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Contents

- 133 Raymond Zammit**
Editorial Note
- 141 Raymond Zammit, Carlo Calleja**
The Environmental Concerns
of the Maltese Church
- 185 Emmanuel Agius**
Our Common Home
belongs to all Generations
- 219 Pasquale Giustiniani**
Verso un'eco-teologia integrale,
alla luce di *Laudato si'*. Aspetti
epistemologici e possibili
implicazioni disciplinari
- 241 Claudette Baluci**
John Anthony Berry
The Christological Ecology
of Joseph Ratzinger
- 263 Eduardo Agosta Scarel**
Climate Change in the
Light of Integral Ecology
- 283 Glen Attard, Charlò Camilleri**
"There is Only a Single Life
in all Living Things": Medieval
Ecological Contemplation in
John of Hildesheim's *Speculum
fontis vitae*
- 313 Carmelo Sant**
Natural Environment:
The Biblical Perspective
- 325 Guidelines For Contributors**

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Climate Change in the Light of Integral Ecology

Introduction

There is no doubt that climate change is a crucial issue on the global agenda of the countries organised under the orbit of the United Nations.¹ It is a human-made disturbance in the energy balance of the earth's climate system. The climate system manifests the amount, distribution, and net balance of

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¹ Climate change is a slow but steady process of changes in regional climates caused by human activity due to the burning of fossil fuels (oil, natural gas and coal). These regional changes have been affecting the quality of life in various regions of the Earth for decades. It is also referred to as a "climate crisis" or "climate emergency." In 1988 the United Nations established the Intergovernmental Panel on Climate Change (known as the IPCC) to provide comprehensive assessments of the state of scientific, technical and socio-economic knowledge on climate change, its causes, potential impacts and response strategies. Note that the IPCC does not "do" research but compiles and describes the state of the art of knowledge of the Earth's climate and produces regular reports with the voluntary collaboration of hundreds of scientists convened for this purpose, a process of which I have been a part. In 1994, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted with the aim of monitoring the problem and influencing global policy solutions. Since 1995, each year the UNFCCC has held a climate summit, known as the Conference of the Parties (COP).

energy at earth's surface (from the ground to below 30 km height). Thus, climate change can even be thought of as the tip of the iceberg of other interdependent environmental concerns such as, among others, deforestation, land-use changes, forest fires, droughts, floods, sea-level rise, and death of coral death reefs, increased climatic extremes, among others. Likewise, for those of us who do climate science, the problem as such is a long-standing one. Since the late 19th century, from considerations of simple radiation budget, it has been known that carbon dioxide in the atmosphere directly affects the earth's heat balance;² a doubling of this amount would lead to a 2°C increase in the global average temperature.³ Over the years, not only has the number of publications on this subject increased, but the scientific evidence of the last decades has consolidated the theory of anthropogenic global warming.

In tune with the climate emergency, with the turn of the century, sustainability science has established nine planetary boundaries to be pivotal for earth with the century's turn. The planetary boundary concept initially aimed to define the environmental limits within which humanity can safely operate. Earth has already transgressed four planetary boundaries due to human activity, increasing the risk of reaching dangerous thresholds that could tip the planet into a new state. These planetary boundaries are, besides climate change, biodiversity loss,

² This gives rise to the well-known "greenhouse effect." For example, Svante Arrhenius predicted in 1896 that a 40% increase or decrease in the atmospheric abundance of carbon dioxide could trigger the advances and retreats of glacial periods. One hundred years later, it would be found that carbon dioxide did indeed vary by this amount between the glacial and inter-glacial periods, enhancing the astronomically induced climate change effect. See Svante Arrhenius, "On the influence of carbonic acid in the air upon the temperature on the ground," *Philosophical Magazine and Journal of Science* 41 (1896): 237-276.

³ Callendar in 1938 solved a set of equations linking greenhouse gases and climate change. He found that a doubling of atmospheric CO₂ concentration resulted in an increase in global average temperature of 2°C, with the warming at the poles being considerably greater. Callendar also associated the increased use of fossil fuels with an increase in carbon dioxide and its greenhouse effects: "Since man is now changing the composition of the atmosphere at a rate that must be quite exceptional on the scale of geological time, it is natural to look for the likely effects of such a change. From the best laboratory observations, it appears that the main result of the increase in atmospheric carbon dioxide... would be a gradual increase in the average temperature in the cooler regions of the earth." See G.S. Callendar, "The artificial production of carbon dioxide and its influence on temperature," *Quarterly Journal of the Royal Meteorological Society* 64, no.275 (1938): 223-240.

land cover change and the flow of nitrogen and phosphorous around the world.⁴ Both climate change and biodiversity integrity are recognised as “core” planetary boundaries based on their fundamental importance. The biosphere’s importance relies on the fact that it regulates earth material and climate-system retained energy flows and increases its resilience to abrupt and gradual change.⁵

The message from earth’s and sustainability sciences is clear: humanity is facing a unique stretch of human history that is decisive for the emergence of an unprecedented planetary-scale environmental crisis. Pope Francis has somehow taken up this message from the scientific community with his timely encyclical letter *Laudato si’*, a document that in its entirety, for the first time, deals with the ecological question, making ecological concern a relevant part of the Social Doctrine of the Church.⁶ The empirical evidence of Earth’s state has sounded the alarm bells, reflected in all the frequent reports or communications from technical-scientific institutions or individual experts worldwide.⁷ Unlike perhaps the warning from the sciences, Francis’ message on this problem is charged with optimism. Pope Francis is a believer and shepherd of a global community, who wants to convey encouragement and hope in humanity that, according to him, can still bring about a timely change in prevailing lifestyles.

