Revista Guillermo de Ockham

Reflection article Open Access

A Systemic Approach to Bioethics of the Environment and Complexity

Un enfoque sistémico de la bioética del medioambiente y la complejidad

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Received: 03/08/2024

Revised: 05/19/2024

Accepted: 05/30/2024

Cite as follows: Velázquez, Lourdes; Agazzi, Evandro. (2024). A systemic approach to bioethics of the environment and complexity. *Revista Guillermo de Ockham, 22*(2), pp. 135-145. https://doi.org/10.21500/22563202.6972

Editor in chief: Norman Darío Moreno Carmona, Ph.D., https://orcid.org/0000-0002-8216-2569

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Declaration of interests: The author has declared that there is no conflict of interest.

Availability of data: All relevant data can be found in the article. For further information, please contact the corresponding author.

Funding: None. This research did not receive any specific grants from funding agencies in the public, commercial, or nonprofit sectors.

Abstract

General system theory offers a conceptual and methodological framework for integrating bioethical considerations into environmental and ecological decision-making, clearly and effectively framing many problems and situations that are usually presented using ordinary language. A system is an internally structured entity characterised by certain specific properties and functions. This unit is related to several of its parts which are also systems and are therefore its subsystems. In turn, each system is part (i.e., subsystem) of higher-order systems. All these systems and subsystems are connected by relationships in such a way that each system is characterised by its specific properties, which, in addition, result from the correlations that link them to their subsystems and higher-order systems. Within this general architecture, concepts such as environment and complexity as well as emergence, with all the problems concerning the limits of predictive possibilities, are easily inscribed, showing that traditional deterministic approaches in science are insufficient to manage such complexity. The paper addresses the challenges posed by unpredictability in complex systems, critiquing fatalistic views that either optimistically or pessimistically accept the uncontrollable nature of technological and ecological developments. It is precisely the unpredictability of a complex system like the environment that necessitates a bioethical dimension to guide the values underlying our decision-making concerning life itself.

Keywords: systemic, subsystem, systemic correlation, complexity, environment, emergence, bioethics.

Resumen

La teoría general de sistemas ofrece un marco conceptual y metodológico para integrar consideraciones bioéticas en la toma de decisiones ambientales y ecológicas, enmarcando clara y eficazmente muchos problemas y situaciones que suelen presentarse utilizando el lenguaje ordinario. Un sistema es una entidad estructurada internamente que se caracteriza por algunas propiedades y funciones específicas. Esta unidad se relaciona con varias de sus partes que también son sistemas y son, por tanto, sus subsistemas. A su vez, cada sistema es parte (es decir, subsistema) de sistemas de orden superior. Todos estos sistemas y subsistemas están relacionados entre sí de tal manera que cada uno se caracteriza por sus propiedades específicas, que, además, resultan de las correlaciones que los unen a sus subsistemas y sistemas de orden superior. Dentro de esta arquitectura general se inscriben fácilmente conceptos como entorno y complejidad, así como emergencia, con todos los problemas relativos a los límites de las posibilidades de predicción mostrando que los enfoques deterministas tradicionales en la ciencia son insuficientes para manejar tal complejidad. El artículo aborda los desafíos que plantea la impredecibilidad en los sistemas complejos, criticando las visiones fatalistas que aceptan de manera optimista o pesimista la naturaleza incontrolable de los desarrollos tecnológicos y ecológicos. Es precisamente la impredecibilidad de un sistema complejo como el entorno lo que requiere una dimensión bioética para guiar los valores que subyacen a nuestra toma de decisiones respecto a la vida misma.

Palabras clave: sistémico, subsistema, correlación sistémica, complejidad, entorno, emergencia, bioética.

Introduction

The topics to which bioethics has devoted most attention have quickly become those of *medical ethics*. with particular attention to the doctor-patient relationship, the dignity of the patient and his various rights, whose protection appears problematic in the case of prenatal or paediatric patients. Animal rights also appeared among the topics of bioethics at the beginning and seemed marginal at first. but later became very popular (Agazzi 2020). On the other hand, some fundamental works have emphasised the concept of *bios*, of life, which broadened the scope of bioethics to its maximum: "It will be precisely bioethics, the interdisciplinary field destined to provide ethical responses to such changes in bios, in the realm of life and its values, and to find the reasons and concrete barriers to face its dangers" (González Valenzuela, 2015, p. 24).

