

Natural Hazards and Disaster Risk Reduction Policies

Loredana Antronico - Fausto Marincioni
Editors





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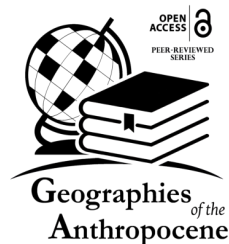
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Fausto Marincioni
Editors

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Cover: A woman shovels mud from her driveway in the aftermath of the October 2010 debris flow that affected the Province of Vibo Valentia (Calabria, southern Italy).

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5. Humankind and Risk: a difficult history

Piero Farabollini¹, Francesca Romana Luger², Nicola Luger³

Abstract

Talking about catastrophes in the Anthropocene Era means tackling a complex and often misunderstood topic, difficult to understand for the general public. On the other hand, a greater and more widespread attention should be given to this theme, especially in relation to natural hazards and risk. The influence of the catastrophe theory does not seem to have sufficiently permeated the interpretive field of the natural sciences, more focused on the traditional systematic approach, antithetical to the systemic and holistic one that characterizes the methodological assumptions of contemporary research on complex systems. This chapter aims to analyze the salient characteristics of the relationship between society and disasters, highlighting those elements that condition social perception of risk as well as risk management. It is important, in our opinion, to focus on the clarity of communication and, above all, on the ability in arousing public interest, to make society aware of the urgent need to change the individual/community/social behavior in a sustainable way, with the aim to prevent natural risks and mitigating their effects.

Keywords: Catastrophe, Prevention, Risk, Society, Communication.

1. Introduction

An infinitesimal variation of some parameters in a status of precarious equilibrium may lead to a huge, sudden change: the catastrophe. The word “catastrophe”, in its etymology, has no negative implications.

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What is commonly ascribed to the catastrophic event is the exceptionality, both in collective imagination and in science. The catastrophe is exceptional because it is beyond the human willingness to completely forecast/manage things, it exceeds our control. It is exceptional because the fury of the elements overwhelms anthropocentrism, undermining its solid foundation and dispersing it in nature's entropic chaos. In theoretical sciences, the concept itself of catastrophe opened a debate -a sort of revolution- touching and shaking complex problems intrinsic to the methodological "set-up" of scientific research itself. For mankind, the meaning of a catastrophe is more linked to the consequences it brings about, rather than to the ways it takes place, its causes, its "essence".

Our reflections start from some considerations on the theory of catastrophes, concerning the scientific revolution triggered by the work of René Thom (Thom, 1972, 1980), the creator of theoretical-methodological innovations whose scope has touched many different disciplines.

The scientific and technical problems related to the prediction, prevention, and management of catastrophic events will be addressed afterwards, with particular attention to the relationship between humankind and catastrophes: a dramatic aspect of the relationship between humanity and nature. In fact, the concept of risk implies the responsibility of individual/community/society as exposed to hazard. Altered perception of risk, which has its roots in anthropocentrism, is a problem that fully manifests itself when dealing with prevention. Scientific communication is therefore a key element in dealing with risk prevention.

By developing these themes, also through examples of pilot cases, this paper aims at focusing some of the most important components of the complex processes that condition social behaviors in case of natural disasters; an analysis hopefully useful in addressing natural disasters' effects.

2. Catastrophe theory

*«There was an earthquake! A terrible flood! Locusts!»
(John Belushi, in "The Blues Brothers". John Landis 1980).*

From Egypt's plagues prophesied by Moses, to the celebrated Jake Blues' excuses. Across science, history, myth, and cinema, the human reaction to catastrophes is aimed at inserting them into a reference system which can be managed. After all, it is nothing but the impossible attempt to make sense out of a disaster.

In order not to succumb to the threat of Mother Nature, when she becomes unkind, representation processes drive us to move away from reality, to observe it from the outside, as far as possible: with this trick, it seems we can know what is happening, how to manage it. In this way, the tragic consequences of events that could happen are exorcized.

