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Man's relationship with nature: from historical and social construction to climate change

Hélder Carreira[1]

[1] PhD student in Management at the University of Beira Interior, Local Health Unit in the Leiria Region. NECE-UBI Research Centre for Business Sciences, Portugal | carreiramail@gmail.com

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Abstract

The relationship between human beings and nature is a historical and social construct, transformed by the Industrial Revolution and the intensification of anthropogenic activities. The growing climate crisis and its effects on public health require integrated analysis; the literature lacks systematic articulation between sociological, health, and educational perspectives. This study aims to analyse the evolution of that relationship, the impacts of climate change on health, and climate literacy as a strategic response. A narrative literature review was conducted, drawing on contributions from classical sociology, environmental sciences, and public health. The results indicate that the industrial economic model has exacerbated environmental imbalances, with estimates of 13 million deaths annually from environmental risks and a growing prevalence of vector-borne, respiratory, and cardiovascular diseases. The evidence demonstrates that only 53% of national curricula include any reference to climate change, reflecting the undervaluation of climate literacy. From a health policy standpoint, this suggests the urgent integration of environmental education into educational programmes and governmental strategies.

Keywords: Health; Climate Change; Climate Literacy

1. Introduction

The reality is that the planet is not merely a geographical area covering 510 million km^2, whose atmosphere formed over 4 billion years ago. Although all planets have a geographical area, only Earth possesses a system intrinsically linked to the physical planet, capable of sustaining life as we know it (Magalhães, 2017).

The relationship between humans and nature, particularly in the way humans appropriate the assets and resources of the so-called natural environment[1] , is intrinsically linked to human evolution (Schonardie, 2020).

Climate change is a natural process; however, before the advent of technology and human-driven production processes, the changes that occurred were balanced in terms of both timing and intensity. With industrialisation, the phenomenon of global warming has escalated to a critical point where it is affecting life on planet Earth. There are increasingly frequent extreme events with societal impacts across all sectors, particularly in the economic and health spheres, such as the rise in mortality resulting from floods, heatwaves or epidemics (Baleia, 2021).

1 The natural environment refers to the natural world, comprising the soil, the subsoil, water, flora, fauna and the atmosphere.

As a result of the underlying trajectory of modernity, beginning with the Industrial Revolution and leading to the current high global population of 7.6 billion (UN) human beings on the planet, it is urgent to reflect on the[2] impact of human activity on the environment and its consequences for health.

2. Conceptions of man's relationship with nature and the 'beginning of modernity'

Based on Duarte (1986), throughout history there have been different conceptions of the relationship between man and nature: the magical conception (natural phenomena as divine action), the Greek cosmological or scientific conception (which calls for philosophical reflection), the mechanistic conception (comparing nature to a machine or mechanism, disconnecting man from nature) and the Marxist conception (man transforms nature and produces a second nature, which is artificial and humanised).

With the development of physical and intellectual heritage, humankind began to produce a new form of material existence and established new social relations. With the development of food cultivation techniques, humankind ceased to be nomadic and began to settle in specific locations, giving rise to agriculture and altering social relations, as well as relations with nature (Gonçalves, 2021).

Industrial development on a global scale and the lack of concern, at the forefront, for the repercussions of environmental degradation arising from this evolution and the temporal and spatial concerns associated with it, led to the environmental dimension being relegated to the background, essentially because: 1) environmental issues were non-existent or marginal to intellectual discourse, as there were no serious consequences of the degradation of natural spaces and the environment in which people lived, as is the case today; 2) collective demonstrations in defence of nature were limited to sporadic initiatives, for various reasons, in different places and at different times, of a conservative or conservationist nature, and did not constitute a social priority (Loureiro, 2000).

As emphasised by Giddens (1991) in 20th-century social theory, greater emphasis was placed on the opportunities arising from modernity, through which human beings would enjoy a safer and more rewarding existence, hitherto unexperienced, rather than the dark and turbulent side to which its consequences might lead (Schonardie, 2020). This view was corroborated by classical sociological thinkers such as Marx and Durkheim, who believed that the negative characteristics would be outweighed by the far greater beneficial possibilities that would ensure better living and health conditions.

According to Durkheim (1999), population density, differentiated human skills and their relationship with material resources act as driving forces behind the evolutionary stratification of societies. For Weber (1991), scientific and technical knowledge, when developed, brings with rationality a new orientation in which nature exists solely to be dominated and manipulated by humans. Formal rationality thus dictates that the most efficient course of action is to clear a centuries-old forest, even though this is by no means substantively rational from an ecological standpoint (Schonardie, 2020; Hannigan, 2009).

In this context, according to Marx, man is a generic creature who behaves towards himself as the present, living species, as a universal being and, therefore, a free one. Thus, nature is the physical extension of the human body, as it forms a part of human life and productive activities, thereby revealing itself as: the immediate means of life and the material object and instrument of human activity (Marx, 2006).

