



Co-funded by  
the European Union



Empower  
Plus

# BOOKLET

## GREEN HORIZON: YOUTH VOICES FOR CLIMATE ACTION THROUGH DRONE TECHNOLOGY





Co-funded by  
the European Union



Empower  
Plus

# GREEN HORIZON: YOUTH VOICES FOR CLIMATE ACTION THROUGH DRONE TECHNOLOGY

2024-3-DE04-KA210-YOU-000293009



## DISCLAIMER:

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the German National Agency JUGEND für Europa. Neither the European Union nor the granting authority can be held responsible for them.

PROJECT COORDINATOR:  
INTEGRATIONAL E.V. (GERMANY)

PARTNERS:  
YENILIKÇI EĞİTİM BİLİM VE SANAT DERNEĞİ (TÜRKİYE)  
ASOCIATIA EMPOWER PLUS (ROMANIA)

PROJECT WEBSITE: [GREENHORIZONYOU.EU](https://greenhorizonyou.eu)

PUBLISHED 2026. OPEN EDUCATIONAL RESOURCE LICENSED UNDER CREATIVE  
COMMONS ATTRIBUTION-SHAREALIKE 4.0 INTERNATIONAL (CC BY-SA 4.0).



## Introduction

### Why this booklet was created

Climate change is no longer a distant scenario. Young people in Germany, Romania and Türkiye already see its effects where they live: rivers running low in summer, heatwaves in city centres, forests damaged by drought and storms, and coastlines under pressure. At the same time, many young people – especially those from rural, low-income or migrant backgrounds – have few opportunities to learn the digital skills that would let them document these changes and make their voices heard.

The Green Horizon project was created to close this gap. Our idea is simple: when young people can capture what is happening in their own neighbourhoods with a drone or a camera, and turn it into a clear visual story, they stop being passive observers and become active witnesses and advocates for climate action.

### Why we wrote it

During the project, youth workers from the three partner countries took part in a training course on drone operation, photography and video editing, and then passed these skills on to young people in local workshops. Together, they produced short documentaries and a VR photo exhibition about local climate impacts.

This booklet collects what we learned along the way. It is designed to outlive the project: a free, practical resource that any youth worker, educator or young person can pick up and use – even without having taken part in our activities.





## About this Booklet

### Who wrote it

This booklet was developed jointly by the three organisations of the Green Horizon partnership:

- Integrational e.V. (Germany) – project coordinator, working on youth inclusion, digital literacy and civic participation;
- Yenilikçi Eğitim Bilim ve Sanat Derneği – IESA (Türkiye) – environmental education and grassroots climate action, which coordinated the production of the booklet;
- Asociația Empower Plus (Romania) – drone technology, photography and media production.

Youth workers, trainers and experts from all three organisations contributed texts, examples and feedback, drawing on their experience from the training course and the local workshops.

### What you will find inside

- Chapter I – Climate Change Mitigation: understanding climate change, identifying and documenting local impacts, and turning evidence into practical action led by young people.
- Chapter II – Photography for Climate Storytelling: the foundations of photography, environmental photography, visual storytelling and responsible sharing of images.
- Chapter III – Drone Operation: how drones work, the rules in Germany, Romania and Türkiye, safe flying, aerial photography and video, basic editing and a printable field checklist.

Each chapter ends with references for further reading. Illustrated pages introduce the key topics, and checklists help you put the guidance into practice.





# How to Use this Booklet

## Who it is for

This booklet is written for youth workers, trainers, teachers and youth organisations, and for young people aged 15–30 who want to use technology and creative media to take action on climate change. No previous experience with drones or photography is needed.

## How to use it

- Youth workers and educators can use each chapter as the basis for a workshop session, combining the explanations with the practice exercises and checklists.
- Young people can use the booklet on their own as a step-by-step guide – from planning a first flight to publishing a short climate story.
- Start with Chapter I if climate change is a new topic for your group; go straight to Chapters II and III if you want to begin with hands-on skills.
- Combine the chapters in a full project: choose a local climate issue, document it with photos and drone footage, and share the result with your community.
- Always check the current national drone rules before flying – they change regularly.

## Share and adapt it

This booklet is an Open Educational Resource licensed under CC BY-SA 4.0. You are welcome to copy, translate, adapt and share it, as long as you credit the Green Horizon partnership and share your adaptations under the same licence. All project results are available at [greenhorizonyou.eu](https://greenhorizonyou.eu) and on the Erasmus+ Project Results Platform.





## Chapter I: Practical Insights Into Climate Change Mitigation Strategies

1. Understanding Climate Change: Conceptual Framework
2. Identifying Local Climate Change Impacts
3. Documenting Climate Change Impacts In Communities
4. From Evidence To Action – Practical Climate Change Mitigation Strategies
5. Role Of Young People In Local Climate Change Mitigation
6. Conclusion
7. Chapter 1 References





## Chapter II: Photography for Climate Storytelling

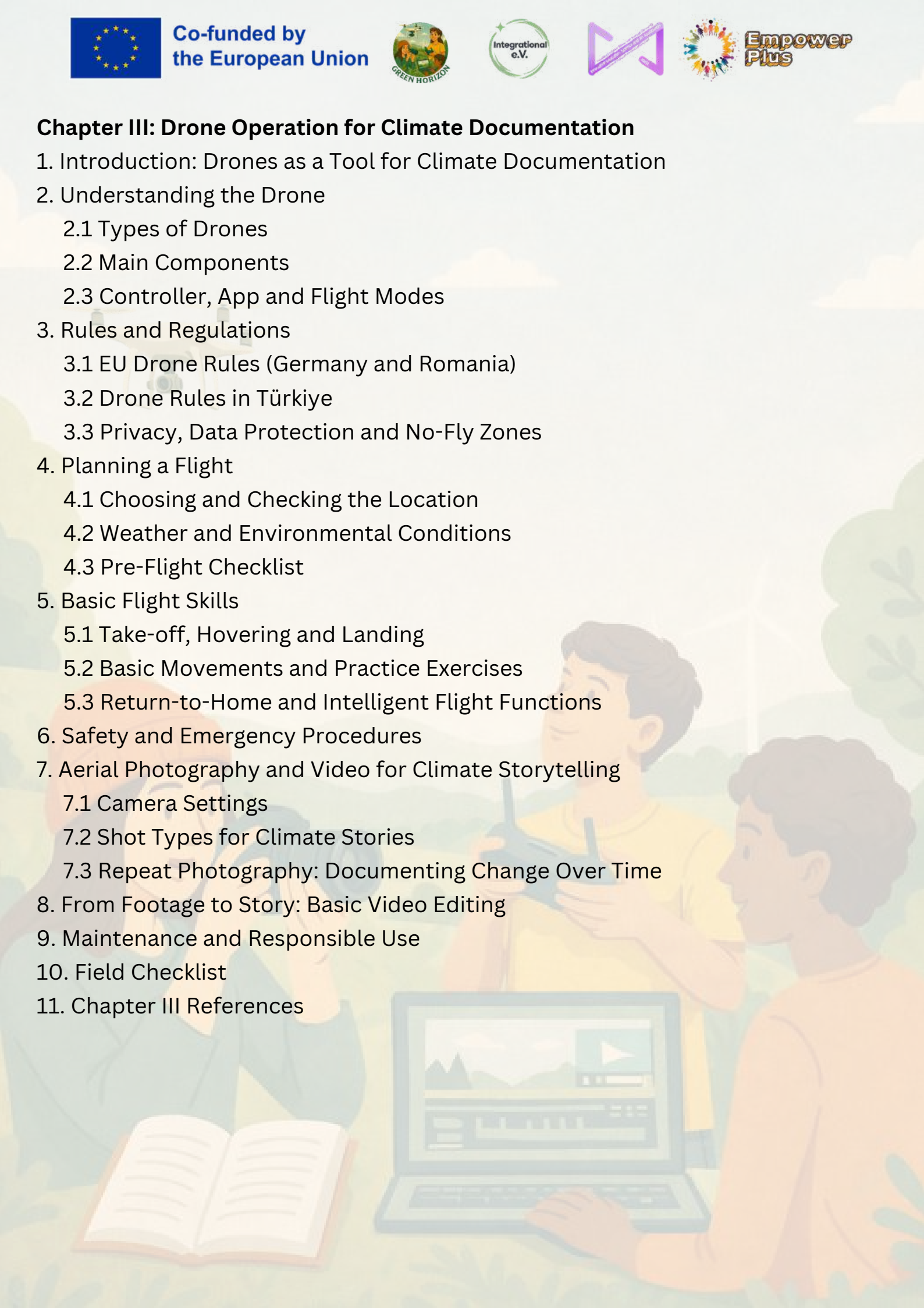
1. Introduction: Photography as a Tool for Climate Awareness
2. Foundations of Photography
  - 2.1 Basic Principles of Image Formation
  - 2.2 Composition Techniques
  - 2.3 The Role of Light
3. Environmental Photography: Observing Climate Change
  - 3.1 Defining Environmental Photography
  - 3.2 Identifying Climate Change Subjects
  - 3.3 Ethical Considerations
4. Visual Storytelling Through Photography
  - 4.1 From Image to Narrative
  - 4.2 Elements of Visual Storytelling
  - 4.3 Types of Visual Narratives
  - 4.4 Constructing Climate Narratives
5. Drone Photography and Aerial Perspectives
  - 5.1 Introduction to Drone Photography
  - 5.2 Aerial vs Ground Perspectives
  - 5.3 Aerial Storytelling and Global Examples
6. Communicating Climate Messages Through Images
  - 6.1 Image Interpretation and Audience
  - 6.2 Emotional and Informational Impact
  - 6.3 Combining Image and Text
7. Photography in Youth Work Practice
  - 7.1 Educational Applications
  - 7.2 Participatory Approaches
8. From Creation to Dissemination
9. Chapter II References





## Chapter III: Drone Operation for Climate Documentation

1. Introduction: Drones as a Tool for Climate Documentation
2. Understanding the Drone
  - 2.1 Types of Drones
  - 2.2 Main Components
  - 2.3 Controller, App and Flight Modes
3. Rules and Regulations
  - 3.1 EU Drone Rules (Germany and Romania)
  - 3.2 Drone Rules in Türkiye
  - 3.3 Privacy, Data Protection and No-Fly Zones
4. Planning a Flight
  - 4.1 Choosing and Checking the Location
  - 4.2 Weather and Environmental Conditions
  - 4.3 Pre-Flight Checklist
5. Basic Flight Skills
  - 5.1 Take-off, Hovering and Landing
  - 5.2 Basic Movements and Practice Exercises
  - 5.3 Return-to-Home and Intelligent Flight Functions
6. Safety and Emergency Procedures
7. Aerial Photography and Video for Climate Storytelling
  - 7.1 Camera Settings
  - 7.2 Shot Types for Climate Stories
  - 7.3 Repeat Photography: Documenting Change Over Time
8. From Footage to Story: Basic Video Editing
9. Maintenance and Responsible Use
10. Field Checklist
11. Chapter III References





Co-funded by  
the European Union



Empower  
Plus

# CHAPTER 1

## CLIMATE ACTION





## Chapter 1: PRACTICAL INSIGHTS INTO CLIMATE CHANGE MITIGATION STRATEGIES

### 1. Understanding Climate Change: Conceptual Framework

Climate change represents one of the most complex and far-reaching challenges of the contemporary era, influencing environmental systems, economic structures, and social relations at multiple scales. Addressing climate change effectively requires a shared conceptual understanding of its underlying mechanisms, drivers, and implications. A clear conceptual framework provides the foundation for analysing climate-related impacts, interpreting evidence, and designing coherent mitigation strategies that are both scientifically grounded and socially relevant.

Understanding climate change within a conceptual framework also allows for the integration of global scientific knowledge with local realities. While climate change is driven by cumulative global processes, its effects are experienced unevenly across regions and communities. This interplay between global dynamics and local manifestations underscores the importance of linking scientific explanations with context-specific observation and action.

By establishing a common conceptual basis, this section situates climate change as a long-term systemic phenomenon shaped by human activity and natural processes. It creates the analytical foundation necessary for examining local impacts, documenting environmental change, and translating evidence into practical mitigation strategies in subsequent sections.

#### 1.1 Definition of Climate Change

Climate change refers to long-term alterations in average temperature patterns, precipitation regimes, and the frequency and intensity of extreme weather events on a global or regional scale. Unlike short-term climatic variability, which reflects natural fluctuations within the climate system, climate change denotes persistent shifts occurring over decades or longer periods. Scientific consensus identifies recent climate change as primarily driven by human activities that have intensified since the Industrial Revolution, particularly through the increased concentration of greenhouse gases in the Earth's atmosphere (Intergovernmental Panel on Climate Change, 2023).

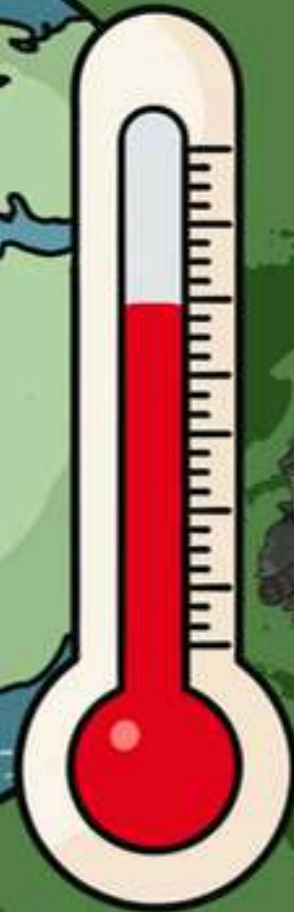


Co-funded by  
the European Union



Empower  
Plus

# CLIMATE CHANGE





The accumulation of greenhouse gases such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) enhances the natural greenhouse effect, trapping heat within the atmosphere and leading to a gradual rise in global average temperatures. This process has resulted in observable changes in climatic systems, including melting glaciers, rising sea levels, shifting ecosystems, and increasing climate-related risks for human societies (United Nations Environment Programme, 2022).

Understanding climate change as a systemic and long-term phenomenon is essential for designing effective mitigation strategies. Mitigation efforts depend on recognising both the scientific foundations of climate change and its complex interactions with social, economic, and environmental systems.

## **1.2 Main Causes of Climate Change**

The primary drivers of contemporary climate change are anthropogenic in nature. Human-induced greenhouse gas emissions result mainly from the combustion of fossil fuels for energy production, transportation, and industrial processes. Coal, oil, and natural gas remain dominant energy sources in many regions, contributing significantly to global carbon emissions (European Environment Agency, 2022).

In addition to energy-related emissions, land-use change plays a critical role in climate change dynamics. Deforestation, agricultural expansion, and urbanisation reduce the capacity of natural ecosystems to absorb carbon dioxide, while simultaneously releasing stored carbon into the atmosphere. Agricultural practices, particularly livestock production and fertiliser use, further contribute to methane and nitrous oxide emissions, intensifying climate impacts (IPCC, 2023).

Urbanisation and consumption patterns also shape emission trajectories. Rapid urban growth often leads to increased energy demand, higher waste generation, and intensified transportation emissions. At the same time, unsustainable consumption behaviours and linear economic models exacerbate resource depletion and environmental degradation, reinforcing climate pressures at both global and local levels (European Commission, 2019). Recognising these structural drivers reinforces the importance of combining technological measures with behavioural and governance-related approaches in climate mitigation (OECD, 2017).



Recognising the multifaceted causes of climate change highlights the need for integrated mitigation strategies that address energy systems, land management, production models, and everyday behavioural choices.

### **1.3 Global and Local Dimensions of Climate Change**

Although climate change is a global phenomenon, its impacts are unevenly distributed across regions and communities. Global temperature rise manifests locally through diverse environmental, economic, and social consequences shaped by geographical, ecological, and socio-economic conditions. Coastal regions may experience sea-level rise and erosion, while inland areas may face increased droughts, floods, or heatwaves. Urban environments often encounter intensified heat stress and air pollution due to the urban heat island effect (European Environment Agency, 2022).