Today, this broad perspective has regained vigour, and in particular, attention is being paid to the issue of the *environment* and ecological considerations. This is a shift of perspective that must be properly understood because it entails conceptual novelties that require appropriate clarification. In our view, system theory offers (not as of today, but with particular usefulness today) several conceptual tools that must be widely appreciated. It is to this task that this paper is devoted: to argue that a systemic approach provides a robust and essential conceptual framework for integrating bioethical considerations into environmental and ecological decision-making. It tries to achieve the highest level of clarity and simplicity and will therefore minimise any scholarly or over-specialised references, by the style of high popularisation that is required in the presentation of topics of a scientific nature.

What Are Systems?

Perhaps the simplest way to introduce us to understand what systems are may be to compare set theory and system theory. We feel that we can do so because, in general, educated people have had the opportunity to come into contact with the concept of set and the rudiments of set theory.

Sets

What is a set? We could say that it is simply a *collection*, i.e., a "being together" of *elements*, an accumulation of elements whose only characteristic is their *membership to the set*, without these elements having any specific nature whatsoever and, what is more, they are not considered to be connected to each other by relations. Thus, there are two fundamental concepts in set theory: *the concept of element and, the concept of set*. The only fundamental relationship that is considered is this: an element is a member of its set. By using only these two fundamental concepts, linked together by the simple relation of set membership, mathematicians have constructed an enormous, marvellous edifice, because we can begin by defining the notion of *subset*, thanks to which we can have sets that are *part* of other sets (since by definition all the elements of the first are also members of the second). Continuing in this game of successive definitions, we can then introduce the notion of the cardinality of a set and, based on this, define the different types of *cardinal numbers*, which include natural numbers, integers, rational numbers, real numbers, and gradually an increasing hierarchy of *transfinite cardinals*.

As already mentioned, set theory is a huge edifice, based on these elementary concepts alone. We can therefore say that all the elements of a set are equal, not because they all have the same nature or quality, but because they have no nature, because they are considered independent of any properties. If we want to understand how we arrive at this notion, we can easily get there by following the idea of taking something and beginning to divide it into parts. Suppose we have, for instance, a flat surface bounded by a certain perimeter: first, we divide it in two, then we divide each of the two parts again in two and continue indefinitely. However, the idea arises that this division cannot continue indefinitely and therefore that we must arrive, at some point, at something that is not divisible any further. This something since Greek antiquity has been called *atom* (in Greek "*atom*" means "indivisible"). In this process, it is implied that atoms retain the same nature as the whole that we have begun to subdivide, and we do not even know what nature it is: we say—in a very general sense—that they all have the same nature but—in a certain other sense—we rightly ignore it. It also follows from this reasoning that, when we wanted to reconstruct the whole by putting the parts together, starting with the atoms and working our way up the scale of divisions, we would not eventually find properties of the whole that are different from the properties of the parts. Thus, in the case of sets, we are authorised to say that *the whole is not different from the sum of its parts, from the point of view of the properties it possesses*.

Systems

System theory starts from a completely different point of view, i.e., it considers from the outset an entity (i.e., the system) that is internally structured and characterised *as a whole* by its *particular properties* (for this reason this way of conceiving an entity is called *holistic* according to the Greek etymology of this term). At the same time, this entity is considered as *constituted by parts that* (*here is the decisive point*) *are themselves complex units* that in turn, are constituted by parts *endowed with specific properties*.

What is the difference from the set perspective? It is this: *the properties of the whole are different from the properties of the single parts* from which it is made up, and this is because these parts are in a *reciprocal relationship* with each other, and it is precisely owing to the *relationships* between these parts that the overall properties of the whole are different from those of the parts. Thus, there is only one fundamental notion in system theory, namely *the pure and simple notion of a system*. We therefore say that a system is itself made up of systems that we call its *subsystems*, and each of these subsystems is made up of its subsystems, in the manner we have described. Unlike the subsets of Set theory, subsystems are related to each other beyond their mere membership to a system and are instead interconnected through interactions that contribute to the system's holistic properties. This reciprocal relationship is what differentiates system theory fundamentally from the abstract, relationless collections of elements in set theory.

