Abstract: Numerous authors emphasize climate change’s profound impact on physical, mental, and community health, particularly highlighting the rising concern of ecological anxiety. The participatory dimension of the KOSMA Observatory, “Leaving No One Behind”, sought to explore this issue. Initially, we presented Spain’s perceptions and trends of eco-anxiety, along with the utilized platform. Subsequently, a roundtable delved into eco-anxiety and emotions, followed by a panel showcasing practical examples of transforming emotions into positive actions. The session concluded with a final reflection on these ideas.

Keywords: climate change impact; eco-anxiety; participatory exploration

1. Introduction

Scientific evidence regarding the environmental impact on health has been steadily increasing in recent years. This evidence underscores the critical importance of this issue for public health. Environmental health explores how biological, chemical, physical, and psychosocial factors can influence an individual’s health and well-being. This concept has evolved over time, and this evolution is one of the reasons why we emphasize the concept of “One Health”.

Our planet is currently facing a crisis, primarily driven by the impact of human habits on natural systems and resources. This crisis encompasses various challenges, including climate change, pollution, biodiversity loss, and harm to marine and freshwater environments. The consequences of our habits are also glaringly evident in the substantial exposure to risk factors we confront. Extensive research conducted by various organizations has underscored that at least 25% of the global burden of disease and mortality stems from exposure to these factors [1,2].
The effects of exposure may depend on individual factors, including age, gender, and place of residence. Different countries are witnessing an increasing number of non-communicable diseases linked to exposure to environmental risk factors. Moreover, the global prevalence of anxiety and depression has been on the upswing in recent years [3,4]. The investigation into the link between environmental factors and mental disorders is intricate, given the absence of a singular cause. This underscores the importance of adopting a comprehensive social and environmental approach to effectively tackling this issue.

The objective of this dimension, organized by the KOSMA Observatory, was to delve deeper into the subject. Initially, Dr. Marina Romeo presented the perceptions and trends of eco-anxiety in Spain, while Jordi Serrano elucidated the platform employed for this purpose. Subsequently, a panel moderated by Carol Belenguer delved into the realm of eco-anxiety and emotions. This was followed by a session directed by Irene Baños showcasing practical examples of transforming emotions into positive actions. Finally, Prof. Fernando Valladares delivered the closing conclusion of the session.

2. Exploring Eco-Anxiety: Perceptions and Trends among the Spanish Population

Numerous authors have drawn attention to the far-reaching impact of climate change on physical, mental, and community health. Among these effects, eco-anxiety has emerged as a focal point of concern within the scientific community in recent years.

The American Psychology Association (APA) defines eco-anxiety as the “chronic fear of experiencing an environmental catastrophe that occurs when observing the seemingly irreversible impact of climate change” (APA, n.d.). This phenomenon triggers anxiety, which is characterized by excessive and constant worry, dissociated mood, prolonged duration, somatization, and a lack of concentration, as outlined in the latest update of the DSM-5, the manual for diagnosing mental health disorders. Individuals experiencing eco-anxiety often manifest traits associated with generalized anxiety disorder (GAD), such as persistent and excessive worry across various aspects of their lives, dissociated mood, and a prolonged duration of symptoms. Somatization may also occur, with physical manifestations like muscle tension, headaches, and stomachaches. A lack of concentration is a common challenge for those grappling with GAD, as constant worry preoccupies their thoughts.

Specifically, eco-anxiety can evoke additional negative sensations, including fear of its impact on future generations, anger toward those not acting, and feelings of helplessness or exhaustion for being unable to prevent the impending disaster [5].

Certain factors make individuals more susceptible to eco-anxiety. Scientists studying climate and planet conservation and possessing in-depth knowledge and evidence regarding climate change are identified as particularly vulnerable [6]. Similarly, individuals with a strong connection to nature, such as Indigenous populations, rural residents, and farmers, are more likely to experience eco-anxiety [7]. Additionally, females and younger individuals, especially millennials, exhibit a higher propensity for climate-related anxiety compared to adults [8,9].

Moreover, a 2021 study involving 10,000 children and young people across ten countries revealed alarming levels of eco-anxiety. The majority expressed significant worry about climate change, with emotions ranging from sadness and anxiety to anger, powerlessness, and guilt. Over 45% reported that their feelings about climate change negatively impacted their daily life and functioning, emphasizing the profound psychological implications of the climate crisis [10]. As we delve into these findings, it becomes evident that eco-anxiety is a multifaceted issue with diverse implications for individuals across various demographics and backgrounds.