Local manifestations of climate change are particularly significant for communities, as they directly affect livelihoods, public health, food security, and social cohesion. These local impacts make climate change tangible and observable, transforming an abstract global issue into an immediate local challenge. As a result, mitigation strategies grounded in local realities are more likely to be understood, accepted, and sustained by communities.

At the same time, local actions contribute cumulatively to global mitigation efforts. Reductions in emissions at community level, adoption of sustainable practices, and increased public awareness collectively support broader national and international climate objectives. This multi-level interaction underscores the importance of aligning local mitigation initiatives with global frameworks such as the Paris Agreement and European climate policies (European Commission, 2019).

### **1.4 Relevance of Climate Change Understanding for Mitigation Strategies**

A clear conceptual understanding of climate change is a prerequisite for effective mitigation. Without a shared understanding of its causes and mechanisms, mitigation efforts risk being fragmented, ineffective, or misdirected. Knowledge-based approaches enable communities to identify emission sources, prioritise interventions, and evaluate the potential impact of mitigation measures.



For young people, climate literacy plays a crucial role in fostering informed participation in climate action. Understanding how global climate processes translate into local impacts empowers young individuals to engage critically with their surroundings, identify environmental challenges, and contribute meaningfully to mitigation initiatives. Educational and participatory approaches that link scientific knowledge to local observation strengthen the capacity of youth to act as informed agents of change (UNEP, 2022). In this respect, education for sustainable development provides an internationally recognised framework for building climate-related competencies and supporting action-oriented learning (UNESCO, 2020).

In the context of community-based climate action, conceptual clarity supports evidence-based decision-making and enhances the credibility of mitigation efforts. It provides a foundation upon which local impact identification, documentation, and practical mitigation strategies can be built, ensuring coherence between observation, action, and long-term sustainability.

## **2. Identifying Local Climate Change Impacts**

Identifying climate change impacts at the local level constitutes a critical analytical step in the development of effective mitigation strategies. While climate change is global in scale, its consequences are experienced locally through environmental degradation, socio-economic disruption, and increased vulnerability of communities. Local impact identification enables communities to recognise climate change as an immediate and tangible challenge, thereby strengthening the relevance and effectiveness of mitigation actions.

Local-level analysis allows climate change to be understood not only as an environmental phenomenon but also as a social, economic, and governance-related issue. Variations in exposure, adaptive capacity, and socio-economic conditions shape how climate impacts are experienced across different communities. Consequently, identifying local impacts is essential for designing mitigation strategies that are context-sensitive, inclusive, and effective.

This section examines the importance of local climate impact identification, outlines key environmental indicators observable at community level, and explains how local observations can be linked to broader global climate trends without relying on anecdotal interpretations.



## 2.1 The Importance of Local Impact Identification

Understanding the importance of identifying climate change impacts at the local level is fundamental to the development of effective and credible mitigation strategies. Local impact identification serves as the analytical link between abstract climate science and concrete community action, enabling environmental change to be recognised, interpreted, and addressed within specific geographical and social contexts.

By focusing on local impacts, climate change becomes more accessible and relevant to communities, decision-makers, and stakeholders. This perspective supports a shift from generalised climate narratives toward evidence-based, place-specific analysis, which is essential for prioritising mitigation measures, engaging communities, and informing local policy responses. Recognising the importance of local impact identification also highlights the role of communities as active contributors to climate knowledge, rather than passive recipients of externally generated data.

### 2.1.1 Why Local Evidence Strengthens Climate Action

Local evidence plays a decisive role in transforming climate change from an abstract scientific concept into a concrete community concern. While global data and climate models provide essential insights into long-term trends, local observations reveal how these trends manifest in specific geographical, ecological, and socio-economic contexts. Such evidence enhances the credibility of climate action initiatives by grounding them in observable reality (European Environment Agency, 2022).

Local impact identification strengthens climate action in several interconnected ways. First, it supports evidence-based decision-making by enabling stakeholders to prioritise mitigation measures that respond directly to locally observed challenges. Second, it increases public awareness and engagement by demonstrating how climate change affects everyday life, natural resources, infrastructure, and public health. Third, locally grounded evidence facilitates dialogue with policymakers and local authorities by providing concrete, place-based justification for mitigation policies, funding decisions, and regulatory measures.



From a mitigation perspective, identifying local impacts also helps to pinpoint emission sources and environmentally harmful practices within communities, such as inefficient energy use, unsustainable land management, or car-dependent mobility patterns. This knowledge allows mitigation strategies to be targeted more precisely, thereby increasing their effectiveness, cost-efficiency, and long-term sustainability.

### **2.1.2 Role of Community-Based Observation**

Community-based observation is a valuable approach for identifying local climate change impacts, particularly in contexts where access to scientific monitoring infrastructure is limited or unevenly distributed. This approach involves the systematic observation and documentation of environmental changes by local actors, including young people, community organisations, and civil society groups.

Such participatory methods complement scientific data by capturing fine-scale environmental changes that may not be immediately visible in national or global datasets. Examples include changes in seasonal cycles, water availability, vegetation cover, soil conditions, or the frequency of extreme weather events. Community-based observation fosters a sense of ownership and responsibility, encouraging active participation in climate action initiatives and strengthening trust in locally led mitigation efforts.

Moreover, participatory observation supports climate literacy by engaging participants in critical reflection on environmental changes and their underlying causes. Through direct involvement in observation and documentation processes, community members develop a deeper understanding of climate dynamics and their relationship to human activities (UNEP, 2022). When properly structured, community-based observation can generate credible and meaningful data that contributes to local mitigation planning, awareness-raising, and advocacy.

### **2.2 Environmental Indicators of Climate Change at Local Level**

Local climate change impacts can be identified through a range of environmental indicators that reflect changes in ecosystems, land use, water systems, and atmospheric conditions. These indicators provide observable evidence of climate-related processes and their interaction with human activities. Monitoring such indicators over time allows communities to identify trends, assess risks, and prioritise mitigation responses.



### 2.2.1 Deforestation and Land-Use Change

Deforestation and land-use change are among the most visible local indicators of climate change and environmental degradation. The conversion of forests and natural landscapes into agricultural land, urban areas, or infrastructure reduces carbon sequestration capacity and alters local climate regulation. Forest loss can lead to increased surface temperatures, soil erosion, reduced water retention, and changes in local precipitation patterns, thereby amplifying climate impacts at community level (Food and Agriculture Organization of the United Nations, 2022).

At the local scale, deforestation is often linked to economic pressures, unsustainable land management practices, and weak environmental governance. Identifying land-use change enables communities to address both climate mitigation and broader sustainability challenges by promoting ecosystem restoration, sustainable forestry, and land-use planning aligned with climate objectives.

### 2.2.2 Coastal Erosion and Sea-Level Rise

In coastal communities, climate change manifests through sea-level rise, increased erosion, saltwater intrusion, and more frequent extreme weather events. Rising sea levels threaten coastal ecosystems, infrastructure, housing, and livelihoods, particularly in low-lying and densely populated areas. Coastal erosion serves as a visible indicator of long-term climatic changes interacting with local land-use practices and coastal management decisions (IPCC, 2023).

Local documentation of shoreline retreat, flooding frequency, and habitat loss provides valuable evidence for both mitigation and adaptation planning. Such documentation can inform sustainable coastal management strategies, land-use regulations, and emission reduction efforts linked to transport, tourism, and urban development in coastal zones.

### 2.2.3 Urban Pollution and Heat Islands

Urban environments are particularly sensitive to climate change due to high population density, energy consumption, and infrastructure concentration. The urban heat island effect, characterised by higher temperatures in cities compared to surrounding rural areas, is intensified by climate change and exacerbated by reduced green spaces, high levels of air pollution, and heat-absorbing construction materials (European Environment Agency, 2022).



Local indicators include increased frequency and intensity of heatwaves, deteriorating air quality, rising energy demand for cooling, and increased health risks for vulnerable populations. Identifying these impacts highlights the need for mitigation strategies focused on sustainable urban planning, energy-efficient buildings, low-emission transport systems, and nature-based solutions such as urban green infrastructure.

#### **2.2.4 Water Scarcity, Droughts, and Flooding**

Changes in precipitation patterns represent a key local manifestation of climate change. Many regions experience increased water scarcity and prolonged droughts, while others face more frequent and intense flooding events. These extremes disrupt agricultural production, water supply systems, ecosystems, and local economies, posing significant challenges for community resilience (UNEP, 2022).

Local observation of changing rainfall patterns, declining groundwater levels, reduced water availability, or flood damage provides critical evidence for mitigation strategies related to water management, land-use planning, and emission reduction in water-intensive sectors. Such evidence supports integrated approaches that link climate mitigation with sustainable water governance.

#### **2.2.5 Biodiversity Loss**

Biodiversity loss is a cross-cutting indicator of climate change impacts at the local level. Changes in temperature and precipitation affect species distribution, breeding cycles, migration patterns, and ecosystem interactions. Local disappearance of plant and animal species, reduced ecosystem services, and habitat degradation signal broader climate-related stressors and environmental imbalance (IPCC, 2023).

Identifying biodiversity loss at community level reinforces the interconnectedness of climate change, ecosystem health, and human well-being. It also strengthens the case for integrated mitigation approaches that combine emission reduction with ecosystem protection and restoration.

### **2.3 Linking Local Observations to Global Climate Trends**

Linking locally observed climate impacts to broader global climate trends is essential for ensuring analytical coherence and scientific credibility.



Local environmental changes gain explanatory value when they are interpreted within established climate frameworks that account for long-term global processes and cumulative greenhouse gas emissions. This connection helps prevent fragmented or isolated interpretations of climate impacts and situates local evidence within a wider scientific context.

Establishing this link enables communities and stakeholders to understand how everyday environmental changes are connected to global drivers of climate change. It also strengthens the legitimacy of local mitigation efforts by aligning them with international climate assessments and policy frameworks. By integrating local observations with global climate trends, communities can move beyond descriptive accounts toward informed, evidence-based mitigation action.

### **2.3.1 Connecting Micro-Level Impacts to Macro-Level Causes**

Local climate impacts do not occur in isolation; they are the result of global climatic processes driven by cumulative greenhouse gas emissions. Linking local observations to global climate trends is essential for ensuring analytical coherence and avoiding misinterpretation. Scientific frameworks provided by international climate assessments enable communities to contextualise local evidence within broader climate dynamics (IPCC, 2023).

By relating local indicators such as rising temperatures, ecosystem degradation, altered hydrological cycles, or extreme weather events to global emission trends, communities can better understand the structural causes of observed changes. This connection strengthens the legitimacy of local mitigation efforts and aligns them with international climate objectives and policy frameworks.

### **2.3.2 Avoiding Anecdotal Interpretations**

While local observation is valuable, reliance on isolated or anecdotal evidence can undermine the credibility of climate action initiatives. To avoid this risk, local observations should be systematically documented, compared over time, and cross-referenced with scientific data, official reports, and expert input.

Combining community-based evidence with established climate science ensures that local impacts are interpreted accurately and responsibly. This approach enhances the reliability of mitigation strategies, supports informed advocacy, and facilitates constructive engagement with policymakers and other stakeholders (European Commission, 2019).



Co-funded by  
the European Union



Empower  
Plus

# Climate Change Impacts





### 3. Documenting Climate Change Impacts in Communities

Documenting climate change impacts at the community level represents a crucial methodological step in translating local observations into credible evidence that can support climate change mitigation strategies. While the identification of climate impacts highlights what is changing, systematic documentation explains how, where, and why these changes occur and why they matter for local decision-making. Effective documentation strengthens the legitimacy of local climate action, supports awareness-raising activities, and provides a robust foundation for evidence-based advocacy and policy engagement.

Beyond its technical function, documentation also plays a social and educational role. It enables communities to articulate their experiences, enhances transparency in climate governance, and fosters shared understanding among stakeholders. When implemented inclusively, documentation processes contribute to capacity-building and long-term engagement in climate mitigation initiatives.

This section examines community-based documentation approaches, explores visual media as a climate action tool, and outlines strategies for ensuring the credibility and reliability of locally generated data.

#### 3.1 Community-Based Documentation Approaches

Community-based documentation refers to participatory processes through which local actors systematically observe, record, and interpret environmental changes linked to climate change. These approaches recognise communities not merely as passive recipients of climate impacts, but as active contributors to climate knowledge production. By decentralising data generation, community-based documentation enhances inclusiveness and complements institutional monitoring systems.

##### 3.1.1 Participatory Observation

Participatory observation involves the structured engagement of community members in monitoring environmental changes over time. This method draws on local knowledge, lived experience, and direct interaction with the environment, allowing communities to identify gradual changes that may not be immediately apparent through remote sensing or large-scale monitoring systems.



In the context of climate change, participatory observation may include recording changes in seasonal patterns, water availability, vegetation cover, soil conditions, or the frequency and intensity of extreme weather events. When conducted systematically and over extended periods, such observations provide valuable qualitative and quantitative insights that complement scientific climate data and enhance understanding of local climate dynamics (UNEP, 2022).

Participatory approaches also foster local ownership of climate initiatives by involving residents directly in evidence generation. This sense of ownership increases community engagement, strengthens trust in climate action processes, and supports long-term commitment to mitigation efforts.

### **3.1.2 Citizen Science Initiatives**

Citizen science initiatives involve the active participation of non-professional scientists in data collection, analysis, and reporting under structured research frameworks. In climate-related contexts, citizen science enables communities to contribute to environmental monitoring through the use of standardised tools, mobile applications, and shared data platforms.

These initiatives enhance data availability at the local scale while promoting climate literacy and scientific awareness among participants. Citizen-generated data, when properly validated and documented, can support local mitigation planning and feed into regional, national, or European environmental assessments (European Environment Agency, 2022). In addition, European-level research and policy discussions increasingly recognise citizen science as a relevant contribution to environmental monitoring and governance when quality assurance and transparency are ensured (European Commission, Joint Research Centre, 2019).

In addition to their technical value, citizen science initiatives strengthen collaboration between communities and scientific institutions. By bridging the gap between expert knowledge and lived experience, they reinforce trust, transparency, and mutual understanding in climate governance processes.

### **3.1.3 Youth-Led Environmental Monitoring**

Youth-led environmental monitoring represents a particularly relevant and impactful approach within the KA210-YOU framework. Young people play a critical role in observing and documenting climate impacts in their communities, combining digital skills, creativity, and local engagement with a strong motivation for environmental action.



Youth-led initiatives may involve monitoring air quality, documenting heat stress in urban areas, recording biodiversity changes, mapping land-use transformation, or collecting visual evidence of climate-related environmental degradation. Such activities not only generate valuable data but also build transferable skills related to research methods, critical thinking, communication, and civic participation (European Commission, 2019).

By positioning young people as knowledge producers rather than passive beneficiaries, youth-led monitoring strengthens their role as active agents of climate mitigation and community resilience.

### **3.2 Visual Documentation as a Climate Action Tool**

Visual documentation has emerged as a powerful tool for communicating climate change impacts and supporting mitigation strategies. Photography, video, mapping, and other visual media translate complex environmental processes into accessible and emotionally resonant narratives, making climate change more tangible for diverse audiences.

#### **3.2.1 Photography and Video as Evidence**

Photography and video can serve as compelling forms of evidence when documenting local climate impacts. Visual records of deforestation, coastal erosion, flooding, drought impacts, or urban heat stress provide concrete illustrations of environmental change over time. When systematically collected, dated, and geographically referenced, visual materials can support both analytical assessment and public communication.

Visual evidence is particularly effective in awareness-raising and advocacy contexts, as it facilitates understanding across linguistic, cultural, and educational barriers. However, visual documentation must be accompanied by accurate contextual information to avoid misinterpretation or oversimplification of complex climate processes (IPCC, 2023).

#### **3.2.2 Ethical Considerations and Accuracy**

Ethical considerations are central to responsible visual documentation. Respect for privacy, informed consent, and the avoidance of harm or misrepresentation are essential principles, particularly when documenting impacts affecting vulnerable communities or sensitive environments.