Faith in creation holds that there are no realities that cannot be approached from the viewpoint of religious faith. Therefore, I would like to present the climate emergency in the light of integral ecology, and the companion spirituality of ecology, inspired by Pope Francis’ proposal in the encyclical letter, *Laudato si’*. Integral ecology and the associated spirituality can be conceived as ecotheological categories of reflection that may offer us a framework or an

⁴ See Johan Rockström, Will Steffen, Kevin Noone, Åsa Persson, F. Stuart Chapin, Eric F. Lambin, Timothy M. Lenton, Marten Scheffer, Carl Folke, Hans Joachim Schellnhuber, Björn Nykvist, Cynthia A. de Wit, Terry Hughes, Sander van der Leeuw, Henning Rodhe, Sverker Sörlin, Peter K Snyder, Robert Costanza, Uno Svedin, Malin Falkenmark, Louise Karlberg, Robert W. Corell, Victoria J. Fabry, James Hansen, Brian Walker, Diana Liverman, Katherine Richardson, Paul Crutzen, Jonathan A. Foley, “A safe operating space for humanity,” *Nature* 461 (2009): 472-475. DOI: 10.1038/461472a.

⁵ See Will Steffen, Katherine Richardson, Johan Rockström, Sarah E. Cornell, Ingo Fetzer, Elena M. Bennett, R. Biggs, Stephen R. Carpenter, Wim de Vries, Cynthia A. de Wit Carl Folke, Dieter Gerten, Jens Heinke, Georgina M. Mace, Linn M. Persson, Veerabhadran Ramanathan, B. Reyers, Sverker Sörlin, “Planetary boundaries: Guiding development on a changing planet,” *Science* 347 (2015): 1-12. DOI: 10.1126/science.1259855.

⁶ Pope Francis, encyclical letter *Laudato si’: On care for our common home* (24 May 2015). Hereafter, *LS*.

⁷ See, for instance, L. Brito and M. Stafford-Smith, “State of the Planet Declaration.” Planet Under Pressure: New Knowledge Towards Solutions Conference, London, 26-29 March 2012.

anchor for thinking, looking carefully at the global environmental problem and reflecting on it from the contributions of faith. The final result of this theological work may imply generating a concordant Christian praxis that contributes to the Church's pastoral work in the global context of environmental and social crisis, which is, as said before, unique in its magnitude and extension (planetary) in the history of humanity.

Earth, a Place to think from Faith

Some time ago, I was reluctant to speak of “ecothology” because I thought it was unnecessary to wrap Theology with the prefix “eco” to bring it up to date with current events. Perhaps it could be admitted only in the case of wanting to sound more “pro-green.” I maintained that it was enough to say theology in the ecological key, or better, theology of creation in the environmental key in epistemological terms. But the passing of time led me to value the positive effects of the term “eco” added to theology, which, as you all know, comes from the Greek word *oikos*, which refers to the common home, the family, the community.⁸

Like theology, with its renewed methodological task catapulted by Vatican II, eco-theology is the exercise of believing reflective thinking that arises from bringing real data face to face under the reflective orientation of faith (from the Bible, Tradition and Doctrine), intertwining them interpretatively. I am referring to the theological-pastoral method presented by the Apostolic Constitution *Gaudium et Spes*, subsequently assumed by the theology of the Church in Latin America and fully applied in the encyclical elaboration *Laudato si'*.⁹ It is usual to refer to it in its simplified version of *seeing, judging and acting*.¹⁰ To my understanding, this method is nothing but a maturation (adoption and enrichment) on the part of believing reflection of the transcendental method of

⁸ Aristotle, in his work *Politics* 1252a, defines *oikos* as “a community naturally constituted to satisfy daily needs,” quoted by Fernando Millán Romeral, “Dalla casa del Carmelo alla casa commune,” in *Tutte le creature sono connesse tra loro*, ed. Valéry Bitar (Rome: Teresianum: Fiamma Viva 57, 2017), 23-48.

⁹ See Alberto García, “Lo que está pasando a nuestra casa. Diagnosis of an unprecedented ecological crisis,” in *Loado Seas mi Señor. Commentary on Pope Francis' Encyclical Laudato si'*, eds., Fernando Chica Arellano, Carlos Granados García (Madrid: Biblioteca de Autores Cristianos, 2015), 311-313.

¹⁰ “The theology of the ‘signs of the times’ is expressed methodologically above all in the three steps ‘see-judge-object’ (GS 4).” Cited by Carlos Schickendantz, “Signs of the Times. Articulation between Theological Principles and Historical Events,” in *Places and Interpellations of God. Discerning the Signs of the Times*, eds., Carlos Schickendantz et al. (Santiago de Chile: Universidad Alberto Hurtado, 2017), 429.

human knowledge, exposed by Bernard Lonergan in the first half of the twentieth century.¹¹ The method of access to knowledge, as such, is empirical-inductive, that is, it is achieved through experimentation and induction, in stages or phases that can be named in different ways according to the discipline in question, and which we easily identify in theology, namely:

- i) *To experience* a portion of reality, accessing it sensibly, that is, to scrutinise it, by seeing the “signs of the times,” or listening to “the cry of the poor,” thus collecting data that represent, give an account, of that portion of the reality to be known.
- ii) *To inquire*, to ask questions, to delve into the data, to understand at an empirical level what it is about; so that the data speaks as the direct testimony of that portion of reality; then,
- iii) *To interpret* the information obtained by interweaving common and differential traits found in the data of reality with the information provided by the sources of faith, to analyse, judge and evaluate the data collected in the light of one’s faith; and finally,
- iv) *To make decisions*, to act, to decide the foundations of one’s actions, to carry out a transformation of that portion of reality, or to allow oneself to be transformed.