Our presentation has been intentionally general, and in a way abstract, so that some exemplification is desirable, especially in order to show that systems are far from being only material. If we consider a concrete national society, a state, it is a big system in which certain subsystems are essentially material (such as the transportation system, the energetic system, and the industrial system), while others are less material and eminently functional (like the public administration, the trade unions, the professional orders), others institutional (like the subdivisions of the basic institutions and authorities of the different public powers). We leave aside large systems of a general scope, like the educational system or the health system that are structured very differently according to the countries, and pass to immaterial systems, such as the legal system consisting in the great display of laws regarding a multiplicity of sectors of social life, and along this path we find immaterial but very influential systems such as the ethical system, the philosophical system, the broad display of articulations of the artistic system and the system of humanities. The list of examples could be easily expanded, but what we have briefly presented is sufficient to show how the systemic approach can be profitably adopted for the analysis and solution of important issues of any society, with the obvious possibility of considering a higher-level system of an international nature in which a national society is normally embedded.

In our presentation, we have so far spoken of systems without any historical reference. The reason is that system theory attained the status of an exact discipline only in the 20th century essentially thanks to the work of a single scientist, the Austrian biologist Ludwig von Bertalanffy, who also advocated the application of the systemic perspective to several domains, starting with biology and extending the systemic view to psychology, technology, and a variety of practical contexts studied in the social sciences. This finally culminated (after a maturation of nearly thirty years) in his 1968 treatise on *General System Theory* (Von Bertalanffy, 1968). This result did not deny the legitimacy of using the term "system" in ordinary language (where we find for instance "the Platonic system" or "the metric decimal system" that do not have a perceivable common meaning). This is also a reason for using "systematic" for the ordinary language and "systemic" for reference to general system theory.

The Notion of Environment

What does "environment" mean? This word too has quite different meanings. The most basic one is *spatial*: environment is the *place* where one is present: for example, for an audience that is listening to a lecture, the environment is the room where these people are gathering. This is the first meaning of the concept of environment that we find in ordinary language, but already in this language we find many other ways of speaking of the environment: for instance, we use expressions such as "social environment", "cultural environment", "political environment".

This meaning is still quite partial. In fact, we speak of an environment as much regarding the outside as to the inside. So far, we have spoken of an environment as a kind of condition *within which* we stay, within which we are located. But we can also say, for example, that the environment in which a certain family was living was not friendly, or that the environment which surrounded a certain community was full of prejudices when we want to refer to a particular subgroup in a certain society. This means that in the notion of environment, there is a more complicated and deeper connotation than the simple idea of a spatial location and, in particular, it alludes to an *internal* situation, in the sense of being *constitutive* of a given reality.

This idea of an *internal environment* appeared very exactly in a particular science, namely physiology. In fact, the famous French physiologist Claude Bernard introduced the concept of the i*nternal environment* in 1865, that is a century before the birth of system theory. By this expression, Bernard intended to denote the liquid environment that surrounds the cells in the body of animals (consisting of the interstitial fluid of the

 https://doi.org/10.21500/22563202.6972

tissues, lymph, blood plasma and coelomic fluids), which protects the cells and ensures the exchange of substances in the organism. Therefore, it is an essential factor for life and its chemical and physical characteristics must remain stable for it to perform its functions. Bernard used the term *homeostasis* to denote this property.

System theory would develop this notion of environment as a fundamental concept. Niklas Luhmann (1995), a key figure in the development of sociological systems theory, expanded this concept by establishing the structural and functional relationship between systems and their environment: "Systems are oriented by their environment not just occasionally and adaptively, but structurally, and they cannot exist without an environment" (p. 18). Therefore, when we talk about the environment, we are actually talking about *a set of general conditions of a given system*. The system we are now talking about is, for example, the human organism, or in general an animal organism (and not even necessarily an animal: it could also be a plant). The organism is a well-identified unit endowed with its characteristics, its own specific properties and is made up of parts that are interconnected and that work together with this unit thanks to a transmission, in this case, of substances but also of energy and information. All this indicates that the notion of environment finds a significant place and clarification in system theory.