Accuracy is equally important. Visual materials should reflect real conditions and avoid manipulation, selective framing, or decontextualisation that could distort reality. Ethical and accurate documentation enhances the credibility of climate action initiatives, strengthens trust among stakeholders, and supports responsible climate communication (UNEP, 2022). Clear ethical guidelines and transparent documentation practices help ensure that visual media contributes constructively to climate mitigation efforts rather than sensationalising or politicising local climate impacts.

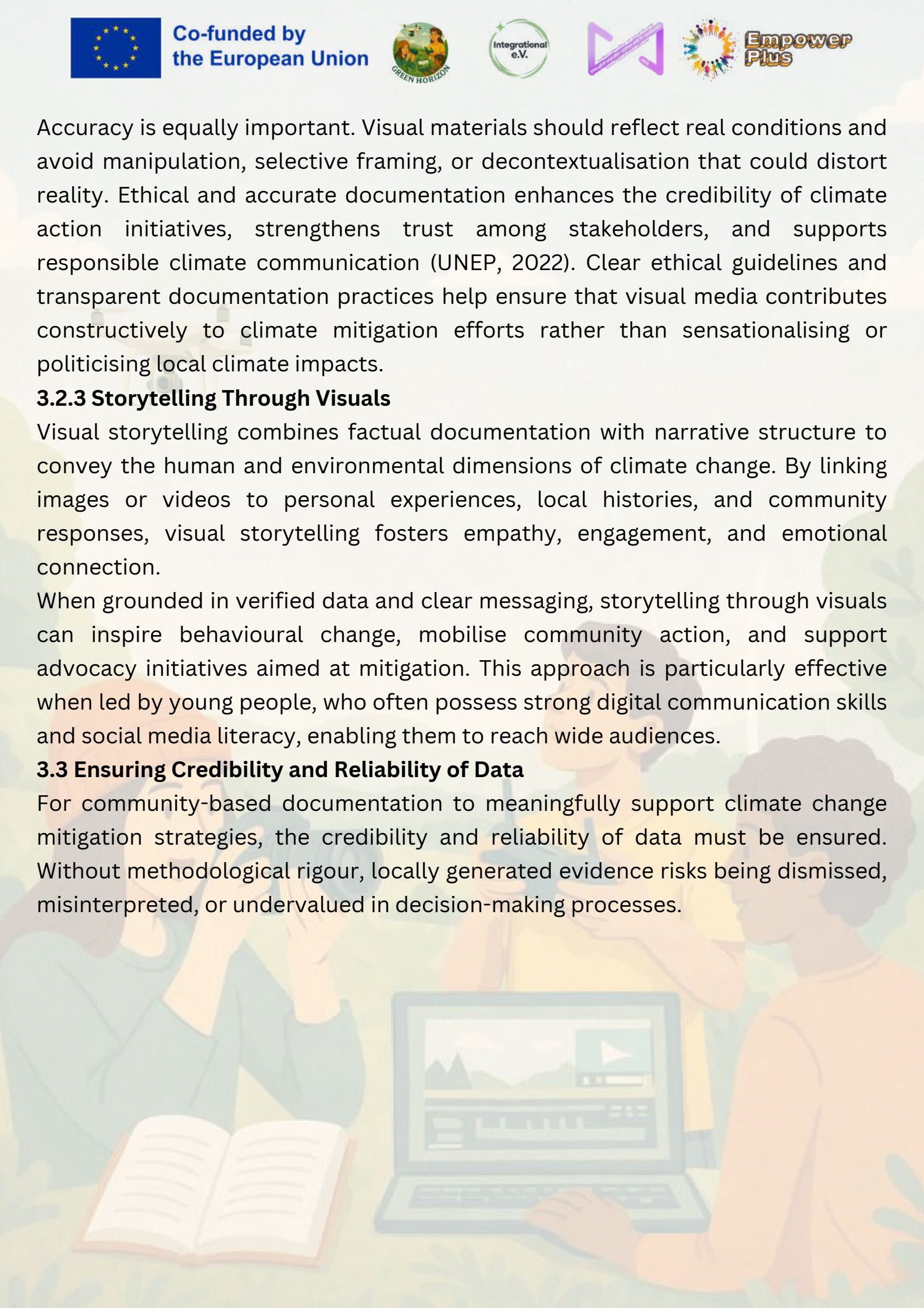
### **3.2.3 Storytelling Through Visuals**

Visual storytelling combines factual documentation with narrative structure to convey the human and environmental dimensions of climate change. By linking images or videos to personal experiences, local histories, and community responses, visual storytelling fosters empathy, engagement, and emotional connection.

When grounded in verified data and clear messaging, storytelling through visuals can inspire behavioural change, mobilise community action, and support advocacy initiatives aimed at mitigation. This approach is particularly effective when led by young people, who often possess strong digital communication skills and social media literacy, enabling them to reach wide audiences.

### **3.3 Ensuring Credibility and Reliability of Data**

For community-based documentation to meaningfully support climate change mitigation strategies, the credibility and reliability of data must be ensured. Without methodological rigour, locally generated evidence risks being dismissed, misinterpreted, or undervalued in decision-making processes.





Co-funded by  
the European Union



**Empower  
Plus**

# DOCUMENTING CLIMATE CHANGE IMPACTS



**REC** ●





### 3.3.1 Cross-Checking Sources

Cross-checking involves comparing locally collected data with other sources, such as historical records, satellite imagery, meteorological datasets, or regional climate reports. This process helps validate observations, identify long-term trends, and distinguish climate-related changes from short-term variability.

Cross-referencing multiple sources reduces the risk of bias and strengthens the analytical value of community-based documentation. It also facilitates alignment between local evidence and established climate science, enhancing the legitimacy of mitigation initiatives (IPCC, 2023).

### 3.3.2 Use of Local Statistics, Reports, and Expert Input

Integrating local statistics, official reports, and expert input further enhances data reliability. Municipal environmental reports, national statistical offices, academic institutions, and environmental agencies provide valuable contextual information that supports interpretation of local observations.

Collaboration with experts and institutions strengthens the legitimacy of community-generated data and supports its use in advocacy and policy dialogue. Such integration ensures that documentation efforts contribute meaningfully to evidence-based mitigation planning and align with broader climate objectives and governance frameworks (European Environment Agency, 2022).

### Strategic Value of Documentation for Mitigation

By combining participatory approaches, visual tools, and methodological rigour, community-based documentation transforms local observations into actionable knowledge. This process bridges the gap between evidence and action, enabling communities and young people to engage more effectively in climate change mitigation initiatives and policy processes.

## 4. From Evidence to Action – Practical Climate Change Mitigation Strategies

Transforming documented climate change impacts into effective mitigation strategies represents a critical step in community-based climate action. Evidence alone does not lead to change unless it is translated into concrete, context-sensitive actions that reduce greenhouse gas emissions and promote sustainable practices. Local evidence, when systematically analysed and communicated, provides a strong foundation for targeted mitigation initiatives that respond directly to community needs and environmental realities.



Mitigation strategies grounded in local evidence strengthen both effectiveness and legitimacy. They ensure that climate action responds to real conditions rather than abstract assumptions, while also enhancing public acceptance and participation. This section examines practical mitigation strategies at the community level, highlights the role of awareness and education, explores participatory advocacy approaches, and discusses pathways for scaling and sustaining local mitigation efforts.

## **4.1 Community-Level Mitigation Strategies**

Community-level mitigation strategies focus on reducing greenhouse gas emissions through changes in behaviour, infrastructure, and local practices. These strategies are most effective when they are grounded in locally documented evidence and tailored to the specific environmental challenges identified within communities.

### **4.1.1 Sustainable Consumption and Behavioural Change**

Sustainable consumption plays a central role in climate change mitigation, as everyday choices related to energy use, food consumption, mobility, and waste generation significantly influence emission levels. Local documentation of consumption patterns and environmental impacts enables communities to identify priority areas for behavioural change and design targeted interventions. Mitigation strategies in this domain may include promoting reduced energy consumption, encouraging plant-based or locally sourced diets, supporting sustainable transport options, and fostering waste reduction and recycling practices. Community campaigns grounded in local evidence are more likely to resonate with residents, as they demonstrate the tangible environmental and economic benefits of behavioural change (UNEP, 2022). Behaviourally informed public policy approaches can further strengthen such interventions by improving the design of communication strategies, participation mechanisms, and community uptake (OECD, 2017).

Young people play a particularly important role in promoting sustainable lifestyles by acting as peer educators, campaign organisers, and role models within their communities. Their involvement supports peer-to-peer learning and increases the social visibility of sustainable practices.



#### 4.1.2 Energy Efficiency and Renewable Energy Practices

Energy production and consumption remain among the largest contributors to greenhouse gas emissions. At the local level, mitigation strategies often focus on improving energy efficiency and promoting the adoption of renewable energy sources. Evidence collected on local energy use, heat stress, or air pollution can support initiatives such as building retrofits, improved insulation, energy-efficient lighting, and decentralised renewable energy systems.

Community-based renewable energy projects, including solar cooperatives and shared energy schemes, provide opportunities for citizen participation and local ownership. Mitigation efforts aligned with broader policy frameworks, such as the European Union's climate and energy targets, contribute to emission reductions while also delivering social and economic co-benefits, including reduced energy costs and increased energy security (European Commission, 2019).

#### 4.1.3 Waste Reduction and Circular Economy Initiatives

Waste management constitutes another critical area for local climate mitigation. Organic waste decomposition in landfills generates methane, a potent greenhouse gas, while excessive resource extraction and production increase carbon emissions. Mitigation strategies based on local waste audits and documentation may include waste prevention campaigns, composting initiatives, repair and reuse programmes, and circular economy practices.

By promoting resource efficiency and extending product lifecycles, communities can significantly lower their carbon footprint. Local evidence documenting waste volumes and disposal practices strengthens the rationale for such initiatives and supports behaviour change at household and community levels (European Environment Agency, 2022).

#### 4.2 Mitigation Through Awareness and Education

Raising awareness and enhancing climate literacy are essential components of effective mitigation strategies. Awareness initiatives based on locally documented climate impacts make mitigation messages more relatable and credible, fostering public engagement and behavioural change.



#### **4.2.1 Evidence-Based Awareness Campaigns**

Awareness campaigns grounded in local evidence are more impactful than abstract or generic messaging. Visual documentation of local climate impacts, combined with clear explanations of their causes and consequences, enables communities to understand the link between everyday activities and climate change.

Such campaigns may take the form of exhibitions, public presentations, community events, digital storytelling, or social media initiatives. When supported by credible data and visual evidence, awareness activities contribute to informed decision-making and sustained mitigation efforts (IPCC, 2023). At European level, initiatives such as the European Climate Pact also emphasise the value of citizen engagement and shared responsibility in strengthening climate action at community level (European Commission, 2020).

#### **4.2.2 Education and Capacity-Building Activities**

Education-based mitigation strategies focus on building knowledge, skills, and competencies related to climate action. Workshops, training sessions, and non-formal learning activities can empower community members—particularly young people—to engage actively in mitigation initiatives.

Integrating locally documented evidence into educational activities enhances relevance, encourages critical reflection, and supports experiential learning. Capacity-building initiatives also contribute to long-term mitigation by fostering environmental responsibility, problem-solving skills, and active citizenship.

#### **4.3 Participatory Mitigation and Local Advocacy**

Effective climate mitigation requires inclusive governance and active participation by local stakeholders. Participatory approaches ensure that mitigation strategies reflect community priorities and are supported by diverse actors.

##### **4.3.1 Engaging Local Stakeholders and Authorities**

Local authorities, civil society organisations, educational institutions, and community groups play a crucial role in implementing mitigation strategies. Evidence-based advocacy, supported by documented local climate impacts, strengthens dialogue with decision-makers and increases the likelihood of policy uptake.



Engagement with municipalities enables communities to influence urban planning, transport systems, energy policies, and environmental regulations. Aligning local actions with regional and national climate objectives enhances coherence and long-term impact (European Commission, 2019). Moreover, climate resilience and risk management frameworks increasingly underline the importance of integrating climate considerations across sectors and levels of governance (European Commission, 2021).

#### **4.3.2 Youth Participation in Climate Governance**

Youth participation is a key driver of innovative and inclusive mitigation strategies. Young people contribute fresh perspectives, digital competencies, and strong motivation for climate action. By involving youth in advocacy processes and decision-making forums, communities strengthen democratic participation and intergenerational equity.

Youth-led advocacy initiatives, supported by documented evidence, can effectively influence local policies, mobilise public support, and inspire broader societal change.

#### **4.4 Scaling, Replicating, and Sustaining Local Mitigation Efforts**

While local mitigation initiatives address community-specific challenges, their impact can be amplified through scaling, replication, and long-term sustainability planning.

##### **4.4.1 Replicability and Knowledge Sharing**

Documented mitigation initiatives provide valuable learning resources for other regions. Toolkits, case studies, and visual materials facilitate knowledge transfer and replication. Networks established through programmes such as Erasmus+ play a vital role in disseminating effective mitigation practices across borders.

##### **4.4.2 Monitoring and Evaluating Mitigation Outcomes**

Monitoring and evaluation are essential for assessing the effectiveness of mitigation strategies over time. Indicators such as emission reductions, behavioural change, and community participation help measure progress and inform adaptive improvements. Youth involvement in monitoring activities strengthens transparency and accountability.



Co-funded by  
the European Union



**Empower  
Plus**

# Practical Climate Change Mitigation Strategies





#### 4.4.3 Linking Local Action to Global Climate Objectives

Local mitigation strategies gain additional significance when aligned with international climate frameworks. Connecting community-level actions to global commitments, such as the Paris Agreement and European climate targets, reinforces the collective nature of climate mitigation (IPCC, 2023).

By situating local action within global climate efforts, communities and young people recognise their contribution to addressing one of the most pressing challenges of our time.

### 5. Role of Young People in Local Climate Change Mitigation

Young people play a central role in advancing climate change mitigation at the local level. As current and future stakeholders, they are uniquely positioned to contribute to sustainable transformations through innovation, participation, and long-term commitment. Youth engagement in climate mitigation extends beyond awareness-raising; it encompasses active involvement in evidence collection, community mobilisation, advocacy, and the implementation of sustainable practices.

Young people also act as intermediaries between scientific knowledge and community action. Their ability to communicate climate-related information through accessible and creative formats enhances the social reach of mitigation initiatives. As a result, youth engagement strengthens both the effectiveness and the sustainability of local climate action.

This section examines young people's role as agents of mitigation, highlights the contribution of youth-led initiatives, and emphasises the importance of climate literacy, active citizenship, and inclusive participation.

#### 5.1 Young People as Agents of Climate Mitigation

Young people increasingly act as key drivers of local climate action by translating documented evidence into practical mitigation initiatives. Their familiarity with digital tools, social media, and visual communication enables them to disseminate climate-related information effectively and engage diverse audiences. Youth involvement enhances the visibility of local climate impacts and supports behavioural change within peer groups and wider communities.



By participating in mitigation activities such as sustainable consumption campaigns, energy-saving initiatives, waste reduction projects, and community advocacy, young people contribute directly to emission reduction efforts. Their engagement also reinforces intergenerational dialogue, encouraging broader societal participation in climate mitigation (UNEP, 2022).

Youth-led climate action fosters innovation and adaptability, qualities that are essential for responding to evolving environmental challenges at the local level.

### **5.1.1 Youth as Innovators and Change Agents**

Young people often introduce innovative approaches to climate mitigation by combining creativity with technological skills. Digital platforms, data visualisation tools, and social media campaigns allow youth to communicate evidence-based climate messages in engaging and accessible ways. These innovations enhance public awareness and encourage collective action.

Youth-led experimentation with new ideas—such as community challenges, digital campaigns, or participatory mapping—supports adaptive mitigation strategies that respond to local needs and changing conditions.