This empirical-inductive method gradually leads us to move from a merely observant, expectant awareness of reality to an understanding that questions, investigates and reasons about the signs observed, to finally reach a moral awareness that orients transforming action according to faith.

Ecotheology must also apply this theological-pastoral method, even though it has a slightly different starting point from the usual theology. The post-synodal theological method starts with the identification of the *signs of the times*. Without pretending to close the epistemological debate on the concept of signs of the times, these can be understood as those “significant events that mark history by their generalization and frequency, triggering awareness and commotion, hope and orientation in an era, creating a basic consensus or universal assent.”¹²

There is no doubt that today, the profound environmental crisis is altering the internal balances of the planet that once provided societies with specific stationery and normalising frameworks for the unfolding of social, cultural, political and

¹¹ Bernard Lonergan, *Insight. A Study of Human Understanding*, 5th ed. (London: Longman, 2005).

¹² Personal translation of a quotation retrieved from Virginia Azcuy, “El Espíritu y los signos de estos tiempos. Legado, vigencia y porvenir de un discernimiento teológico,” *Concilium* 342 (2011): 602.

economic events. Thus, the planetary ecological crisis affects peoples' history to varying degrees according to their *topoi*, or places, where the historical events are manifested and that we can identify as signs of the times for theology. That is, the discernible features of a historical event are distinctively marked by the geographical place. This requires a significantly broaden of our starting point to grasp the reality affected by the spatial diversity of the ecological crisis.

For this reason, it is urgent not only to see the signs of the times – that is, to grasp the controversial messages embedded in the social, cultural and political events of recent history – but also to decipher the *signs of the place*. It means to perceive the signs of sin and ruptures present in the local geography, in the natural environment that sustains that neighbourhood, town, city, country, region, or earth itself. Thanks to the contribution of science, this planet can be regarded today as a *common home*, which is the only one inhabited by the human family in a diversity of peoples. That river, that mountain, the coast, those forests, the valley, the glacier are not mere natural elements scattered around, with no implications in our lives, but emerge as the support, the solid base, the configuring structure, which make possible the global *oikos*, the common home. In this way, the natural environment, previously seen as a mere static and immutable scenario in which human history unfolded, can now be perceived as a theological place. This is because the environment is the support, possibility and limit of life in its broadest sense and unfolding in time and space. With its specific concrete qualities, the inhabited environment can facilitate life, conditions it, and limits it. Therefore, the environment also shapes relationships between men and women of all times and their environment reciprocally. Without the environment, there is no life, real and concrete, in any way. From an ecological point of view, the environment is the physical, concrete space of nature at a given time, in which the exchange of energy in all its forms takes place. The flow of energy in the Earth system is a complete gift from the sun. Life flows from the sun daily and is received by the environment. Nothing of human intervention can be added to spontaneously, that is, naturally, unfold the magnificent gift of possibilities that solar energy brings with it, as the miracle of life in its many forms, in mutual interrelation with the environment.

Earth, A Place of Relationships

To pay attention to the signs of the place, of that portion of the terrestrial geography in which I live, is nothing more than to be consistent with the ecological instruction given in the book of Genesis, when we are metaphorically told that God placed the human being in the garden, the geophysical space, an earthly place to which the human beings belong naturally since the environment

also shapes them in their existence. And God placed the human beings in an environment with a precise mandate so that they would “cultivate it and take care of it” (Gen. 2:15).

Thus, the biblical data indicates that humans being disconnected from their geographical space, without connection or responsible bond of care and transforming work, are not possible in this world, at least in the world intended by God in creation. Succinctly, human beings are also defined through their functional relationships with the environment, of care and tillage. Therefore, human relationships with nature, with the earthly domain, must be such that the work must be carried out as stewards to whom something is entrusted. We are stewards, ministers, guardians of God’s creation, at the origin. Stewardship involves the conscious and responsible management of something entrusted to one’s care.

Biblical data also teaches us that humans are beings of free relationships and must choose whether they shall eat the fruit that tempts them to be like God, or better yet, to occupy his place and become knowledgeable or bearers of the knowledge of good and evil (Gen. 3:5). This is how evil is introduced in the course of time, which – for some reason, somehow, linked to the distortion in the perception of reality and the exercise of freedom made by human beings (Gen. 3) – alters the balance, the harmony, of everything created.¹³

Therefore, human beings suffer from disobedience, sin, like the rupture of relationships on three levels. One level relates to God since Adam and Eve tried to hide themselves when God walked in the garden (Gen. 3:8), having feelings of shame and fear because of God’s gaze. This would explain humans’ historical propensity to avoid God’s presence, either through ignorance and because of forgetting or ignoring his commandments.

