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CLIMATE CHANGE MITIGATION AND ADAPTATION THROUGH TRADITIONAL RURAL BEHAVIOURS AND LIFESTYLES

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1. Introduction to the SPARROWS Project

SPARROWS (Sharing Paths Among Rural Residents: Old-age Wisdom and Sustainability) is an Erasmus+ funded initiative aiming to foster sustainable living in rural communities by empowering older adults. The project envisions seniors, especially those in under-resourced rural areas, as key "ambassadors" who can share their traditional knowledge and sustainable lifestyles with younger generations.

Core Objectives

- **Behavioral Change through Active Learning**
SPARROWS develops innovative educational pathways utilizing outdoor learning environments in natural rural settings. These incorporate digital tools for teaching sustainability, from resource management and eco-friendly practices to conservation efforts.
- **Social Inclusion and Community Empowerment**
By engaging elderly individuals with fewer opportunities, the project strengthens their role as local models of sustainability and instills pride and visibility in their contributions.
- **Intergenerational Connections**
A key element is fostering mutual learning between older and younger participants. While youth gain valuable hands-on and digital skills, seniors expand their digital literacy and social networks .
- **Institutional Enhancement and Cross-border Cooperation**
Through collaboration among rural organisations across Europe, SPARROWS focuses on improving practices and building a stronger, transnational partner network.

Across Portugal, Spain, and Italy, SPARROWS brings together expertise in adult education, municipal governance, cultural preservation, and vocational training. Each partner plays a crucial role in implementing intergenerational, sustainability-focused educational pathways tailored to rural realities.

Why SPARROWS Matters

1. Valuing Elder Knowledge: It recognizes and leverages the eco-conscious lifestyles and environmental wisdom of older adults in rural settings, linking traditional practices with contemporary sustainability goals.
2. Hands-on, Place-based Education: The project emphasizes experiential learning in nature, blending in-person activities with digital tools to promote accessible and effective environmental education.
3. Strengthening Community Ties: SPARROWS nurtures solidarity across generations, enhancing inclusivity and reducing rural isolation through mutual exchanges.
4. Sustainable Impact: With measurable goals in behavior change, digital literacy, and community engagement, the project aligns with key EU objectives on rural development, social inclusion, and climate action.

2. Objective of this Handbook

This handbook aims to serve as a practical and inspiring guide for addressing sustainability and climate change in rural communities. It brings together traditional knowledge, scientific understanding, and innovative practices to empower rural actors as agents of ecological resilience and cultural continuity.

By showcasing best practices and real-world examples, the handbook supports the SPARROWS project's mission to:

- Promote sustainable lifestyles rooted in rural traditions.
- Strengthen the adaptive capacity of communities to climate change.
- Foster intergenerational learning and the transmission of environmental knowledge.
- Encourage inclusive participation in local decision-making.

- Provide tools and inspiration for mitigating environmental impacts and revitalising rural territories.
- Encourage rural institutions to build partnerships, scale up local impact, and leverage EU funding.

Whether you are a community leader, educator, policymaker, or simply someone living in or working with rural areas, this guide is designed to help you harness local strengths and build a more sustainable, climate-resilient future, starting from the ground up.

3. General Vision of Climate Change

Climate change is one of the most profound and complex challenges of our century. It is no longer a distant threat but an accelerating crisis with measurable impacts on every continent, sector, and community. While its causes are global, the consequences often manifest locally, shaping the daily realities of people, especially in vulnerable rural communities.

Rural areas, rich in natural heritage and cultural traditions, are often disproportionately exposed to climate risks due to their dependence on weather-sensitive sectors like agriculture, forestry, and tourism. Yet, they also hold unique assets for resilience: tight-knit communities, deep ecological knowledge, and adaptive lifestyles rooted in sustainability.

This handbook explores how rural communities, particularly through the SPARROWS project, can be key actors in climate resilience. It provides both conceptual understanding and practical strategies to help local actors prepare for, respond to, and adapt to climate change, using the strengths of intergenerational knowledge, nature-based practices, and inclusive governance.

3.1 What is Climate Change?

Climate change refers to long-term shifts in temperatures and weather patterns, primarily driven by human activities such as the burning of fossil fuels, deforestation, and industrial emissions. These activities release greenhouse gases (GHGs) like carbon dioxide (CO₂) and methane (CH₄), which accumulate in the atmosphere and trap heat, a phenomenon known as the greenhouse effect.

Since the industrial revolution, human-induced climate change has caused global temperatures to rise at an unprecedented rate. Europe is the fastest-warming continent in the world, with temperatures rising at more than twice the global average. This warming is altering precipitation patterns, increasing the frequency of extreme weather events, and disrupting natural ecosystems.

Climate change is not just an environmental issue, it is also a social, economic, and political challenge. It exacerbates existing inequalities, affects food and water security, increases health risks, and places growing pressure on infrastructure, financial systems, and governance.