Based on the results obtained in this study, we were interested to assess the eco-anxiety in the Spanish population and to understand their level of environmental concern toward the environment.
To achieve this objective, we administered an online questionnaire to a Spanish population aged 17 and above, ensuring the anonymity and confidentiality of responses (Figure 1A,B).

![QR Code](A) ![QR Code](B)

**Figure 1.** (A) Scan the QR code to access the survey on eco-anxiety in English; (B) Scan the QR code to access the survey on eco-anxiety in Spanish.

The instrument administered was the validated Clayton and Karazsia (2020) questionnaire [11], structured into four dimensions. Cognitive/Emotional Impairment (eight items, \( \alpha = 0.97 \)): This dimension assesses the cognitive and emotional impact of climate change on individuals. Items include statements such as “Thinking about climate change makes it hard for me to sleep”. Functional Impairment (five items, \( \alpha = 0.79 \)): This dimension evaluates any functional challenges individuals may experience in their daily lives due to climate change. An example statement is “My friends tell me that I think too much about climate change”. Experience (three items, \( \alpha = 0.86 \)): This dimension explores participants’ direct experiences with climate change or their awareness of its impact on others. An example statement is “I know someone who has been directly affected by climate change”. Behavioral Engagement (six items, \( \alpha = 0.94 \)): This dimension analyzes participants’ proactive efforts to engage in environmentally friendly behaviors related to climate change. An example statement is “I try to reduce my behaviors that contribute to climate change”.

The sample was composed of 230 participants, comprising 28% men and 69.2% women, primarily residing in urban areas (82.1%). A total of 61% of the respondents affirm adhering to the Mediterranean diet, 41.5% identify with left-wing ideology, 58.1% hold a bachelor’s degree, and 35% work in the health sector.

The overall findings suggest that participants perceive minimal dysfunction at functional, emotional, and cognitive levels due to climate change, with mean scores of 1.84 and 1.80, respectively. However, respondents express a robust environmental commitment (mean score of 4.25). While direct experiences with climate change are infrequent (mean score of 2.97), a notable standard deviation of 1.11 underscores diverse opinions on this matter.

Analyzing specific dimensions, the most significant negative impact relates to concentration, with 53.7% reporting difficulty concentrating when thinking about climate change. Functional impairment is generally low, with only 13.7% struggling to balance sustainability concerns with family needs and 10.7% being told by friends that they think too much about climate change. Concerning the experience of climate change, 59.8% claim direct impact or knowledge of someone affected or the observation of significant changes in crucial locations. In the behavioral engagement dimension, recycling (90.1%) and turning off lights (96.6%) emerge as the most prevalent environmentally friendly behaviors.

Gender-based differences are significant, with women reporting higher cognitive-emotional impairment (\( t = 0.030, p < 0.01 \)) and exhibiting greater participation in recycling behaviors (\( t = 0.082, p < 0.05 \)).

Summing up, a noteworthy trend emerges, indicating that women exhibit a greater inclination toward ecologically responsible behavior, with a particular emphasis on recycling practices. This aligns with the broader pattern observed in environmental conscious-
ness and sustainable practices [12]. Additionally, the research highlights that women not only engage more in recycling behaviors but also tend to perceive higher levels of cognitive-emotional impairment, as evidenced by their reported difficulty concentrating when contemplating climate change. Despite these trends, the overall analysis indicates no evidence of signs of cognitive or emotional dysfunction among participants. However, it is notable that women stand out as an exception, reporting challenges in concentration specifically related to climate change. This study emphasizes the importance of participants’ perceptions concerning the impact of climate change on their lives and the lives of their loved ones. This aspect underscores the personal relevance and significance that individuals attribute to the consequences of climate change, adding a qualitative dimension to the quantitative data collected.

However, it is important to note that although the participants in our research exhibit an urban bias and a gender imbalance, as indicated by the scientific literature [13], these factors can indeed impact the perception of climate change and eco-anxiety. Therefore, future research should explore how these demographic statistics align with national data to provide a more comprehensive understanding of eco-anxiety in various contexts. Additionally, it is necessary to continue collecting samples, as the data obtained so far are very limited. If you are interested in collaborating, we will be very grateful.

3. Platform for Planetary Health Interventions and Studies

UhDa Health is a platform dedicated to aggregating health data and monitoring while integrating evidence-based behavioral change content, with a primary focus on preventive interventions. The platform facilitates various types of interventions and is evolving to include studies within interventions. Operating through a comprehensive (360-degree) approach, UhDa Health engages with municipalities, universities, civil society, research institutions, private companies, and government bodies. Its aim is to empower non-experts to create and implement digital interventions, integrating health studies seamlessly. The primary objective is to develop a platform that (1) provides interventions addressing the social determinants of health; (2) combines user health prevention with ecosystem health preservation; and (3) enables the implementation of studies in these fields. This study on eco-anxiety among the Spanish population was conducted using UhDa Health’s comprehensive platform. This platform enabled the seamless integration of research, data collection, and monitoring, facilitating the effective analysis of eco-anxiety levels.

