



# Digging in the dirt: Searching for effective tools and languages to promote soil awareness

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## ABSTRACT

The aim of the paper is to propose additional viewpoints aimed at enhancing soil perception among the general public that could foster soil awareness, valorisation and, consequently, protection and stewardship.

Starting from *soil security* concept, introducing the pillars (the five Cs) for securing soil, the paper focuses on *connectivity*, with the aim of suggesting new perspectives to look at and deal with soil. In particular, the article encompasses semantic issues, analyses new attributes, and proposes communications tools, other than scientific language, that can effectively reach a broad audience. The article focuses on art because, in the present era of image-based communication, artworks show an effective and promising way to spread a “soil culture”.

## 1. Introduction

“Soil is a non-renewable resource on a human time scale”: this statement has always been firmly pointed out, since the beginning of soil science.

However, in the last two decades, alarming data regarding soil loss and irreversible degradation are being widely and continuously reported (FAO and ITPS, 2015; IPBES, 2018).

Therefore, the inconsistency between our apparent appreciation of the importance of soil and the lack of care towards it shows that, despite scientific evidence about the timescale for soils’ renewal, their degradation and loss have not been prevented. It may be argued that there is a disconnect in the relationship between land use planning and soils management and their actual status. In other words, current policies at local, national, or international scale, as well as individual attitudes such as the ethical behavior, do not show any awareness of soil’s slow regenerative processes.

The aim of this paper is therefore an attempt to focus on the factors underlying the contemporary common disregard towards the soil resource with the aim of proposing effective communications tools and languages, to promote soil knowledge, its cultural value and, ultimately, establish a *soil culture* (a term derived from the Latin *cultura* and meaning “to cultivate the soil”). In particular, [Section 2](#) presents the innovative perspective introduced by the soil security concept, [Section 3](#) provides an overview on semantic issues, such as soil definitions and vague soil-related terms, [Section 4](#) presents a brief discussion on the need to re-

establish a soil ethical behavior, [Section 5](#) claims the need to use different forms of language to talk about the soil to the general public and, finally, [Section 6](#) explores the effectiveness of visual images such as artworks as the way to successfully accomplish this goal.

## 2. The soil security concept: an innovative perspective to look at soil

The soil security concept (McBratney et al., 2014; McBratney and Field, 2015) set an important milestone that helps to focus efforts aimed to spread soil awareness and improve soil stewardship.

It introduced, indeed, two important aspects that: i) change the perception towards soil and ii) offer the potential to different communications tools to reach a wider public. The first innovative aspect is that soil is placed in a central position with respect to societal and environmental issues; it has been clearly pointed out, for the first time, that food and water security, energy sustainability, climate change abatement, biodiversity protection and ecosystem services delivery all depend on soil security (McBratney et al., 2014). Therefore, repositioning soil at the center of such issues certainly increases the awareness and attention that soil resource attracts. The global soil resource is heavily threatened and, in most cases, so irreversibly degraded that a serious concern about its potential to sustain future generations is acknowledged within the whole soil scientists’ community (Ferreira et al., 2022). However, although such degradation levels and worldwide threats are constantly highlighted by soil scientists, few significant outcomes from

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international and/or national policies, climate agreements etc. are specifically focused on soil protection. When dealing with environmental issues, it can be demonstrated that soil has always been poorly considered, in most cases forgotten or included (as an embedded component) in the concept of *land*, landscape or territory. This is demonstrated clearly by the UN 2030 Sustainable Development Goals (SDGs) (UN General Assembly, 2015) whereby none of the 17 SDGs explicitly mention the word “soil”; despite the widespread knowledge that soil health and/or quality are, directly or indirectly, the prerequisite for most of them (Davies, 2017; Lal, 2018). In fact, to this point, Lal (2018), in the preface of the volume “Soils and Sustainable Development Goals”, stated that: “*this reflects an utter lack of awareness of the importance of the most basic of all natural resources on which depends all terrestrial life – soils*”.

Many authors agree that the neglect of soil is deeply rooted in historical, social, religious and cultural reasons (Minami, 2009). In fact, it can be demonstrated that the gradual loss of a soil culture, which started with the industrial revolution and is most visible in today's technological era, is at the heart of soil disaffection and disregard (Hermann, 2006).

In the XXI century, mankind is almost completely disenfranchised from soil. Soil has been variously labelled a *hidden* resource (Robbins, 2013), the *soil underfoot* (Jock Churchmann and Landa, 2014), a *buried* treasure (Davies, 2017), whose value is difficult to perceive particularly in urban areas where soil sealing hampers the mere view of it. “*Most people are soil blind*” reports Koons Garcia (2014) focusing on the simple act of seeing soil to acknowledge its importance. These attitudes can be seen as a general unawareness of it rather than a disregard.

Therefore, focusing attention on soil resource, and to its crucial role towards the main environmental challenges of the XXI century is welcome thanks to the soil security concept.

The second innovative aspect brought about by the concept of soil security lies in its five pillars. In fact, the five Cs (capacity, condition, capital, connectivity, and codification) provide additional tools and contexts that will help to promote soil knowledge.