The second level of bond-breaking is found among humans. Before the Fall, Adam said about Eve: “This is, at last, bones of my bones and flesh of my flesh” (Gen. 2:20). However, after the sin, Adam complains about his companion for the sin committed by saying: “The woman you gave me to be with me” (Gen. 3:10). This scene represents humanity’s first offence against neighbour and companion, and the inability to recognise personal guilt. The third level of broken relationships is with nature, highlighted by the curse on the serpent, painful childbirth, bread earned with effort and hard work. Thus, it is evidencing the hostility between human flourishing, prosperity, and the power of nature.

¹³ See Eduardo Agosta Scarel and Lucio Florio, “La Tierra creada,” in *Una Tierra creada para todos* (Buenos Aires: Claretiana, 2013), 20.

Underlying these biblical texts is faith's interpretation that human beings have introduced disturbances within the natural world. That is to say, the distancing of human beings from the will of God had a cosmic impact that altered the order of creation while generated ecological crises. Of course, there is no intention to give a historical explanation of either natural disasters or human anguish that arises from them. What is certain is a profound relationship between human beings and the rest of the natural world. This relationship includes an extension of the mystery of evil within nature, which originates in the human heart and impacts the balance and harmony of nature.¹⁴ This fact is not minor, since it implies recognising beforehand, by faith, that human activities on Earth (and wherever they could live) inherently bring with them a certain degree of risk of altering the socio-environmental harmony of creation, for which we should take responsibility. In short, our actions have planetary (cosmic) consequences.

After these accounts of disobedience in the Genesis narrative, God's initiative appears. In the face of human unfaithfulness, God continues to seek them. Even though the human beings slip away from God's presence because they have doubted the goodness of his work and his love, God makes them realise that they are no longer in their place, addressing this call to them: "Where are you?" (Gen. 3:9), what have you got yourself into? This call is implicitly a call to return, to change one's inner attitude, an invitation to conversion. Conversion is a turning back on oneself, beginning to retrace the path that has been taken, but this time in the right, healing direction. According to Scripture, humanity's vocation and place in the world are now concordant with their conversion history. Humanity's conversion is essentially a re-establishment of relationships among human beings, with others and oneself, the environment, and God. It will also be a re-establishment of order and harmony in the world and the ecological balance of nature, which God had in mind from the origin of creation.

Ecological Conversion: Towards an Integral Ecology and a Spirituality of Ecology

From the above, it is worth asking about the link between integral ecology and our conversion. That is, how to link the interdependent relationships within creation in the natural world and the moral, ethical-spiritual relationship of each human being with God.

¹⁴ See José Loza, *Génesis 1-11. Comentario a la Nueva Biblia de Jerusalén* (Bilbao: Desclée de Brouwer, 2005).

As a global community of faith, the Church has been reflecting, for over decades after the Second Vatican Council, on the theme of care for creation in the light of faith. The environmental deterioration caused by human activities has been unavoidable since at least the mid twentieth century. Today we perceive the consequences of the carelessness and negligence of human beings who do not want to take responsibility for their actions on the planet. Pope Francis, aided by the vital contribution of scientific knowledge on five major environmental issues affecting the Earth and the life of human beings and other species, describes this in chapter 2 of *Laudato si'*.

So far, the most elaborated concept of this progressive theological reflection on the global ecological crisis is undoubtedly the category of “integral ecology,” a concept taken from science but enriched by faith in *Laudato si'*. The first word, “ecology,” indicates the science, or intellectual activity that seeks to understand the relationships of equilibrium established between a physical environment and life in all its forms that develop in it. The second word, “integral,” broadens the basic concept of ecology to incorporate a holistic vision of interconnectedness within the system theory. The conceptual basis is premised on the observational fact that on Earth “everything is interconnected, related.”¹⁵ This is an elaborated scientific premise, not so evident at first glance. It is known to all, for example, the “butterfly effect” of the Chinese proverb, which Edward Lorenz in 1963 attributed to the complexity and non-linearity of the physics that governs the atmosphere and gives rise to chaotic, indeterministic behaviour.¹⁶

As introduced in *Laudato si'*, integral ecology must open up to other categories of thought which go beyond merely physical laws and open up to the core of humanness, the spiritual dimension of reality, until becoming significant to humans.¹⁷ In other words, integral ecology, in which “everything is interconnected,” also includes the sacred dimension of creation that it possesses itself for being the work of God’s love. For Pope Francis, there is a deep bond between the Divine Creator and creatures that must not be silenced: integral ecology. Thus, integral ecology correctly understood requires spirituality. In fact, in number 28 of *Evangelii Gaudium*, Pope Francis will explicitly say that

¹⁵ The interconnectedness of all the created things is consistently mentioned throughout the pastoral letter. See *Laudato si'*, 70, 92, 111, 138, 142, and 240.

¹⁶ See the original work of Edward Lorenz, “Deterministic Nonperiodic Flow,” *Journal of Atmospheric Science* 20, no.2 (1963): 130-141.

¹⁷ Pope Francis explicitly says: “An integral ecology calls for openness to categories which transcend the language of mathematics and biology and take us to the heart of what it is to be human.” See *LS*, 11.

Laudato si' is, in fact, a spirituality of ecology. In other words, integral ecology and the spirituality of ecology are two inseparable categories when it comes to addressing the theme of care for creation in the key of faith.