### **5.1.2 Peer Influence and Behavioural Change**

Peer-to-peer engagement is a powerful mechanism for promoting sustainable behaviours. Young people influence consumption patterns, mobility choices, and lifestyle practices within their social networks. When youth act as role models for sustainable behaviour, mitigation messages gain credibility and are more likely to be adopted by others.

Peer influence reinforces the social dimension of climate mitigation and contributes to long-term behavioural change at community level.

## **5.2 Youth Participation in Community and Policy Processes**

Meaningful youth participation in climate governance strengthens the legitimacy, inclusiveness, and effectiveness of mitigation strategies. When young people are involved in decision-making processes, local policies are more likely to reflect long-term sustainability goals, intergenerational equity, and community priorities.

Youth participation may take various forms, including involvement in local environmental councils, consultation processes, public forums, participatory budgeting initiatives, and advocacy campaigns targeting local authorities.



Evidence-based advocacy, supported by documented local climate impacts, enhances the effectiveness of youth engagement and supports constructive dialogue with policymakers (European Commission, 2019). This focus on participation is consistent with the EU Youth Strategy framework, which emphasises youth engagement in democratic life and social participation (Council of the European Union, 2018).

Through such participation, young people develop civic competencies, leadership skills, and a sense of responsibility toward their communities, contributing to democratic resilience and sustainable development.

### **5.2.1 Youth-Led Advocacy and Policy Engagement**

Youth-led advocacy initiatives play an important role in translating local evidence into policy-relevant messages. By presenting documented climate impacts and mitigation proposals to decision-makers, young people contribute to more informed and responsive climate governance.

Engagement in advocacy processes also enhances young people's understanding of institutional frameworks and policymaking mechanisms, strengthening their capacity for long-term civic participation.

### **5.2.2 Strengthening Democratic Participation and Inclusion**

Inclusive youth participation ensures that climate mitigation strategies reflect diverse perspectives, including those of marginalised or underrepresented groups. By creating spaces for youth voices in local governance, communities promote democratic participation and social inclusion while addressing climate challenges.

## **5.3 Building Climate Literacy and Active Citizenship**

Climate literacy is a foundational element of youth-led mitigation efforts. Understanding the causes, impacts, and solutions related to climate change enables young people to engage critically with environmental issues and make informed decisions. Educational and non-formal learning activities that integrate local evidence enhance the relevance and effectiveness of climate education.

Active citizenship emerges when climate knowledge is combined with opportunities for participation and action. Youth-led monitoring, documentation, and mitigation initiatives support experiential learning and empower young people to take ownership of climate challenges. These processes align closely with the objectives of Erasmus+ youth projects, which emphasise participation, inclusion, and competence development.



Co-funded by  
the European Union



**Empower  
Plus**

# Contribution of Youth to Climate Change Mitigation





By fostering climate literacy and active citizenship, communities invest in long-term mitigation capacity and social resilience (European Environment Agency, 2022).

### **5.3.1 Non-Formal Learning and Skills Development**

Non-formal education settings provide flexible and inclusive spaces for developing climate-related competencies. Through workshops, project-based learning, and community activities, young people acquire skills related to critical thinking, teamwork, communication, and problem-solving, all of which support effective climate mitigation.

### **5.3.2 Long-Term Impact and Intergenerational Responsibility**

Youth engagement in climate mitigation contributes to long-term environmental responsibility and intergenerational solidarity. By involving young people in local mitigation efforts, communities ensure continuity of climate action and strengthen collective commitment to sustainability across generations.

#### **Strategic Contribution of Youth to Climate Change Mitigation**

By combining innovation, participation, and climate literacy, young people serve as catalysts for locally grounded and socially inclusive mitigation strategies. Their involvement enhances the effectiveness, legitimacy, and sustainability of climate action, reinforcing the connection between local initiatives and global climate objectives.





## 6. Conclusion

Effective climate change mitigation requires more than scientific consensus or policy commitments; it depends on the capacity to translate knowledge into locally grounded, socially embedded action. Climate impacts acquire their greatest significance when they are identified, documented, and addressed at the community level, where environmental change intersects directly with everyday life, livelihoods, and social systems. Locally rooted evidence transforms climate change from a distant global challenge into an immediate and shared responsibility.

Systematic documentation—particularly through participatory and visual approaches—strengthens the credibility, accessibility, and legitimacy of climate knowledge. When combined with ethical practices and reliable data sources, locally generated evidence becomes a powerful foundation for awareness-raising, education, advocacy, and decision-making. Such evidence enables communities to design mitigation strategies that are context-sensitive, targeted, and socially accepted, ranging from sustainable consumption and energy efficiency to waste reduction and inclusive governance.

Youth engagement emerges as a decisive factor in sustaining and advancing local climate action. Young people contribute not only through innovation and digital communication, but also by fostering climate literacy, civic responsibility, and intergenerational dialogue. As observers, communicators, advocates, and practitioners, young people strengthen the continuity, inclusiveness, and long-term impact of mitigation efforts, ensuring that climate action remains dynamic and future-oriented.

Climate change mitigation is inherently cumulative: global outcomes are shaped by the aggregation of countless local actions. While international agreements and national frameworks provide essential direction, their effectiveness ultimately depends on implementation at the community level. Local mitigation initiatives, when aligned with broader climate objectives, demonstrate how place-based action contributes meaningfully to global emission reduction and climate resilience.



Co-funded by  
the European Union



**Empower  
Plus**

# *From Evidence to Action*





Community-based mitigation initiatives confirm that local contexts are not obstacles to global impact but essential starting points for transformation. By grounding mitigation strategies in local evidence and participatory processes, communities enhance both the effectiveness and democratic legitimacy of climate action. Empowering communities and young people to act on documented climate impacts reinforces the shared responsibility at the heart of effective, inclusive, and equitable climate change mitigation.

## References

Council of the European Union. (2018). *Council Resolution of 26 November 2018 on a framework for European cooperation in the youth field: The European Union Youth Strategy 2019–2027*.

[https://youth.europa.eu/strategy\\_en](https://youth.europa.eu/strategy_en)

European Commission. (2019). *The European Green Deal*. Publications Office of the European Union.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN>

European Commission. (2020). *Communication on the European Climate Pact* (COM(2020) 788 final).

<https://climate-pact.europa.eu/system/files/2020-12/20201209%20European%20Climate%20Pact%20Communication.pdf>

European Commission. (2021). *Forging a climate-resilient Europe: The new EU Strategy on Adaptation to Climate Change* (COM/2021/82 final).

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52021DC0082>

European Commission, Joint Research Centre. (2019). *Citizens Science and Environmental Monitoring: Benefits and Challenges*.

[https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117665/jrc117665\\_jrc117665\\_ws\\_cs\\_and\\_env\\_monitorng\\_final\\_draft\\_report\\_for\\_e-publication.pdf](https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117665/jrc117665_jrc117665_ws_cs_and_env_monitorng_final_draft_report_for_e-publication.pdf)



European Environment Agency. (2022). Climate change impacts and adaptation in Europe. European Environment Agency.

<https://www.eea.europa.eu/themes/climate>

Food and Agriculture Organization of the United Nations. (2022). The State of the World's Forests 2022: Forest pathways for green recovery and building inclusive, resilient and sustainable economies. FAO.

<https://openknowledge.fao.org/items/4c8bd12f-d6b8-4755-a82f-1284c41bf012>

Intergovernmental Panel on Climate Change. (2023). Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC.

<https://www.ipcc.ch/report/ar6/syr/>

OECD. (2017). Behavioural Insights and Public Policy: Lessons from Around the World. OECD Publishing.

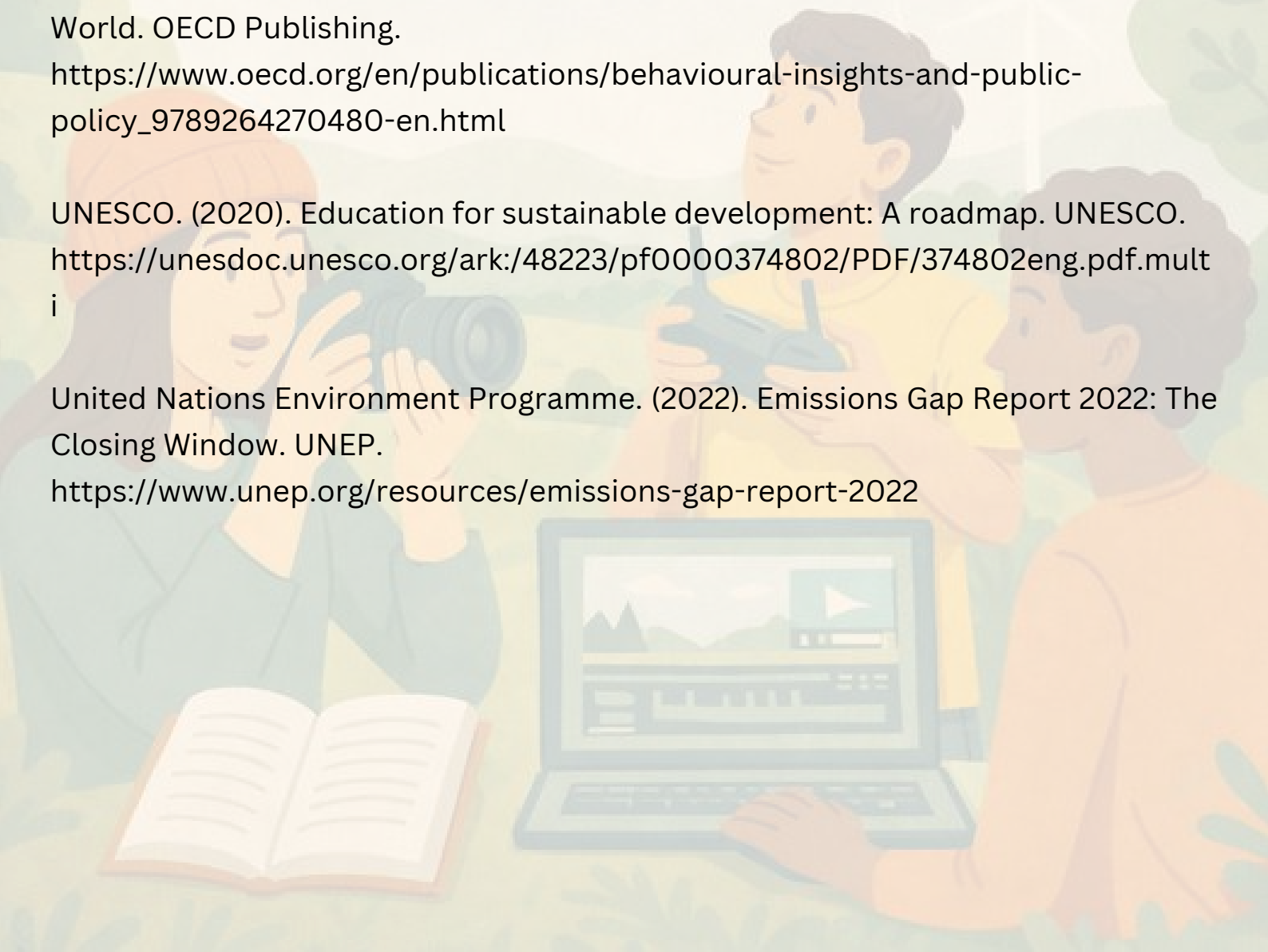
[https://www.oecd.org/en/publications/behavioural-insights-and-public-policy\\_9789264270480-en.html](https://www.oecd.org/en/publications/behavioural-insights-and-public-policy_9789264270480-en.html)

UNESCO. (2020). Education for sustainable development: A roadmap. UNESCO.

<https://unesdoc.unesco.org/ark:/48223/pf0000374802/PDF/374802eng.pdf.multi>

United Nations Environment Programme. (2022). Emissions Gap Report 2022: The Closing Window. UNEP.

<https://www.unep.org/resources/emissions-gap-report-2022>





Co-funded by  
the European Union



Empower  
Plus

# CHAPTER II

## PHOTOGRAPHY





## 1. Introduction: Photography as a Tool for Climate Awareness

Photography has evolved from a medium of visual representation into a powerful tool for communication, interpretation, and social engagement. Within the context of environmental challenges, it plays an important role in shaping how individuals and communities perceive and understand complex issues such as climate change. Rather than simply recording reality, photography actively constructs meaning, influencing how environmental problems are recognised, interpreted, and communicated to wider audiences (Sontag, 1977). This interpretative function becomes particularly important in the context of climate change, where many processes are gradual, abstract, or not immediately visible in everyday life.

In contemporary environmental discourse, photography is increasingly used as a tool to raise awareness and encourage civic engagement. Visual images have the capacity to translate complex scientific or environmental data into accessible and emotionally engaging content, allowing broader audiences to connect with global issues through local perspectives. As Lester (2013) shows, images function as powerful communicative tools that can simplify complex information and enhance public understanding, particularly when addressing global challenges such as environmental degradation and climate change.

One of the central strengths of photography lies in its ability to make distant or abstract environmental issues tangible. Climate change is often perceived as a global or future-oriented problem. However, photographic images can reveal its immediate and local manifestations, such as pollution, deforestation, or visible transformations in natural and urban landscapes. Through visual representation, these issues become more relatable and emotionally engaging, enabling viewers to connect with environmental realities that might otherwise remain unnoticed. In this sense, photography operates both as a documentary and interpretative medium, bridging the gap between environmental processes and public perception (Wells, 2015).

Furthermore, photography has the capacity to act as a catalyst for social awareness and behavioural change. Images that capture environmental degradation or human impact on ecosystems can provoke emotional responses, challenge existing perceptions, and stimulate critical reflection. This aligns with



broader research suggesting that visual communication plays a key role in influencing attitudes and encouraging engagement with environmental issues (UN Environment Programme, 2021). By presenting visual evidence of environmental change, photography contributes to a more informed and responsive society.

In educational and youth work contexts, photography also supports the development of digital, creative, and critical thinking skills. Participants are encouraged to observe their surroundings, identify environmental issues, and communicate their perspectives through visual media. This process enhances technical competencies and also fosters a deeper sense of environmental responsibility and active citizenship. Photography becomes a method of engaging with real-world challenges, enabling individuals to participate in broader conversations about sustainability and climate action.

In this context, photography should be understood not merely as a technical or artistic practice, but as a strategic tool for environmental communication. By combining observation, creativity, and critical awareness, it allows individuals to document reality while simultaneously contributing to a wider dialogue on climate change. Through this dual function, photography can support efforts to raise awareness, influence public perception, and ultimately contribute to the urgent need for environmental action.





## 2. Foundations of Photography

### 2.1 Basic Principles of Image Formation

Understanding the basic principles of image formation is essential for developing photography as an effective tool for environmental communication. At its core, photography involves capturing light reflected from objects and translating it into a visual representation. Whether using a smartphone, a digital camera, or a drone, this process remains fundamentally the same: light enters the lens, is recorded by a sensor, and forms an image that can be interpreted by viewers.

In the context of climate-related photography, this technical process gains additional significance. The ability to capture clear and meaningful images determines how effectively environmental realities are communicated. As Freeman (2007) explains, even basic control over focus, exposure, and framing can significantly influence how an image is perceived, making technical awareness a crucial foundation for visual storytelling. For young participants, mastering these fundamental elements enables them to move beyond casual image-taking and towards intentional visual communication.

Moreover, photography is not a neutral recording of reality but a selective process shaped by the photographer's choices. What is included or excluded from the frame, how the subject is positioned, and the moment of capture all contribute to the construction of meaning. This becomes particularly relevant when documenting environmental issues, as the photographer decides how to represent complex realities such as pollution, environmental degradation, or human impact on natural landscapes. In this sense, even the most basic photographic decisions contribute to shaping environmental narratives (Wells, 2015).





## 2.2 Composition Techniques

Composition refers to the way visual elements are arranged within an image, and it plays a central role in determining how a photograph communicates meaning. Effective composition guides the viewer's attention, highlights key elements, and supports the overall message of the image. For participants engaged in environmental photography, understanding composition is essential for transforming observations into impactful visual statements.