Fear is just evoked, almost like a vector for the narration towards a final catharsis. The anguish decreases: the real threat is transposed on a border surface, between the real and the indefinite. However, first of all, human responsibilities are removed. Represented, but delegated to an alien figure, far from our everyday life, so keen to drag the collective imagination into an emotional current, evoking reactions as much involving as distracting, uprooted from reality.

The catastrophe goes away, losing its connotations. It is a phenomenon and reveals itself as such. Catastrophes, in a scientific and cultural sense, can still be considered - to use an active naturalistic image - as fluid, incandescent matter. Such a problem is the core of a discussion that involves several fields of study, at several levels. The term "Catastrophe" means in itself a change of some variables, gradual or continuous, such as to produce a phenomenon of great importance.

The study of these phenomena, discontinuous and divergent, is based on the study of mathematical models, that make possible a rigorous description of the nonlinear phenomena, in different fields (biology, geology, meteorology, as well as linguistics, psychology, economics). The catastrophe paradigm and the related research program (understood as a constellation of concepts, beliefs, mathematical techniques, research styles) is mainly attributed to René Thom, whose thinking (and the conspicuous amount of work) has been divulged and commented in Italy by Tito Tonietti (1983) and Umberto Curi (1988).

The «catastrophe theory» was born as a mathematical thesis of critical points; subsequently, as a theory of the description of the forms of dynamic changes (Thom, 1972, 1980). Umberto Curi (1988) defines the notion of catastrophe as a sudden change of biological or physical status that can be described linearly; in Thom's theory, in fact, discontinuity is not considered an anomaly: rather, it is made comprehensible by modeling. According to Thom (1972), such theory is not a scientific one *sensu stricto*, because it is not compatible with rigorous empirical control; rather, it tends to construct a model that is as simple and functional as possible. Thom himself defines catastrophes as "a way of life", reaffirming his own, subjective, conception of the world. Disasters are their story: telling it is essential to understand its evolution.

Catastrophes make their appearance in the scientific debate in 1972 when the text "*Stabilité structurelle et Morphogénèse. Essai d'une théorie générale des modèles*" by René Thom was published. A complex treatise, in which epistemology and mathematics are integrated. The difficulty of the text originates from the "heretical" perspective from which the author upsets the scientific disciplinary divisions and the criteria of relevance adopted by the orthodox sciences. Thom considers all the phenomena that can be observed in nature as forms that arise, interfere, conflict, die. The transformation is continuous; nevertheless, in a continuous becoming, it is necessary to identify stability of the form, concerning the perturbations, to be able to recognize the equality between two forms or to describe the transition from one form to another (Thom, 1972, 1980).

Structural stability is the basis of a sort of obligatory path, the chreod, a term coined by the biologist C. H. Waddington to explain how each evolutionary development is structured or constrained by necessary paths (Waddington, 1968), which lead to the same final result, whatever the small interfering disturbances. Scientific knowledge itself is based on structural stability, based on the repeatability of those experiments that verify those laws expressed in formulae. Structural stability does not mean laws' independence from the spatiotemporal conditions of verification (invariance of scientific theories in an s/t system). The crucial point is that the shapes have their dynamics: the breaking of the waves, the clouds that thicken or fray; "Next to the domains of stability there are cases in which small changes cause great changes": this is a catastrophe.

Thom's approach is essentially morphological: by studying the dynamics of morphogenesis, he shows how this achieves the -static- classification of the forms. To limit to a finite number of types the infinite variety of natural forms and their continuous variations is possible only by establishing "thresholds": the structural stability of forms and processes, the continuity of descriptive modalities, the four-dimensional space-time constraint size.

The point - still open - of the research program, is the typification of disasters through topological properties: places with more information, essential forms, "Gestalt". At the same time, for Thom, reality and life are more precious than any formal representation of them, and he cites Paul Valéry: "Life does not have time to wait for rigor" (Valéry, 1933; Thom, 1972). These words take us to the next step: how to deal with nature.

3. Prediction and prevention

«Progress is a very delicate thing and an ambiguous concept. It may be that a little further on, along the way, either a bridge collapsed or an abyss has been dug»

(J. Huizinga, *The crisis of civilization*. 1938).