3.2 Global Impacts of Climate Change

The consequences of climate change are already widespread and intensifying. According to the European Climate Risk Assessment (EEA, 2024), climate hazards are multiplying in severity and frequency, with cascading effects across society:

1. Extreme Weather Events

- Heatwaves, storms, droughts, and floods are becoming more frequent and severe.
- Southern Europe faces increasing risk of megadroughts and wildfires.
- 2023 was the hottest year on record globally; the EU already experienced over 60,000 heat-related premature deaths in 2022 alone.

2. Water and Food Insecurity

- Droughts and changing rainfall patterns jeopardize freshwater supplies and crop yields.
- Prolonged dry periods threaten the stability of energy production, especially hydropower.
- Food production in southern Europe is already critically affected, with ripple effects on prices, nutrition, and rural livelihoods.

3. Ecosystem Degradation

- Climate stress is intensifying forest fires, pest outbreaks, and species migration.
- Marine and coastal ecosystems suffer from warming, acidification, and sea-level rise.
- Critical carbon sinks like forests are weakening, even turning into net emitters during climate disturbances.

4. Public Health Threats

- Rising temperatures increase heat stress, especially for older adults, children, and outdoor workers.
- Infectious diseases like dengue, West Nile virus, and tick-borne illnesses are spreading into new regions.
- Health systems face cascading pressures from climate-driven emergencies.

5. Coastal and Urban Risks

- Sea-level rise is accelerating, putting low-lying regions and cities at growing risk of floods and erosion.
- Urban areas face compounded threats from heat islands, inadequate drainage, and aging infrastructure.

6. Cascading and Systemic Risks

- A single climate hazard can disrupt multiple systems, such as when drought leads to food shortages, economic instability, and political unrest.
- These "risk cascades" particularly affect vulnerable groups and remote communities, reinforcing existing social inequalities.

The magnitude of these changes calls for urgent and coordinated action. Yet, amidst the risk, there is opportunity: to rethink development, foster local innovation, and build communities that are not only sustainable, but also regenerative and inclusive. Rural communities, when equipped and empowered, can be at the forefront of this transformation.

4. Rural Areas and Climate Change

4.1 Rural Vulnerabilities

Rural areas face particular vulnerabilities to climate change:

1. Climate Dependence and Natural Resources
 - Agriculture, livestock farming, forestry, and rural tourism depend directly on the climate. Droughts, frosts, fires, or storms can severely affect these activities.
2. Demographic Changes and Rural Depopulation
 - Population aging.
 - Youth migration to urban areas.
 - Reduced availability of services and infrastructure.
 - This reduces the capacity for response and adaptation.

4.2 Engaging Rural Communities in Adaptation

Climate adaptation in rural areas is only effective when local people actively participate in identifying problems, developing solutions, and implementing actions. The SURF Guide emphasizes that top-down strategies fail if they do not recognize local values, knowledge, concerns, and priorities. Therefore, SPARROWS integrates participatory methodologies, intergenerational learning, environmental education, and collaborative networks.

The four key dimensions of this approach are further explained below.

4.2.1 Raising Awareness

Raising awareness is the first step toward activating genuine participation. Without understanding local risks and adaptation opportunities, communities cannot make informed decisions.

Multi-format awareness campaigns

Based on scientific data, local testimonies, and visual examples from the region: historical floods, heat waves, droughts, fires, crop losses, or biodiversity loss. These can utilize:

- Local radio and regional press.
- Posters in community spaces.
- Municipal social media.
- Outdoor public exhibitions.

Educational programs for different age groups

Aligned with the SURF Guide, education should be tailored to the target audience:

- Children: interactive games, school gardens, landscape exploration.
- Youth: workshops on energy, water, biodiversity, and eco-entrepreneurship.
- Adults: training sessions on local risks, adaptation, and water management.
- Older adults: spaces for sharing traditional climate-related knowledge.

Outdoor Learning

A key tool for SPARROWS. It allows users to:

- Observe real-world climate impacts in the environment.
- Connect sensory experience with risk understanding.
- Explore nature-based solutions.

Visual and dynamic materials

Infographics, videos, risk maps, interpretive trails, comparative historical photographs, etc.

4.2.2 Involving Community Members in Decision-Making

Climate adaptation requires social legitimacy. This is achieved by involving citizens in all phases: diagnosis, design, implementation, and evaluation.

Accessible Public Consultations

- Open spaces where residents express:
 - Perceived risks.
 - Adaptation needs.