Complexity and Emergence

We want now to examine some important features related to the nature of complexity. Indeed, we have noted that a system is a complex structure, to such an extent that it could be argued that the concept of complexity applies precisely to systems. In fact, complexity consists not so much—as it would seem at first sight—in the fact of being "complicated" or "difficult", but rather in the presence of a *structure* in which there are several relations such as to constitute an *organised* whole. This is why complexity converges with the notion of a system, insofar as it refers to an entity or process that is characterised *as a whole* and, on the other hand, is a whole within which some relations characterise *the nature* of the whole, a nature that in a certain sense is not strictly dependent of the nature of its single parts.

We have already emphasised a fundamental characteristic of complex systems, which we could summarise in the fact that *the whole is more than the sum of its parts*. What does "more" mean? It means that the whole (which is characterised by its very precise and qualifying properties) enjoys properties that are *new* compared to those of each of its constituent parts, and at the same time *result* from them.

What does "result" mean? It means that the constituent parts also have characteristic properties but that only through interactions do give rise to characteristics of the whole that are new in this sense. This phenomenon is sometimes referred to as *emergence*. Emergence means something different from *result*: in fact, the result is typically, for example, what is obtained by adding up addends, and the nature of the result is of the same kind as the nature of the addends (e.g., adding up several natural numbers still yields a natural number). On the other hand, there are processes in which the result shows *new properties* that are not independent of the properties of the parts and their relations, and yet they cannot be obtained simply by addition (we would better say that they are not *predictable*). This unpredictability, central to the field of *complexity science* which evolved from system theory in the 1970s and 80s, is illustrated in the work of Edgar Morin, a distinguished philosopher and sociologist whose interdisciplinary approach emphasises that emergent properties arise from interactions within a system, leading to new, unpredictable characteristics. As Morin (2008) explains, "Everything that has to do with the emergence of the new is non-trivial and cannot be predicted" (p. 56).

Since our intention is that of avoiding difficulties in understanding our presentation, we simply suggest a valuable recent book for readers interested in a deeper study of complexity (Thurner *et al.*, 2018).

Unpredictability

Emergence and novelty immediately invite several considerations. The first derives from the fact that complex systems, when they are dynamic systems (i.e., capable of evolving, or changing over time) are not exactly predictable in their course. This does not surprise at the level of common sense, because we are accustomed in life to seeing the occurrence of a large number of unpredictable phenomena. However, the admission of this fact represents a major innovation compared to what was the ideal of traditional science, according to which the unpredictable events of ordinary life are such only because they are deterministically produced by many causes too great to be mastered by us but are in themselves rigorously determined. Traditional science—paradigmatically represented by mechanics and so-called "classical" physics—had one fundamental characteristic, that of being deterministic and thus allowing for *predictions* with a very high order of approximation. Concisely, if we are in the presence of a system of bodies subjected to the action of traditional physical forces, it is known that the application of these forces to each of these elements predetermines the course of that element in time. That is to say, once certain initial conditions have been established within a fixed order of accuracy, the result, i.e., the final state of that particular element (e.g., of that particular particle) can be predicted with an order of approximation that is entirely comparable to the accuracy with which the initial conditions could have been determined. Such a process is usually called linear (named after the type of equations used to calculate it).

However, as early as the end of the 19th century it had already begun to be realised that a system in which there were even a small number of elements (the problem already arises in the case of three bodies subjected to the sheer force of gravitation), the course of the system's state could not be predicted with exactitude. This is because the interrelations between these bodies are sufficient to no longer allow this type of prediction. This phenomenon is mathematically called *non-linearity*. The problems resulting from nonlinearity led to a focus on systems, notably in the field of cybernetics, pioneered by Norbert Wiener in the 1940s, who in his seminal work *Cybernetics: Or Control and Communication in the Animal and the Machine* (1948) notes that "analysis in the treatment of linear phenomena does not persist when we come to consider non-linear phenomena" (Wiener, 1985, p. viii). This means that it is not possible to make exact predictions about complex systems (of course this does not exclude that within relatively short time intervals it is possible to make predictions of sufficient reliability, but this never allows the exact prediction of single parameters). Building on these ideas, Ludwig von Bertalanffy's General System Theory further critiques the limitations of linear, deterministic models. For Bertalanffy (1968), "the scheme of isolable units acting in one-way causality has proved to be insufficient" (p. 45), and therefore "in the last resort, we must think in terms of systems of elements in mutual interaction" (p. 45) which are no longer deterministic.