Let us dwell for a moment on the word “spirituality.” In the Christian tradition, it is a versatile term, since it often expresses different things depending on history. Christian spirituality is the confluence of the human spirit and the Holy Spirit in search of meaning and sense for the human existence through reflection, grace and commitment with the created. It is a life guided by the Spirit of God, made concrete through certain dispositions of the intellect, will and behaviour consistent with the Gospel in the believer’s life.¹⁸ I propose then to understand spirituality as a set of beliefs and values, that is, faith motivations. These once discovered by the light of intelligence, are glimpsed in mind as good, true and beautiful and are learned with great satisfaction of desire. To find the motivations of faith with the joy of heart, with affective satisfaction, means that the values and beliefs are charged with the power of love. When I discover these motivations, my affectivity is involved. They are neither a heavy burden, nor an imposition to be fulfilled, but a happy and positive adoption. My human heart is moved by them; a change from inside occurs.¹⁹ And these values become non-negotiable convictions of life, capable of directing my deepest drives that are born of desire, and set me on the way, leading me to carry out behaviours and attitudes under these assumed values. This spirituality of values and motivation generates lasting changes in my mentality (conversion) and sustainable changes in my consequent actions because they stem from conviction and love. These changes are a guarantee for the transformation of personal and community reality.

In short, it is a spirituality for which what matters is what we do because of what we say we believe, rather than the mere pursuit of belief itself.²⁰ It is a faith put into deeds. As the apostle James says: “Test your faith without works, and I will test my faith by works” (Js 2:18). Understanding spirituality as the realization of great values and motivations of faith, intuitions that the Holy

¹⁸ See the entry “Contemporaneous Spirituality” in Stefano de Fiores et al. eds., *Nuevo Diccionario de Espiritualidad* (Madrid: Paulinas, 1991).

¹⁹ See *LS*, 215.

²⁰ See Joan D. Chittister, *Heart of Flesh: A Feminist Spirituality for Women and Men* (Michigan/Cambridge: Eerdmans - Ottawa: St Paul University, 1998), 15. “Spirituality is Theology in action; it is what we do by virtue of what we say we believe. What we dogmatize into creeds, spirituality embodies; and what we embody is what we really believe.” Cited by Joan D. Chittister, *El fuego en estas cenizas. Espiritualidad de la vida religiosa hoy* (Santander: Sal Terrae, 1998), 139.

Spirit awakens in us, puts us in tune with *Laudato si*²¹ and with the spirituality of ecology that follows from it.

Therefore, at the level of faith, integral ecology points out that ecological balance and social justice in a specific geography are two sides of the same coin. The two are linked. Social justice should be understood as the proper, fair and balanced use of the Earth's gifts by human beings in that specific space. For example, when we do justice to the oppressed and marginalized, the vulnerable of the socioeconomic system, and care for nature through environmental protection activities, recycling, reusing or repairing goods, then the signs of hope for the Kingdom of God become present among us. The aforementioned are but a few examples through which justice and peace are imparted. This is so because human beings and nature are part of interdependent relationships of life, impossible to separate. The good that one does to nature impacts the well-being of human beings, and vice versa.

With this in mind, it is clear that from integral ecology a new paradigm of justice is born for the pastoral action of the Church, which is social justice and environmental justice integrated into a single socio-environmental form of justice, as Pope Francis summarises so well: "a true ecological approach always becomes a social approach; it must integrate questions of justice in debates on the environment, so as to hear both the cry of the earth and the cry of the poor."²² Integral ecology thus indicates that my faith and eschatological hope of "new heavens and a new earth" (Rev. 21:1) is comparable to the gospel action proposed by Jesus: "As you did it to one of the least of these my brethren, you did it to me" (Matt. 25:40). Integral ecology helps us to connect the exercise of care for the natural world with that of justice for the poorest and most disadvantaged on earth, who are God's preferred option in revealed history, his identification, in which all creatures are included (cf. Matt. 25:40ff).

As we have said, integral ecology requires a spirituality of ecology, adequately understood as what we do from what we say we believe, rather than the pursuit of belief per se. This spirituality is determined by the set of beliefs and values that constitute the core of personal motivations, the non-negotiable principles of the individual regarding the place and meaning of the human being in creation. For the Christian, these must be inspired by the values of the Kingdom preached by Jesus Christ. They are beliefs and values about how human beings must relate to the rest of creation and God.

²¹ See *LS*, 64.

²² *Ibid.*, 49.

Therefore, the connection between integral ecology and spirituality is to realise that the ultimate goal of Christian (and human in general) spirituality is similar to that of integral ecology, which is to achieve harmony, balance, peace, through relationships of justice with all creation, with oneself and with God. As Pope Francis rightly reminds us:

We have to recognise that we Christians have not always gathered and developed the riches that God has given to the Church, where spirituality is not disconnected from one's own body or from nature or from the realities of this world, but is lived with them and in them, in communion with all that surrounds us.²³

In the late 1960s, Lynn White Jr., an American Professor of History, argued against the Judeo-Christian tradition for the planetary ecological crisis that was looming. In his sounded article "The Historical Roots of Our Ecological Crisis,"²⁴ the author wrote: "We shall continue to have a worsening ecologic crisis until we reject the Christian axiom that nature has no reason for existence save to serve man."²⁵ He attributed a Christian axiom to the classic, flawed interpretation of Genesis 1:28 ("subdue the earth"): God gives humanity lordship and dominion over all creation, thus justifying, according to this interpretation, all indiscriminate and even destructive exploitation of nature. In the modern era, this statement from the biblical creation account was interpreted as God's legitimization for humans to be absolute rulers of nature, and it was one of the important foundations for the legitimacy of complete instrumental dominance over nature. This interpretation still underlies within the mindsets of many people who ignore the planet's situation and the poor on earth. Here the ecotheology had to come in to shed light on the correct interpretation of the Sacred Scriptures, as Pope Francis presented in *Laudato si'*, numbers 65-69.

