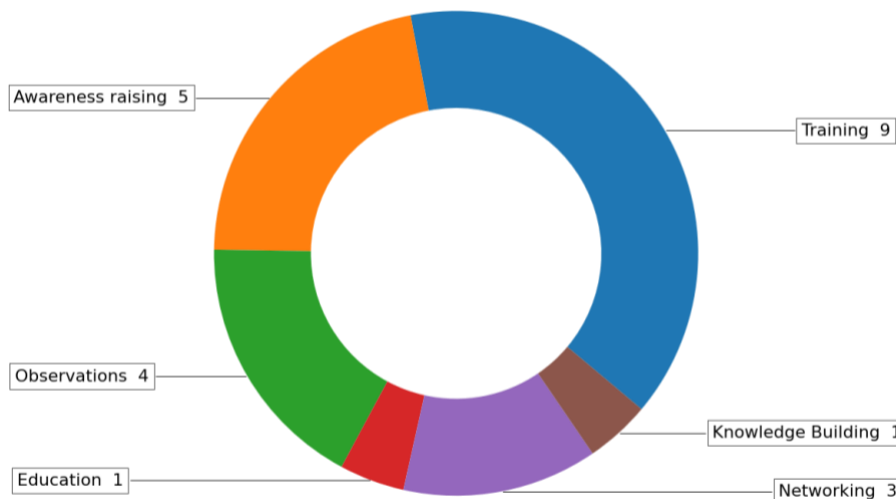


Figure 12. Number of capacity building resources for climate adaptation by type of capacity building (N=23).



4.1.1.1 Building citizens' capacity to adapt to climate change: A focus on behavioural change

When assessing their efficacy in supporting behavioural change, the majority of these CBRs were marked as 'No' in the category 'Does it support behavioural change?' since, as explained in section 3.1.3, identified projects did not measure their impact on behavioural change. However, there were three resources that stood out as potential agents for fostering citizens' behavioural change, since they focus on raising awareness and facilitating an active involvement of citizens in climate actions, for instance, by encouraging them to participate in the co-creation of climate change solutions. It is important to note, however, that we cannot ascertain their impact as no comprehensive impact assessment was conducted throughout the duration of the projects that produced these resources.

- **TERRIFICA's 'Angry face of Nature' video**²⁴. The 5-minute video 'Angry Face of Nature', produced by the TERRIFICA project, serves as an effective capacity building resource for climate change adaptation. Through a visually engaging narrative, the video highlights the impacts of climate change (floods, droughts, forest fires) while specifically addressing the concept of 'urban heat island' and the importance of making cities greener. The video supports a better understanding of climate change through its easy-to-understand language, woven into a conversation between a child and a climate scientist. The video encourages viewers to participate in citizen science campaigns to support the definition and implementation of just and equitable solutions in their cities. A great feature of the resource is its acknowledgement of vulnerable groups, particularly the elderly and those with health vulnerabilities. The video is filmed in Serbian, but with English subtitles, ensuring accessibility across a wide range of countries.
- **TERRIFICA's Crowdmapping tool and map**²⁵. This crowdmapping tool empowers citizens to mark specific locations in their regions with markers indicating various factors, such as comfort or negative effects during heatwaves, low or high risks related to water and extreme winds, good or bad air quality, and proper soil management or soil degradation. These markers are then visually represented on a map. Citizens can further enhance their input by providing information explaining the reason behind each marker and proposing solutions. We identified this CBR as a potential promoter of behavioural change because it increases citizens' awareness and knowledge about how well their cities or towns are adapted to climate change, specifically concerning heatwaves and water. The tool empowers them to highlight areas needing improvement and propose solutions. Moreover, the tool serves the purpose of collecting qualitative data for co-creating local or regional adaptation plans, further fostering community involvement in the fight against climate change.
- **REACHOUT Climate stories**²⁶. These stories effectively raise awareness by using a storytelling approach to communicate scientific knowledge to citizens, fostering a better

²⁴ <https://youtu.be/cRpfoyhgxBE?feature=shared>

²⁵ <http://climatemapping.terrifica.eu/>

²⁶ <https://reachout-cities.eu/climate-stories/>



understanding of climate change and its impacts on a personal level. This narrative structure, centred on relatable stories and experiences (e.g., Javier and Mariás’s experience in Logroño regarding heatwaves), could promote citizens engagement since it allows citizens to connect emotionally with the characters and their challenges, potentially encouraging them to consider their own roles in climate adaptation. The storytelling approach aims to motivate citizens to take action. As seen in the example, after learning about the impact of heatwaves, Javier and María express a desire to contribute to climate change mitigation and adaptation by exploring initiatives on the town hall's website, encouraging the reader also to discover and get involved in local initiatives to combat climate change.

4.1.2 Best Practices in Capacity-Building Resources for Climate Adaptation

Throughout our analysis, we encountered additional resources that, while not explicitly designed to promote behavioural change *per se*, could be of great value for AGORA and other climate adaptation projects. These resources provide in-depth insights into case studies, offer a plethora of adaptation options centred around nature-based solutions (NBSs), and serve as networking platforms, fostering knowledge-sharing and collaboration among nations or regions facing similar adaptation challenges. These CBRs are as follows:

- **RESCCUE Resilient cities facing climate change e-book**²⁷. This e-book presents successful experiences from three pilot cities: Barcelona, Bristol, and Lisbon. Within dedicated sections for each pilot, end-users have access to external links offering more in-depth information on how these cities are actively responding to the impacts of climate change. The e-book provides best-practice advice on essential aspects like stakeholder engagement and developing a Resilience Action Plan. It includes detailed information on the procedural steps taken in each pilot region. This insightful content is designed to be replicable, offering a practical guide for other initiatives. The resource encapsulates the lessons learned from the project in a visually appealing format, ensuring clarity and enhancing readability. Moreover, including external links to official databases and websites from local authorities is also a great feature since it provides additional relevant information about the pilot regions.
- **UNALAB Implementing NBS in Tampere**²⁸, **Eindhoven**²⁹ and **Genova**³⁰. These resources consist of Storymaps generated with ArcGIS, offering an overview of the regions and their challenges related to climate adaptation (such as flooding and stormwater management). These Storymaps highlight examples of NBSs implemented in cities, providing the specific locations and details of their benefits in a visually interactive way. The NBSs were developed in collaboration with residents and local stakeholders as part of the different events held by

²⁷ <https://toolkit.resccue.eu/wp-content/uploads/2021/11/RESCCUE-e-book.pdf>

²⁸ <https://storymaps.arcgis.com/stories/db53861d8dbc448f878d3cef14a1e1ec>

²⁹ <https://storymaps.arcgis.com/stories/dd013aeab97240398f0bb5917643c9e5>

³⁰ <https://storymaps.arcgis.com/stories/a7749fc8855342ab9b4336abc5cee80f>



the project. This inclusive approach aimed to empower citizens by providing them with insights into the climate challenges facing their regions and actively involving them in co-creating solutions. It stands as a source of inspiration for other projects focusing on implementing NBS to reduce the effects of climate change.

- **UNALAB NBS Best practices booklet**³¹. This booklet encompasses best practices derived from the UNALAB project. It encapsulates key aspects of successful NBS implementation within a user-friendly format. The content is organized into relevant sections, covering crucial elements such as stakeholder engagement. Additionally, it provides insights into innovative financing mechanisms and strategies for embedding NBSs into existing climate adaptation strategies and plans. Each section is accompanied by practical recommendations.
- **NATURVATION: Urban Nature Atlas**³². This atlas offers users access to a collection of more than 1000 inspiring NBSs from European cities and beyond. Designed as an interactive platform, the atlas has a search bar and filters to streamline the discovery of projects based on specific challenges. A virtual map enhances the user experience by showcasing regions that have successfully implemented NBSs to combat the effects of climate change. Stakeholders can explore these initiatives and potentially replicate them in their respective cities. The platform provides a comprehensive overview of each project, offering general information along with deeper insights into its governance, financing, impact, and monitoring.
- **REGILIENCE: Self-assessment tool to spot risks of maladaptation**³³. This CBR stands out as one of the most innovative: a tool specifically designed to assess the risk of maladaptation. This tool guides users through a checklist comprising 17 questions, each focusing on a distinct risk factor for maladaptation. As a general rule, the more checklist questions answered with 'no' or 'partially', the higher the maladaptation risk. Once the whole checklist has been completed, all questions marked with 'no' shall be further investigated because they imply a potential risk of maladaptation. Given the lack of resources assessing or monitoring adaptation actions (Figure 5), we believe it is important to highlight this tool.
- **CONNECTING Nature: UrbanByNature capacity building programme**³⁴. UrbanByNature is a facilitated capacity-building programme promoting exchange among cities, researchers, SMEs and NGOs to build bridges with the NBSs communities across Europe, Asia, Latin America and other interested regions. After filling in a registration form, stakeholders will receive notifications about upcoming webinars, events, learning opportunities, as well as publications and new resources on urban nature.
- **CONNECTING Nature: Enterprise Platform**³⁵. This platform provides a space for nature-based enterprises to connect with their peers and potential buyers, explore best practices

³¹ <https://unalab.eu/system/files/2022-09/d712-unalab-nbs-best-practices-kit2022-09-29.pdf>

³² <https://una.city/>

³³ <https://regilience.eu/self-assessment-tool-for-maladaptation/>

³⁴ <https://urbanbynature.eu/programme>

³⁵ <https://naturebasedenterprise.com/>



and stay informed about market trends. There are 10 dynamic communities of practice (ecosystem restoration and diversity, green buildings, urban landscapes, regenerative agriculture, regenerative forestry, water management, community engagement, health and wellbeing, regenerative tourism and smart tech) led by industry ambassadors who organise regular webinars, activities and courses to keep everyone connected and foster knowledge sharing. Considering there are limited resources exclusively designed for enterprises, it is important to emphasize that this platform represents the largest community of nature-based enterprises in the world. It is also free of registration fees, making it accessible to all.

- **REACHOUT Triple-A toolkit**³⁶. This toolkit includes tools and resources to better understand the risks and opportunities associated with climate change, prioritise adaptation measures and develop effective adaptation strategies for cities. In addition, the toolkit includes a set of user-based questions to guide decision-makers and stakeholders to the most appropriate tool to enhance resilience as well as a strategic planner to create formalized adaptation plans or strategies and to facilitate the design of effective climate services tailored to the specific needs of the end-users. In addition, the toolkit also features the previously mentioned climate stories. Overall, we highlight this toolkit because of its relevant tools, which support different phases of the adaptation process and are aimed at different target groups.

4.2 Existing capacity building resources to tackle disinformation related to climate change

In this analysis, our CORDIS search came up with 17 projects, from which only 2 (Co-Inform³⁷ and Peritia³⁸) had generated relevant CBRs about disinformation and climate change, underscoring the necessity of further exploring how disinformation about climate change is delaying climate action and how **media literacy** can prepare societies to be more resilient to deceiving information.

Initially, a mere total of 8 CBRs were identified in this search. Since this number was not satisfactory, we decided to add some more EU-funded projects leveraging on the expertise and knowledge from our consortium, adding a total of 9 additional CBRs from 3 more projects (SLACC³⁹, TINTIN⁴⁰ and Anti-Rumour⁴¹), co-funded by the EC within the Erasmus+ programme. These resources are listed in **Annex 2**.

As in section 4.1.1, since the final number of CBRs is small (17 in total), we do not show percentages but absolute values in the figures.