The significant problem of scientists (and of the whole human condition) is the prediction of catastrophes. Knowing what is going to happen, with the highest possible precision, is the fundamental element to provide for a useful alert of the population and to implement the necessary evacuation plans, that can safeguard people and things. Salvation is based on the timeliness and appropriateness of the alarm. In any event, it seems preferable to opt for an excess of zeal, rather than incur the consequences of approximation and negligence. However, starting an evacuation plan is a complicated operation, delicate to realize: neither the authorities nor the population proves to be adequately prepared for such events. Unfortunately, the consequences of this situation are experienced in too many occasions.

Monitoring of environmental hazards seems to be an act of study and research, more useful for knowledge than for prevention. It seems that society considers hazard like a science-fiction eventuality or something that can not relate to the present, “here and now”.

Beyond the technical and scientific aspects of the problem, there seems to be a profound difficulty conditioning the problematic human approach to the catastrophe. In harmony with the ever-present anthropocentrism, humanity stands outside, above nature, assuming an attitude of security and mastery or superficiality, which fully manifests itself when faced with problems related to prevention and management of disastrous events.

An ancestral misunderstanding, able to significantly influence the approach to the problem: forecasting and management vs. intervention (especially the latter) are oriented not so much on the event as a whole, but on the produced effects, with particular reference to anthropic infrastructures. Beyond the significant diversifications in the practical setting of the problem, there is a widespread and generalized tendency to separate causes and effects, in dichotomous ways. It is quite logical to understand how such a “trick” facilitates the removal of the responsibility component, direct or not, of the humankind itself in what has happened. Moreover, “it happened, by now”: the urgency is in repairing the damages and (at least in declarations of intents) in working to prevent other damages that can occur in further similar circumstances. Recovery, restoration, reconstruction: man likes to build, and we can’t forget the economic and corporatist interests that affect most of the

activities related to disaster management. However, the most balanced approach to the problem of catastrophes is that based on prevention, which does not separate the components, does not neglect responsibilities, which, far from devoting exclusively to forecasting plans, inserts fundamental elements and processes as consciousness, knowledge, divulgation, education (De Pascale *et al.*, 2017; Antronico *et al.*, 2017).

The scientist studies all -almost all- the possible aspects of catastrophes, through mathematical models that simulate those mechanisms and processes that determine the occurrence of a catastrophic event, its evolution, the consequent damage. So, reality often adds insult to injury: we can know what will happen, but not where, how, when. Alternatively, only partially, due to the complexity of environmental processes, and to technology limits, or, somewhere, to the differentiated availability of the same. The case of the December 26, 2004, the so-called Christmas tsunami, is tragically eloquent: the tsunami originated after the 9.1 magnitude Sumatra-Andaman Earthquake occurred off the northwest coast of Sumatra, Indonesia, causing catastrophic levels of destruction to countries around the Indian Ocean basin. The warning system managed by the US Federal Meteorological Agency, following the recording of the earthquake, issued a bulletin that excluded the risk of tsunami for the countries included in the “Tsunami warning system” in the Pacific area. Only an hour later, with fatal delay, the event was foreshadowed for the areas that were about to be affected.

Unfortunately, fourteen years later (22 Dec. 2018), a deadly tsunami, triggered by the eruption of Anak Krakatau vulcan, struck Java’s western coast. No early warning systems, despite the predictability of the event, prompted by an undersea landslide that followed the eruption.

4. Catastrophes and Society

«Your home is your biggest body»
(Kahlil Gibran, The Prophet. 1923).

The consequences of natural disasters can be so dramatic to upset, even in a permanent way, the existence of individuals, communities, society hit by the event. The house, in almost all cultures, takes on an existential meaning: a set of dwellings identifies a settlement. A disaster, along with the houses, sweeps away the social and emotional reference points of individuals. Natural disasters occur with impressive frequency according to statistics; as told before, the extent of damage and loss is a function of the territory affected: geographic location, structures, and infrastructures, population density.