Despite this failed legacy, Professor White would now agree with us on this point of the need for a spirituality of ecology to address an integral solution for the ecological crisis, as he further stated in his article:

What people do about their ecology depends on what they think about themselves concerning things around them. Human ecology is deeply conditioned by beliefs about humanity's nature and destiny, that is, by religion... Since the roots of our trouble are so largely religious, the remedy must also be essentially religious, whether we call it that or not.²⁶

²³ Ibid., 216.

²⁴ Lynn White, "The Historical Roots of Our Ecologic Crisis," *Science* 155 (1967): 1203-1207.

²⁵ Ibid.

²⁶ Ibid.

Therefore, “if a mistaken understanding of our principles has at times led us to justify mistreating nature, to exercise tyranny over creation,” then it is ecotheology, with its empirical-deductive method, the one that helps us “acknowledge that by so doing we were not faithful to the treasures of wisdom which we have been called to protect and preserve.”²⁷ The main task of ecotheology will be to help Christian people to understand the right relationship between man and nature in the light of faith. It has been bringing to consciousness, by the light of intelligence through reflection, the values of care and cultivation of creation, opening individuals to find new horizons or points of view, recognised as beautiful, true and good. What Pope Francis calls “the great motivations” or “the deepest convictions about love, justice and peace.”²⁸

Moreover, it has been scientifically proven that mere information, the simple facts of reality, do not change us. For such motivations to become conviction and mobilise from within, they must be charged with affective power, passion, love, in such a way that they are capable of orienting the deepest desires of the individual, setting him or her on the path of conversion, or of changing behaviour and attitudes. Ecological conversion is based in the affective world. This is because we modify our behaviour based on emotion and not so much on reason. What does not touch the emotional core of the human being’s desire cannot change anything in personal life. Change of mind and behaviours implies first a change from inside.²⁹

Spirituality must, therefore, always be an experience of contact with reality, through the experience of immersion in the natural environment and close presence to the most vulnerable in society. In *Laudato si’*, Pope Francis tells us that “the life of the spirit is not dissociated from the body or nature or worldly realities, but lived in and with them, in communion with all that surrounds us.”³⁰ At the same time, we ought “to dare to turn what is happening to the world into our own personal suffering.”³¹ to generate convictions anchored in our moral conscience.

Without wishing to exhaust the educating proposals from *Laudato si’*,³² I bring here that this spirituality is taught experientially. It is a matter of transmitting ecological convictions through life, that help overcome the

²⁷ *LS*, 200.

²⁸ See *ibid.*

²⁹ See *ibid.*, 215-216.

³⁰ *Ibid.*, 216.

³¹ *Ibid.*, 19.

³² See *ibid.*, 215-219.

purely instrumental and materialistic mentality of our culture, opening us to the mystery. The pedagogy of ecological spirituality will seek to strengthen young people's instinct for ethical and moral issues of justice and care for the environment through the experience of beauty and creativity. It will also seek to pay attention to the harmony of creation and to feel and love it, overcoming the utilitarian and consumerist paradigm. Education in ecological values should motivate and endow competences of cooperation and democratic participation, opposite to technocratic isolation that is dominant, to transform the individual and the society in which he/she lives as a goal of ecological conversion.

The Climate Crisis as a Theological Place

We have seen that ecotheology can benefit from the conventional inductive method of access to knowledge having a starting point in scrutinising the signs of place. Moreover, it has integral ecology as a category or hermeneutical tool for fitting together the jigsaw puzzle pieces that are the inhabited environment. The integral ecology introduced in *Laudato si'*, for which there is a profound connection between the Creator and the creature, will be the framework or guide for the ecotheological reflection of the socio-environmental data, selected to ponder the presence of inharmonious relationships, or ruptures, in the place. In other words, it will offer the ecotheological principles on which to base the praxis of faith. Consequently, the spiritual proposal of strategic values and particular experiences to heal relationships will be a transforming ethical programme appropriate to the place.

Let us look at climate change as an illustration. The *place* sending out signals of disturbance of the balance is the whole earth. Its cry is heard today under the voice, the word: climate change. The consensus is global, the scientific community, the political world, a large part of the economic power and international civil society assumed in 2015 in the celebrated Paris Agreement during COP 21.³³ Although today there are still a few who deny it, the observed fact that the earth's climate is undergoing planetary-scale changes towards unsuspected behavioural conditions within a few decades is scientific knowledge and accepted by most of the world. The magnitude of these patterns is the most significant risk, because of the catastrophic impact on terrestrial life, with the greatest damage to the most vulnerable human populations due to their structural poverty conditions.

³³ Paris Agreement, available at https://unfccc.int/sites/default/files/english_paris_agreement.pdf (accessed on 1 June 2021).