³⁶ <https://reachout-cities.eu/triple-a-toolkit/>

³⁷ <https://coinform.eu/>

³⁸ <https://peritia-trust.eu/>

³⁹ <https://slacc-project.eu/>

⁴⁰ <http://portability.mydocumenta.com/preview22464>

⁴¹ <https://anti-rumour.eu/>



Result 1. Type of resource

Out of the 17 identified CBRs to tackle disinformation, nearly half take the form of **tools** (5) and **reports** (5), as shown in Figure 13. And, opposite to the CBRs for climate adaptation, **training materials** are not predominant: we found only 1 resource. In the same line, we only found 3 **media materials** (such as videos or podcasts) delving into disinformation, 2 **books or handbooks** and 1 **fact-checking tool**.

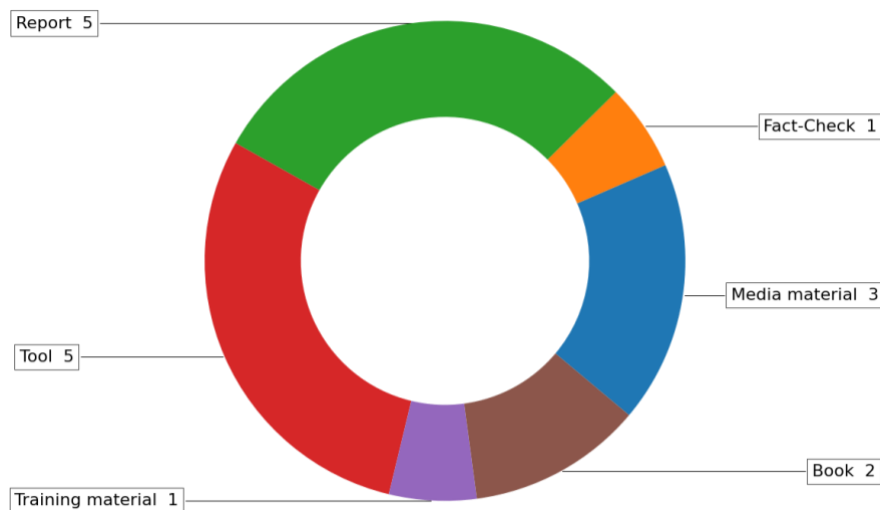


Figure 13. Number of capacity building resources to tackle disinformation by type (N=17).

Result 2. Type of capacity building

As illustrated in Figure 14, most of the resources analysed fall under the ‘**Training**’ category (7). These resources aid end-users in developing skills to spot and effectively counter disinformation. This category includes CBRs such as courses, handbooks, and guidebooks, as well as interactive tools fostering critical thinking. The second largest category was ‘**Knowledge Building**’ (5), which delves a bit deeper into the intricacies of disinformation, providing a more specific understanding. ‘**Awareness raising**’ (4) resources, on the other hand, are more targeted towards citizens, introducing the different modes of disinformation and sharing reliable sources for fact-checking. Interestingly, we found no CBRs focused on the ‘**Networking**’ category, indicating a focus on the individual level.



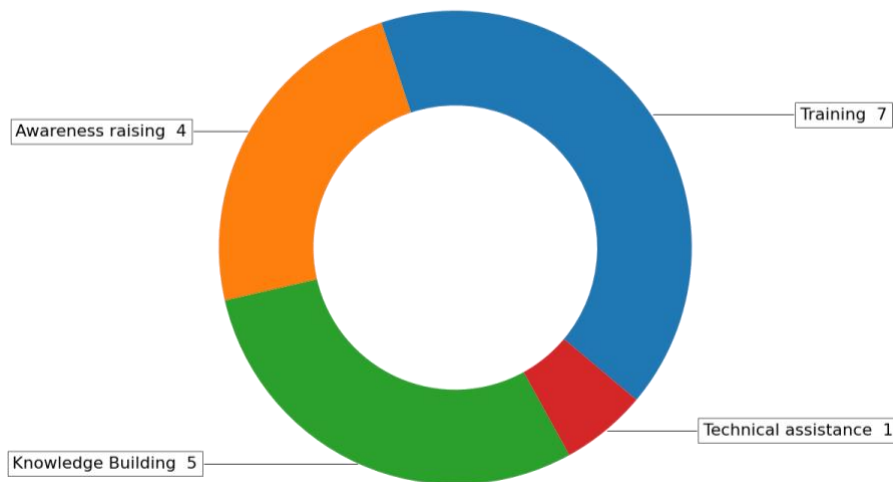


Figure 14. Number of capacity building resources to tackle disinformation by type of capacity building (N=17).

Result 3. Main target group

In contrast to the findings in climate adaptation CBR analysis, **citizens emerge as the primary target audience** for these resources, with 11 resources directed towards them (Figure 15). Most of the projects developing these CBRs aim to educate societies to better detect disinformation by fostering media literacy and critical thinking. We observe that the **public sector, research and academia**, and the **private sector** are less represented in these resources. This discrepancy was expected by the design of our study since we specifically focused on finding resources for citizens. It also highlights the importance of individual empowerment in combating misinformation.

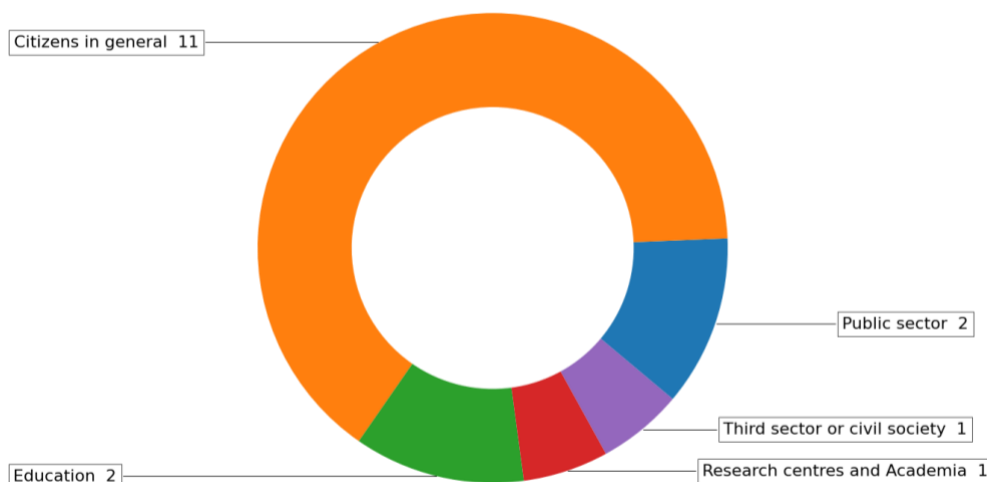


Figure 15. Number of capacity building resources to tackle disinformation by main target group addressed (N=17).

Similar to our approach for climate adaptation, we categorized various target groups for the same set of resources. As shown in Figure 16, a significant number of CBRs proved accessible to the **general public** (14 in total). Remarkably, all of these resources also hold potential interest for **third-sector organizations**. Additionally, 12 resources were identified as valuable for **educational purposes**. Within this group of CBRs, 7 emerged as valuable tools for journalists and science



communicators. Moreover, 6 resources were tailored for the public sector, and 5 were directed at researchers and academics. Notably, only one CBR addressed the private sector – a digital tool designed to verify if a specific Twitter account is spreading misinformation. This resource was marked as ‘Yes’ for all target groups.

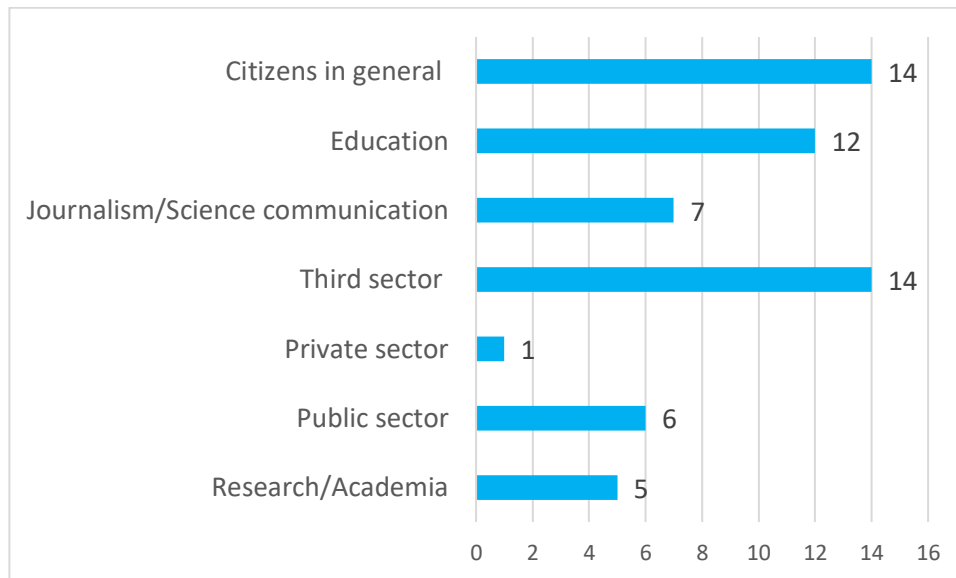


Figure 16. Number of capacity building resources to tackle disinformation that can be useful for each target group (N=17, data showing counts).

Moreover, among the 17 analysed CBRs, 6 of them had versions in languages other than English. Just as in the case of climate adaptation CBRs, we emphasize the significance of **creating resources in local languages** to enhance accessibility and engagement among diverse audiences.

4.2.1 Combating disinformation: Tools for citizens with the potential to support behavioural change

Within the 17 CBRs identified and analysed, we found that 6 could potentially produce a change in citizens’ behaviour, according to our methodology (see section 3.1.3).

- Peritia Toolkit⁴²**. This toolkit is designed to help users determine the trustworthiness of experts. This toolkit aims to help users decide when to rely on expert advice and when they are right to be distrustful. It has been designed to be accessible to everyone, including secondary school students, regardless of their technical expertise. The toolkit consists of quizzes where users can test whether they know which information is reliable. After submitting an answer to the quiz, users get a brief explanation of why the answer was wrong or right, with a link to a brief educational video and additional resources for those who want to deepen their knowledge.