4. Delving Strategies for Navigating Emotions and Eco-Anxiety: Roundtable Moderated by Carolina Belenguer Hurtado

Ever since Aristotle defined the human being as the only rational being, emotions have remained in the well of scientific oblivion for over two thousand years. Fortunately, scientific advances are bringing them to light, demonstrating that emotions are at the base of all knowledge and that the brain works by managing all data in an interconnected way [14].

Throughout this debate, the speakers provided several arguments pointing out that eco-anxiety is an adaptive response that allows people to prepare for facing potentially threatening situations. For that reason, all the panelists emphasized the importance of creating safe spaces and training professionals who understand the emotions caused by climate change and who can offer useful tools for the effective management of those emotions [15].

As Dr. Joima Panisello, a specialist in internal medicine, explained, chronic stress caused by climate change can affect physical and psychological health in multiple ways through the stimulation of the hypothalamic–pituitary–adrenal (HPA) axis. During the entirety of adolescence, this can be grievously damaging, given that the limbic regions that regulate emotions mature earlier than cortical regions that are more influential in managing anxiety, which may affect the architecture of the brain. One consequence of the climate crisis is that it can elicit negative stress with symptoms of pathological anxiety.
However, conversely, this can also activate positive stress, in which anxiety is understood as an alert system, that leads to the search for innovative responses to overcome distress. Understanding anxiety as a constructive worry focused on solving problems can lead to commitment toward pro-environmental behaviors.

Mr. Felip Miralles, Executive Director of Health Technologies at Eurocat Technology Center, talked about how to utilize artificial intelligence to overcome the challenges presented by the climate crisis in terms of health. The concept of one health calls for training artificial intelligence with data coming from multiple disciplines, such as health systems, social services, and environment records. Responsible use must be guaranteed, preserving privacy while promoting trust, to avoid falling into stereotypes that would only increase inequality. These tools could be used by citizens, healthcare and social professionals, and policymakers to regulate the emotions generated by climate change, stimulate behavioral change, identify risk factors, and predict health threats, respectively. Ethical deliberation on AI is essential, additionally, to serve to make better and more ambitious decisions for supporting public health and environmental interventions.

Dr. Jordi Serrano, CEO of UniversalDoctor, talked about his experience with the design of new technologies that can help eliminate the barriers between thinking about the globe and acting locally. Technological innovation helps create spaces of connection that allow for the expression and exploration of emotions in order to reduce negative impacts and denialism, further building deep resilience. Despite the fact that eco-anxiety is perceived as undermining agency capacity, the actions and decisions that are made daily, including what to eat, what clothes to buy, transport choices, who to vote for, etc., are very significant in shaping lifestyles that have a high impact on the environment. Technology is considered a source of hope since it makes it easier to face controversial questions involving the right to climate justice. This perspective emphasizes the power of making healthier life choices in local contexts at the global level.

Mrs. Maríà Lledó Cisneros, an interior designer has talk about how the constructed spaces can affect our health (physical, emotional, cognitive and social). During her speech she has spoken about more deeply delving into the human complexity so that the built spaces provide us with well-being, autonomy, facilitate positive emotions and do not isolate anyone. Designing spaces should be based on a multidisciplinary understanding of the person, with the aim of creating healthy and emotional environments. Considering that the elements of the build spaces impact directly onto the person’s integral health, as it is done for example in neuroarchitecture. The world is a network of relationships between nature and humanity. When we harm nature, we harm humanity and vice versa. Therefore, it is necessary to build models of cooperation, protection, and care with affection and gratitude.

In summary, the moderator proposes that eco-anxiety in the face of the climate emergency acts as an alarm warning about the need to change certain behaviors so that life can continue. The tools that allow us to build a more equal world in which emotions, along with reason, guide action are those that will put an end to the problems caused by socio-economic structures that promote inequality and unwellness [16,17].

As such, the panel was a perfect example of where the links between well-being and public health, human rights, and socio-economic development are shown. Making the world see how the transformation of cultural practices can generate real and significant benefits for individuals and their communities.