Data shows, for example, that in the late 2010s we have already warmed the Earth's surface climate by just almost 1.2°C or so compared to pre-industrial values (Figure 1), leading to the occurrence of extreme weather events that we see from time to time and from place to place. As stated in the Paris Agreement, climate scientists say that the warming threshold must not exceed 1.5°C if we want to preserve the planet as we know it. Well, every month, in isolation, we have already reached that limit in 2016 and 2020. A recent assessment by the World Meteorological Organization indicates that at least one year in 2020-2024 will exceed the global average value of 1.5°C of warming.³⁴ As a maximum threshold, we can afford to warm up to 2°C by the end of this century. Globally and in annual terms, estimates indicate that we will undoubtedly reach it in the 2040s.³⁵

These changes in the earth's climate are due to a gradual increase in energy from the Sun, trapped in the climate system by a thickening of a layer of gases in the atmosphere, known as "greenhouse gases." This surplus energy flows through each of the components of the earth's climate: the atmosphere, the oceans, polar sea and continental ice, rivers, lakes and forests, altering the stable patterns of behaviour of each of these parts. The thickening of the greenhouse gas layer is due to the burning of fossil fuels – oil, natural gas and coal – to maintain the current rate of human activity. That is why we talk about anthropogenic climate change. We burn so much cheap energy of fossil origin as our voracious desire to maintain lifestyles that in many places tend towards hedonism and exacerbated consumption under the domination of the throwaway culture, at the lowest economic cost, regardless of the consequences for peoples and ecosystems.

It is worthy to note that the climate system, by the natural laws of physics, embedded in its internal dynamics (and intended and maintained by the Creator, we can say in the light of faith), seeks to reach a balance, that is, to regain internal equilibrium. This is evident from Figure 1 which displays the year-to-year variation of the global mean surface temperature anomaly, as a measure of the earth's climate system's internal energy, together with alternating periods of sharp warming and pause or slight cooling (shaded transparencies in Fig. 1). Still, it fails to do so with success at large. The dominant pattern is long-term warming.

³⁴ Find out more at <https://public.wmo.int/en/media/press-release/new-climate-predictions-assess-global-temperatures-coming-five-years> (accessed on 1 June 2021).

³⁵ The climate projection for the future with higher carbon dioxide emissions (RCP8.5) estimates that the 2°C threshold will be crossed between about 2035 and 2055. For lower emissions projections this crossing may be delayed until 2060 or later. See M. Joshi et al., "Projections of when temperature change will exceed 2 °C above pre-industrial levels," *Nature Climate Change* 1 (2011): 407-412. <https://doi.org/10.1038/nclimate1261>.

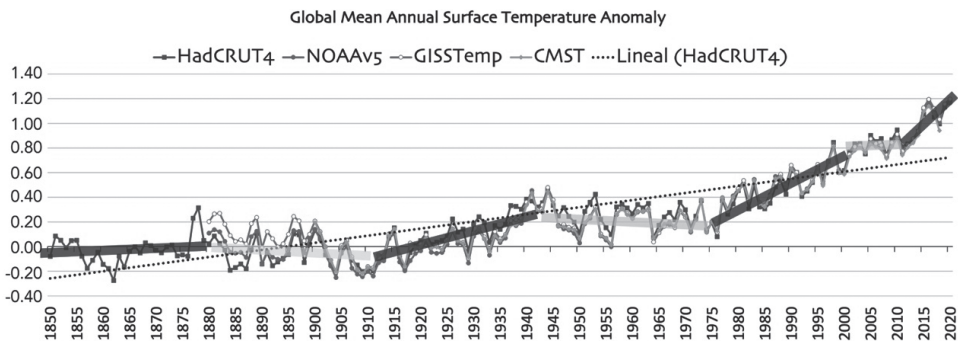


Figure 1: Year-to-year variation of the global mean annual surface temperature anomaly concerning the global mean 1961-1990, for the period 1850-2020 (in °C) from four independent data sets (HadCRUT4, NOAAv5, GISTemp and CMST), adjusted to the pre-industrial era, and the linear trend curve fitted to the HadCRUT4 data (dotted line). Note that the increase towards warming is a step-like process with alternating periods of warming (black shaded transparency) and pause, or even cooling, (grey shaded transparency). The climate system seeks to stabilise the energy imbalance drawing energy from the surface and storing it into the oceans. In the long term, the trend is towards gradual warming (dotted line). Prepared by the author.

The stabilisation will not be possible as long as the disturbing forcing (in this case, a forcing of human origin) is not dampened or extinguished over time.

Just as we did not see the coronavirus pandemic coming, although epidemiological experts have been warning us about it for a long time, today we still cannot see the full effects of climate change.³⁶ However, we cannot wait until we realise how serious it is when it is already too late, and the victims start to pile up, as happened when the first wave of the pandemic hit Europe, and the sick collapsed the corridors of our hospitals in March 2020. In this sense, we all agree with Pope Francis that climate change “represents one of the principal challenges facing humanity in our day.”³⁷

Although we cannot see the full effects of climate change, there are already signs of change in the intensity and frequency of extreme weather events (e.g., droughts, heavy rainfalls and floods, forest fires, heat waves, or extraordinary snowfalls, etc.) and climate factors (such as melting of Arctic sea ice and Greenland ice caps, continental glacier losses, among others). The globally

³⁶ A more than a decade-old precedent on the pandemic potential of a SARS-COV (coronavirus) type virus is found in V.C. Cheng, S.K. Lau, P.C. Woo, K.Y. Yuen, “Severe acute respiratory syndrome coronavirus as an agent of emerging and reemerging infection,” *Clinical Microbiology Review* 20, n.4 (2007): 660-692.