This unpredictability is very important in terms of our ability to predict the future, to govern it, and to make plans. In fact, we can no longer cultivate the illusion that, should we achieve exact measurement of a whole series of variables or parameters, it would be sufficient to *calculate well* (and today the formidable electronic computers we have at our disposal allow us to calculate well) to be able to make precise plans: this is a type of reasoning that can no longer be set up today. The availability of very powerful computers, however, is not the essential point. What is needed is a specific analysis of the systems in

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which the different *levels* of their correlations are explicitly identified and characterised, such that this architecture can be formulated in suitable mathematical operations. A good book that offered a still valuable treatment of this issue was published almost half a century ago (Mesarovic *et al*., 1970).

The Fatalist View

Faced with this complexity, many people adopt an attitude that I call *fatalist*, i.e., they say that, in any case, we cannot predict or pre-direct, especially the development of our technology, but we can *hope* that things will spontaneously end up with an acceptable situation. This is an optimistic fatalist view: we cannot make any real far-reaching plans. however, we do not worry too much because we think that the damage that is done by a certain kind of disorderly development of technology will be repaired and compensated for because other technologies will arise that will remedy the disasters that have been made. Thus, we will go on more or less like we have gone on for centuries. Other fatalists, on the contrary, are of a completely different opinion and see in this unpredictable production of novelties that overlap one upon the other without any order the scenario of a final phase of destruction of the living conditions of humanity itself. This is a pessimistic view that is no less widespread.

If we try to understand this fatalist attitude from a systemic point of view, we can see it as the conviction that it is impossible for a system to control its environment, and this is all the more so as the environment becomes larger and more complex. This belief is not entirely unreasonable: in general, when a system is functioning badly, it is possible to straighten it out and bring it back to good working order by intervening on it *from outside*, i.e., from its *environment*. This strategy, however, is impossible to adopt when the system is so large that it has practically no usable environment outside itself (Velázquez, 2014).

Translated into *concrete terms*, this reasoning means that, to keep under control the gigantic technological system that is growing dizzily and chaotically on itself, one would have to intervene "from outside" of it, but this option is not viable given the pervasiveness of the technological system itself. If we then move on to consider what, in a certain sense, can be considered as our insurmountable global environment, that is, planet Earth with all its dimensions, we can indeed recognise that it too is embedded in the great cosmic environment, but man certainly cannot place himself in this latter environment to govern the Earth from it.

This is the conceptual situation in which we find ourselves—continuing in the idealisation that leads us to "ascend" from a given system to its environment that is also a system, to a further environment-system and so on. At the limit, we end up in the *global system* that should be possible to govern only *from within*. But how can this happen? This is the big problem: how can a system be governed from within when—given its complexity—it is not possible to intervene using deterministic laws that force it to realise a certain *design*, in particular a certain *correction* that corresponds to an *idea* of a better global system?

The solution is possible because we do not need to operate on the whole internal environment of the global system, but we usually can intervene just on one or very few subsystems to attain the desired modification of the general system because, owing to the *correlations* that link together all the subsystems, the desired effect will occur. A familiar example will clarify this talk. Let us imagine that the global system is a human organism that is seriously ill and might even die. In order to cure it, a good diagnosis indicates that the cause of this illness is the bad functioning of a specific organ (for example, the lungs). Therefore, by applying the pertinent therapy to the lungs we can get the healing of the illness. Of course, the side effects of the medications adopted might be undesirable, and we should take measures to keep them under control. This common and reasonable practice is fully understandable from the systemic point of view, within which the fundamental notion of *correlation* contains different kinds of causality.