5. Showcasing Practical Examples of Transforming Emotions into Positive Actions: A Session Directed by Irene Baños

Britt Wray, a Stanford researcher specializing in climate change and mental health and author of the eco-anxiety book *Generation Dread*, argues that climate anxiety in itself is not a problem. On the contrary, it is a healthy response that reflects awareness of the seriousness of our current situation and the urgency to act to reduce its impacts. Thus, the concern is more about how individuals cope with eco-anxiety and the resulting behaviors. It can serve as a driving force for climate action or lead to paralysis and even disease.
Deciphering the patterns for transforming these feelings into motivation is crucial. On the one hand, identifying the responsibilities of the various actors in the crisis underscores the need for palpable climate and environmental action to alleviate citizens’ feelings of neglect, frustration, and anger. Government and business response is critical to addressing eco-anxiety, which calls for a shift toward responsible practices. On the other hand, the focus must be on transforming eco-anxiety into a positive force, not idleness. Responsibility must be channeled into strategies for change rather than fostering guilt.

Hope, defined by Rebecca Solnit as an active force [18], is crucial for overcoming paralyzing anxiety. That hope, rooted in action rather than passively awaiting a solution from external sources, is cultivated both individually and collectively, requiring support from education and environmental information. Presenting facts based on evidence and scientific consensus is crucial for raising awareness, but insufficient for prompting action and avoiding fear, hence, the importance of accompanying these processes with messages that offer solutions, allow for envisioning new societal models, and showcase real examples of people or initiatives already driving the transformation needed in this crisis situation. Positive narratives and solutions are more effective than fear-based communication in garnering citizen support for climate policies [19].

The solution to eco-anxiety lies in addressing the climate and ecological crisis, which is essential for ensuring a secure and healthy future for the planet and all its inhabitants. In that sense, collective action is essential to influence structural change, whether through associations, political initiatives, or supporting media outlets providing constructive information. Mental health considerations are crucial, and support groups, climate reading groups, and mental health specialists should be integrated into discussions. The goal is to provide tools and techniques to face difficulties, transform anxiety into positive action, and foster hope.

During Francesc Font’s impactful presentation at the One Health Conference, a profound exploration of agricultural practices over the past 70 years unfolded. Framing the discourse were two distinct approaches to food production. The conventional method, characterized by land overuse and chemical-intensive practices, was depicted as leading to impoverished soils, erosion, biodiversity loss, and a significant carbon footprint, in which 25% of emissions stem from traditional agriculture.

In stark contrast, Font passionately illuminated an alternative vision—the regenerative agriculture paradigm. This transformative approach diverges from synthetic chemical reliance and embraces a symbiotic relationship with nature. Rather than employing herbicides and insecticides that harm ecosystems, regenerative agriculture actively nurtures soil microorganisms, promotes biodiversity, and, notably, creates life instead of extinguishing it. He conveyed the essence of regenerative agriculture as a commitment to ceasing soil degradation, emphasizing active care, nurturing, and regeneration. The metaphorical shift from applying “soil pills” to a holistic approach of feeding and sustaining the soil underscores a profound departure from battling nature to cooperating with it.

The powerful impact of this paradigm shift resonates through its tangible outcomes. Soil protection serves as a shield against erosion, preserving valuable topsoil. The conscious decision to avoid the widespread destruction of life not only fosters biodiversity but actively contributes to the reduction of carbon emissions. Regenerative agriculture practices have been implemented in various countries, including the United States, Australia, and several in Europe. Studies have evaluated their effects, showing significant improvements in soil health, increased biodiversity, and carbon capture. Notable references include the work by LaCanne and Lundgren [20] in the United States and the CSIRO report [21] in Australia. Font emphasized that through the perpetual photosynthetic activity of green plants, regenerative agriculture becomes a powerful force in fixing more carbon than it emits—an inspiring testament to its potential in addressing climate change.

Mrs. Sonia Hernández delved into how Europe is promoting a process of decarbonization of the construction sector, both in the energy consumption of buildings and in the life cycle of materials. However, there are other indicators that must be taken into account from...
a health point of view, for example, water resources, vulnerability, or the chemical impact of the materials.

In the case of chemicals, it is known that some additives used in construction materials are bioaccumulative, neurotoxic, and endocrine disruptors. The Eco-design Directive [22] and the Flame Retardant Regulatory Strategy [23] are examples of European initiatives that want to reduce these impacts. However, until they are properly regulated, we can use non-toxic materials like biomaterials of natural origin without chemical additives, such as earth, clay, wood and other natural fibers, lime, stone, etc.

This is just one example of the various strategies with which architectural design must improve people’s quality of life. We could also talk about chronobiological lighting systems, optimal indoor air quality, electrical and telecommunications installations that reduce exposure to electromagnetic fields, inclusive design, and cognitive perception [24].