One of the most widely used compositional techniques is the rule of thirds, which involves dividing the image into nine equal parts by placing two horizontal and two vertical lines across the frame, and positioning key elements along these lines or at their intersections. This approach creates balance and directs the viewer's gaze towards important aspects of the scene. In environmental photography, this technique can be used to emphasise contrasts, such as the relationship between natural and urban elements or between preserved and degraded landscapes. As Lester (2013) notes, visual structure significantly influences how images are interpreted, affecting both attention and meaning.

Framing is another critical compositional tool, involving the deliberate inclusion or exclusion of elements within the image. Through framing, photographers can isolate specific environmental issues or provide broader contextual information. For example, a tightly framed image of waste highlights the problem itself, while a wider frame may reveal its impact on the surrounding environment. Perspective also plays a significant role, as different angles can alter how a subject is perceived. A low-angle shot may emphasise scale or dominance, while a high-angle or aerial perspective can reveal patterns and relationships not visible from ground level.

In addition to these fundamental principles, several other compositional techniques can further enhance the clarity and impact of environmental photography. One important aspect is the use of leading lines, which guide the viewer's eye through the image towards a focal point. Roads, rivers, fences, or natural formations can act as visual pathways, directing attention to key environmental elements. In the context of climate-related photography, leading lines can be used to emphasise processes such as pollution flow, deforestation paths, or the expansion of urban areas, making environmental change more visually understandable (Freeman, 2007).



Another relevant technique is depth and layering, which involves structuring the image into foreground, middle ground, and background. This approach creates a sense of spatial depth and helps situate the subject within a broader environmental context. For example, placing waste in the foreground and a natural landscape in the background can visually reinforce the relationship between human activity and environmental impact. This layered composition supports more complex storytelling, allowing viewers to interpret connections within the scene rather than focusing on a single isolated element (Wells, 2015).

Balance and visual weight also play a significant role in composition. Elements within an image carry different levels of visual importance based on size, colour, contrast, and position. A well-balanced image distributes these elements in a way that feels stable, while an intentionally unbalanced composition can create tension or discomfort. In environmental photography, imbalance can be used strategically to reflect disruption, degradation, or conflict between natural and human-made environments. This deliberate use of visual weight enhances the communicative potential of the image, supporting its role as a tool for raising awareness.

The use of patterns and repetition is another effective compositional strategy, particularly in aerial and environmental photography. Repeated elements, such as rows of trees, buildings, or agricultural fields, can create visually striking images that reveal larger environmental structures. When these patterns are disrupted - for instance, by deforestation or pollution - they can highlight environmental damage in a powerful and immediate way. As visual communication research suggests, patterns help viewers recognise order, while their disruption draws attention and signals change (Lester, 2013).

Also, contrast, both visual and conceptual, can significantly strengthen the message of a photograph. Visual contrast may involve differences in colour, light, or texture, while conceptual contrast may highlight opposing elements such as nature versus industry, clean versus polluted environments, or growth versus destruction. These contrasts are particularly relevant in climate storytelling, as they allow photographers to communicate complex environmental tensions through a single image.

By integrating these compositional techniques, participants can develop a more advanced visual language that supports the objectives of the project. Rather



than simply capturing what is visible, they learn to organise visual elements intentionally in order to communicate environmental issues more effectively. This reinforces the role of photography as an active process of meaning-making, where each compositional decision contributes to raising awareness and drawing attention to the urgent challenges of climate change. This shifts photography from passive observation to active interpretation.

## 2.3 The Role of Light

Light is one of the most fundamental elements of photography, directly influencing visibility, mood, and meaning. The quality, direction, and intensity of light determine how subjects are perceived and how effectively a message is conveyed. In environmental photography, light can be used strategically to enhance the emotional and communicative impact of an image.

Natural light is particularly important in this context, as most environmental photography takes place outdoors. Different times of day produce varying lighting conditions, each with distinct visual effects. For instance, soft light during early morning or late afternoon can create a more balanced and visually appealing image, while harsh midday light may emphasise textures and contrasts. Understanding these variations allows participants to make informed decisions about when and how to capture environmental subjects. According to Hunter et al. (2011), light not only reveals form but also shapes the emotional tone of an image, making it a key element in visual communication.

In addition to technical considerations, light can also carry symbolic meaning. Shadows, contrast, and brightness can be used to reinforce the message of an image, particularly when addressing environmental issues. For example, strong contrasts may highlight the tension between natural and artificial elements, while darker tones can evoke a sense of urgency or degradation. These visual cues influence how viewers interpret the image and respond to its message.

Within the framework of the project, the effective use of light supports the goal of creating compelling visual narratives about climate change. By learning how to observe and utilise natural lighting conditions, participants can produce images that are not only technically accurate but also emotionally engaging. This enhances their ability to communicate environmental concerns and contribute to raising awareness through visual media.



### 3. Environmental Photography: Observing Climate Change

#### 3.1 Defining Environmental Photography

Environmental photography refers to a form of visual practice that focuses on the relationship between humans and the natural world, with particular attention to environmental change, degradation, and sustainability. Unlike general landscape photography, which may prioritise aesthetic value, environmental photography is often driven by purpose: to document, interpret, and communicate issues affecting ecosystems and communities. It operates at the intersection of art, documentation, and advocacy, making it especially relevant in the context of climate change.

A key characteristic of environmental photography is its dual function. On the one hand, it provides visual evidence of environmental conditions, capturing real-world phenomena such as pollution, deforestation, or changing land use. On the other hand, it interprets these realities through the photographer's perspective, selecting specific moments, locations, and viewpoints to construct meaning. As Wells (2015) emphasises, photographic images do not simply reflect reality but actively shape how that reality is understood, particularly in relation to social and environmental issues.

In recent years, environmental photography has become increasingly connected to global climate discourse. Scientific reports and data often rely on visual representation to communicate urgency and scale, while photographers contribute by translating complex environmental processes into accessible visual narratives. According to the UN Environment Programme (2021), visual communication plays a critical role in raising awareness of environmental challenges, as images can reach audiences beyond traditional scientific or policy frameworks.

Within this broader context, technological developments - particularly the use of drones - have expanded the scope and impact of environmental photography. Aerial perspectives allow for the documentation of large-scale environmental transformations, such as deforestation patterns, urban expansion, or the effects of climate change on natural landscapes. These perspectives reveal spatial relationships and patterns that are not visible from ground level, contributing to a more comprehensive understanding of environmental issues. As a result, environmental photography today is not limited to observation but increasingly



Co-funded by  
the European Union



Empower  
Plus





### 3.2 Identifying Climate Change Subjects

A central aspect of environmental photography involves the ability to recognise and select subjects that effectively illustrate climate change and its local manifestations. Unlike abstract global narratives, this approach focuses on observable, tangible elements within specific communities and environments. The identification of such subjects requires both environmental awareness and critical observation, as many signs of climate change are subtle or embedded within everyday landscapes.

Typical subjects in climate-related photography include visible forms of environmental degradation, such as waste accumulation, air and water pollution, deforestation, soil erosion, or the impact of industrial activity on natural ecosystems. In urban environments, this may also involve documenting traffic congestion, infrastructure expansion, or reduced green spaces. In rural or natural contexts, subjects may include drought-affected land, changes in vegetation, or evidence of extreme weather conditions. According to the Intergovernmental Panel on Climate Change (2023), climate change manifests through a wide range of environmental indicators, many of which can be visually documented at local level.

What distinguishes effective environmental photography is not only the selection of subjects, but the ability to connect them to broader environmental processes. A single image of waste, for example, can be framed as an isolated issue or as part of a larger system of consumption and environmental impact. This requires participants to move beyond surface observation and consider the underlying causes and implications of what they photograph. As Rose (2016) suggests, visual methodologies involve analysing not only what is seen, but how it relates to wider social and environmental contexts.

Drone technology plays a particularly important role in this process by enabling the identification of subjects that are not easily accessible or visible from the ground. Aerial imagery can reveal patterns such as large-scale deforestation, river pollution, or urban sprawl, offering a broader perspective on environmental change. This expanded field of observation allows participants to capture both detail and scale, strengthening the connection between local realities and global climate issues.



Co-funded by  
the European Union



Empower  
Plus

In the context of youth-focused environmental projects, this process also supports experiential learning. Participants engage directly with their surroundings, developing observational skills while gaining a deeper understanding of environmental challenges. By identifying and documenting climate-related subjects, they become more aware of the impact of human activity on the environment and more capable of communicating these issues through visual media.





### 3.3 Ethical Considerations

Ethical considerations are a fundamental component of environmental photography, particularly when images are used to communicate sensitive issues such as environmental degradation, community vulnerability, or the impact of climate change. The act of photographing is not neutral; it involves choices that can influence how subjects are represented and how audiences interpret them. For this reason, photographers must consider both the accuracy and the implications of their work.

One key ethical principle is the commitment to authenticity. Environmental images should aim to represent reality without manipulation that distorts the context or exaggerates the situation. While editing techniques may be used to enhance clarity or visibility, they should not alter the meaning of the image. As Newton (2001) argues, the credibility of visual communication depends on maintaining trust between the image and the viewer, particularly in contexts where images are used to inform or persuade.

Another important consideration relates to the representation of people and communities. Environmental issues often affect specific populations, and photographing these contexts requires sensitivity and respect. Participants should be aware of issues such as consent, privacy, and the potential for images to reinforce stereotypes or misrepresent situations. Ethical environmental photography should prioritise dignity and accuracy, avoiding exploitative or sensationalist representations.

The use of drone technology introduces additional ethical dimensions. While drones provide valuable perspectives, they also raise concerns related to privacy, safety, and responsible use of airspace. Participants must be informed about legal regulations and ethical guidelines governing drone operation, ensuring that aerial photography is conducted in a safe and respectful manner. This includes avoiding intrusive or inappropriate use, particularly in populated areas or sensitive environments.

Furthermore, environmental photography carries a responsibility towards the message it communicates. Images intended to raise awareness about climate change should aim to inform and engage without inducing misinformation or unnecessary alarm. The goal is to create a balanced representation that



highlights environmental challenges while encouraging constructive reflection and action. As visual communication research indicates, ethical representation enhances both the credibility and the impact of environmental messages (Lester, 2013).

In educational and youth work contexts, integrating ethical awareness into photography practice is essential. Participants should be encouraged not only to develop technical and creative skills, but also to reflect on the implications of their work. This contributes to a more responsible and conscious use of visual media, aligning with the broader objective of promoting informed and active engagement with environmental issues.





## 4. Visual Storytelling Through Photography

### 4.1 From Image to Narrative

While a photograph can capture a moment, visual storytelling transforms that moment into a meaningful narrative. The distinction between an image and a story lies in intention and interpretation. A single photograph may present a scene, but when it is created with a clear purpose and contextual understanding, it can communicate a broader message about environmental realities and human impact.

Visual storytelling involves selecting, organising, and presenting images in a way that guides the viewer towards a specific understanding. This process is particularly important in the context of climate change, where images must convey not only what is visible but also what it represents. As Barthes (1981) suggests, images carry both denotative meaning (what is directly shown) and connotative meaning (the cultural or emotional associations attached to it). In environmental photography, this dual meaning allows images to communicate complex issues in a concise and accessible form.

In practice, this means that participants must move beyond simply capturing visually interesting scenes and instead consider the narrative potential of their images. For example, a photograph of a polluted river is not only a representation of water contamination but can also suggest broader themes such as human negligence, industrial impact, or environmental injustice. The ability to recognise and construct such narratives is essential for effective climate communication.





## 4.2 Elements of Visual Storytelling

Effective visual storytelling relies on several key elements that shape how an image is perceived and understood. These include the subject, context, emotion, and message, each contributing to the overall narrative of the photograph.

The subject is the focal point of the image, representing the core issue or theme being communicated. In environmental photography, this might include visible signs of climate change such as waste, damaged ecosystems, or human activity affecting the environment. However, the subject alone is not sufficient to create meaning; it must be supported by context.

Context provides the background information necessary for interpreting the subject. This can be achieved through visual elements within the frame or through accompanying text. Without context, an image may be visually striking but ambiguous in meaning. As Rose (2016) argues, images must be understood within their social and environmental context in order to be interpreted accurately.

Emotion plays a crucial role in engaging the viewer. Images that evoke emotional responses are more likely to be remembered and to influence attitudes. In climate-related photography, emotions such as concern, urgency, or empathy can encourage viewers to reflect on environmental issues and their implications. This emotional dimension enhances the communicative power of photography, transforming it into a persuasive medium.

The message represents the intended meaning of the image. It is the result of combining subject, context, and emotion into a coherent visual statement. A strong message is clear, relevant, and aligned with the broader goal of raising awareness about environmental challenges. According to Lester (2013), effective visual communication depends on the clarity of the message and its ability to resonate with the audience.





### 4.3 Types of Visual Narratives

Visual storytelling in photography can take multiple forms, depending on how images are structured and presented. One common approach is single-image storytelling, where a single photograph conveys a complete and powerful message. This requires careful composition and strong visual elements, as the entire narrative must be communicated within one frame.

Another approach is the use of photo series, where multiple images are combined to create a more detailed and layered narrative. This format allows photographers to explore different aspects of an environmental issue, such as its causes, effects, and possible solutions. For example, a series might include images of a natural landscape, evidence of environmental damage, and human activity contributing to the problem. This sequential structure provides a more comprehensive understanding of the issue.

Comparative storytelling is another effective method, particularly in the context of climate change. This involves presenting contrasting images, such as before-and-after scenarios or differences between preserved and degraded environments. These comparisons make environmental changes more visible and emphasise the impact of human activity over time. As Cotton (2014) notes, contemporary photography often uses such strategies to highlight social and environmental transformations.

Each of these narrative forms offers different advantages, and their selection depends on the intended message and context. In all cases, the goal is to create a coherent visual narrative that communicates environmental issues clearly and effectively.





## 4.4 Constructing Climate Narratives

Constructing a visual narrative around climate change requires a structured approach that connects individual images to broader environmental themes. One effective framework involves four key stages: identifying the problem, illustrating its impact, communicating a message, and suggesting the need for action.

The first stage, problem identification, involves recognising a specific environmental issue that can be visually documented. This may include pollution, habitat destruction, or the visible effects of climate change within a local context.

The second stage, impact representation, focuses on capturing how this issue affects the environment or communities. This adds depth to the narrative, moving beyond surface observation.

The third stage, message development, involves clarifying what the image or series is intended to communicate. This may be achieved through visual emphasis, composition, or accompanying text such as captions.

The final stage, encouraging reflection or action, connects the visual narrative to a broader purpose, inviting the audience to engage with the issue.

In this process, drone photography can play a significant role by providing perspectives that strengthen the narrative. Aerial images can reveal the scale of environmental issues, making the impact more visible and compelling. For example, patterns of deforestation or urban expansion become more evident when viewed from above, supporting the development of stronger visual narratives.

Within youth-focused environmental initiatives, this structured approach helps participants develop both creative and critical skills. They learn not only how to create images but also how to use them strategically to communicate environmental messages. This aligns with broader goals of fostering awareness, encouraging engagement, and empowering individuals to contribute to climate action through visual storytelling.



## 5. Drone Photography and Aerial Perspectives

### 5.1 Introduction to Drone Photography

Drone photography represents a significant development in contemporary visual practices, expanding the possibilities of environmental documentation and storytelling. By enabling photographers to capture images from elevated and previously inaccessible viewpoints, drones introduce new ways of observing and understanding landscapes. This technological advancement has become particularly relevant in the context of environmental photography, where scale, spatial relationships, and patterns play a crucial role in communicating climate-related issues.