³⁷ *LS*, 25.

uneven sea level rise is one effect that affects populations worldwide in the last decades. Since we have had satellite sea height measurements in 1993 to present (2020), global mean sea height has risen at a pace of 3.2 mm per year due to thermal expansion and continental ice melting (caused by anthropogenic climate change).³⁸ But there are regional differences in sea-level rise that put some places at risk more than others (Fig. 2). The nations most affected by sea-level rise in the 1990s and the early 2000s were the western equatorial Pacific island populations. It was not a surprise that the Pacific insular countries were the first to claim to take action on climate change at the United Nations and have been urging for

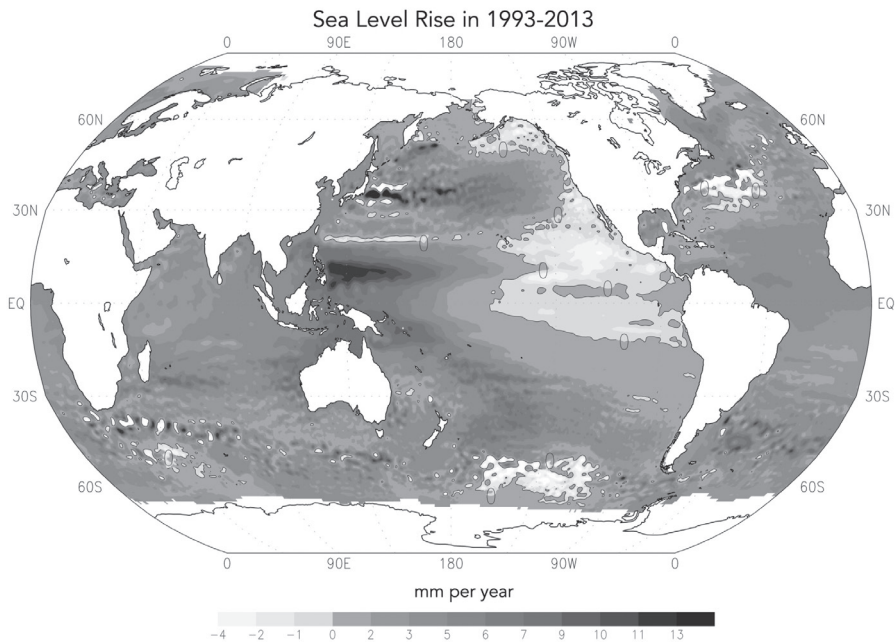


Figure 2: Observed changes in global sea level (in mm per year), mainly due to climate change (melting of glaciers and ice caps, and thermal expansion). There are several reasons for these regional variations, such as different seawater temperatures, ocean currents, changes to average winds and atmospheric pressures, gravitational adjustments owing to the loss of ice, and changes to the amount of water on land. Regional differences in sea-level rise put some places at risk more than others. During the 1990s and 2000s, the coastal regions most affected by sea-level rise were the western Pacific islands. Multiannual Satellite Altimetry Data on a 0.25° latitude and longitude gridded resolution from the Copernicus Climate Change Service (C3S), operated by the European Center for Medium Weather Forecast (ECMWF). Prepared by the author.

³⁸ Find out more on sea level rise at https://www.esa.int/ESA_Multimedia/Images/2020/09/Regional_mean_sea-level_trends_1993_2019 (accessed on 1 June 2021).

climate agreement over the last three decades. They are not the main culprits of greenhouse gas emissions, but they were the ones who first started to suffer its consequence. Recent studies also indicate that in the next thirty years, just over 300 million people living in coastal areas worldwide will be affected and displaced by flooding caused by rising sea levels.³⁹

Here it comes integral ecology to better ponder the “signs of place” by holistically listening to both the cry of the earth and the cry of the poor. When from faith in creation we uphold, as a positive datum, the eco-theological principle of the original harmony prevailing in nature as well as that of just, balanced relationships between human beings, with nature and the Creator, we are perhaps likely to be upset by the crisis of climate change. Today we are witnessing the fact of faith globally that disorderly human behaviour has cosmic consequences, disrupting the natural order and relationships of justice among peoples.

At this point, where the climate emergency is alarming, the spirituality of ecology should play a key role in making each individual, and societies collectively, seriously review the values and beliefs that govern our lifestyles, which often tend to disregard the damage that results from it. The climate crisis requires a global decision by all societies to slow down production and consumption of earth goods and energy. An alternative mode of human progress and development, based on a decarbonised economy, can occur. At the individual level, spiritual convictions can help to understand the quality of life differently and teach us to enjoy deeply without being obsessed by consumption, where sobriety regains its positive value.⁴⁰ It can also motivate Christian communities to coordinate actions with civil society organisations in pursuit of climate justice.

In conclusion, I believe that the global ecological crisis evidenced by climate change was to be expected. It is a type of crisis that arises in a world for which God may not exist. If culturally God is forgotten, the centrality of the human person is also lost at all levels, political, economic, social and psychological, and the sacred value of nature, as Pope Benedict XVI rightly warned in 2009 in his encyclical *Caritas in Veritate*. The cultural absence of God deprives us of the human experience of fraternity with all creatures so that we no longer

³⁹ Find out more are the National Oceanic and Atmospheric Administration (NOAA), <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>. (accessed on 1 June 2021).

⁴⁰ See *LS*, 222.

perceive ourselves as members of a large interconnectedness of lives that shares the common home and its destiny. Ecotheology may help us recover the faith conviction that the created earth precedes us with its goods and gifts. We inherit it under the transcendent value of gratuitousness and the logic of gift.

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