⁴² <https://peritia-trust.eu/toolkit/>



- **SLACC Climate lies**⁴³. SLACC objective is “to increase critical thinking in young people so they can better unmask fake news and misconceptions about climate change”. The resource ‘Climate lies’ provides practical tips to detect climate misinformation through a series of steps, such as investigating the source, doing a quick background check on the authors, and using reverse image search tools. This resource also offers a compilation of debunked climate myths, including ‘Climate change does not exist’; ‘Climate change is not caused by humans’; ‘The consequences of climate change are not significant’; ‘Climate-friendly policies are bad for the people’; and ‘We couldn't do anything to stop climate change’. This resource not only raises awareness and understanding about climate disinformation but also enhances users' capacity to counteract deceptive information.
- **SLACC Game and online gamification environment**⁴⁴. This resource, hosted on Moodle, allows citizens to test their knowledge of climate change and disinformation and provides them with additional educational resources to deepen their knowledge. The resource is designed to raise awareness and understanding of various types of misleading content. The platform offers an interactive learning experience where users can test their skills, receive feedback on incorrect answers, and better prepare for real-life scenarios involving the identification and countering of disinformation. You must create an account to access the course.
- **TINTIN online platform and curriculum**⁴⁵. Among the goals of the TINTIN project, we found its commitment “to develop, validate and promote an innovative, creative and cross-curricular on-line course on journalism and climate change, where students become actors in promoting behavioural changes”. To achieve this, TINTIN has created an online course in environmental journalism tailored for secondary school students. This resource comprises several didactic units aiming to foster media literacy and encourage community action. The resource actively engages students in addressing climate change and enhances their understanding of journalists' work. The final educational unit focuses on encouraging community action towards climate change, showcasing that the resource goes beyond raising awareness. It guides students on how to reach and impact their communities, potentially fostering behavioural change.
- **Anti-Rumour Guidebook “Fake news, conspiracy theories, and how to spot them”**⁴⁶. The Anti-Rumour project “seeks to provide citizens, particularly young people, the tools to analyse and differentiate truthful news from any kind of misinformation”. The guidebook examines the issues surrounding fake news, conspiracy theories, and rumours, delving into their definitions, historical context and impact on democracy. The chapters also examine the psychology of spreading rumours throughout history, addressing media rumours in the

⁴³ <https://slacc-project.eu/climate-lies/>

⁴⁴ <https://slacc.dieberger.com/>

⁴⁵ <http://portably.mydocumenta.com/preview22696>

⁴⁶ https://anti-rumour.eu/wp-content/uploads/2023/05/PR1.A5-Creation-of-the-Guidebook_Final-Version2.pdf



digital era and providing guidance on dealing with them. Furthermore, the guidebook explores best practices and innovative methodologies for preventing the spread of fake news and conspiracy theories, with specific examples from various EU countries. Additionally, it delves into the education of youth on disinformation through game-based learning.

- **Anti-Rumour Toolkit**⁴⁷. This toolkit provides users with the necessary tools to identify and counter disinformation. The inclusion of serious games encourages users to test their knowledge and increase their understanding regarding mis/disinformation. By providing insights into the strengths and limitations of each tool, the toolkit not only engages users but also empowers them to take practical actions against disinformation. Remarkably, many of the included tools are available in several EU languages besides English.

4.2.2 EDMO: Digital platform against disinformation in Europe

In October 2019, the EC launched a call to set up a digital platform to fight disinformation in Europe. The **European Digital Media Observatory (EDMO)**⁴⁸ was intended as an organization under whose umbrella there would be a joint collaboration of fact-checkers, academics and researchers. Its objective was to **better inform policymakers** at a European level.

The role of EDMO is threefold: (1) to strengthen the work of the European External Action Service (EEAS)⁴⁹; (2) to create the Rapid Alert System for immediate response on issues related to disinformation; and (3) to communicate with platforms and undertake the writing of the Code of Practice.

EDMO provides **free-of-charge training** to those interested in developing their skills on disinformation issues, the vast majority of whom are online. In collaboration with fact-checking organizations from various European countries, a report presenting the **most viral disinformation narratives** is published monthly. This report illustrates the online dissemination of those narratives and their cross-national distribution. EDMO's website includes a repository with free material on media literacy and scientific publications.

In May 2021, the first **eight EDMO Hubs** were launched, with another six at the end of 2022. The EDMO Hubs are transnational consortiums of academic institutions, fact-checking organisations and research centres operating in an EU Member State. Their aim is to **raise awareness and provide insights into disinformation issues at a regional or national level**. Additionally, they provide training and resources to enhance the soft skills of relevant actors and the public. The Edmo Hubs are as follows:

- **ADMO** – Adria Digital Media Observatory (Countries covered: Croatia, Slovenia)

⁴⁷ <https://view.genial.ly/653fab0ddd9e6500112af907>

⁴⁸ <https://edmo.eu/>

⁴⁹ <https://www.eeas.europa.eu/en>



- **BECID** – Baltic Engagement Centre for Combating Information Disorders (Countries covered: Estonia, Latvia and Lithuania)
- **BENEDMO** – Belgium-Netherlands Digital Media and Disinformation Observatory (Countries covered: Belgium and Netherlands)
- **BROD** – Bulgarian-Romanian Observatory of Digital Media (Countries covered: Bulgaria and Romania)
- **CEDMO** – Central European Digital Media Observatory (Countries covered: Slovakia, Czech Republic and Poland)
- **DE FACTO** – Observatoire de l' Information er des Medias (Country covered: France)
- **EDMO BELUX** – Belgium-Luxembourg Research Hub on Digital Media and Disinformation (Countries covered: Belgium and Luxembourg)
- **EDMO Ireland** (Country covered: Ireland)
- **GADMO** – German-Austrian Digital Media Observatory (Countries covered: Austria and Germany)
- **HDMO** – Hungarian Hub Against Disinformation (Country covered: Hungary)
- **IBERIFIER** – Iberian Digital Media Research and Fact-checking Hub (Countries covered: Spain and Portugal)
- **IDMO** – Italian Digital Media Observatory (Country covered: Italy)
- **MEDDMO** – Mediterranean Digital Media Observatory (Countries covered: Greece, Cyprus, Malta)
- **NORDIS** – The Nordic Observatory of Digital Media and Information Disorder (Countries covered: Denmark, Sweden, Norway and Finland)

A **repository with fact-checking articles** can be found on each Hub's website, as well as lists with tools guiding users to identify cases of misinformation and resources on digital and media literacy.

The dissemination of the activities conducted and **raising awareness of disinformation issues** are focal points for all hubs. One of the tasks undertaken is organizing onsite **conferences** and **workshops** for experts and the public.

4.3 Repository of fact-checks and scientific literature

In the following subsections, we introduce the results obtained from the analysis of our compilation of fact-checking websites and resources. Additionally, we provide a list of scientific papers on disinformation and climate change.

4.3.1 Repository of fact-check resources

Hereafter, we explore the findings derived from the analysis and categorization of 154 fact-checking websites and resources, which were identified following the methodology detailed in section 3.2. The list of fact-check resources is included in **Annex 3**.



Note that, as explained in section 3.2, the aim was to identify resources that could be used by citizens in different countries and that contributed to the development of soft skills related to climate change and disinformation. To achieve this goal, our initial approach involved conducting a search using English keywords. This method yielded resources originating from regions beyond the EU scope. Despite their non-EU origin, these resources proved to be valuable and compelling, thus justifying their inclusion in our analysis.

Result 1. Countries of the identified fact-checking websites and resources

As illustrated in Figure 17, the majority of resources identified and used in this report originate from the **United States** at 33.8%, followed by **Italy** at 11.7% and the **United Kingdom** and **Germany** at 11% each. Other countries have a presence in resources but with smaller percentages, such as **Spain** (5.8%), **France** (3.9%) and **Austria** (5.8%). Cumulatively, resources from Belgium, Canada, Hungary, Ireland and Sweden are estimated at 7.8% (cited as “Others” in Figure 17).

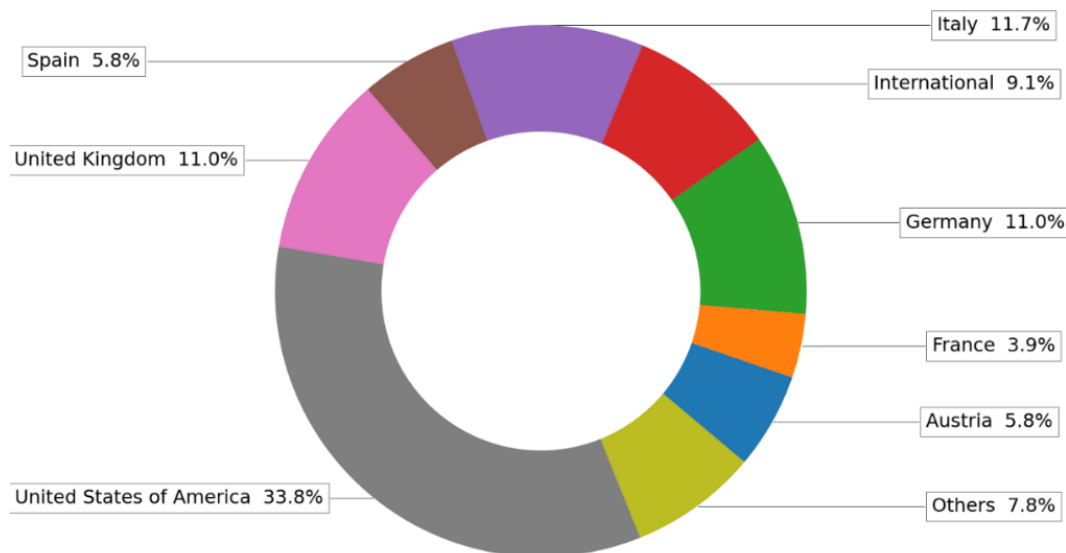


Figure 17. Distribution of fact-checking websites and resources on disinformation by country (N=154).

Result 2. Social sector creating resources to tackle disinformation

As part of the research, those responsible for creating the resources were categorized. Figure 18 illustrates that the largest percentage (38.3%) of resources were created by **journalists or science communicators**, followed by a **third sector or civil society** (26%). **Research centres and Academia** also contributed by 16.9%. Organisations belonging to the **public and private sectors** had low participation (6.5% and 3.9%, respectively). 5.8% of the resources resulted from cooperation between different organisations (classified as mixed/consortium).



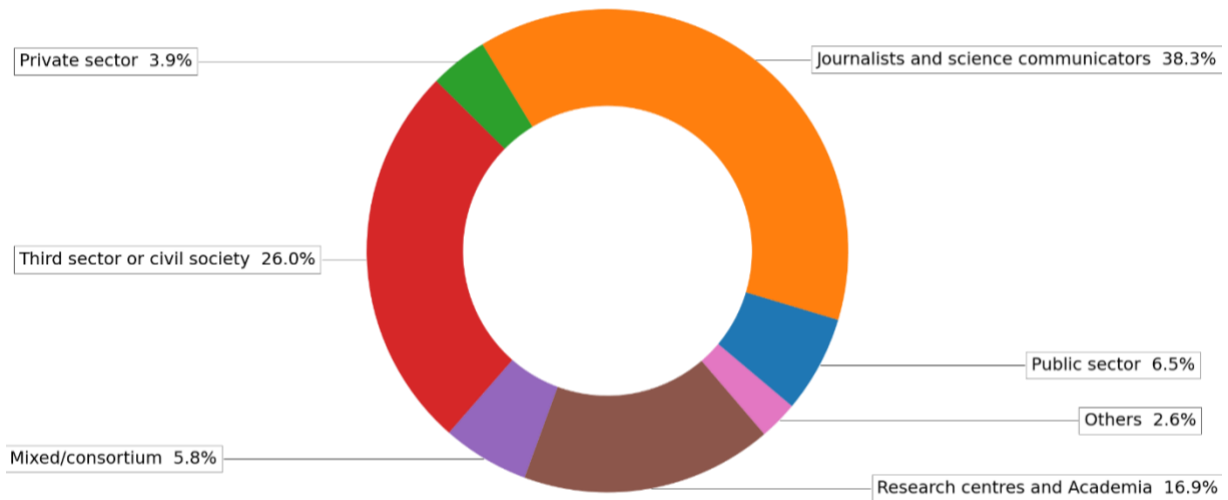


Figure 18. Distribution of fact-checking websites and resources on disinformation by social sector creating the resource (N=154).