The first two pillars, which considered together represent soil capability, refer to the bio-physical attributes of soil, specifically the aspects routinely considered by environmental scientists. Conversely, the last three pillars elevate the socioeconomic aspects, that may include a wider range of stakeholders in the pursuit of soil valorisation and stewardship, at the same level of importance. Capital, connectivity and codification underline, in fact, urgent issues such as: i) placing a monetary value on soil, ii) identifying new communications tools to promote soil culture through education, iii) drafting laws and rules for soil protection (McBratney et al., 2014). Enhancing connectivity, would eventually serve to strengthen the other two pillars, capital and codification. In fact, only through soil knowledge and awareness can we undertake an accurate assessment of soil's natural capital, promote a soil investment opportunity and spread robust soil policies aimed to regulate its use and protection (Mol and Keesstra, 2012).

Therefore, connectivity tends, among its aims, to promote soil culture. This can be achieved through different but integrated pathways such as: a) reviewing semantic issues (e.g. soil definitions and soil-related terms), b) re-thinking how mankind relate itself to soil re-establishing a “soil ethics”, c) considering soil, within and beyond educational processes, using different languages and communications tools such as art.

### 3. A matter of terms: the semantic issue

Before moving towards the many semantic issues related to soil, it should be underlined that the definition of “soil” itself is not a unique one (Hartemink, 2016). In an exhaustive reviewing chapter published in *Advances in Agronomy* in 2016, Hartemink lists, for example, 45 different definitions taken from soil science textbooks from 1900 to 2014. Starting from the early 1800's, definitions of the term “soil” were

based on developments in agricultural chemistry or geology, where soil was considered solely as a production factor. The past century has seen huge achievements in the field of soil science, bringing a new approach to the soil as a resource which encompasses not only the productive function but also includes additional fundamental ecological attributes (see the concept of soil health, Doran and Safley, 1997). Feller (2019) focused on the difficulties in communicating about soil, demonstrating that “*le sol des uns n'est pas celui des autres*” meaning that many diverse actors deal with soil from different perspectives and using different definitions. What is meant by “soil” when used by an archeologist may not be the same for a geologist, a pedologist or an engineer.

Soil disregard is ascribable to several causes that may be grouped into few large categories such as: socio/cultural, historical, religious/mythological, and semantic. As often reported in the literature (Baveye et al., 2016; Minami, 2009; Montgomery, 2007), soil's reputational misfortune, within English speaking countries, lies in the word *dirt* which identifies soil in everyday language. Such negative connotations certainly does not help to look at soil as something to be valorised and protected; the association of soil with graves, burials or Hell also doesn't encourage a positive relationship between man and soils.

Moreover, it should be acknowledged that soil's lack of specific identity, when dealing with landscape themes is grounded in the interchangeable use of the terms *land* and *soil* which are often considered as synonymous. The term *land* contains the concept of soil; in this way soil is deprived of its individual identity and policy makers are excused from focusing on soil specific issues and regulations. A practical example can be found in the list of the ten criteria to be met by eligible sites for the World Heritage Sites status (UNESCO, 2005), where the term “soil” is never mentioned despite being conceptually and obviously embedded in, at least, six of them such as landform, natural habitat, terrestrial ecosystem, natural areas etc. (Costantini, 2023). Another example is the already mentioned list of the SDGs discussed in the previous paragraph.

Many soil definitions use the term *surface* of the planet or *skin* of the earth. From an ecological perspective it is correct to consider soil as the interface through which fluxes of energy and matter move back and forth through the different ecospheres (atmosphere, lithosphere, hydrosphere, biosphere). In this case soil is conceived of as a two-dimensional entity that marks the border between the aboveground and belowground systems. However, when dealing with the many functions soils perform, a three-dimensional perspective is necessary where soil depth plays a fundamental role in providing plant rooting, favouring water infiltration, allowing carbon storage, supplying biodiversity niches etc. Therefore, the term depth or an additional dimension such as thickness should be considered when describing and defining soils.

An additional crucial question lies in the term *resource*. In the present era, characterized by an economic-productivist view, the term itself embeds the attitude of exploitation. Soil is considered a productive factor used to satisfy our necessities and, due to this designated role, humans feel authorized to use/abuse it. “*A resource for value extraction and a recalcitrant object of scientific inquiry*” (Puig de la Bellacasa, 2015).

To this purpose, rather than “*resource*” the term “*matrix*” could better fit the aim of soil identification as the source of life. Additionally, from an ecological perspective, together with air and water, soil is one of the environmental matrices constituting the natural environment and the landscape.

The last semantic issue that is worth considering is the adoption of the term “soil ecosystem services” instead of “soil functions” (Evangelista et al., 2023; Baveye et al., 2016). Again, the term *service* - accused of embodying an anthropocentric attitude - considers soil functions and attributes solely in view of the benefits that it secures to mankind. According to Cardona (2012) the concept of service allows the perpetuation of attitudes that led to our current state of environmental degradation. Minami (2009) claims that “*humans and the soil are linked in a completely utilitarian relationship, with humans taking no responsibility for the soil. A host of environmental problems have resulted from this lack of*

responsibility". Leopold (1949) mentioned soil abuse as linked to the concept of a commodity for humans.