The so-called “survivor syndrome”, studied and defined in war veterans, also affects those who have escaped a catastrophe. Life is safe, but the consequences of the psycho-physical suffered traumas, induce emotional reactions in the subject (anger, guilt, anguish), cognitive (amnesia, disorientation), psycho-somatic (sleep disorders, exhaustion, tachycardia). Difficulties condition social relationships: the individual affected by the syndrome is unable to make sense of the experience he is living, he tends to isolate himself, to not trust others, to feel vulnerable, he can become aggressive. These are the characteristics of the phase of disillusionment, which follows the first passage through two other so-called heroic phases (in which an active reaction prevails) and “honeymoon” (in which the subject feels himself to be helped). Over time, the catastrophic event ceases its mediatic power and, after having saturated the public's attention, it no longer makes an audience. The affected populations are left alone, in taking care of reconstruction: of the self, of their own home: here occur the most painful phases of the syndrome (Lifton, 1982).

Some individual characteristics or social situations can favor, aggravate or make chronic the so-called post-traumatic stress disorders (PTSD). The subjects who have already suffered other traumas, the bearers of physical or psychological discomfort, the elderly, are more exposed and vulnerable to the syndrome. However, poverty, unemployment, ignorance are undoubtedly powerful catalysts of an internal and external destructive reaction, both individual and collective. The sense of insecurity can permanently accompany the existence of catastrophe's victims, especially when isolation and ineffective provisional measures impede the re-establishment of a social fabric. Even rescuers, if exposed for a long time to the conditions that characterize a hit site, can suffer some similar symptoms. However, timely information on the perspectives (and difficulties) of reconstruction can avoid the aggravation of the syndrome. The PTSD fail to affect the majority of the population exposed to a catastrophic event. A not irrelevant minority - from 10 to 30% - shows lasting symptoms.

The psychological reactions to the catastrophe, the “invisible earthquake,” have not so far been the subject of specific studies, in our country, at least until the earthquake that in 1997 hit Umbria and Marche. Only after that event, some organizations for the psychology of the emergency have been present, but neither a culture of trauma nor a culture of the earthquake has yet matured (De Pascale *et al.*, 2016). The need for normality leads the population to remove or what happened and silences the consciousness that it may occur again. Despite the attempted training, which was somewhat general, it was not possible to delete or moderate this trend. The interventions concerning the mental competence carried out on the population, are often borrowed from

studies and experiences carried out outside our country and are not correlated with studies regarding the transculturality of the interventions and lack adequate scientific bibliography regarding the responses made.

The absence of a “culture of risk” is impressively evident in communication. Communicative processes should be a powerful tool in emergency situations (Farabollini *et al.*, 2014). “Communication, in fact, connects people with specific skills and common people, and only the development of a specific culture and proper education to natural disasters make it possible to avoid phenomena like the uncontrolled panic and the social amplification of risk. All effects that weigh the emergency operations down” (Lanza, 2005). Another aspect of the complex problem is in the approach between information operators and involved population. The presence, sometimes the invasion, of journalists, operators, photographers, can cause further psychological trauma in individuals already hit by dramatic experiences. Moreover, postmodern media have the dangerous power to confuse the plans of reality with those of fiction. It is not uncommon to be disconcerted in attending interviews with people involved in tragic events. The bewilderment has two faces: one of the interviewees (why expresses his pain in front of a camera? Is it helpful, is the victim aware of what he is doing?) And one of the journalists (why does he do it? media looting?). “When a journalist interviews a victim of a traumatic event, it could trigger a post-traumatic stress disorder. It is therefore essential that journalists learn about what a PTSD is and its symptoms, increasing not only his professionalism but also his humanitarianism” (Ochberg, 1996).

“Disasters are a real laboratory to experimentally assess the degree of integration, the compactness and the capacity for recovery of social systems. They are, on the sociological level, the equivalent of the experiments that are carried out in engineering to evaluate the resistance capacity of a machine subjected to extreme physical stress” (Fritz, 1961).