Result 3. Type of resource

Cumulatively, as shown in Figure 19, the majority of the resources on climate change and disinformation are **media outlets** (including mainstream and climate-focused newspapers, magazines, radio, TV, and websites) or **fact-checking websites** (39.6% and 21.4%, respectively). The types of resources identified that contribute at a theoretical level are **publication repositories** (9.7%), **reports** (8.4%), **books** (4.6%) and **papers** (4.6%). As regards soft skills enhancement through hands-on experience, the resources include openly accessible **training** by 5.7% and **tools** by 1.3%. The **multimedia material** (including videos, podcasts, infographics, and web blogs) detected is 7.8%.

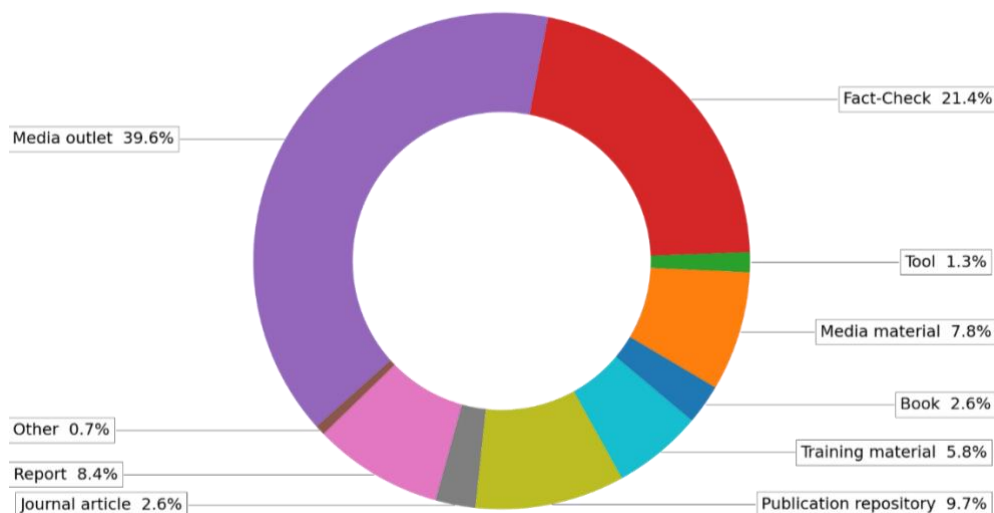


Figure 19. Distribution of fact-checking websites and resources on disinformation by type (N=154).



Result 4. Main target group

Figure 20 shows that more than half of the resources (55.8%) are addressed to the **public in general**, with 5.8% being addressed to the **public sector** and 1.9% to the **private sector**. Cumulatively, 8.4% is intended for organizations related to **education** and **research** (5.2% education and 3.2% research centres/academia). It is worth mentioning that only a small percentage (3.2%) is aimed at **journalists**. Moreover, 23.3% of resources are addressed to more than one of the above target group categories.

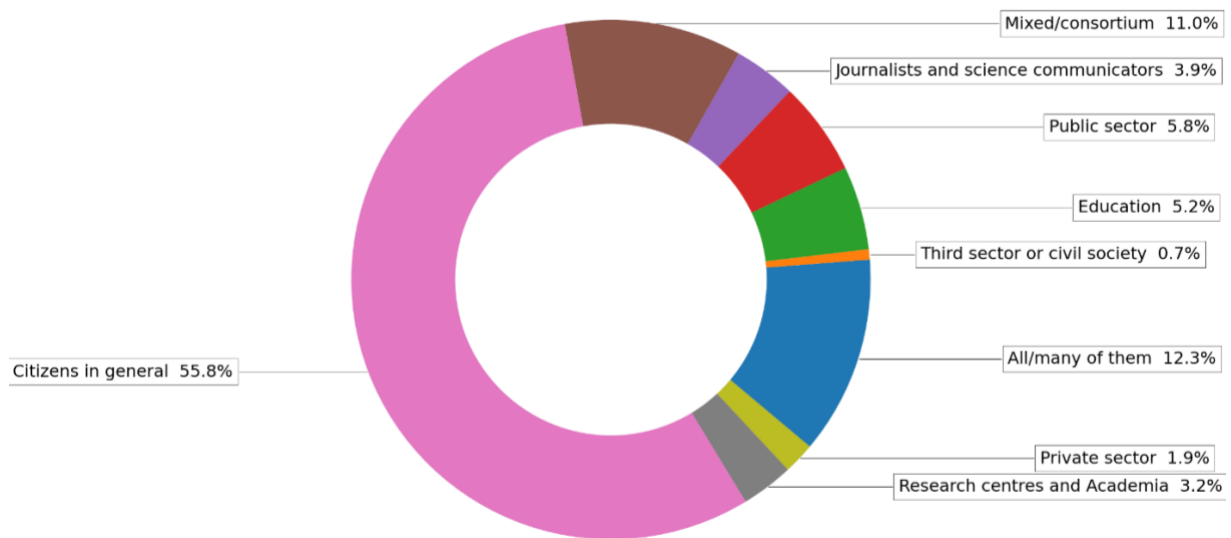


Figure 20. Distribution of fact-checking websites and resources on disinformation by main target group addressed (N=154).

Additionally, Figure 21 illustrates numerical data on the resources identified and whether they meet the needs of **each target group**. The majority of resources (135) are addressed to the **public**. 88 resources are intended for **journalists** or those working in science communication, and 80 for **educators**. More than half of the resources can be used by the **third sector** (65), the **public sector** (58), and **research centres and academia**. Finally, 29 is aimed at the **private sector**. It should be emphasized that more than one target group can use the same resource simultaneously.



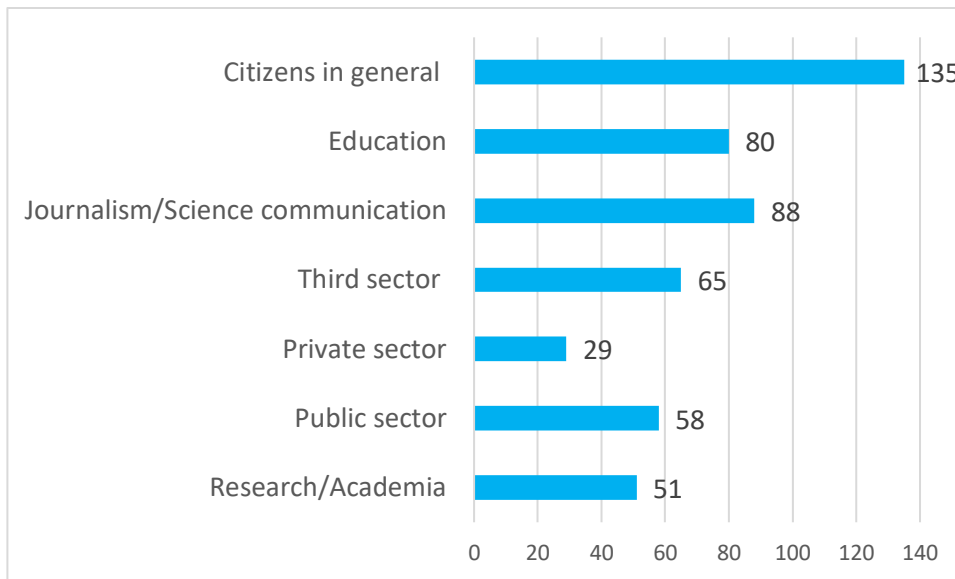


Figure 21. Distribution of fact-checking websites and resources by language (N=154, data showing counts).

Result 5. Resources addressing disinformation broadly and specifically focused on climate change

It should be mentioned at this point that a total of 48.7% of the identified resources are climate change specific, whereas the remaining 51.3% have a wider field of topics including climate change (Figure 22).

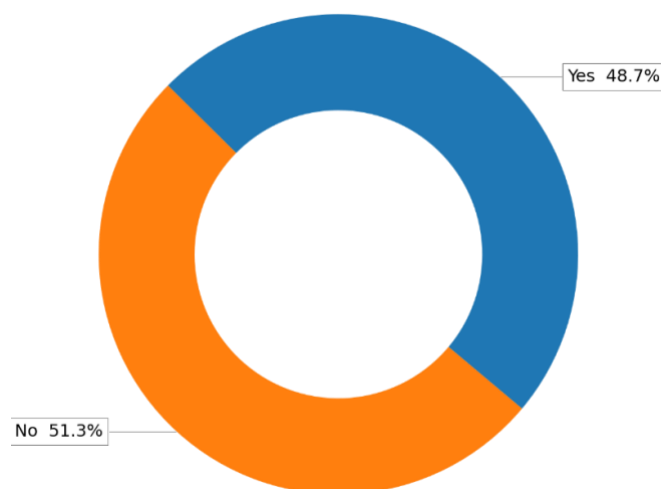


Figure 22. Distribution of fact-checking resources according to whether they address misinformation from different fields (such as politics, health and environment issues) or specific to climate change (N=154).



Result 6. Main language in which the resources are created

As shown in Figure 23, 63.2% of resources are in English, followed by German (17.5%) and Italian (12.7%). 3.6% are written in Spanish/Catalan or Portuguese and 3.0% in Arabic, Dutch, French, Hindi and Hungarian (cited as “Other”).

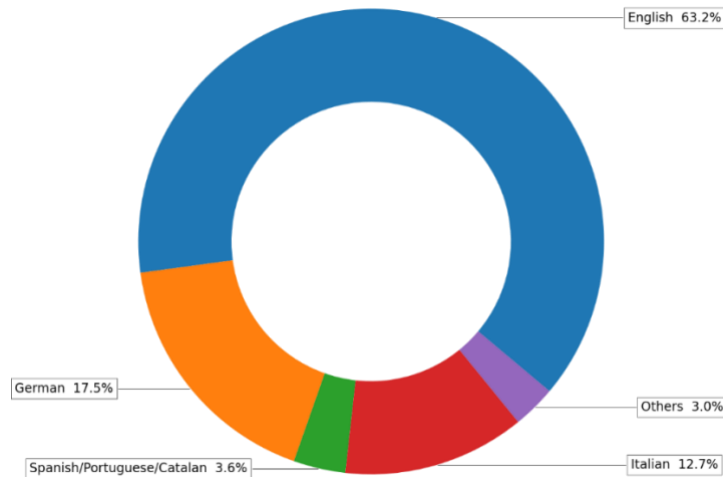


Figure 23. Distribution of fact-checking websites and resources by language (N=154).

Result 7. Geographical scope of the identified fact-checking websites and resources.

The vast majority of the resources (72.1%) selected and analysed in this report focus on climate change issues under an international scope, while 25.3% are at a national level and only 2.6% are at a regional level (Figure 24).

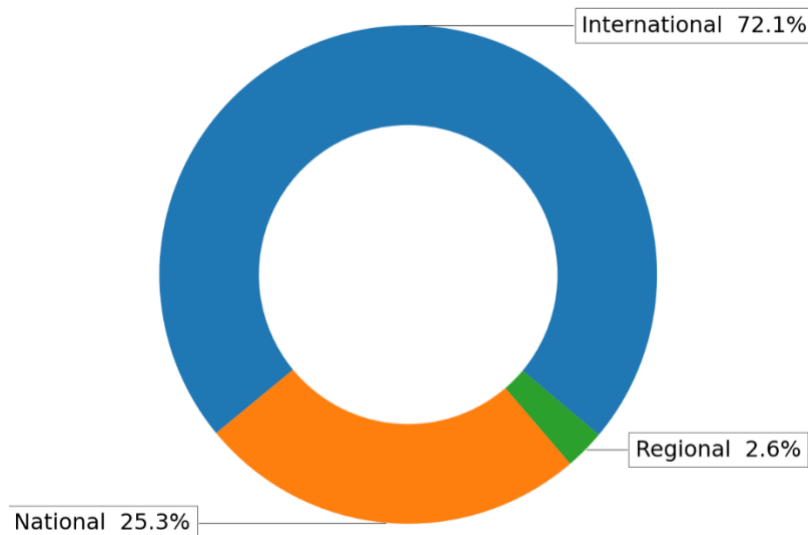


Figure 24. Distribution of fact-checking websites and resources by geographical scope (N=154).