3. The deterioration of the economic model and climate change

2 An impact assessment is the process of identifying the future consequences of an action. The impact reflects the difference between what would happen in the absence of the action and what would happen if it were to take place. The concept of 'environmental impact' is defined as the "set of favourable and unfavourable changes produced in the environment, regarding certain factors, over a specific period of time and in a specific area, resulting from the implementation of a project, compared with the situation that would occur, during that period of time and in that area, if that project were not to take place" (REA, 2023).

Man's relationship with nature is a historical and social construct, a process that changes over time. Understanding the concept of nature also allows us to grasp the issues surrounding the relationship between man and nature and the rift that has driven them apart, reaching a point of divergence, thereby determining the worsening environmental crisis resulting from the economic model that has emerged (Tozonis-Reis, 2004).

Historical reconstructions of the Earth's climate reveal frequent natural climate variations spanning hundreds, thousands or millions of years, whether due to variations in the Earth's orbit around the Sun, variations in the Earth's axis of rotation, fluctuations in solar activity, or periods of heightened volcanic activity (Longhurst, 2015).

Since the beginning of the 20th century, the global average surface air temperature has risen by 0.6°C, a phenomenon that is exceptional in terms of both magnitude and the rate at which it is occurring; this is attributed to anthropogenic emissions of greenhouse gases, primarily resulting from the combustion of fossil fuels or from agriculture and livestock farming (Santos & Miranda, 2006).

Over the last 50 years, the rise in temperature has led to the extinction of animal species, a decline in agricultural production and an increase in the number of fires. It is also emphasised in the literature that climate change exacerbates poverty in countries where it is already severe, with the situation being further exacerbated by climate-related issues (Fonseca, 2015; IPCC, 2018).

Climate change refers to a shift in the state of the climate, which can be characterised by significant variations in the mean and/or variability of its properties, or when its instability persists over long periods, typically decades or more. This change may be related to: i) natural internal processes, such as modulations of solar cycles and volcanic eruptions; ii) or external forces such as persistent anthropogenic activities, causing changes in the composition of the atmosphere or soil (IPCC, 2014).

4. Impact of Climate Change on Health

The relevance of climatic conditions to human health has been recognised throughout history, with Hippocrates in 400 BC highlighting the importance of the environment to the health of populations (Lúcio & Coelho, 2008).

As a result of global warming, the impact of climate change has direct effects on public health, in terms of population morbidity and mortality, but also indirect effects, through changes to ecosystems (e.g. negative effects on food production or damage to infrastructure) (Baleia, 2021; Vaz, 2010).

In terms of individual health, the impact of climate change due to rising temperatures relates to the biological organism, leading to vector-borne diseases such as dengue, yellow fever, malaria, or leishmaniasis, which account for over 17% of infectious diseases worldwide, causing more than 700,000 deaths per year (European Environment Agency, 2015; WHO, 2020).

Phenomena such as drought or extreme rainfall can affect agricultural production, leading to difficulties in food supply, security and availability, and contributing to malnutrition, particularly among children. Energy production, resulting from the burning of fossil fuels, contributes significantly to the worsening of respiratory problems, such as asthma and allergies, as well as cardiovascular diseases (Pereira *et al.*, 2020).

From a public health perspective, climate change places a strain on health services, leading to a growing need for the development of public policies aimed at government strategies and leadership in health, whilst also addressing the need to break down institutional barriers. In this context, it is essential to raise awareness among the public and governments regarding the development of actions aimed at promoting and protecting the environment and health, as well as policies for disseminating scientific knowledge on this subject, namely greater investment in projects and research that promote scientific advancement and better adaptation and mitigation of the impacts caused by climate change (Pereira *et al.*, 2020).

According to the World Health Organisation (WHO), environmental risks associated with fires and flood-prone areas, coastal erosion, drought, exposure to substances and chemicals, genetically modified organisms or changes to ecosystems are linked to mortality and morbidity indicators (Bárbara, 2020) – a quarter of global mortality: 13 million deaths annually (WHO, 2020). Also according to the WHO, air pollution is estimated to be responsible for around 7 million deaths per year (Health Effects Institute, 2020); over 90% of the world's population breathes polluted air and nearly 3 billion people still rely on polluting fuels (such as fossil fuels or kerosene) for lighting, cooking, heating or transport. More than half of the world's population is still exposed to poor water management, with inadequate sanitation and poor hygiene, resulting in more than 800,000 deaths each year (WHO, 2020).

5. A look at the challenges of tomorrow

In order to better address the challenges posed by the impact of climate change, it is essential that environmental policies lead to a transformation in the way the environment is managed, with due regard for health and well-being (European Environment Agency, 2015).