Some studies conducted on populations exposed to the effects of disasters have revealed that “the effectiveness and efficiency of the response to a natural disaster depend more on the readiness and functionality of first aid than on the psychological state or immediate reaction of individuals” (Quarantelli and Dynes, 1977). “Only 11% of the affected populations live in underdeveloped countries but is where 53% of the victims are registered... To avoid disasters or reduce the damage, action must be taken on the social development of populations” (Fraoli, 2005). When events occur in industrialized and rich countries, even if they cause numerous victims and very considerable damages, consequences are not permanent, progressively repaired by the national economies. In developing countries, the loss of life is 3 to 4 times higher than in industrialized countries (McGuire, 2003). A very

delicate problem is how to organize and manage relief efforts to reduce the effects of the disaster: “Today we risk the overlap between the various agencies that intervene in case of a disaster” (Cardinali *et al.*, 2010) Moreover, very often the amount of aid is not determined by the measure of need, but by the measure of loss. “Rescue operations explicitly reproduce the normal models of discrimination of pre-existing political relations. In fact, previous differences in status seem to be reaffirmed with great ease” (Fraiola, 2005).

Moreover, there are political implications: “on the wave of world compassion, states and governments, shaky for their failures, can disengage from the uncomfortable role of the accused...and assume that of the rescuer... that organizes the solidarity interventions after the disaster” (Beck, 1986).

What would happen if events of exceptional, destructive intensity struck “rich” countries? It is easy to foresee that similar disasters would have repercussions on the economies of other countries, due to the deep link to the economy, considering the “global” characteristics of the current economy.

Geological times are very different from the “human” ones. Such a difference does not exclude, however, that certain phenomena have occurred and that the triggering causes are still existing and are ready, sooner or later, to discharge their destructive energy.

5. Italian way of facing risks

“You worship fate, destiny. That is why you despise nature. Because you fear it because you want to be in its possession to blame it for every misfortune. And put your conscience in peace”
(Farinetti, The burning island, 1997).

In our country the approach to the problem of hazard and risk is mainly focused on the effects that calamities produce on the anthropic infrastructures, and given the practical limitation of the prevision skills and tools, the reaction is to exalt the anthromorphism, extending its action into misleading preventive works (of regimentation, protection, etc.) that often, more than averting risks, even enhance the devastating effects of natural events, moreover conditioning its modalities. Prevention, despite its significance, is forced towards the engineering intervention, often reaching results contrary to the aims of the intervention itself. The hydrogeological risk, for example, has been strongly influenced by the anthropic action as well as by the continuous changes in the territory. These factors increase the possibility of occurrence of disastrous phenomena, causing at the same time, an increase in

risks, due to the developing of infrastructures in those areas where such events are possible. Abandonment of mountain land, illegal building, continuous deforestation, use of agricultural techniques not environmentally friendly, the opening of loan slots, the occupation of areas of fluvial relevance, the uncontrolled extraction of fluids from the subsoil, the abusive collection of aggregates from riverbeds, the lack of maintenance of regional settings. All of these actions have certainly aggravated the instability of the Italian territory, furtherly highlighting its fragility.

Italy is a country that, due to its physiographic characteristics and its exposure to hydrogeological, seismic and volcanic risks, represents well the coexistence, sometimes the contraposition of two consciences: the one of responsibility and the one of fatalism; their comparison is more complicated due to the presence of interests, speculations, bad faith. The case of Vesuvius is exemplary: an active volcano, characterized by effusive activity and explosive activity. Although the volcano is currently quiescent, it is expected to erupt in the future. There are emergency plans that provide for the evacuation of more than two million people. What would happen if in ten, twenty, fifty years Vesuvius began to show signs of eruptive activity such as to advise the evacuation? Apart from the fact that it is not sure how much this pre-eruption activity could last - maybe months - move and settle in the rest of Italy two million people would imply an overload for the whole transport system of the Peninsula, with severe damage to the economy of the entire country. The economy would be hit in the whole of Campania region. Needless to talk about the effects of the eruption itself, easily imaginable. The reflection is open, considering that the last eruption of Vesuvius, even if not so dangerous, was in 1944.