4.3.2 Repository of scientific literature addressing issues related to climate change misinformation

Disinformation refers to any type of false, incorrect, or deceptive information crafted, conveyed, and endorsed with the deliberate intent to cause harm to the public or for financial gain.⁵⁰ Disinformation narratives⁵¹ surrounding climate change have become a significant obstacle to public understanding and effective policy implementation.⁵² As society grapples with the urgent need for climate action, tackling disinformation is imperative to building a more resilient and informed global community.

The literature review aims to examine scientific research on the sources, tactics and consequences of **climate change misinformation** and contribute to a deeper understanding of the **challenges** faced. Of the total number of resources retrieved, 117 were shortlisted (see section 3.3). Added to those were another two books derived from the fact-check resources dataset. After eliminating duplicates included in both datasets, **the total number of resources amounts to 119** (Annex 4).

The roots of climate change misinformation are multifaceted. Therefore, it is imperative to approach it from different perspectives to create resources to target and tackle the phenomenon. **Social media platforms** play a pivotal role in disseminating climate change disinformation⁵³ exacerbate the challenge as they transcend national boundaries. The **echo chamber effect** within online communities further reinforces pre-existing beliefs. Now, it is easier to find validation as the same social media facilitates contact with people sharing the same beliefs living in different countries or socio-economic environments.

In an era characterized by post-truth dynamics, credibility faces a significant challenge. This phenomenon refers to the conditions wherein “objective facts have less influence on opinions and decisions than personal emotions and beliefs⁵⁴”. To enhance credibility, the training of journalists is considered crucial. This comes in line with the results of research in Pakistan⁵⁵ highlighting the fact that interventions should include **educating journalists** on the topics in question. This is imperative when considering that the majority of journalists who are called upon to cover news related to

⁵⁰ Final report of the High Level Expert Group on Fake News and Online Disinformation. (2018, March 12). Shaping Europe’s Digital Future. <https://digital-strategy.ec.europa.eu/en/library/final-report-high-level-expert-group-fake-news-and-online-disinformation>. Retrieved date: 12/11/2023.

⁵¹ In the context of disinformation, the term "narrative" refers to a constructed or fabricated story that is intended to mislead or deceive. According to the Merriam-Webster dictionary, has a few related meanings. A narrative is regarded as “a way of presenting or understanding a situation or series of events that reflects and promotes a particular point of view or set of values”. <https://www.merriam-webster.com/dictionary/narrative>

⁵² *What impact do climate change misinformation and disinformation have?* HTML. (2023, November 16). GOV.UK. <https://www.gov.uk/government/publications/climate-change-misinformation-impacts/what-impact-do-climate-change-misinformation-and-disinformation-have-html>. Retrieved date: 12/11/2023

⁵³ Treen, K. M. D., Williams, H. T. P., & O’Neill, S. J. (2020). Online misinformation about climate change. *Wiley Interdisciplinary Reviews. Climate Change*, 11(5). <https://doi.org/10.1002/wcc.665>

⁵⁴ Whibey, J. & Ward, B. (2016). Communicating About Climate Change with Journalists and Media Producers. *Oxford Research Encyclopedia*. doi:10.1093/acrefore/9780190228620.013.407

⁵⁵ Ejaz, W., Ittefaq, M., & Arif, M. (2021). Understanding influences, misinformation, and Fact-Checking concerning Climate-Change journalism in Pakistan. *Journalism Practice*, 16(2–3), 404–424. <https://doi.org/10.1080/17512786.2021.1972029>



climate change (heat waves, forest fires, floods) described themselves as general reporters⁵⁶ and do not have any expertise in environmental issues.

Research conducted in disinformation and climate change has contributed to an understanding of this field and provides insights on a national basis. Researchers in Germany⁵⁷ cite important data on citizens' attitudes and beliefs.⁵⁸ According to the study, the level of certainty citizens expressed in their understanding of climate change was only approximately half as accurate as their actual knowledge on the subject. Additionally, when considering knowledge accuracy, the confidence accuracy was lower for climate change compared to two benchmark comparisons: general science knowledge in a different national German sample and climate change knowledge in a sample of scientists. Some studies provide insight into the tactics employed in climate change disinformation campaigns. The **misrepresentation of scientific consensus**⁵⁹ illustrates the deliberate attempts to undermine the credibility of climate change scientists. This should be taken into account when designing interventions.

On the other hand, factors at the individual level also seem to matter on how information is perceived by individuals. According to Lewandowsky *et al.* (2017)⁶⁰, **cognitive processes** and **social networks** influence the reception of information by individuals. As the majority of people worldwide are informed through social media, the educational process should include interventions to **promote media and digital literacy**. Also, climate science literacy interventions considering social factors and presenting important information for individuals and communities should be considered.

As mentioned above, a multifaceted approach is needed to tackle climate change disinformation. Targeted and evidence-based interventions should be carried out with communication strategies based on successful models⁶¹. It is imperative that scientific institutions, experts, journalists, civil society and governments cooperate to promote accurate information and cultivate a **more informed public debate on climate change**.

⁵⁶ Straub, N., Painter, J., Ettinger, J., Doutreix, M., Wonneberger, A., & Walton, P. (2021). Reporting on the 2019 European heatwaves and climate change: Journalists' attitudes, motivations and role perceptions. *Journalism Practice*, 16(2–3), 462–485. <https://doi.org/10.1080/17512786.2021.1969988>

⁵⁷ Fischer, H., Amelung, D., & Said, N. (2019). The accuracy of German citizens' confidence in their climate change knowledge. *Nature Climate Change*, 9(10), 776–780. <https://doi.org/10.1038/s41558-019-0563-0>

⁵⁸ Ejaz, W., Ittefaq, M., & Arif, M. (2021). Understanding influences, misinformation, and Fact-Checking concerning Climate-Change journalism in Pakistan. *Journalism Practice*, 16(2–3), 404–424. <https://doi.org/10.1080/17512786.2021.1972029>

⁵⁹ Cook, J., Oreskes, H., Doran, P. T., Anderegg, W. R. L., Verheggen, B., Maibach, E., Carlton, J. S., Lewandowsky, S., Skuce, A. G., Green, S., Nuccitelli, D., Jacobs, P., Richardson, M., Winkler, B., Painting, R., & Rice, K. (2016). Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. *Environmental Research Letters*, 11(4), 048002. <https://doi.org/10.1088/1748-9326/11/4/048002>

⁶⁰ Lewandowsky, S., Ecker, U. K. H., & Cook, J. (2017). Beyond misinformation: Understanding and coping with the “post-truth” era. *Journal of Applied Research in Memory and Cognition*, 6(4), 353–369. <https://doi.org/10.1016/j.jarmac.2017.07.008>

⁶¹ Van Der Linden, S., Leiserowitz, A., & Maibach, E. (2019). The gateway belief model: A large-scale replication. *Journal of Environmental Psychology*, 62, 49–58. <https://doi.org/10.1016/j.jenvp.2019.01.009>



5. Needs and gaps in capacity building for climate adaptation and tackling disinformation campaigns

Based on the above findings, diverse gaps in CBRs for climate change adaptation and tackling disinformation campaigns are identified. The following paragraphs are related to the corresponding results and figures in section 4.1 and 4.2. In the following description we also follow the order of the fields described in

Table 2 (section 3.1.3).

Climate change adaptation

Several needs and gaps have emerged in our analysis of climate change adaptation CBRs generated by EU-funded projects (particularly Horizon 2020 and Horizon Europe). Firstly, within the **EU policy sector** (Figure 2), we observed a **lack of attention to certain critical areas**, such as the ‘Health’ sector, even though climate change affects physical and mental health and well-being⁶².

The research further revealed gaps regarding the **type of resources** generated by projects (Figure 3). The low percentage of resources falling under the ‘media materials’ (video, podcast, infographic, web blogs) category indicates a **potential opportunity to create captivating multimedia content** that is more accessible to the general public. Using media materials to introduce the challenges faced by the AGORA pilot regions and how we are addressing them in the project could be achieved through a storytelling approach. In this approach, local communities become the main actors, sharing their experiences and knowledge to create a more impactful narrative.

When examining the **steps to adaptation** covered by CBRs (Figure 5), we observed that fewer resources are generated further along in the adaptation process, highlighting a **deficiency in CBRs focused on the later stages** of climate adaptation. Only 3% of CBRs addressed Step 6 – Monitoring and Evaluation, which raises concerns about the effectiveness of adaptation processes and the potential for maladaptation scenarios. This outcome highlights a common challenge faced by many EU projects. Adaptation to climate change is a complex process that extends beyond the typical 3–5-year duration of Horizon 2020 and Horizon Europe projects.

In relation to **target groups**, our analysis identified a gap in outreach efforts, with less than 10% of CBRs directed toward **citizens** (i.e., third sector and non-organised citizens) (Figure 7). This issue is concerning since the active involvement and support of citizens are vital for driving meaningful change towards a more resilient society. Additionally, the private sector is also poorly represented, indicating an area where further attention may be needed.

Exclusively examining **resources aimed at citizens** (section 4.1.1), a lack of CBRs addressing forest fires was also observed (Figure 9). Regarding the **type of resources** (Figure 10), there is a clear need

⁶² <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>



to create materials that are accessible to everyone, including those with **limited to no prior knowledge** of climate adaptation. Another identified gap is that CBRs aimed at citizens usually take the form of training and awareness-raising initiatives (Figure 12). Other forms of capacity building should be explored, for instance, **networking**. These types of digital platforms should not only involve stakeholders but also regular citizens, fostering a more inclusive and participatory approach. Notably, we only identified two **citizen science** CBRs for climate change adaptation. Employing this approach could be beneficial, as it facilitates the collection of large-scale data while concurrently strengthening local capacities to address climate change and take action. Citizen science also brings together diverse perspectives and experiences, enriching our understanding of climate change and its implications at the local level. While this approach is gaining traction in climate mitigation projects, it remains **underexplored in the context of climate adaptation**.

Furthermore, it is important to highlight that we found no resources providing insights into how activities carried out in EU-funded projects focused on climate change adaptation supporting **citizens' behavioural change**. In contrast, it seems to be a topic tackled by those focusing on climate mitigation. This information is crucial for gaining a comprehensive understanding of how citizens can be effectively engaged in ways that lead to meaningful behavioural changes.

The overall analysis uncovered additional gaps, such as the limited availability of CBRs in languages other than English and a lack of resources addressing vulnerable groups.

Climate change misinformation and disinformation

Firstly, we highlight the **lack of EU-funded projects** addressing disinformation and misinformation on climate change. We have identified only two projects funded by Horizon 2020 and Horizon Europe that focus on this subject, indicating a significant area for further exploration. Interestingly, we found that many of the CBRs compiled were directed towards **citizens**, indicating a focus on the individual level (guiding individuals on how to identify and counter disinformation). This emphasis becomes more apparent when we note the absence of 'Networking' CBRs.