Future economic development is intrinsically linked to coherent policies for the intelligent conservation of natural resources, as exemplified by the United Nations' 2030 Agenda, which addresses various dimensions of sustainable development, notably: Goal 4 (quality education), Goal 7 (affordable and clean energy), Goal 12 (sustainable consumption and production), Goal 13 (climate action), Goal 14 (life below water) and Goal 15 (life on land) (BCSD Portugal (2023).

Given the current situation, in which climate change is having an ever-greater impact on both individuals and society as a whole, it poses a threat to civilisation; it is a problem that concerns everyone, not just a specific segment of society, a political group or environmental activists. It is an unforeseen consequence brought about by society itself (Beck, 2015).

Alongside the development of societies, the phenomena of climate change demand new social structures, as global risks create global publics. Uncertainties regarding the planet's future may mean that nations cease to be at the centre, thus rendering the concept of sovereignty meaningless, with solutions to climate change passing to cities as global actors of crucial importance (Beck, 2015).

Given that knowledge is the genesis of evolution, empowerment and understanding, enabling us to comprehend the present and plan for the future, the challenge of combating climate change inevitably involves climate literacy[3] , as a mandatory prerequisite for the existence of life. This global priority is enshrined in the 2030 Agenda, specifically in Goal 4 – Quality Education, with a focus on ensuring access to quality education for all and promoting lifelong learning) (BCSD Portugal (2023).

As highlighted by Ferreira (2024), drawing on UNESCO data covering 100 countries, only 53% of national school curricula include any mention of climate change, and when the topic is addressed, it is not treated as a priority, with only general aspects being explored rather than the underlying causes in depth, in other words, school programmes and textbooks do not reflect the actual evolution of the problem (Viana, 2022). According to the same author, a 2020 study on the importance of climate education in individual carbon emissions over a lifetime emphasises that "climate education can be as effective in reducing carbon emissions as other solutions, such as rooftop solar panels or electric vehicles".

According to Campos (2023), President of the Portuguese Council for Health and the Environment (2023), the topic of health and climate change must be introduced into education, with a pressing need for profound changes that reduce the ecological footprint, promote present-day education and prepare for the future.

3 We can understand climate literacy as part of scientific literacy, which enables a basic understanding of the climate system and the natural and anthropogenic factors that determine it (Oliveira *et al*., 2015).

In environmental literacy, education emerges as a tool for knowledge and understanding of the Earth's climate, the impacts of climate change, and approaches to adapting to or mitigating these outcomes, whilst also promoting greater literacy in related sciences, providing this educational framework of principles and concepts with the involvement of the whole of society (North American Association for Environmental Education, 2022).

Individuals with higher literacy have the ability to assess the validity of scientific evidence on the climate and use this information to support their beliefs and decisions (Oliveira *et al*., 2015). In contrast, low climate literacy – or climate illiteracy – leads to confusion, misconceptions, naive theories, and distorted beliefs and perceptions that conflict with scientific explanations on the subject, in an era of mass communication (FIA Business School, 2019).
To meet the identified needs, it is essential to focus on effective communication[4] aimed at changing behaviour; using clear, accessible and personalised messages that highlight tangible benefits, such as cost savings or an improved quality of life, can encourage uptake. The narrative should inspire a sense of environmental responsibility, establishing an emotional connection with the issue. The media, with their wide reach and credibility, should use scientific information to combat 'fake news', clarifying confusion, addressing cognitive gaps and common misconceptions in people's perceptions. In combination with social media, practical calls to action should be included, such as simple tips for reducing one's carbon footprint, transforming knowledge into concrete actions, and steering the world towards a more sustainable future (Ramos *et al.*, 2022; McCaffery & Buhr, 2008).

6. Final considerations

Technological development, linked to the process of evolution, has led to changes in the production of the means for human existence, giving rise to transformations in society, nature and the relationship between humans and nature. The increase in the production of consumer goods, linked to consumerism, has required greater exploitation of natural resources, triggering environmental impacts and a redefinition of humanity's place in nature and society (Gonçalves, 2021).

The climate crisis is a complex and cross-sectoral issue, far from being binary; currently, education is underutilised as a mitigation tool (Ferreira, 2024).

In the face of the challenges of climate change, it is crucial to promote a shift in attitudes and behaviours in favour of the environment, from an early age – within a lifelong learning perspective (Ramos, *et al*., 2022). Prioritising environmental education from an early age is a pathway to achieving climate literacy, so that citizens incorporate environmental values as a reality. The urgency of resolving environmental problems calls for citizens to be active and environmentally 'literate', that is, to have a greater capacity to consciously be part of the solution to environmental problems (Mafra & Moreno, 2019).

With a long road still ahead, it is only through genuine awareness of the impact of climate change, and by strongly investing in environmental literacy – in schools and beyond, within the social context of young people, at the heart of their families, and simultaneously with local communities and society – that it is possible to develop concrete actions to bring humanity into harmony with nature.

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4 The ability to communicate accurately and comprehensibly.

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