There are various research centers and initiatives that promote the use of natural materials or healthy architectural design, such as the Healthy Materials Lab from the Parsons School of Design, the Green Science Policy Institute that promotes the Six Classes approach, the Institut für Baubiologie und Nachhaltigkeit (IBN), which offers extensive training in bioarchitecture adapted to many countries, and the web tool “Healthy Interior Spaces” designed by the technical office of the Association of Architects of Catalonia. The impact of these strategies is difficult to measure, but they raise awareness, offer tools, and succeed in promoting legislative changes toward healthier environments.

As another example, in 2020, Incasól (the public housing manager in Catalonia) published the Technical Guide on Biohabitability. Currently, specifications for social housing competitions are being drafted, including scoring health criteria.

In summary, architectural design can provide many benefits to people’s health and well-being. Architecture must be understood as a public health tool.

Daniel Turon reflected on his experience in “The Work That Reconnects” and “Regenerative Culture”, a practical methodology to manage eco-anxiety and climate grief, increase empathy and biophilia, and take action. Our society is anesthetized, e.g., a study shows that acetaminophen inhibits social empathy [25], when just what we need is the opposite. The WTR has been developed by Joanna Macy [26], who has been an ecophilosopher and activist for more than 40 years. The spiral of the WTR consists of the following four stages in which a series of participatory dynamics are carried out: 1—Coming from Gratitude, e.g., circles of gratitude for life: The oxygen that the plants give us is free; it puts us in grace, and it takes us out of self-centered egoism. Open the door of the heart.

2—Honoring our Pain for the World: Address different types of circles of grief, share what we feel for what is being lost, and embrace if there is solastalgia, eco-anxiety, shock, etc.

3—Seeing with New/Ancient Eyes (deep time [27], ecological self, interdependence, power within [18]): Recognize the 3.500 million years of evolution that have brought us this far, be able to become good ancestors [28], decolonize, and project new visions of the future e.g., solarpunk, using art and literature [29]. Heal patriarchy, eurocentrism, anthropocentrism, and speciesism (recognize consciousness, intelligence, and animal culture). See nature as a community of subjects, not a collection of objects.

4—Going Forth: Take action. Raise awareness of our ecological footprint and know it objectively and concretely. Reduce individual consumption, work collectively to avoid looting, and change laws (ecocide, the rights of nature and future generations). Celebrate successes.

6. Closing of the Session by Fernando Valladares

The state of the environment profoundly affects our health. There is growing evidence that a degraded environment makes us sick and that a healthy environment heals us. Climate change is the main environmental challenge facing humanity at this time. It generates tens of millions of deaths from direct and indirect causes, including the impact of extreme events, the spread of infectious diseases, human migrations, and crises in water availability and food production. The American Medical Association declared in 2022 that we are in a public health crisis due to the ecological threat that directly undermines the
levels of health and well-being that our societies have achieved over the last century. Britt Wray, Chair in Climate Mental Health in the Department of Psychiatry and Behavioral Sciences at Stanford Medical School, has shown that the consequences of climate change for mental health are as varied as they are profound. Not only do extreme weather events have a direct influence but the information received awakens a whole range of emotions that cause discomfort, suffering, and even anxiety and stress disorders [30].

The Global South has hardly driven global warming but is suffering terribly from the impacts of climate change. No one escapes climate change. While the improved infrastructure and technologies available in the Global North cushion some of the impacts of climate change on people’s physical health, mental health is profoundly affected. From eco-anxiety to solastalgia, from stress to anxiety, and from depression to suicide, the statistics are chilling, revealing a rapid growth of mental disorders resulting from climate change, especially in the youngest [31].

A macro study by Susan Clayton and collaborators [8] found that it is women, youth, and the populations of the poorest countries who have higher levels of ecological anxiety. The analysis of eco-anxiety cannot be separated from social conditions, cultural factors, and prevailing ideologies and worldviews since risks in the face of threats do not depend only on scientific information received but also on learned emotional dynamics, which play a transcendental role.

Eco-anxiety is a response to a world whose hegemonic mandates are not liked, cannot be complied with, and also produce internal conflicts that are difficult to resolve [25]. The inclusion of emotions in the public discourse of environmental activists, scientific personnel, and governmental institutions is subversive because it radically transforms society, breaking down the schemes that perpetuate inequalities among those who are supposed to have the monopoly of a superior reason, free of feelings or scruples. Uncoupling emotions from the rules of feminine sensibility and universalizing them to use them as valid criteria in decision-making would undoubtedly open the way to a world in which the common good is considered a good in itself. The climate crisis and its cascade of effects on people’s lives and the functioning of society offer a unique opportunity to completely rethink the model of civilization we want to be part of, starting with health, continuing with emotions, and ending with human values.


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