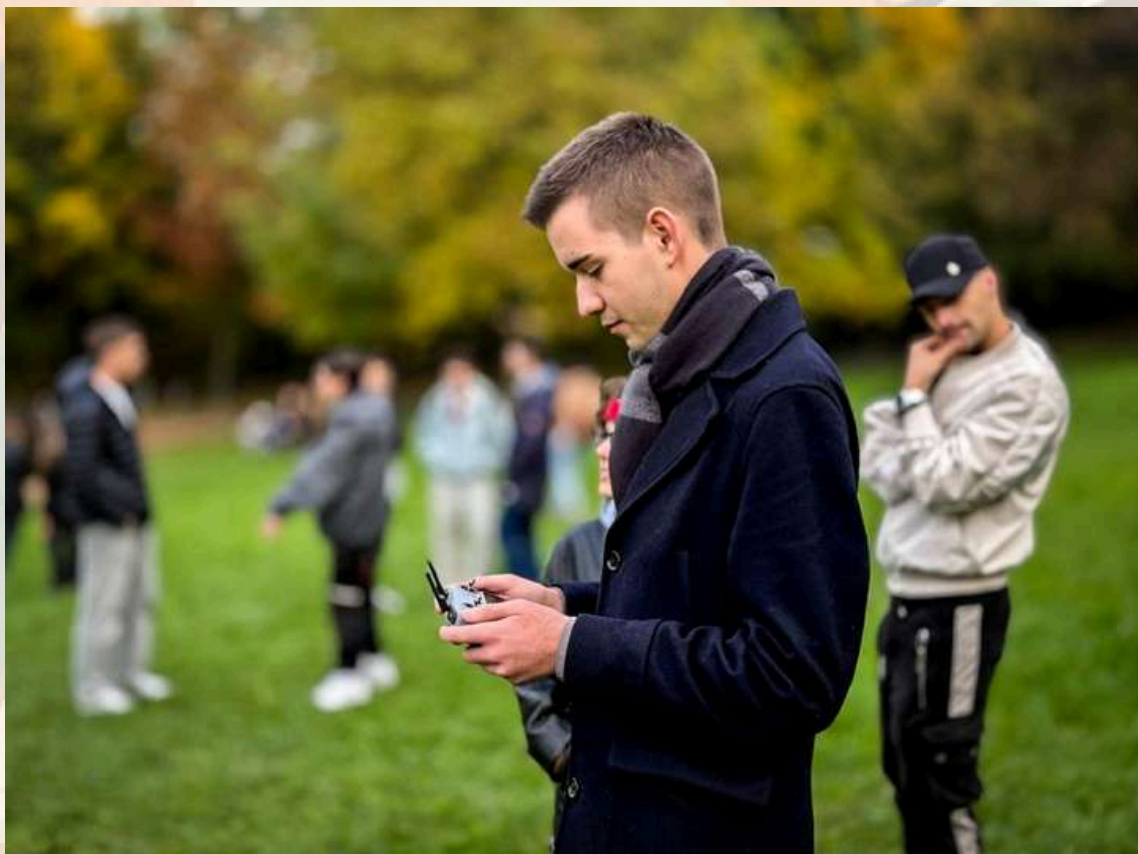
Unlike traditional ground-based photography, drone imagery allows for a broader perspective, revealing the extent and distribution of environmental changes. Large-scale phenomena such as deforestation, urban expansion, or water pollution can be documented more effectively from above, providing a visual overview that complements detailed ground-level observations. As Cotton (2014) suggests, contemporary photography increasingly integrates new technologies to expand its capacity for critical engagement with social and environmental issues.

In the context of climate change, drone photography supports the visualisation of processes that are often difficult to perceive directly. Environmental transformations typically occur gradually or across large areas, making them less visible in everyday experience. Aerial imagery addresses this limitation by capturing patterns and changes over space, allowing viewers to better understand the scale and impact of environmental degradation. This contributes to more effective communication, as audiences are able to see not only isolated elements but also the broader context in which they exist.

Furthermore, drone technology has increased accessibility to aerial photography, allowing not only professional photographers but also youth participants and educators to engage with this form of visual documentation. This democratisation of perspective aligns with the objectives of educational and environmental initiatives, where participants are encouraged to actively explore and represent their surroundings. By integrating drone photography into



environmental projects, participants gain both technical skills and a deeper awareness of the spatial dimensions of climate change.





## 5.2 Aerial vs Ground Perspectives

The relationship between aerial and ground-based photography is not one of replacement, but of complementarity. Each perspective offers distinct advantages, and their combined use can create a more comprehensive visual understanding of environmental issues. Ground-level photography captures detail, texture, and human-scale interactions, while aerial photography reveals structure, distribution, and large-scale patterns.

From the ground, photographers are able to document specific elements with precision, such as waste accumulation, damaged vegetation, or human activity. These images often create a sense of proximity and immediacy, allowing viewers to connect emotionally with the subject. In contrast, aerial perspectives provide a more detached but informative viewpoint, highlighting the extent and organisation of environmental phenomena. For example, a polluted river may appear as a local issue when photographed from the ground, but aerial imagery can reveal its full trajectory and impact across a wider area.

This distinction is particularly important in climate-related storytelling, where both detail and scale are necessary for effective communication. As Wells (2015) notes, the meaning of an image is shaped by perspective, and different viewpoints can produce different interpretations of the same subject. By combining aerial and ground perspectives, photographers can construct more nuanced narratives that reflect both the immediate and systemic dimensions of environmental change.

Drone photography also introduces new compositional possibilities, allowing for vertical perspectives, geometric patterns, and abstract visual forms that are not achievable from the ground. These perspectives can enhance the visual impact of environmental images, making them more engaging and memorable. At the same time, they require careful consideration to ensure that the message remains clear and relevant, rather than purely aesthetic.

In educational contexts, encouraging participants to explore both perspectives supports the development of critical observation skills. By comparing ground-level and aerial images of the same subject, participants can better understand how perspective influences interpretation. This process reinforces the idea that photography is not only about capturing images, but also about making informed decisions that shape how environmental issues are perceived.



### 5.3 Aerial Storytelling and Global Examples

Aerial photography has played a significant role in shaping global awareness of environmental issues, particularly by revealing patterns and transformations that are not visible from the ground. Through the use of elevated perspectives, photographers have been able to communicate the scale and impact of human activity on the environment, contributing to public discourse and environmental advocacy.

The work of Yann Arthus-Bertrand (<https://www.yannarthusbertrand2.org/collection/earth-from-above/>) is widely recognised for demonstrating the potential of aerial imagery in environmental communication. His project Earth from Above presents large-scale photographs of landscapes affected by human activity, including deforestation, desertification, and industrial development. These images have been exhibited internationally and used in environmental campaigns, highlighting how aerial perspectives can transform environmental data into visually compelling narratives (Wells, 2015).

Similarly, Edward Burtynsky (<https://www.theanthropocene.org>) has used aerial and large-format photography to document the environmental consequences of industrialisation. His work focuses on landscapes altered by human activity, such as mining sites, oil extraction areas, and urban expansion. Through projects such as Anthropocene, he has contributed to global discussions about the impact of human actions on the planet, demonstrating how visual representation can influence cultural and environmental awareness (Cotton, 2014).

More recent developments in drone technology have enabled photographers such as Daniel Beltrá (<https://www.danielbeltra.com>) to capture real-time environmental crises with greater flexibility and immediacy. His aerial images of oil spills, forest fires, and environmental disasters have been widely disseminated through international media and environmental organisations, supporting advocacy efforts and increasing public engagement with climate-related issues (Newton, 2001).

The growing importance of environmental imagery is also reflected in international platforms such as the World Press Photo, where climate change and environmental themes are increasingly represented among award-winning



photographs. These images reach global audiences and contribute to shaping public understanding of environmental challenges, demonstrating the role of photography as both a documentary and communicative medium (<https://www.worldpressphoto.org>).

In the context of environmental education and youth engagement, these examples illustrate the potential of aerial storytelling as a tool for raising awareness and inspiring action. By learning to use drone technology and aerial perspectives, participants can document their own environments in ways that reveal hidden patterns and highlight pressing issues. This not only enhances their technical and creative skills but also empowers them to contribute to broader conversations about climate change.

Through the integration of aerial photography into environmental projects, visual storytelling becomes a means of connecting local observations with global concerns. By capturing images that reveal both detail and scale, participants are able to communicate the urgency of environmental challenges and contribute to efforts aimed at increasing awareness and promoting sustainable practices.





## 6. Communicating Climate Messages Through Images

### 6.1 Image Interpretation and Audience

The communicative power of environmental photography is determined not only by the image itself, but by how it is interpreted by different audiences. Unlike written information, which tends to guide understanding more directly, visual content is inherently open to multiple interpretations. This means that the meaning of an image is shaped through an interaction between the visual content and the viewer's experiences, cultural background, and level of environmental awareness.

In the context of climate change, this variability of interpretation presents both an opportunity and a challenge. On one hand, images can reach a wide and diverse audience, including individuals who may not engage with scientific or policy-based information. On the other hand, if visual messages are not sufficiently clear, they risk being misunderstood or losing their intended impact. As Barthes (1981) explains, images operate through both denotation and connotation, making interpretation dependent on context and prior knowledge. For this reason, environmental photography must be developed with a clear awareness of the target audience. Images designed for educational contexts, such as youth workshops, may prioritise clarity, recognisable subjects, and direct connections to everyday experiences. In contrast, images used in public awareness campaigns may rely more on visual impact and symbolic meaning to attract attention and provoke reflection. Effective communication requires aligning the visual message with the expectations and interpretative abilities of the audience (Lester, 2013).

In practice, this involves making deliberate decisions about subject selection, visual emphasis, and context. For example, an image of environmental degradation may be interpreted differently depending on whether it is presented as an isolated incident or as part of a broader narrative about climate change. By considering how audiences interpret images, participants can develop a more strategic approach to photography, ensuring that their work communicates clearly and effectively.



## 6.2 Emotional and Informational Impact

A key aspect of communicating climate messages through photography is the balance between emotional engagement and informational clarity. Environmental images are most effective when they combine these two dimensions, allowing viewers not only to understand the issue but also to feel its significance. This dual function is particularly important in the context of climate change, where the scale and complexity of the problem can make it difficult for individuals to relate to it directly.

Emotional engagement plays a crucial role in capturing attention and encouraging reflection. Images that evoke feelings such as concern, empathy, or urgency are more likely to remain in the viewer's memory and influence attitudes. For example, photographs that highlight visible environmental damage or human vulnerability can create a sense of immediacy, making the issue more personal and relevant. As Sontag (1977) argues, photographs have the capacity to shape emotional responses and influence how people perceive global issues.

However, emotional impact alone is not sufficient. Without a clear informational component, images may be interpreted in unintended ways or fail to communicate a specific message. This is particularly relevant in environmental contexts, where visual evidence must be understood in relation to broader processes such as climate change, pollution, or resource exploitation. According to UNEP (2021), effective environmental communication requires a combination of accessible information and engaging presentation in order to support informed decision-making and public awareness.

The integration of emotional and informational elements allows images to function as both expressive and explanatory tools. For instance, a photograph of a polluted landscape may evoke concern while also illustrating the consequences of human activity. This combination enhances the communicative potential of the image, making it more effective in raising awareness and encouraging critical reflection.

In educational settings, this balance is especially important. Participants must learn not only how to create visually engaging images but also how to ensure that these images communicate accurate and meaningful information. This supports the development of responsible visual communication practices, where creativity is combined with awareness of environmental realities.



### 6.3 Combining Image and Text

The communicative effectiveness of environmental photography is significantly enhanced when images are combined with textual elements. While images can capture attention and evoke emotion, text provides the context necessary for interpretation. This combination is particularly important in climate communication, where visual content often represents complex processes that require explanation.

Captions are one of the most common and effective forms of textual support. A well-written caption can clarify the subject of the image, provide relevant background information, and reinforce the intended message. It can also guide the viewer's interpretation by highlighting specific aspects of the image that might otherwise be overlooked. As Rose (2016) notes, the meaning of an image is shaped not only by its visual content but also by the context in which it is presented, including accompanying text.

In environmental photography, captions can play a key role in linking local observations to global issues. For example, an image of a degraded natural area can be accompanied by a brief explanation of its causes, such as pollution or unsustainable practices, and its broader implications for climate change. This connection helps viewers understand the relevance of the image beyond its immediate visual appearance.

Text can also contribute to the structure of visual narratives, particularly in photo series or exhibitions. Titles, short descriptions, and thematic statements can provide coherence, guiding the audience through a sequence of images and supporting a more comprehensive understanding of the issue. This is especially relevant in dissemination contexts, where images are presented to audiences who may not have prior knowledge of the subject.

For participants, learning how to combine images with text is an essential component of developing communication skills. It encourages them to reflect on the purpose of their images and to articulate their message clearly. This process strengthens their ability to use photography as a tool for environmental communication, enabling them to engage more effectively with issues related to climate change.

Moreover, the integration of image and text supports the dissemination of visual



Co-funded by  
the European Union



Empower  
Plus

content across multiple platforms, including exhibitions, educational materials, and digital media. In these contexts, clarity, coherence, and relevance are essential for reaching diverse audiences and maintaining the impact of the message. By developing both visual and textual communication skills, participants are better equipped to contribute to environmental awareness and to communicate the urgency of climate-related challenges.





## 7. Photography in Youth Work Practice

### 7.1 Educational Applications

Photography has become an increasingly valuable tool within youth work, particularly in non-formal educational settings where experiential and creative methods are prioritised. Unlike traditional teaching approaches, photography-based activities encourage active participation, observation, and reflection, allowing young people to engage with real-world issues in a direct and meaningful way. In the context of environmental education, photography supports the development of both technical skills and critical awareness, enabling participants to explore and communicate climate-related challenges through visual means.

One of the main advantages of photography in youth work lies in its flexibility and adaptability. It can be integrated into a wide range of activities, including workshops, field visits, and project-based learning. Participants can be guided to document their local environment, identify visible signs of climate change, and reflect on the impact of human activity on natural systems. This process transforms learning into an active experience, where knowledge is constructed through observation and engagement rather than passive reception. As Rose (2016) suggests, visual methods can enhance learning by encouraging participants to interpret and analyse their surroundings in a structured way.

Photography also supports interdisciplinary learning, combining elements of environmental education, digital literacy, and creative expression. Participants develop practical skills in image creation while simultaneously exploring broader themes such as sustainability, climate change, and social responsibility. This integrated approach aligns with contemporary educational practices, which emphasise the development of transferable competences and critical thinking (Lester, 2013).

In addition, photography-based activities can contribute to the development of reflective skills. By reviewing and discussing their images, participants are encouraged to consider what they have observed, how they have represented it, and what message their work communicates. This reflective process enhances both self-awareness and understanding of environmental issues, supporting the overall goal of fostering informed and engaged individuals.



## 7.2 Participatory Approaches

Participatory approaches are central to effective youth work, as they place young people at the centre of the learning process. In photography-based activities, this means that participants are not simply following instructions but actively contributing to the creation of content and the development of meaning. They are involved in selecting subjects, making decisions about how to represent them, and interpreting the results of their work.

This approach is particularly important in the context of environmental photography, where personal perspective and local knowledge play a key role. By documenting their own communities and environments, participants bring unique insights into the visual narratives they create. This reinforces the relevance of the activity, as the issues being explored are directly connected to their lived experiences. According to Wells (2015), photography can function as a participatory medium that allows individuals to express their perspectives and engage with social and environmental realities.

Participatory photography also supports collaboration and dialogue. Group activities such as photo walks, thematic projects, or collective exhibitions encourage participants to share ideas, compare perspectives, and reflect on different interpretations of the same environment. This exchange of views contributes to a deeper understanding of environmental issues, as participants are exposed to multiple viewpoints and experiences.

Furthermore, participatory approaches can strengthen a sense of ownership and responsibility. When young people are actively involved in documenting environmental issues, they are more likely to feel connected to the subject and motivated to engage with it beyond the activity itself. This connection is essential for promoting long-term awareness and encouraging active involvement in environmental initiatives.

In addition, the use of drone photography can enhance participatory approaches by introducing new perspectives and collaborative opportunities. Participants can work together to plan aerial shots, analyse the images produced, and discuss the insights gained from these perspectives. This not only develops technical skills but also promotes teamwork and critical thinking, reinforcing the educational value of the activity.