The history of the Earth is full of natural phenomena that have influenced the climate, modified the landscapes and the shape of the surface itself. Usually, they are a continuum of events periodically occurring. Earthquakes and volcanic eruptions, and tsunamis are only the surficial manifestations of tectonic plates' movements and the internal dynamics of the planet, as well as floods, hurricanes and tornadoes are just the effects of meteorological dynamics; landslides are the response to those environmental agents that tend to modify the reliefs. It is their interference with the anthropic activities that transforms natural events into catastrophes.

What can be done to soothe, if not avoid, the harmful effects of natural phenomena? As we have seen, a valid approach to possible solutions is based on investment in knowledge and therefore in prevention, using scientific and technological achievements for the diffusion and improvement of monitoring networks, both on Earth and in space, and rigidly applying criteria for environmental protection and adequate construction. Is the current human

society available for this? One cannot but be pessimistic, given the financial resources used for armaments, wars, unnecessary infrastructures. Not to mention the difficulties in applying the Kyoto agreement on carbon dioxide emissions, rich countries trying to buy the shares of the poorest countries to continue to pollute as before. “Washington does not want the cause-effect relationship between climate change and disasters to be made explicit. If it were official, since the link between US consumption and global warming is now established, the US would be considered the main perpetrators of future disasters”. “What is never found in the United States is the attribution of some responsibility to the institutional structures” (Kertzer, 1983). Not even the subsequent conference on climate change (Paris 2015) made progress in the necessary start of the reduction of greenhouse gas emissions, despite the alarm confirmed by the scientific models. The last, recent congress in Katowice (December 2018) reiterates and reinforces the provisions, thus confirming in this way the lack of effectiveness of the decisions, the insufficiency of the agreed regulation. Moreover, social inertia is surprisingly constant, not giving credit to the urgency of the problem, attributing an almost science fiction value to the consequences prefigured by the scientists (moreover the scientific community itself is not always agreeing on the interpretation of events, nor cohesive in the request for adequate interventions). In such a complex context, all that is completely certain is the fact that man's presumed supremacy over nature has never occurred, nor will it be achieved, at least soon. Too large is the strength and energy that the Earth has in itself and that humankind cannot manage.

6. Reflections, proposals, experiences

*«Tis sweet, when, down the mighty main, the winds
Roll up its waste of waters, from the land
To watch another's labouring anguish far,
Not that we joyously delight that man
Should thus be smitten, but because 'tis sweet
To mark what evils we ourselves be spared»;
(Tito Lucrezio Caro, De Rerum Natura)*

Alike two thousand years ago, society still uses an evocative tool to deal with disasters, to evoke and exorcize them: the representation. Representing a dramatic event, telling it, favors the distance between events and people. The potential victims of catastrophes become spectators, observing the

spectacle in a safe position. The mechanism of every strategy of representation is advantageous: anguishes and obsessions are avoided.

Living in Anthropocene, living the postmodernity: a plethora of technological tools and sources offer everyone around the world the possibility of participating in social dynamics, a resulting side effect of which is an extreme superficiality and fragmentation of knowledge (Lugeri and Farabollini, 2015).

The traditional scientific communication has not produced remarkable effects as a tool for prevention until now, in our as well as in others countries: this should make us reflect: there is a gap to be filled, a lack of connection between the world of research and that of information. The different cognitive needs (or the various phases of the same need) suggest new strategies and procedural logic in the interaction between scientists and society. It is necessary to follow a scientific and cultural approach that integrally considers all social and environmental components, including public participation and education. The youngest generation is the focus of a desirable and necessary dynamics for change; they are a starting place for a new active approach to science and its applications, a catalyst for the process of engagement of the “*facies sociale*” of adults, leaders and people responsible for the current state of affairs, yet far too often deprived of future prospects and conditioned by the obsession of the “here and now”.