Additionally, we see a need to go beyond simply educating about misinformation and disinformation. Sharing **practical tips** to help people actively deal with false information is a great way for users to know what to do when they come across misleading content. While section 4.2.1 highlights some best practices that effectively achieve this, it is important to note that many are tailored specifically to high-school students rather than the general public. Moreover, with the rise of Artificial Intelligence, new types of disinformation have emerged; this topic is a new threat that citizens need to be aware of⁶³. Therefore, there is a current need to explore and create new resources in this regard.

⁶³ <https://edmo.eu/2023/04/05/generative-ai-marks-the-beginning-of-a-new-era-for-disinformation/>



The resources focused on disinformation and climate change do not depict the true dimensions of the issue. The majority present **fragmentary information** or are not openly accessible. There arises a need for an online platform that will contain (1) an updated repository with fact-checks on climate change disinformation; (2) relevant educational resources, such as media literacy, digital literacy and science literacy material; and (3) reports on the latest disinformation involving climate change narratives. The platform should be accessible with varying levels of discourse to address experts and non-experts accordingly.

The platform should provide specialized material for educators, climate adaptation advocates and journalists. According to the results of our study, there is a **small amount of relevant material for educators**, which needs to be updated and enriched. No material specifically targeted for climate adaptation advocates or journalists was identified. It is necessary for journalists, especially, to create relevant material to enhance their knowledge of the respective topics.

Another gap identified was the lack of a tool to test one's knowledge of climate disinformation in the form of a game. An **educational game** combining the basic principles of media and digital literacy will greatly contribute to teaching basic concepts and soft skills on climate change.

6. Recommendations for the development of capacity building resources

Building on the previous section on needs and gaps, we provide recommendations for developing innovative CBRs for (1) climate adaptation and (2) combating misinformation. It serves as a foundation for shaping our approach to future AGORA activities, including organising events and workshops (WP2, WP5) and developing new capacity-building materials (WP5), as well as for guiding ongoing and future projects, organisations, or individuals interested in producing CBRs related to the two topics addressed.

Climate change adaptation

- Approach EU policy areas that have received little or no attention to gain a clear understanding of how climate adaptation impacts them and the specific needs and challenges they encounter (e.g., health, biodiversity, transport, cultural heritage, ICT, land use planning, mountain areas and tourism).
- Address the least represented target groups, including citizens in general and the private sector, by exploring their unique needs and challenges through a bottom-up approach and developing tailored CBRs to empower these actors by enhancing their literacy in climate adaptation.
- Engage citizens and other relevant stakeholders actively throughout the entire adaptation process, rather than solely as data collectors or recipients of information (Step 1 – Preparing the ground for adaptation).



- Carry out longer projects or additional projects that further explore and follow up on the climate actions undertaken in EU-funded projects to determine their effectiveness (short-term, mid-term, and long-term).

Climate change misinformation and disinformation

- Expand the target audience for combating misinformation and disinformation beyond students and specialists (i.e., journalists, media professionals, climate adaptation advocates) to address citizens in general.
- Organise existing resources on climate change disinformation in a usable and searchable repository/platform to be made available to journalists and other target audiences.
- Create resources on climate change disinformation for journalists to be used in their work (articles, investigations, etc.) to tackle disinformation narratives and campaigns efficiently.
- Produce targeted multimedia material to increase engagement on social media to raise awareness about climate change disinformation among citizens.
- Curate and organise existing and new resources within brief and focused modules to inform the target audiences about climate change, disinformation narratives and media literacy.
- Provide training and informative material to educate the general public and specialists about the emerging threats caused by the use of generative Artificial Intelligence, such as deceptive visual images and videos, as well as about existing and future means to address these methods efficiently.

Both topics

- Go beyond merely raising awareness and incorporate practical steps that citizens can follow to be better prepared against climate-related hazards and misinformation.
- Conduct research to determine whether the actions carried out within the project have supported behavioural change. This can be achieved through surveys conducted both before and after the implementation of project initiatives.
- Create CBRs in multiple languages to reach broader audiences.
- Develop materials that specifically address the necessities of vulnerable groups, ensuring that no one is left behind.
- Understand the needs of local communities by developing CBRs with them through solid co-creation processes.

7. Annexes

Annex 1 – List of capacity building resources for climate change adaptation created by EU-funded projects. DOI: <https://doi.org/10.5281/zenodo.10389817>

Annex 2 – List of capacity building resources for combating climate mis/disinformation created by EU-funded projects. DOI: <https://doi.org/10.5281/zenodo.10390084>



Annex 3 – Repository of fact-checking websites and resources to combat climate mis/disinformation. DOI: <https://doi.org/10.5281/zenodo.10390171>

Annex 4 – Repository of scientific literature addressing issues related to climate change misinformation (see below).

ANNEX 4. Repository of scientific literature addressing issues related to climate change misinformation

1. Allchin, D. (2020). The credibility game. *The American Biology Teacher*, 82(8), 535–541. <https://doi.org/10.1525/abt.2020.82.8.535>
2. Allen, D. E., & McAleer, M. (2018). Fake news and indifference to scientific fact: President Trump’s confused tweets on global warming, climate change and weather. *Scientometrics*, 117(1), 625–629. <https://doi.org/10.1007/s11192-018-2847-y>
3. Al-Rawi, A., O’Keefe, D., Kane, O., & Bizimana, A. (2021). Twitter’s fake news discourses around climate change and global warming. *Frontiers in Communication*, 6. <https://doi.org/10.3389/fcomm.2021.729818>
4. Auer, M. R., Zhang, Y., & Lee, P. (2014). The potential of microblogs for the study of public perceptions of climate change. *Wiley Interdisciplinary Reviews. Climate Change*, 5(3), 291–296. <https://doi.org/10.1002/wcc.273>
5. Benegal, S., & Motta, M. (2023). Overconfident, resentful, and misinformed: How racial animus motivates confidence in false beliefs. *Social Science Quarterly*, 104(5), 947–970. <https://doi.org/10.1111/ssqu.13224>
6. Benegal, S., & Scruggs, L. (2018). Correcting misinformation about climate change: the impact of partisanship in an experimental setting. *Climatic Change*, 148(1–2), 61–80. <https://doi.org/10.1007/s10584-018-2192-4>
7. Biamby, G., Luo, G., Darrell, T., & Rohrbach, A. (2022). Twitter-COMMs: Detecting climate, COVID, and military multimodal misinformation. *Proceedings of the 2022 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*.
8. Boonprakong, N., Tag, B., & Dingler, T. (2023). Designing technologies to support critical thinking in an age of misinformation. *IEEE pervasive computing*, 22(3), 8–17. <https://doi.org/10.1109/mprv.2023.3275514>
9. Brannon, L., Gold, L., Magee, J., & Walton, G. (2022). The potential of interactivity and gamification within immersive journalism & interactive documentary (I-docs) to explore climate change literacy and inoculate against misinformation. *Journalism Practice*, 16(2–3), 334–364. <https://doi.org/10.1080/17512786.2021.1991439>
10. Brisman, A. (2018). Representing the “invisible crime” of climate change in an age of post-truth. *Theoretical Criminology*, 22(3), 468–491. <https://doi.org/10.1177/1362480618787168>
11. Broomell, S. B., & Davis-Stober, C. P. (2023). The strengths and weaknesses of crowds to address global problems. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*. <https://doi.org/10.1177/17456916231179152>



12. Buchanan, G., Kelly, R., Makri, S., & McKay, D. (2022). Reading between the lies: A classification scheme of types of reply to misinformation in public discussion threads. *ACM SIGIR Conference on Human Information Interaction and Retrieval*.
13. Burivalova, Z., Butler, R. A., & Wilcove, D. S. (2018). Analyzing Google search data to debunk myths about the public's interest in conservation. *Frontiers in Ecology and the Environment*, 16(9), 509–514. <https://doi.org/10.1002/fee.1962>
14. Caserini, S., Coyaud, S., Persico, G., & Messori, G. (2021). Evaluating the scientific credentials of the supporters of public petitions denying anthropogenic climate change. *Tellus A Dynamic Meteorology and Oceanography*, 73(1), 1875727. <https://doi.org/10.1080/16000870.2021.1875727>
15. Ceyhan, G. D., & Saribas, D. (2022). Research trends on climate communication in the post-truth era. *The Educational and Developmental Psychologist*, 39(1), 5–16. <https://doi.org/10.1080/20590776.2021.2001295>
16. Chen, L., & Unsworth, K. (2019). Cognitive complexity increases climate change belief. *Journal of Environmental Psychology*, 65(101316), 101316. <https://doi.org/10.1016/j.jenvp.2019.101316>
17. Chinn, S., & Pasek, J. (2021). Some deficits and some misperceptions: Linking partisanship with climate change cognitions. *International Journal of Public Opinion Research*, 33(2), 235–254. <https://doi.org/10.1093/ijpor/edaa007>
18. Chu, J., Zhu, Y., & Ji, J. (2023). Characterizing the semantic features of climate change misinformation on Chinese social media. *Public Understanding of Science (Bristol, England)*, 32(7), 845–859. <https://doi.org/10.1177/09636625231166542>
19. Clark, B., & Stoakes, E. (2023). Intersections of media influence: Radical conspiracist 'alt-media' narratives and the climate crisis in Aotearoa. *Pacific journalism review*, 29(1and2), 12–26. <https://doi.org/10.24135/pjr.v29i1and2.1308>
20. Clayton, S., & Manning, C. (2018). *Psychology and climate change: Human Perceptions, Impacts, and Responses*. Academic Press.
21. Coan, T. G., Boussalis, C., Cook, J., & Nanko, M. O. (2021). Computer-assisted classification of contrarian claims about climate change. *Scientific Reports*, 11(1). <https://doi.org/10.1038/s41598-021-01714-4>
22. Cogley, J. G., Kargel, J. S., Kaser, G., & Van Der Veen, C. J. (2010). Tracking the source of glacier misinformation. *Science*, 327(5965), 522. <https://doi.org/10.1126/science.327.5965.522-a>
23. Compton, J., van der Linden, S., Cook, J., & Basol, M. (2021). Inoculation theory in the post-truth era: Extant findings and new frontiers for contested science, misinformation, and conspiracy theories. *Social and Personality Psychology Compass*, 15(6). <https://doi.org/10.1111/spc3.12602>
24. Cook, J. (2022). Understanding and countering misinformation about climate change. In *IGI Global eBooks* (pp. 1633–1658). <https://doi.org/10.4018/978-1-6684-3686-8.ch081>
25. Cook, J., Ecker, U. K. H., & Lewandowsky, S. (2015). Misinformation and how to correct it. *Emerging Trends in the Social and Behavioral Sciences*, 1–17. <https://doi.org/10.1002/9781118900772.etrds0222>