- Community priorities.
 - Local obstacles (water, energy, infrastructure, health, mobility, etc.).
- Structured Participatory Processes
 - Following the SURF Guide approach, the following are recommended:
 - Collective territorial maps.
 - Risk prioritization workshops.
 - Sectoral roundtables (agriculture, tourism, health, youth, seniors, etc.).
 - Deliberative dynamics.
- Citizen Climate Assemblies: A method of deliberative democracy where a diverse group of residents:
 - Receives understandable technical information.
 - Deliberate collectively.
 - Formulate recommendations for the municipality.
- Participatory Action Research (PAR) Participatory action research allows the community to:
 - Identify problems.
 - Co-create solutions.
 - Evaluate the impact.

4.2.3 Utilizing Local Knowledge and Expertise

The SURF Guide emphasizes that local knowledge is essential for understanding the specific circumstances of each territory. SPARROWS particularly values the knowledge of elders.

Integration of Traditional Agricultural Knowledge

This includes practices such as:

- Agricultural calendars based on climate signals.
- Selection of resistant varieties.
- Historical water management practices.
- Soil conservation methods.

Conservation of Species Adapted to the Territory

Local species are often more resilient to droughts, frosts, and temperature changes. Integrating their management allows us to:

- Reduce dependence on external inputs.
- Maintain robust agroecosystems.
- Protect functional biodiversity.

Revaluation of Ancestral Practices

Examples:

- Auzolan, tornallom, hacenderas (collective work).
- Communal systems for water or forest management.
- Bioclimatic construction techniques.

Intergenerational Transmission Spaces

Workshops where elders teach:

- Plant identification.
- Use of traditional tools.
- Local weather forecasting methods.
- Climatic history of the region.

4.3.4 Creating Networks and Sharing Knowledge

Climate adaptation is more effective when territories cooperate. The municipal scale is often insufficient to address interconnected risks.

Cooperation between municipalities and regions

- Sharing resources.
- Unifying criteria for managing water, fires, or biodiversity.
- Creating supra-municipal strategies.

European adaptation networks

- Such as those promoted by the SURF Guide, help to:
- Learn about successful solutions in other countries.
- Access European funding.
- Participate in innovation projects.

Communities of Practice

Stable groups that exchange:

- Experiences.
- Methodologies.
- Results.
- Training.

Exchange of best practices

Can be carried out through:

- Study visits.
- Transnational meetings.
- Webinars.
- Shared manuals and guides.

5. Rural Behaviors

The rural world offers practices that can inspire climate solutions:

- Traditional Sustainable Practices
- Efficient Water Use
- Local Food Production
- Bioclimatic Architecture
- Cultivation and Management of Local Varieties

Rural Lifestyles and Their Low Ecological Impact

- Local Consumption
- Short Commutes
- Reuse of Materials
- Care Economy and Mutual Support

Tools for Mitigation and Adaptation

- Regenerative Agriculture
- Preventive Forest Management

- Energy Communities
- Water Harvesting Systems

Practical Examples

Water Management

- Restoration of Ditches, Cisterns, Waterwheels, Ponds, and Traditional Irrigation Systems

Revitalization of Orchards and Traditional Agriculture

- Crop Rotation, Agroecology, Biological Pest Control, Composting

Intergenerational Knowledge Transfer

- Oral stories, workshops, intergenerational activities.

Food and Climate Change

- Diets based on local and seasonal products.
- Reducing food waste.

Organic Waste Management

- Community composting, manure use, soil restoration.

Native Species

- Greater resilience to droughts and pests.

Ecosystem Services

- Pollination, soil quality, water regulation.

Forest Management and Land Restoration

- Managed grazing, agroforestry systems, fire prevention.

6. An Expert Perspective

6.1 Social Innovation in Rural Areas: Solutions from the Margins for Global Crises

Rural areas are laboratories for social innovation, providing a space for:

- Community networks of mutual support.
- Non-market economic cooperation.
- Revival of collaborative practices (auzolan, tornallom).
- Circular, common good, and solidarity-based economies.

Rural communities generate solutions based on:

- Social cohesion.
- Environmental sustainability.
- Self-management.
- Local production.

These initiatives allow us to envision alternative models to urban-industrial development and strengthen territorial resilience.

7. Conclusions

7.1 Summary of Key Learnings

- Climate change has a significant impact on rural areas.
- The combination of traditional knowledge and modern science is essential.
- Citizen participation improves the effectiveness of adaptation.

7.2 Connection between traditional practices and climate resilience

Rural wisdom—local agriculture, water management, and knowledge of the land—is a crucial resource for addressing climate crises.

7.3 Recommendations for trainers and public officials

- Enhance environmental and digital training.
- Promote energy communities.
- Promote agroecology.
- Strengthen rural networks.

7.4 Possibilities for replication and scalability

Good rural practices can be adapted to other European territories through:

- Intermunicipal projects.
- Cooperation networks.
- Educational programs.
- Social innovation.

This handbook draws inspiration from the SURF Guide, the SPARROWS Project, and scientific literature on rurality, social innovation, and climate adaptation-

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