## 8. From Creation to Dissemination

The impact of environmental photography extends beyond the moment of image creation, reaching its full potential through effective dissemination. In the context of climate change, images are not only produced to document reality but also to communicate messages, engage audiences, and contribute to broader awareness. Dissemination therefore represents an important stage in the process, transforming individual photographs into tools for public engagement and environmental advocacy.

One of the most effective forms of dissemination is the photo exhibition, which provides a structured environment for presenting visual narratives to an audience. Exhibitions allow images to be curated, organised, and contextualised, guiding viewers through a coherent story about environmental issues. Unlike isolated images, photographs presented within an exhibition can create a cumulative effect, where each image contributes to a broader understanding of climate change and its local impact. As Cotton (2014) notes, contemporary photography increasingly relies on curated presentation formats to enhance meaning and audience engagement.

In environmental contexts, exhibitions can serve both educational and communicative purposes. They provide opportunities for audiences to reflect on visual representations of environmental change and to engage in dialogue about the issues presented. This is particularly relevant in youth-focused initiatives, where exhibitions can showcase the work of participants and amplify their perspectives. By presenting their images to a wider audience, young people move from the role of learners to that of communicators, contributing actively to public awareness of climate challenges.

In addition to traditional exhibitions, digital formats have become increasingly important for dissemination. Online platforms and social media enable images to reach wider audiences beyond local communities, extending the impact of environmental photography. These platforms allow for rapid sharing, interaction, and feedback, creating opportunities for dialogue and engagement. According to Lester (2013), the digital circulation of images enhances their communicative potential by increasing accessibility and audience reach.

A particularly innovative approach to dissemination is the use of virtual reality



(VR) exhibitions, which introduce immersive ways of experiencing environmental photography, making issues such as climate change more tangible and immediate. In the context of environmental projects, VR exhibitions are especially relevant as they align with the use of digital tools and innovative communication methods. By integrating drone photography with VR environments, it becomes possible to present aerial perspectives in a more dynamic and interactive way. This approach not only enhances the visual experience but also reinforces the educational value of the images.

Another important aspect of dissemination involves the integration of photography into public campaigns and community engagement activities. Images can be used in posters, online campaigns, or educational materials to raise awareness about specific environmental issues. When combined with clear messaging and strategic communication, these visual materials can contribute to shaping public attitudes and encouraging behavioural change. As Wells (2015) highlights, photography has long been used as a tool for social engagement, particularly in contexts where visual evidence can support advocacy and awareness.

For participants, involvement in dissemination activities represents a continuation of the learning process. Preparing images for exhibition, selecting photographs, and organising visual narratives require critical thinking and reflection. Participants must consider not only the technical quality of their images but also their relevance, clarity, and communicative impact. This process reinforces the connection between image creation and communication, emphasising the role of photography as a purposeful activity.

Furthermore, dissemination activities contribute to the visibility and sustainability of environmental initiatives, including the long-term impact of the Green Horizon: Youth Voices for Climate Action Through Drone Technology project. By sharing visual outputs created by participants through exhibitions, digital platforms, and immersive formats such as VR, the project ensures that its results extend beyond the immediate implementation phase. The photographs, aerial images, and visual narratives developed during the activities become lasting educational resources that can continue to inform and engage new audiences over time.

In this context, sustainability is not limited to environmental awareness, but also



refers to the continued use and relevance of project outcomes. The photo exhibition and VR exhibition, in particular, function as tools for ongoing dissemination, allowing the project's messages to reach wider communities even after the formal activities have concluded. These formats enable repeated use in educational settings, community events, and online platforms, ensuring that the knowledge and perspectives developed by participants remain accessible. Moreover, the integration of digital dissemination methods supports the project's objective of combining environmental awareness with digital skills. By presenting their work through online channels and immersive technologies, participants contribute to a dynamic and evolving communication process. This not only increases the reach of the project but also reinforces its innovative character, demonstrating how visual media and technology can be used together to address climate change.

The sustainability of the project is further strengthened by the role of participants as multipliers. By developing skills in photography, drone usage, and visual storytelling, they are able to continue creating and sharing environmental content within their own communities. This extends the impact of the project beyond its original scope, contributing to a broader culture of environmental awareness and active engagement.

In this way, dissemination is directly linked to the long-term objectives of the Green Horizon project. It ensures that the visual materials produced are not only outputs of the project but also tools for continued education, communication, and advocacy, supporting the ongoing effort to raise awareness about climate change and promote more sustainable practices.





## References

### Chapter II

- Arthus-Bertrand, Y. (n.d.) Available at: <https://www.yannarthusbertrand.org>
- Barthes, R. (1981) Camera Lucida. London: Vintage.
- Beltrá, D. (n.d.) Available at: <https://www.danielbeltra.com>
- Burtynsky, E. (n.d.) Available at: <http://www.edwardburtynsky.com>
- Cotton, C. (2014) The Photograph as Contemporary Art. London: Thames & Hudson.
- Freeman, M. (2007) The Photographer's Eye. London: Ilex.
- Hunter, F., Biver, S. and Fuqua, P. (2011) Light: Science and Magic. Oxford: Focal Press.
- Intergovernmental Panel on Climate Change (2023) Climate Change 2023: Synthesis Report. Available at: <https://www.ipcc.ch>
- Lester, P.M. (2013) Visual Communication: Images with Messages. 6th edn. Boston: Wadsworth.
- Newton, J.H. (2001) The Burden of Visual Truth. London: Lawrence Erlbaum.
- Rose, G. (2016) Visual Methodologies. 4th edn. London: Sage.
- Sontag, S. (1977) On Photography. New York: Farrar, Straus and Giroux.
- UN Environment Programme (2021) Making Peace with Nature: A Scientific Blueprint to Tackle the Climate, Biodiversity and Pollution Emergencies. Available at: <https://www.unep.org>
- Wells, L. (2015) Photography: A Critical Introduction. 5th edn. London: Routledge.



Co-funded by  
the European Union



**Empower  
Plus**

# CHAPTER III

## DRONES





## 1. Introduction: Drones as a Tool for Climate Documentation

Drones, also called unmanned aircraft systems (UAS), have moved from specialist tools to equipment that youth workers and young people can use in everyday projects. A small camera drone can show in seconds what would take hours to understand from the ground: the edge of a shrinking forest, the path of a polluted stream, the scale of a dried-out reservoir or the spread of new construction over green land.

In the Green Horizon project, drones are not used for spectacle. They are a learning and documentation tool that helps young people observe their local environment, collect visual evidence of climate change and turn that evidence into stories that others can understand.

This chapter is a practical guide for youth workers and young people who are new to drone operation. It explains how a drone works, what the rules are in Germany, Romania and Türkiye, how to plan and fly safely, how to capture useful aerial images and video, and how to turn raw footage into a short climate story.

Three principles run through the whole chapter:

- Safety first: people, animals, property and other aircraft always come before the shot.
- Respect the law and privacy: every flight follows national rules and respects the people being filmed.
- Purpose before pictures: each flight should answer a clear question about the local environment.

Important: drone rules change regularly. Always check the latest information from the national aviation authority before flying.





Co-funded by  
the European Union



Empower  
Plus

# DRONE OPERATION



## 2. Understanding the Drone – 2.1 Types of Drones

Not every drone is the same, and the right type depends on what you want to document.

Multirotor drones (with four, six or eight propellers) are the most common type in youth work and the type used in this project. They take off and land vertically, can hover in one place and are easy to control, which makes them ideal for photography and short video sequences over a specific location.

Fixed-wing drones look like small aeroplanes. They fly longer and cover larger areas, so they are used for mapping forests, farmland or coastlines, but they need space to take off and land and are harder for beginners.

Hybrid (VTOL) drones combine vertical take-off with fixed-wing flight. They are mainly used by professionals and research teams.

Drones are also grouped by weight, which matters for the rules explained in Section 3:

- Under 250 g: light and portable, with fewer legal requirements in the EU – a good choice for beginners and workshops.
- 250 g to 900 g: typical consumer camera drones with better cameras and more stability in wind.
- Over 900 g: professional drones with advanced cameras, usually requiring additional training.

For climate documentation with young people, a small multirotor drone with a stabilised camera (gimbal), satellite positioning (GPS) and a return-to-home function offers the best balance between image quality, safety and ease of use.



## 2.2 Main Components

Understanding the parts of a drone helps users fly safely, spot problems early and take good care of the equipment.

- **Frame and arms:** the body of the drone that holds all components. Foldable arms make transport easier.
- **Motors and propellers:** create lift and movement. Propellers must be undamaged and correctly attached; a cracked propeller is a common cause of accidents.
- **Battery:** the intelligent flight battery powers the drone. A typical consumer drone flies 20–40 minutes per battery, less in cold or windy weather.
- **Flight controller:** the ‘brain’ of the drone, which keeps it stable using data from its sensors.
- **Sensors:** satellite positioning (GPS) for location, a compass for direction, an inertial measurement unit (IMU) for balance and, on many models, obstacle-avoidance sensors.
- **Camera and gimbal:** the camera records photos and video; the gimbal keeps it stable and allows it to tilt up and down.
- **Remote controller:** sends commands to the drone and receives the live video, usually shown on a smartphone or a built-in screen.
- **Lights (LEDs):** show the orientation and status of the drone and help the pilot keep visual contact.

Before every flight, each of these components should be checked. A quick visual inspection takes less than a minute and prevents most technical problems in the field.





## 2.3 Controller, App and Flight Modes

Most camera drones are flown with a remote controller that has two sticks and a connected app.

In the most common setting (Mode 2):

- Left stick: up/down makes the drone climb or descend (throttle); left/right turns it around its own axis (yaw).
- Right stick: up/down moves the drone forward or backward (pitch); left/right moves it sideways (roll).

The controller also has buttons for take-off and landing, return-to-home, photo and video recording, and a wheel to tilt the camera.

The app shows the live camera image and important flight information: battery level, height, distance from the take-off point, number of satellites, signal strength and warnings. Learning to read this screen is as important as learning to use the sticks.

Typical flight modes include:

- Normal / Position mode: GPS holds the drone in place when the sticks are released. This is the mode for beginners and for most documentation work.
- Cine / Tripod mode: slower, smoother movements, ideal for filming.
- Sport mode: faster flight, often with obstacle sensors switched off. Not recommended for workshops.
- Attitude (ATTI) mode, on some models: no GPS position hold, so the drone drifts with the wind. Pilots should understand this behaviour, because GPS can be lost near buildings, bridges or metal structures.



# Rules of the Sky



↑  
120 m





### 3. Rules and Regulations – 3.1 EU Drone Rules (Germany and Romania)

Germany and Romania follow the common European drone rules set out in Regulation (EU) 2019/947. They are supervised by the European Union Aviation Safety Agency (EASA) and the national authorities: the Luftfahrt-Bundesamt (LBA) in Germany and the Romanian Civil Aeronautical Authority (AACR) in Romania.

Most educational and youth flights belong to the 'open' category, which has these main conditions:

- Maximum height of 120 m above the ground.
- The drone stays in the visual line of sight (VLOS) of the pilot at all times.
- No flights over assemblies of people.
- Maximum take-off mass below 25 kg.
- No transport of dangerous goods and no dropping of objects.

Registration and training:

- The operator must register with the national authority if the drone weighs 250 g or more, or if it has a camera (unless it is a toy). The operator registration number must be displayed on the drone.
- Pilots of drones of 250 g or more must complete free online training and pass a test (proof of competency for subcategories A1/A3). Flying heavier drones closer to people requires the additional A2 certificate.
- The minimum age is generally 16 years, although countries may set a lower age.

National rules add further requirements, for example mandatory third-party liability insurance in Germany, and geographical zones where flights are forbidden or need special authorisation. Always check the official national maps and websites before flying in a new location.





### 3.2 Drone Rules in Türkiye

In Türkiye, drones are regulated by the Directorate General of Civil Aviation (Sivil Havacılık Genel Müdürlüğü – SHGM). A completely revised Unmanned Aircraft Systems Instruction (SHT-İHA) entered into force on 30 July 2026, with a transition period for existing certificates and licences until 31 July 2027.

Key points for youth workers and young people:

- Flight authorisation is now linked mainly to the pilot's licence level – P0 (amateur), P1 (commercial) and P2 (advanced) – rather than only to the weight of the drone.
- Drones and pilots generally have to be registered with SHGM; simple toy-category drones are exempt from registration and licensing.
- Registration, permissions and authorisations are handled through SHGM's digital platform and the new drone tracking and traffic-management system (İHATTYS). Geofencing helps keep drones out of restricted areas.
- Flights near airports, military zones, government buildings and other restricted areas remain prohibited or require permission. Flying without the required registration or permission can lead to significant fines.

Because the rules have just changed, always check the exact registration and licence requirements for your drone on the official SHGM websites ([shgm.gov.tr](http://shgm.gov.tr) and [iha.shgm.gov.tr](http://iha.shgm.gov.tr)) before every project.





### 3.3 Privacy, Data Protection and No-Fly Zones

A drone camera can easily capture people, homes and vehicles. In the EU, photos and videos in which people can be identified are personal data under the General Data Protection Regulation (GDPR); Türkiye provides similar protection through its Personal Data Protection Law (KVKK). Responsible drone users therefore:

- Inform people in the area before filming and ask for consent when individuals are recognisable.
- Avoid filming private gardens, windows and courtyards.
- Blur faces and number plates before publishing material when consent has not been given.
- Store footage securely and delete material that is not needed.
- Follow the project's safeguarding rules whenever minors appear in images.

No-fly zones and restricted areas protect people and other aircraft. Typical examples are:

- Airports and their surroundings, helipads and hospitals;
- Military areas, prisons, police stations and government buildings;
- Power plants, industrial sites and other critical infrastructure;
- Nature reserves and protected areas, where drones can disturb wildlife;
- Large events, demonstrations and gatherings.

Official interactive maps published by national authorities and air navigation service providers show these zones and help you check a location in advance. If you are not sure whether you may fly, do not fly until you have checked.





Co-funded by  
the European Union



**Empower  
Plus**

# FLY SAFE



## 4. Planning a Flight – 4.1 Choosing and Checking the Location

Good documentation begins long before take-off. Planning answers two questions: what do we want to show, and can we show it safely and legally?

Start with the story. Decide which climate issue you want to document – for example riverbank erosion, drought on farmland, a heat island in a car park, illegal dumping or forest damage – and what a viewer should understand from the images.

Then check the location:

- Is the area inside a restricted or protected zone? Check the official maps.
- Who owns the land, and do you need permission from the owner or the municipality?
- Where are people, roads, power lines, trees and buildings?
- Is there an open, flat and safe take-off and landing point away from the public?
- Is there a clear line of sight to the whole area you want to film?
- Where could the drone land safely in an emergency?

A short site visit without the drone is very useful. Walk the area, take ground-level photos, note obstacles and agree on the shots you need. In group activities, assign clear roles: pilot, observer (spotter) who watches the drone and the surroundings, camera assistant, and someone responsible for informing the public.

Write the plan down on a simple flight sheet: date, location, purpose, planned shots, team roles, number of batteries and emergency landing spot.





## 4.2 Weather and Environmental Conditions

Weather is one of the most common causes of drone accidents and poor images.

- Wind: small drones can handle light wind, but strong or gusty wind drains the battery quickly and can push the drone away. Check the manufacturer's wind limit and remember that wind is usually stronger at 100 m than on the ground. As a rule of thumb, beginners should not fly small drones when the wind exceeds about 30 km/h.
- Rain, snow and fog: most consumer drones are not waterproof. Fog and low clouds also make it impossible to keep visual line of sight.
- Temperature: cold reduces battery performance, so keep batteries warm before the flight and land earlier. Very hot weather can overheat batteries and electronics.
- Light: the best photographs are usually taken in the 'golden hours' after sunrise and before sunset. Midday light is harsh but can be useful for mapping, because shadows are short.
- Magnetic interference: avoid taking off near large metal structures, cars or reinforced concrete, which can disturb the compass.
- Wildlife: birds may attack or be disturbed by drones, especially in the nesting season. Keep your distance and leave if animals react.