26. Cook, J., Ecker, U. K. H., Trecek-King, M., Schade, G. W., Jeffers-Tracy, K., Fessmann, J., Kim, S. C., Kinkead, D., Orr, M., Vraga, E. K., Roberts, K. E., & McDowell, J. (2022). The cranky uncle game—combining humor and gamification to build student resilience against climate misinformation. *Environmental Education Research*, 29(4), 607–623. <https://doi.org/10.1080/13504622.2022.2085671>
27. Cook, J., Ellerton, P., & Kinkead, D. (2018). Deconstructing climate misinformation to identify reasoning errors. *Environmental research letters*, 13(2), 024018. <https://doi.org/10.1088/1748-9326/aaa49f>
28. Cook, J., Lewandowsky, S., & Ecker, U. K. H. (2017). Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence. *PLoS One*, 12(5), e0175799. <https://doi.org/10.1371/journal.pone.0175799>
29. Cook, J., Oreskes, H., Doran, P. T., Anderegg, W. R. L., Verheggen, B., Maibach, E., Carlton, J. S., Lewandowsky, S., Skuce, A. G., Green, S., Nuccitelli, D., Jacobs, P., Richardson, M., Winkler, B., Painting, R., & Rice, K. (2016). Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. *Environmental Research Letters*, 11(4), 048002. <https://doi.org/10.1088/1748-9326/11/4/048002>
30. Cremades, R., & Stella, M. (2022). Disentangling the climate divide with emotional patterns: a network-based mindset reconstruction approach. *Earth System Dynamics*, 13(4), 1473–1489. <https://doi.org/10.5194/esd-13-1473-2022>
31. Das, A. (2020). Combatting climate change denial. *Resonance*, 25(7), 933–945. <https://doi.org/10.1007/s12045-020-1010-2>
32. Daume, S., Galaz, V., & Bjersér, P. (2023). Automated framing of climate change? The role of social bots in the Twitter climate change discourse during the 2019/2020 Australia bushfires. *Social Media + Society*, 9(2), 205630512311683. <https://doi.org/10.1177/20563051231168370>
33. Davis, C. J., & Lewandowsky, S. (2022). Thinking about climate change: look up and look around! *Thinking & Reasoning*, 28(3), 321–326. <https://doi.org/10.1080/13546783.2022.2041095>
34. Donald, B. A., Gwiazdon, K., & Westra, L. (2023). *The Routledge Handbook of Applied Climate Change Ethics*. Routledge.
35. Drummond, C., Siegrist, M., & Árvai, J. (2020). Limited effects of exposure to fake news about climate change. *Environmental Research Communications*, 2(8), 081003. <https://doi.org/10.1088/2515-7620/abae77>
36. Ejaz, W., Ittefaq, M., & Arif, M. (2022). Understanding influences, misinformation, and fact-checking concerning climate-change journalism in Pakistan. *Journalism Practice*, 16(2–3), 404–424. <https://doi.org/10.1080/17512786.2021.1972029>
37. Farrell, J. (2019). The growth of climate change misinformation in US philanthropy: evidence from natural language processing. *Environmental research letters*, 14(3), 034013. <https://doi.org/10.1088/1748-9326/aaf939>
38. Farrell, J., McConnell, K., & Brulle, R. (2019). Evidence-based strategies to combat scientific misinformation. *Nature Climate Change*, 9(3), 191–195. <https://doi.org/10.1038/s41558-018-0368-6>



39. Fasce, A., Adrián-Ventura, J., Lewandowsky, S., & Van Der Linden, S. (2021). Science through a tribal lens: A group-based account of polarization over scientific facts. *Group Processes & Intergroup Relations*, 26(1), 3–23. <https://doi.org/10.1177/13684302211050323>
40. Ferkany, M. (2015). Is it Arrogant to Deny Climate Change or is it Arrogant to Say it is Arrogant? Understanding Arrogance and Cultivating Humility in Climate Change Discourse and Education. *Environmental Values*, 24(6), 705–724. <https://doi.org/10.3197/096327115x14420732702572>
41. Fischer, H., Amelung, D., & Said, N. (2019). The accuracy of German citizens' confidence in their climate change knowledge. *Nature Climate Change*, 9(10), 776–780. <https://doi.org/10.1038/s41558-019-0563-0>
42. Franta, B. (2021). Early oil industry disinformation on global warming. *Environmental Politics*, 30(4), 663–668. <https://doi.org/10.1080/09644016.2020.1863703>
43. Freiling, I., & Matthes, J. (2023). Correcting climate change misinformation on social media: Reciprocal relationships between correcting others, anger, and environmental activism. *Computers in Human Behavior*, 145(107769), 107769. <https://doi.org/10.1016/j.chb.2023.107769>
44. Friedman, R. A. (2021). Why humans are vulnerable to conspiracy theories. *Psychiatric Services*, 72(1), 3–4. <https://doi.org/10.1176/appi.ps.202000348>
45. Green, M., McShane, C. J., & Swinbourne, A. (2022). Active versus passive: evaluating the effectiveness of inoculation techniques in relation to misinformation about climate change. *Australian Journal of Psychology*, 74(1). <https://doi.org/10.1080/00049530.2022.2113340>
46. Gruener, S. (2022). Determinants of gullibility to misinformation: A study of climate change, COVID-19 and artificial intelligence. *Journal of Interdisciplinary Economics*, 026010792210834. <https://doi.org/10.1177/02601079221083482>
47. Hall, C. M., Amelung, B., Cohen, S., Eijgelaar, E., Gössling, S., Higham, J., Leemans, R., Peeters, P., Ram, Y., Scott, D., Aall, C., Abegg, B., Araña, J. E., Barr, S., Becken, S., Buckley, R., Burns, P., Coles, T., Dawson, J., ... Weaver, D. (2015). Denying bogus skepticism in climate change and tourism research. *Tourism Management*, 47, 352–356. <https://doi.org/10.1016/j.tourman.2014.08.009>
48. Haney, T. J. (2022). 'Scientists don't care about truth anymore': the climate crisis and rejection of science in Canada's oil country. *Environmental Sociology*, 8(1), 7–24. <https://doi.org/10.1080/23251042.2021.1973656>
49. Hassan, I., Musa, R. M., Latiff Azmi, M. N., Razali Abdullah, M., & Yusoff, S. Z. (2023). Analysis of climate change disinformation across types, agents and media platforms. *Information Development*, 026666692211486. <https://doi.org/10.1177/02666669221148693>
50. Hornsey, M. J., & Lewandowsky, S. (2022). A toolkit for understanding and addressing climate scepticism. *Nature Human Behaviour*, 6(11), 1454–1464. <https://doi.org/10.1038/s41562-022-01463-y>
51. Jasny, L., & Fisher, D. R. (2019). Echo chambers in climate science. *Environmental research communications*, 1(10), 101003. <https://doi.org/10.1088/2515-7620/ab491c>



52. Javeline, D., & Shufeldt, G. (2014). Scientific opinion in policymaking: the case of climate change adaptation. *Policy Sciences*, 47(2), 121–139. <https://doi.org/10.1007/s11077-013-9187-9>
53. Ji, J., Zhu, Y., & Chao, N. (2023). A comparison of misinformation feature effectiveness across issues and time on Chinese social media. *Information Processing & Management*, 60(2), 103210. <https://doi.org/10.1016/j.ipm.2022.103210>
54. Jones-Jang, S. M., Mortensen, T. M., & Liu, J. (2019). Does media literacy help identification of fake news? Information literacy helps, but other literacies don't. *American Behavioral Scientist*, 65(2), 371–388. <https://doi.org/10.1177/0002764219869406>
55. Jylhä, K. M., Stanley, S. K., Ojala, M., & Clarke, E. J. R. (2023). Science denial: A narrative review and recommendations for future research and practice. *European Psychologist*, 28(3), 151–161. <https://doi.org/10.1027/1016-9040/a000487>
56. Kahan, D. M. (2017). Misconceptions, misinformation, and the logic of Identity-Protective Cognition. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.2973067>
57. Kažys, J. (2018). Climate Change Information on Internet by Different Baltic Sea Region Languages: Risks of Disinformation & Misinterpretation. *Journal of Security and Sustainability Issues*, 7(4), 685–695. <https://etalpykla.lituanistika.lt/object/LT-LDB-0001:J.04~2018~1576851802534/>
58. Koch, T., Frischlich, L., & Lerner, E. (2023). Effects of fact-checking warning labels and social endorsement cues on climate change fake news credibility and engagement on social media. *Journal of Applied Social Psychology*, 53(6), 495–507. <https://doi.org/10.1111/jasp.12959>
59. Kolmes, S. A. (2011). Climate change: a disinformation campaign. *Environment: Science and Policy for Sustainable Development*, 53(4), 33–37. <https://doi.org/10.1080/00139157.2011.588553>
60. Krishna, A. (2021). Understanding the differences between climate change deniers and believers' knowledge, media use, and trust in related information sources. *Public Relations Review*, 47(1), 101986. <https://doi.org/10.1016/j.pubrev.2020.101986>
61. Lai, K., Yang, Y., Na, Y., & Wang, H. (2022). The relationship between bullshit receptivity and willingness to share misinformation about climate change: The moderating role of pregnancy. *International Journal of Environmental Research and Public Health*, 19(24), 16670. <https://doi.org/10.3390/ijerph192416670>
62. Lawrence, E., & Estow, S. (2017). Responding to misinformation about climate change. *Applied Environmental Education & Communication*, 16(2), 117–128. <https://doi.org/10.1080/1533015x.2017.1305920>
63. Lewandowsky, S. (2021). Climate change disinformation and how to combat it. *Annual Review of Public Health*, 42(1), 1–21. <https://doi.org/10.1146/annurev-publhealth-090419-102409>
64. Lewandowsky, S. (2021b). Liberty and the pursuit of science denial. *Current Opinion in Behavioral Sciences*, 42, 65–69. <https://doi.org/10.1016/j.cobeha.2021.02.024>
65. Lewandowsky, S., Armaos, K., Bruns, H., Schmid, P., Holford, D. L., Hahn, U., Al-Rawi, A., Sah, S., & Cook, J. (2022). When science becomes embroiled in conflict: Recognizing the public's need for debate while combating conspiracies and misinformation. *The Annals of the*



- American Academy of Political and Social Science*, 700(1), 26–40. <https://doi.org/10.1177/00027162221084663>
66. Lewandowsky, S., Cook, J., & Lombardi, D. (2020). *Debunking Handbook 2020* [Data set]. Databrary.
 67. Lewandowsky, S., Cook, J., Fay, N., & Gignac, G. E. (2019). Science by social media: Attitudes towards climate change are mediated by perceived social consensus. *Memory & Cognition*, 47(8), 1445–1456. <https://doi.org/10.3758/s13421-019-00948-y>
 68. Lewandowsky, S., Ecker, U. K. H., & Cook, J. (2017). Beyond misinformation: Understanding and coping with the “post-truth” era. *Journal of Applied Research in Memory and Cognition*, 6(4), 353–369. <https://doi.org/10.1016/j.jarmac.2017.07.008>
 69. Maertens, R., Anseel, F., & van der Linden, S. (2020). Combatting climate change misinformation: Evidence for longevity of inoculation and consensus messaging effects. *Journal of Environmental Psychology*, 70(101455), 101455. <https://doi.org/10.1016/j.jenvp.2020.101455>
 70. Mann, M., Zhang, Z., Hughes, M. K., Bradley, R. S., Miller, S. K., Rutherford, S., & Ni, F. (2008). Proxy-based reconstructions of hemispheric and global surface temperature variations over the past two millennia. *Proceedings of the National Academy of Sciences of the United States of America*, 105(36), 13252–13257. <https://doi.org/10.1073/pnas.0805721105>
 71. Markowitz, E. M., & Guckian, M. L. (2018). Climate change communication: Challenges, insights, and opportunities. In S. Clayton & C. Manning (Eds.), *Psychology and climate change: Human perceptions, impacts, and responses* (pp. 35–63). Elsevier Academic Press. <https://doi.org/10.1016/B978-0-12-813130-5.00003-5>
 72. Mays, C. (2021). Ignorance as a productive response to epistemic perturbations. *Synthese*, 198(7), 6491–6507. <https://doi.org/10.1007/s11229-019-02471-8>
 73. McCaffrey, M. S., & Buhr, S. M. (2008). Clarifying climate confusion: Addressing systemic holes, cognitive gaps, and misconceptions through climate literacy. *Physical Geography*, 29(6), 512–528. <https://doi.org/10.2747/0272-3646.29.6.512>
 74. McKenzie, B. (2019). The possible museum: Anticipating future scenarios. En *Climate Change Management* (pp. 443–456). Springer International Publishing.
 75. McLoughlin, N., Corner, A., Capstick, S., Richardson, H., Bell, A., Muller, C., & Illingworth, S. (2018). Climate communication in practice: how are we engaging the UK public on climate change? *EGU General Assembly Conference Abstracts*, 10038. <https://e-space.mmu.ac.uk/621973/>
 76. Meddeb, P., Ruseti, S., Dascalu, M., Terian, S.-M., & Travadel, S. (2022). Counteracting French fake news on climate change using language models. *Sustainability*, 14(18), 11724. <https://doi.org/10.3390/su141811724>
 77. Morosoli, S., Van Aelst, P., Humprecht, E., Staender, A., & Esser, F. (2022). Identifying the drivers behind the dissemination of online misinformation: A study on political attitudes and individual characteristics in the context of engaging with misinformation on social media. *American Behavioral Scientist*. <https://doi.org/10.1177/00027642221118300>