We strongly believe, following years of experience first in teaching, then in research and finally in scientific communication, that it is necessary to build a bridge between diverse realities and between diverse communicative codes. Appealing to themes that best embrace the collective imagination, is therefore profoundly motivated as it facilitates phenomena of identification and engagement. It responds to the need to arouse curiosity and vision, which lead to the planning and realisation of a polyhedral objective thanks to teamwork.

The following projects, realised in an experimental way in Italy, have been successfully realized thanks to a synergy between the Camerino University and the Geological Survey of Italy-ISPRA. The main topics are:

- The geological characterization of landscape in movies and fictions, based on the use of the filmic communication in order to make the territory comprehensible to the society. In the episodes of the famous TV series “Il Commissario Montalbano” filmed in Sicily, the natural and cultural landscapes, giving a fascinating scenery to the films, represent a meaning in the representation of history (Lugeri *et al.*, 2015).

- The “GeoloGiro” and the “GiROSAuro” (a cartoon created for the youngest audiences) for the popularization of the scientific knowledge, explaining the geological setting of the landscapes crossed by the cycling race

“Giro d’Italia”. The morphology of the territory becomes a key component in the race context: if explained by the geologist, can offer to the public a new point of view of the landscapes, linking scientific information to the agonistic valence of the stage. The Giro d’Italia has welcomed the presence of the geologist, thanks to a dedicated space during the TV live transmission of the race (Lugeri *et al.*, 2018).

On our opinion, the most sensitive point in the scientific communication is how to organize the information in a strategic way, referring to targets and messages, in order to better communicate the contents to the audience. Being that landscape is also an object of human perceptions, the result of the interaction of many natural and cultural components, and the expression of the geo-environmental processes as well, it could become a “medium” to communicate the Earth Sciences to the whole society.

For humankind, a catastrophe is always the result of the interaction between natural factors and human action. In all cases, the event arises in complex situations where concomitant causes determine effects of unpredictable scale.

“There are not even purely natural disasters. Human action - or non-action - is always involved in them. The coral reefs that protected from flooding are shattered by the construction industry to make them raw material, the mangrove forests are indecently deforested, the alarm systems are not installed, the sea level rises due to climate change, the promised paradises Mass tourism is staged close to the coast, so the tsunami turns into a murderous wave”, writes Ulrich Beck, after the tsunami of December 26, 2004, that has violently brought to the attention of everyone the terrible potential resulting from an altered relationship between man and environment. Most of the tragic circumstances are often almost meticulously developed by man for his own “non-knowledge, perhaps not being able to know; still worse: the non-knowledge without awareness” (Beck, 2005).

Considering oneself to be an integral part of the environment in which one lives, awareness represents an essential goal, reachable through the integration of knowledge and conscience: a necessary process for social survival: In this sense, a proper communication, aimed at making risk comprehensible, is a tool for public health management.

Today, more than ever, a new approach to raising awareness on the territory is necessary, the first step for starting good behaviors, essential in avoiding risks as well as in mitigating their effects.

A correct cultural approach to the problem of risk management, requires a multidisciplinary methodological approach, useful for guiding decision-making guidelines and management activities to achieve delicate balances but

progressively more stable, aiming at reaching a development that is sustainable for the social /environmental ecosystem.

Each type of risk management can and must make use of risk assessment, based on interpretative models (Marincioni, Fraboni, 2012).

In parallel, a new dialogue window has to be opened up between scientists and society: a dialogue that must articulate on a common code, suitable to overcome those misunderstandings often due to inconsistencies in communication with devastating effects. The need for effective social protection is a priority: such an aim can be reached only by sharing information and knowledge: information must be assimilated by individual/community/society, in order to become conscious knowledge.

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Natural Hazards and Disaster Risk Reduction Policies collects 14 original essays, of authors from all around the World, exploring strategies and ability of local communities to adjust to natural hazard and disasters. The volume, fostering the current scientific debate on disaster ecology, muses about the need for Homo sapiens to define its rights and responsibilities in environmental dynamics, including extreme events and disasters. In the end, the reflections about how to deal with hazard, vulnerability and disasters, highlights the ethical nature of disaster risk reduction; control of nature or adaptation to its cycles?

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