Weather apps, wind forecasts and drone-specific apps that combine weather, satellite coverage and airspace information are very helpful. If conditions are doubtful, postpone the flight – the climate story will still be there tomorrow.





### 4.3 Pre-Flight Checklist

Use this checklist before every flight. Experienced pilots use checklists too – they stop small mistakes from becoming accidents.

#### Documents and permissions

- ☐ Operator registration and pilot certificate available
- ☐ Location checked on official maps; permissions obtained
- ☐ Insurance valid (where required)
- ☐ People in the area informed

#### Drone and equipment

- ☐ Frame, arms and propellers undamaged and secure
- ☐ Drone, controller and phone batteries fully charged
- ☐ Memory card inserted, with enough free space
- ☐ Camera lens clean, gimbal cover removed
- ☐ Firmware and app up to date (update at home, not in the field)

#### Site and conditions

- ☐ Wind, rain and temperature within limits
- ☐ Take-off area flat, clear and away from people
- ☐ Obstacles and emergency landing point identified
- ☐ Observer briefed and in position

#### Just before take-off

- ☐ Strong satellite signal and home point recorded
- ☐ Return-to-home height set above the highest obstacle
- ☐ Compass calibrated if the app asks for it
- ☐ Flight mode set to Normal / Position
- ☐ Announce “Take-off!” to the team





## 5. Basic Flight Skills – 5.1 Take-off, Hovering and Landing

Every flight follows the same basic sequence. Practise it many times in an open field before going to a documentation site.

### Take-off

- Place the drone on a flat surface, facing away from you, at a safe distance from people.
- Switch on the controller first, then the drone. Wait for the satellite lock and the recorded home point.
- Start the motors (or use automatic take-off) and rise to about 2–3 m.

### Hover check

- Let the drone hover for 10–20 seconds at eye level. It should stay still without drifting.
- Check that it responds correctly to small stick movements in all directions.
- If anything seems unusual – vibration, drifting or warnings – land immediately and check.

### Climbing and flying

- Climb vertically to a safe height above trees and obstacles before moving horizontally.
- Use smooth, small stick movements. Sudden movements make footage shaky and flying risky.

### Landing

- Return to the take-off area with at least 30% battery left.
- Descend slowly, stop a few metres above the ground, check that the landing area is clear and land gently.
- Hold the left stick down until the motors stop. Switch off the drone first, then the controller.

After every flight, write the flight time, battery used and any problems in a simple flight log.



## 5.2 Basic Movements and Practice Exercises

Confidence comes from practice. These exercises, done in an open field at low height, build the core skills needed for documentation flights.

Exercise 1 – The square: fly forward 10 m, right 10 m, back 10 m and left 10 m, keeping the drone facing the same direction. This trains pitch and roll control.

Exercise 2 – Turn on the spot: hover and rotate the drone slowly through 360°, then fly forward in the new direction. Remember that when the drone faces you, left and right are reversed.

Exercise 3 – The figure eight: fly two connected circles, combining forward movement with gentle turns. This prepares pilots for smooth video movements.

Exercise 4 – The orbit: fly in a circle around a fixed object, such as a tree or a cone, while keeping the camera pointed at it.

Exercise 5 – Precision landing: land on a marked square of 1 m × 1 m, approaching from different directions.

Exercise 6 – Simulator: many drone apps and free simulators let pilots practise on a computer or smartphone without any risk.

In workshops, work in pairs: one pilot and one observer, swapping roles every few minutes. Give each participant a clear task and finish with a short reflection: What was difficult? What would you do differently in a real documentation flight?



### 5.3 Return-to-Home and Intelligent Flight Functions

Modern camera drones include automated functions that support safety and filming. They are helpful, but they never replace the pilot's attention.

#### Return-to-Home (RTH)

When the signal is lost, the battery is low or the pilot presses the RTH button, the drone climbs to a pre-set height and flies back to the recorded home point. To make RTH safe:

- Make sure the home point is recorded before take-off.
- Set the RTH height above the tallest obstacle on the route (trees, buildings, power lines).
- Remember that obstacle sensors may not work in all directions or in low light.
- Be ready to take back control and cancel RTH if the drone approaches an obstacle.

#### Intelligent flight modes

Depending on the model, drones offer functions such as:

- Waypoints: the drone flies a pre-planned route – useful for repeating exactly the same flight months later (see 7.3).
- Point of Interest / Orbit: the drone circles a chosen point automatically.
- QuickShots (for example Dronie, Rocket, Helix): short automated video movements.
- Follow / Tracking: the drone follows a moving subject. Use it with care and never to follow people without their consent.
- Hyperlapse and Panorama: time-lapse video and wide panoramic photos, very useful for showing landscapes.

Test each function in an open area before using it at a documentation site.





## 6. Safety and Emergency Procedures

Even careful pilots face unexpected situations. Knowing in advance what to do keeps everyone safe.

Golden safety rules

- Never fly over people, crowds, roads with traffic or animals.
- Keep visual line of sight and work with an observer.
- Do not fly when tired or after drinking alcohol.
- Keep well away from airports, helicopters and other aircraft; if a manned aircraft appears, descend and land immediately.
- Never fly from a moving vehicle.

What to do if...

- The signal is lost: stay calm, point the controller towards the drone and move to an open position. In most cases RTH will start automatically.
- The low-battery warning appears: stop filming and return at once. A critical battery warning means the drone will land automatically where it is – make sure that place is safe.
- The wind becomes strong: descend to a lower height, where the wind is usually weaker, and fly back in a straight line.
- GPS is lost: the drone may start to drift. Concentrate on stick control and fly it back manually.
- The drone gets close to people: climb and move away at once – landing near people is never the solution.
- There is a crash or flyaway: note the last known position in the app, secure the area, check for injuries and damage, and report serious incidents to the national aviation authority as the law requires.

Keep a small first-aid kit and a fire-safe bag for damaged batteries in your field kit.





Co-funded by  
the European Union



**Empower  
Plus**

# CAPTURE THE CHANGE





## 7. Aerial Photography and Video for Climate Storytelling – 7.1 Camera Settings

Chapter II explained the principles of composition and light. This section focuses on the camera settings that make drone images clear and useful as evidence.

- Resolution and format: shoot photos in RAW (DNG) plus JPEG when possible, and video in 4K or at least Full HD. RAW files keep more detail for editing.
- Frame rate: 25 or 30 frames per second (fps) for normal video; 50 or 60 fps if you want smooth slow motion.
- Shutter speed: for natural-looking video, a common rule is a shutter speed about twice the frame rate (for example 1/50 s at 25 fps). In bright sun this requires ND filters, which work like sunglasses for the camera.
- ISO: keep ISO low (100–200) to avoid noise.
- White balance: set it manually (for example ‘sunny’ or ‘cloudy’) so that colours do not change between shots.
- Exposure: watch the histogram and avoid burnt-out skies or completely black shadows.
- Focus: tap on the subject in the app to focus, especially when flying low.
- Grid lines: switch on the grid in the app to apply the rule of thirds and keep the horizon level.
- Metadata: keep the GPS location and date in the files. For climate documentation, knowing exactly where and when an image was taken is essential. Beginners can start with automatic settings and change one setting at a time as their confidence grows.



## 7.2 Shot Types for Climate Stories

Each type of aerial shot tells something different. Combining several types creates a strong visual story.

- Establishing shot: a high, wide view that shows the whole area and its context – a river valley, a city district, a coastline. It answers the question “Where are we?”
- Top-down (bird’s-eye) shot: the camera points straight down. It reveals patterns that are invisible from the ground: cracked dry soil, the edge of a cleared forest, plastic along a shoreline, the contrast between green parks and grey car parks.
- Reveal shot: the drone starts close to a subject (a tree, a sign, a person who has given consent) and moves backwards or upwards to reveal the wider problem around it.
- Orbit shot: the drone circles a point of interest, such as a dried-out pond or a flood-damaged building, showing it from all sides.
- Tracking shot: the drone moves slowly along a line – a river, a road, the edge of a forest – guiding the viewer’s eye.
- Low-level shot: flying low, where safe and legal, gives the feeling of being inside the landscape.
- Scale shot: including a known object, such as a car, a house or a person, helps viewers understand the size of the area.

For each location, plan a short shot list: one establishing shot, two or three top-down or detail shots and one movement shot. Combine them with ground-level photos and interviews to give the full picture.





### 7.3 Repeat Photography: Documenting Change Over Time

Climate change often happens slowly. One of the most powerful ways to make it visible is to photograph the same place, from the same position, at different times – a method called repeat photography.

How to do it:

- Record the exact position: GPS coordinates, height, camera direction and camera angle. Many apps save this automatically in the photo metadata.
- Use waypoint missions where available, so the drone can fly exactly the same route again.
- Take a reference ground photo that shows where the pilot stood.
- Repeat the flight at the same time of day and, ideally, in the same season, so that differences in light do not hide real changes.
- Keep a simple record for every flight: date, time, weather, height and observations.

What can be documented:

- River levels and riverbank erosion in dry and wet seasons;
- Drought and the drying of lakes, ponds and wetlands;
- Loss or recovery of vegetation after fires, storms or tree-planting activities;
- Growth of construction and sealed surfaces in urban areas;
- Accumulation and clean-up of waste in natural areas.

Presented side by side, or as a slider in a digital exhibition, ‘before and after’ images are clear and convincing evidence. They also connect with the community-based documentation approach described in Chapter I and with the VR exhibition created in this project.





## 8. From Footage to Story: Basic Video Editing

Raw footage becomes a story only through editing. This simple workflow helps beginners produce a clear climate video of one to three minutes.

1. Organise: copy all files to a computer, make a backup and sort them into folders (aerial, ground, interviews, audio).
  2. Select: watch the material and mark the best clips. Be strict – a short, focused video is more powerful than a long one.
  3. Structure: build the story in three parts – the place (establishing shots), the problem (top-down and detail shots, interviews, facts) and the response (what people are doing and what viewers can do).
  4. Assemble: place the clips on the timeline. Most aerial clips work best at 3–6 seconds.
  5. Refine: cut out shaky moments, use simple transitions and keep the horizon level.
  6. Colour: correct exposure and white balance so that clips match. Avoid strong filters that change the reality of the scene.
  7. Sound: add narration, interview sound, natural sounds and royalty-free music at a level that does not cover speech.
  8. Text: add a title, short captions with facts and sources, subtitles in the local language and English, and credits.
  9. Export and share: export in Full HD or 4K (MP4, H.264) and include the “Co-funded by the European Union” emblem and the EU funding disclaimer.
- Free or low-cost tools such as DaVinci Resolve, Shotcut, CapCut or the editors built into drone apps are enough for youth projects. Always use music and images that you have the right to use.





## 9. Maintenance and Responsible Use

Good maintenance keeps the drone safe and extends its life, which also reduces electronic waste.

### Batteries

- Charge batteries only with the original charger and never leave them charging unattended.
- For storage longer than a few days, keep batteries at about 40–60% charge in a cool, dry place.
- Do not use batteries that are swollen, damaged or very hot. Take them to an official battery collection point.

### Drone and controller

- Clean the drone, sensors and camera lens after each flight, especially after dust, sand or humidity.
- Replace damaged propellers immediately and check that the motors turn freely.
- Keep the firmware updated and recalibrate the compass and IMU when the app asks for it.
- Transport the drone in a protective case with the gimbal cover in place.

### Responsible use

- Fly only when there is a clear purpose, and keep flights near wildlife as short as possible.
- Respect local communities: explain what you are doing and why.
- Share the results with the community you documented.
- Repair rather than replace, and pass on equipment that still works.

Drone documentation should always leave the environment and the community better informed, never more disturbed. This is the spirit of Green Horizon: technology at the service of people and the planet.





## 10. Field Checklist

A one-page summary to print and take to every documentation activity.

### BEFORE

- ☐ Clear purpose and shot list for the climate issue to document
- ☐ Rules, maps and permissions checked
- ☐ Registration, certificate and insurance with you
- ☐ Weather and wind checked
- ☐ Batteries charged, memory card empty, propellers checked
- ☐ Team roles agreed: pilot, observer, camera assistant

### ON SITE

- ☐ People nearby informed; consent for recognisable people
- ☐ Safe take-off and emergency landing points chosen
- ☐ Home point recorded, return-to-home height set
- ☐ Hover test at 2–3 m
- ☐ Visual line of sight kept; maximum height 120 m
- ☐ Establishing, top-down, detail and movement shots taken
- ☐ Ground photos, interviews and notes collected
- ☐ Landed with at least 30% battery

### AFTER

- ☐ Flight log completed
- ☐ Files backed up, with location and date
- ☐ Faces and number plates blurred where needed
- ☐ Footage edited into a short story with facts and sources
- ☐ Results shared with the community, online and in the project exhibition
- ☐ Batteries stored at storage charge, equipment cleaned





## Chapter III References

European Union (2019) Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft.

Available at: [https://eur-lex.europa.eu/eli/reg\\_impl/2019/947/oj](https://eur-lex.europa.eu/eli/reg_impl/2019/947/oj)

European Union (2019) Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems. Available at: [https://eur-lex.europa.eu/eli/reg\\_del/2019/945/oj](https://eur-lex.europa.eu/eli/reg_del/2019/945/oj)

European Union (2016) Regulation (EU) 2016/679 – General Data Protection Regulation. Available at: <https://eur-lex.europa.eu/eli/reg/2016/679/oj>

European Union Aviation Safety Agency (EASA) (n.d.) Drones and Air Mobility. Available at: <https://www.easa.europa.eu/en/domains/drones-air-mobility>

Luftfahrt-Bundesamt (LBA) (n.d.) Unmanned aircraft systems. Available at: <https://www.lba.de>

Digitale Plattform Unbemannte Luftfahrt (dipul) (n.d.) Geographical zones for drones in Germany. Available at: <https://www.dipul.de>

Autoritatea Aeronautică Civilă Română (AACR) (n.d.) Unmanned aircraft systems. Available at: <https://www.caa.ro>

Sivil Havacılık Genel Müdürlüğü (SHGM) (2026) İnsansız Hava Aracı Sistemleri Talimatı (SHT-İHA) and İHA Kayıt Sistemi. Available at: <https://iha.shgm.gov.tr>

Kişisel Verileri Koruma Kurumu (KVKK) (n.d.) Personal Data Protection Authority. Available at: <https://www.kvkk.gov.tr>

Blackmagic Design (n.d.) DaVinci Resolve. Available at: <https://www.blackmagicdesign.com/products/davinciresolve>



Co-funded by  
the European Union



Empower  
Plus

## About the Green Horizon Project

Green Horizon: Youth Voices for Climate Action Through Drone Technology (2024-3-DE04-KA210-YOU-000293009) is a small-scale partnership in the youth field, co-funded by the Erasmus+ Programme of the European Union. It was implemented from May 2025 to August 2026 by three organisations:

- Integrational e.V. (Germany) – project coordinator
- Yenilikçi Eğitim Bilim ve Sanat Derneği (Türkiye)
- Asociatia Empower Plus (Romania)

The project empowers young people and youth workers to use drone technology, photography and digital storytelling to document the local impacts of climate change and to inspire action in their communities.

Main activities and results:

- A training course in drone operation, photography and video editing for youth workers from the three partner countries;
- This booklet, a practical guide combining climate change mitigation, photography and drone operation;
- Local workshops in Germany, Romania and Türkiye, where trained youth workers passed on their skills to young people;
- A documentary series and a VR-enhanced photo exhibition on local climate change impacts, created by young participants;
- A project website and dissemination events sharing all results as open educational resources.

All project results are freely available on the project website ([greenhorizonyou.eu](https://greenhorizonyou.eu)) and on the Erasmus+ Project Results Platform. We invite youth workers, educators and young people to use, adapt and share them.