78. Nettlefold, J., & Pecl, G. T. (2022). Engaged journalism and climate change: Lessons from an audience-led, locally focused Australian collaboration. *Journalism Practice*, 16(1), 19–34. <https://doi.org/10.1080/17512786.2020.1798272>
79. Nygren, T., & Guath, M. (2022). Students evaluating and corroborating digital news. *Scandinavian Journal of Educational Research*, 66(4), 549–565. <https://doi.org/10.1080/00313831.2021.1897876>
80. O'Connor, C., & Weatherall, J. O. (2018). *The Misinformation Age: How False Beliefs spread*. <https://ci.nii.ac.jp/ncid/BB28750573>
81. Oreskes, H., & Conway, E. M. (2011). Merchants of doubt: how a handful of scientists obscured the truth on issues from tobacco smoke to global warming. *Choice Reviews Online*, 48(11), 48–6243. <https://doi.org/10.5860/choice.48-6243>
82. Petersen, A. M., Vincent, E. M., & Westerling, A. L. (2019). Discrepancy in scientific authority and media visibility of climate change scientists and contrarians. *Nature Communications*, 10(1). <https://doi.org/10.1038/s41467-019-09959-4>
83. Porter, E., Wood, T. J., & Bahador, B. (2019). Can presidential misinformation on climate change be corrected? Evidence from Internet and phone experiments. *Research & Politics*, 6(3), 205316801986478. <https://doi.org/10.1177/2053168019864784>
84. Proudfit, M. (2020). Sorting fact from fiction. *The American Biology Teacher*, 82(8), 542–544. <https://doi.org/10.1525/abt.2020.82.8.542>
85. Ranney, M. A., & Velautham, L. (2021). Climate change cognition and education: given no silver bullet for denial, diverse information-hunks increase global warming acceptance. *Current Opinion in Behavioral Sciences*, 42, 139–146. <https://doi.org/10.1016/j.cobeha.2021.08.001>
86. Rauscher, N. (2023). Philanthropie und politische Polarisierung in den USA: konservative Philanthropie und die internationalen Verbindungen der Klimaskeptiker. *Politische Vierteljahresschrift*. <https://doi.org/10.1007/s11615-023-00484-0>
87. Rode, J. B., Dent, A. L., Benedict, C., Brosnahan, D. B., Martínez, R., & Ditto, P. H. (2021). Influencing climate change attitudes in the United States: A systematic review and meta-analysis. *Journal of Environmental Psychology*, 76, 101623. <https://doi.org/10.1016/j.jenvp.2021.101623>
88. Samoilenko, S. A., & Cook, J. (2023). Developing an *Ad Hominem* typology for classifying climate misinformation. *Climate Policy*, 1–14. <https://doi.org/10.1080/14693062.2023.2245792>
89. Scheufele, D. A., & Krause, N. (2019). Science audiences, misinformation, and fake news. *Proceedings of the National Academy of Sciences of the United States of America*, 116(16), 7662–7669. <https://doi.org/10.1073/pnas.1805871115>
90. Schubatzky, T., & Haagen-Schützenhöfer, C. (2022). Debunking climate myths is easy—is it really? An explorative case study with pre-service physics teachers. *Education Sciences*, 12(8), 566. <https://doi.org/10.3390/educsci12080566>
91. Sharon, A. J., & Baram-Tsabari, A. (2020). Can science literacy help individuals identify misinformation in everyday life? *Science Education*, 104(5), 873–894. <https://doi.org/10.1002/sce.21581>



92. Sill, T. E., Ayala, J. R., Rolf, J., Smith, S., & Dye, S. (2023). How climate literacy and public opinion are the driving forces behind climate-based policy: A student perspective on COP27. *ACS Omega*, 8(5), 4430–4435. <https://doi.org/10.1021/acsomega.2c07674>
93. Simion, M. (2023). Knowledge and disinformation. *Episteme*, 1–12. <https://doi.org/10.1017/epi.2023.25>
94. Sinatra, G. M., & Hofer, B. K. (2021). *Science denial: Why it Happens and what to Do about it*. Oxford University Press.
95. Song, Z., Sun, Y., & Lc, R. (2022). DRIZZLE: A comic for covert climate action influence. En [] *With Design: Reinventing Design Modes* (pp. 1613–1623). Springer Nature Singapore.
96. Stover, D. (2019). Marshall Shepherd: Connecting atmospheric science and society. *The Bulletin of the Atomic Scientists*, 75(4), 205–209. <https://doi.org/10.1080/00963402.2019.1628517>
97. Strudwicke, I. J., & Grant, W. J. (2020). #JunkScience: Investigating pseudoscience disinformation in the Russian Internet Research Agency tweets. *Public Understanding of Science (Bristol, England)*, 29(5), 459–472. <https://doi.org/10.1177/0963662520935071>
98. Stubenvoll, M., & Marquart, F. (2019). When facts lie: The impact of misleading numbers in climate change news. En *Climate Change Management* (pp. 31–46). Springer International Publishing.
99. Taddicken, M., & Wolff, L. (2020). ‘fake news’ in science communication: Emotions and strategies of coping with dissonance online. *Media and communication*, 8(1), 206–217. <https://doi.org/10.17645/mac.v8i1.2495>
100. Taddicken, M., & Wolff, L. (2023). Climate change-related counter-attitudinal fake news exposure and its effects on search and selection behavior. *Environmental Communication*, 17(7), 720–739. <https://doi.org/10.1080/17524032.2023.2239516>
101. The disinformation age. (2020). In *Cambridge University Press eBooks*. <https://doi.org/10.1017/9781108914628>
102. Traberg, C. S., Roozenbeek, J., & van der Linden, S. (2022). Psychological inoculation against misinformation: Current evidence and future directions. *The Annals of the American Academy of Political and Social Science*, 700(1), 136–151. <https://doi.org/10.1177/00027162221087936>
103. Treen, K. M. D., Williams, H. T. P., & O’Neill, S. J. (2020). Online misinformation about climate change. *Wiley Interdisciplinary Reviews. Climate Change*, 11(5). <https://doi.org/10.1002/wcc.665>
104. Treen, K., Williams, H., O’Neill, S., & Coan, T. G. (2022). Discussion of climate change on reddit: Polarized discourse or deliberative debate? *Environmental Communication*, 16(5), 680–698. <https://doi.org/10.1080/17524032.2022.2050776>
105. van der Linden Sander; Maibach Ed; Lewandowsky Stephan, C. J. (2018). *The Consensus Handbook*. Center for Climate Change Communication, George Mason University. <https://doi.org/10.13021/G8MM6P>
106. Van Der Linden, S. (2021). The Gateway Belief Model (GBM): A review and research agenda for communicating the scientific consensus on climate change. *Current Opinion in Psychology*, 42, 7–12. <https://doi.org/10.1016/j.copsyc.2021.01.005>



107. Van Der Linden, S., Leiserowitz, A., & Maibach, E. (2019). The gateway belief model: A large-scale replication. *Journal of Environmental Psychology*, 62, 49–58. <https://doi.org/10.1016/j.jenvp.2019.01.009>
108. van der Linden, S., Leiserowitz, A., Rosenthal, S., & Maibach, E. (2017). Inoculating the public against misinformation about climate change. *Global Challenges (Hoboken, NJ)*, 1(2). <https://doi.org/10.1002/gch2.201600008>
109. Van Der Linden, S., Maibach, E., Cook, J., Leiserowitz, A., & Lewandowsky, S. (2017). Inoculating against misinformation. *Science*, 358(6367), 1141–1142. <https://doi.org/10.1126/science.aar4533>
110. Van Lange, P. A. M., & Rand, D. G. (2022). Human cooperation and the crises of climate change, COVID-19, and misinformation. *Annual Review of Psychology*, 73(1), 379–402. <https://doi.org/10.1146/annurev-psych-020821-110044>
111. Vraga, E. K., Kim, S. C., Cook, J., & Bode, L. (2020). Testing the effectiveness of correction placement and type on Instagram. *Politics [The International Journal of Press]*, 25(4), 632–652. <https://doi.org/10.1177/1940161220919082>
112. Wells, J. S. G., & Scheibein, F. (2022). Global pandemics, conflict and networks – the dynamics of international instability, infodemics and health care in the 21st century. *Journal of Research in Nursing: JRN*, 27(3), 291–300. <https://doi.org/10.1177/17449871221090778>
113. West, J. D., & Bergstrom, C. T. (2021). Misinformation in and about science. *Proceedings of the National Academy of Sciences of the United States of America*, 118(15). <https://doi.org/10.1073/pnas.1912444117>
114. Williams Kirkpatrick, A. (2021). The spread of fake science: Lexical concreteness, proximity, misinformation sharing, and the moderating role of subjective knowledge. *Public Understanding of Science (Bristol, England)*, 30(1), 55–74. <https://doi.org/10.1177/0963662520966165>
115. Williams, M. N., & Bond, C. M. C. (2020). A preregistered replication of “Inoculating the public against misinformation about climate change”. *Journal of Environmental Psychology*, 70(101456), 101456. <https://doi.org/10.1016/j.jenvp.2020.101456>
116. Williamson, P. (2016). Take the time and effort to correct misinformation. *Nature*, 540(7632), 171. <https://doi.org/10.1038/540171a>
117. Wolff, L., & Taddicken, M. (2022). *Disinforming the unbiased*: How online users experience and cope with dissonance after climate change disinformation exposure. *New Media & Society*, 146144482210901. <https://doi.org/10.1177/14614448221090194>
118. Xu, Z., & Atkin, D. J. (2022). Framing climate change in the 5th estate: Comparing online advocacy and denial webpages and their engagement. *Electronic News*, 16(2), 84–103. <https://doi.org/10.1177/19312431221087247>
119. Zhou, Y., & Shen, L. (2022). Confirmation bias and the persistence of misinformation on climate change. *Communication Research*, 49(4), 500–523. <https://doi.org/10.1177/00936502211028049>