Linear Causality and Circular Causality

Linear causality corresponds to the most common concept of cause in ordinary language, according to which the cause of an event or object is what *produced* it. In other words, it is what was traditionally called an *efficient cause*, and the occurrence of the event was its necessary consequence. This is a very idealised discourse, i.e., applicable to single events, which becomes inapplicable when the concrete situation is complicated and forces one to treat the problem in terms of probability, as we shall see later.

A different and interesting case is that in which a system *acts upon itself*, in the sense that each of its actions modifies its environment to some extent, and this causes the system to operate under a different condition and thus to change its operations. This is a *cyclical process*, which justifies the qualification of *circular causality*, which, of course, to be correctly assessed and understood requires important complements, the first among which is the introduction of the concept of *information*, but we will deal with this later.

On closer scrutiny, one realises that the underlying motive of the preceding reasoning is the elimination of *chance* in natural phenomena. As Spinoza said, chance, or the miraculous intervention of supernatural beings, is the "refuge of ignorance" of the deterministic causes of facts.

A belief in the objective *existence of chance* is implicit in the reviews of "latecomer numbers" in the lotto game whereby it is said, for example, that the number seven is twenty weeks late on the wheel of Naples and therefore it ought to appear soon. Evidently, those who reason in this way ignore that *chance has no memory* and that the occurrence of any number has the same probability as it would have if it were the first draw and would be equal to the probability of any other number.

From Prediction to Anticipation and Committed Hope

Our interest in system theory is not purely methodological and epistemological, hence essentially speculative; instead, we can expect that the systemic perspective, considered in all its variety of applications, can also help us make important decisions at certain decisive moments of personal existence. Indeed, as Rolando García (2006) notes, in complexity theory, "the main motivation for the studies is to be able to act on the system" (p. 97). Therefore, to conclude our study of systems, we wish to deal with this existential aspect, imagining the case of a person who, at a given time and under a set of concrete conditions that characterise him or her, must operate a fundamental option.

A rational strategy for mastering the complex web of issues that are concretely present at a given time could be the following: (a) consider that concrete situation as the *global system* and (b) present a very clear *idea* of what this global system *ought to be*; (c) be sure that it is possible to "adjust" *now* the functioning of the *subsystems* concretely accessible at the present moment. It is possible to intervene in these subsystems because each of them is not the global system that is—by hypothesis—not manageable, whereas the action on certain subsystems should favour the *realisation of the idea*.

Let us focus our attention on the expression that *ought to be* that according to a first meaning denotes the *expected result* of a certain process, especially in the domain of tech-

 https://doi.org/10.21500/22563202.6972

nology. System theory has shown, as we have seen, that *unpredictability* affects this process so a display of compensatory measures must be studied to get a satisfactory solution. It is clear that this is not the meaning we associate to this expression according to which "ought to be" is a *value judgement*, concerning an *idea* that contains an *expectation*. An *anticipation* of the goal of a course of action is still to be elaborated.

We can now ask the question: system theory has shown that, by using the strategies useful for mastering material technological processes, we will find no help for our problem; however, are there in system theory other tools that might serve our purpose? The answer is affirmative: In the section devoted to systems we have mentioned several subsystems of a *not material kind*, among which, in particular, the *ethical system* occupies a prominent position since it is in correlation with *all the subsystem*s of a global social system and we do not need additional comments to show that this fact is a very convincing *point of reference* for the foundation of concepts such as those of duty, responsibility, human dignity and many other.

This confirms that the issue here is no longer that of having powerful techniques, but rather that of having in mind that *idea of what the global system ought to be* which is close to a *model of the world*, a model of a social system in which it makes sense to spend life, to continue to live, we and future generations.

The Bioethical Dimension

The issue just approached is essentially a *deeply ethical question*: it is a question of choosing *the values* according to which we think it makes sense to live as individuals, as communities, and as subsystems of a global system on which, willingly or unwillingly, we depend, since humanity itself, taken as a whole, could not survive if there were no nature to sustain it. Actually, the expression "to make sense" is still vague and must be completed by saying "a *positive* sense", in which the adjective makes implicit reference to *values.* In this context, bioethics enhances our capacity to make informed and ethically sound decisions in the face of environmental and technological complexities that concern life itself.

This remark underlines the limitations of most approaches to this problem, which limit themselves to sounding the alarm about the depletion of material resources or energy, or about the disastrous effects of climate change: all serious matters, but which at best can arouse feelings of apprehension, without making us overcome the fatalistic attitude mentioned above, and do not in themselves push us to action. In a nutshell: accepting, for example, a certain decrease in luxury and well-being in our living conditions, in order to contribute to saving non-renewable energies, requires a *moral decision*, which does not get lost in wondering who should be the first to start making these renunciations (the common inclination is to believe that others should start), nor does it get discouraged by the too little effect that our renunciation would have in any case. These. behaviours, taken one by one, have a modest quantitative weight but if they become general and part of the custom (i.e., if they directly influence the type of intrasystemic relations) produce significant effects on a large scale. To achieve this, however, it is necessary to recover an ethical virtue, namely *thrift*, which has been outlawed in our "consumer societies". It is clear that the recovery of this and similar virtues requires fundamental *existential options*, which can only be made if there are very strong *ideal drives* behind them (Agazzi, 2019).

The need for such drives is imposed precisely by the unpredictability associated with complexity. I will make use of an analogy. What do we do when we want to reach a destination by crossing an unknown territory about which we cannot make predictions because we do not have a map? Certainly, if we had one, we could follow the routes drawn on it and predict with certainty how we would arrive at our destination. However, it is by no means the case that we are condemned to inertia if we lack a map; provided we have a compass thanks to which we know in which *direction* we should go. The compass does not mark out paths but *orients* us by providing cardinal points, i.e., *points of reference*. We know in which direction we want to orient ourselves and according to that we gradually carve out our path: if we encounter an obstacle, we try to overcome it or go around it, if a certain track turns out to be closed, we look for another one and, in this way, we gradually manage to get closer to the goal we wanted.

The dependence on ethics of the options in our actions is not restricted to the kind of ethics we have outlined, an ethics based on the notion of *duty* which we could call *deontological.* Other ethical doctrines could propose other justifications for the same type of action, and utilitarianism is a significant example as we will briefly discuss regarding a concrete example.

Not every *justification* of respect for the *environment* has the moral background that we have mentioned. Rather often this respect appears as a way of avoiding the self-destruction of those people who are working to the ruin of the human species, also ignoring the rights of future generations. Within a rigidly utilitarian perspective, one would be led to ask: “What have future generations done for me so that I have to worry about them?”. It is difficult to answer this question if there is no concept of *duty and responsibility* behind it, and these are exquisitely ethical concepts that are inevitable when faced with choices in which we must sacrifice something today for a tomorrow that we will not even see.

Let us see, then, how many things are indispensable for seriously realising the project of respect for the environment: it requires a profound change within that selfish and strictly individualistic mentality that has dominated much of Western culture and which—within certain limits—has also ensured, as they say, it is “flourishing.” It is often said, in fact: after all, the individual, driven by his desire to enrich himself, driven by the spring of economic profit, gets busy, changes things, produces, sells, and in so doing contributes to advancing the economy, advancing technology, and in this way also helping the community to prosper. There is some truth in this assertion, but its one-sidedness has long been highlighted considering the socially negative consequences that this individualistic background has produced, and to which to some extent corrective measures have been sought by drawing on the principles of solidarity and social justice. Today, we are faced with even more serious drawbacks that struggle to be perceived in all their gravity precisely because they require overcoming this individualistic and selfish mentality for reasons that are more difficult to grasp as they do not result from “calculations” based on predictions.

The future state of a better world can be the subject of an *anticipation* that traces the ideal frameworks of reference and is translated not so much into an expectation as into *hope*, that is, into a tension that unites the uncertainty of the result with the factual commitment to achieve it and that supposes the capacity to “go beyond” the concrete horizon in which we find ourselves. It is for this reason, among others, that it is from religions (which offer visions of the world that place their meaning beyond what falls before our eyes) that we can draw the strength of conviction to face this in a certain sense *eschatological* task that is imposing itself, in a secularised form, on the contemporary world.

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