The term *soil functions* seems therefore to encompass human needs and consider services from soils to nature itself.

A valorisation process of soil should, thus, begin by a re-definition of this environmental matrix specifically from the semantic point of view to re-establish its identity, to focus on its precious role and to guarantee its original dignity. Very recently, Hartemink and Mc Bratney (2024) proposed in a short article a new paradigm of soil in two definitions (a shorter and a longer one) that aim to describe as much about soil using concise and clear terminology to be understood by a wider public and to fulfill the connectivity dimension of the soil security concept.

#### 4. Soil and ethics

Soil identity may be reinforced only if an ethical shift in perspective is undertaken. Puig della Bellacasa (2015) claims that the close linking of soil science with a techno-scientific viewpoint should be undone to restore soil to its original dignity. There is a need to shift from an instrumental view of soil's value, (as embodied by the concept of "ecosystem services"), to an ecocentric view focused on soil's intrinsic value. This would imply the re-establishment of a "soil ethics" (Thompson, 2011), that can be attained through a social and cultural (r) evolution. Again, the social dimension of the soil security concept – connectivity – perfectly fits this desirable goal.

The ecocentric view places man "within" the ecosystem at the same level as other components, while with the anthropocentric attitude humans are somehow outside of the system.

This dual perspective had already been emphasized when the concepts of soil quality and health were developed in the '90 s (Doran and Parkin, 1996; Doran and Safley 1997). While soil quality was defined in relation to the intended use of soil selected by man, the health concept captures its ecological attributes which have implications beyond its quality or capacity to produce a particular crop.

The ethical relationship between soil and humans should also be discussed as regards the dependence of food security from soil conservation (van Mansvelt et al. 2021). As an example, due to the gradual historical disenfranchisement of mankind from soil, the collective imagination lost the connection between food and soil. The root of our livelihood derives directly from soil but humans have lost this perception (Pepper, 2013). This last author, in fact, stress the soil health-human health nexus which is no more perceived making it difficult to conceive that threats to soil may ultimately affect human well-being (Brevik et al., 2017).

A valuable and effective approach to explore and re-establish a relation between man and soil is the book *Soil and Culture* (Landa and Feller, 2009). It explores the perception of soil across different societies (from the antique to the modern ones). It also encompasses all sorts of visual arts (painting, textiles, sculpture, architecture, film and comics), literary arts (prose, and poetry), religion, philosophy, anthropology, archaeology, stamp-design and, ultimately, wine production. Soil and culture provides, therefore, a wider view of human perception of the soil and ways in which man relates to soils enriched with new perspectives aimed to encourage outreach to the broader community, to think about soils on various levels of discussion.

Therefore, soil ethics, in its different guises, either philosophical-naturalistic, spiritual and religious (Lal, 2024) or generally cultural should be considered, reviewed, and discussed with the aim of improving the tight interrelationship between mankind and this natural resource.

#### 5. New languages to approach soil

To promote general soil awareness requires, at first, the adoption of communications tools other than those commonly used within soil science to reach a wider public.

The tools of science are unavoidably and limitedly used within scientific societies and/or academic environments. They require an objective attitude, a high level of specialization (Mol and Keesstra, 2012) and the use of a conventional language necessary to describe and discuss data from the quantitatively point of view. For these reasons, the language of science is unquestionably not suitable for a broad audience or, in the main, to be used with policy makers. Paradoxically, in most cases it has been shown that "scientific talking" may produce exactly the opposite result to that intended, leading to largely diffused non-respectful attitudes even among policy makers.

A connection of soil science to society is a major challenge as invoked by Richer-de-Forges et al. (2019). In a special number of the journal *Étude et gestions de sols* these authors gathered articles dealing with a great number of activities performed with the aim to communicate soil. Some approaches were deliberately aimed at the very young, through educational schemes including playful aspects and were aimed primarily at schoolchildren. Others were aimed more broadly at the general public, such as descriptions of soil exhibitions or events, discoveries and awareness-raising tools.

A change of perspective and language is therefore imperative if a wider public is to be reached with the aim of raising soil awareness and increasing soil literacy. A first important step in this direction has been the recognition of soil as cultural heritage (Costantini and l'Abate, 2009; Costantini 2023). The association of the term *soil* with those of *culture* and *heritage* represents an important pillar towards promoting a positive attitude towards soil. Aspects that should characterize eligible heritage sites such as historical/archeological, aesthetical and anthropological/ethnological value have proven to be helpful in highlighting soil heritage. The new perspective and definition in which the concept of cultural heritage has recently evolved, enables to include the natural environment, such as soil sites and soilscape and their cultural value (Vecco et al., 2010; Moscatelli et al., 2011; Costantini, 2023).

#### 6. Soil and art

Art, in all its forms of expression, is a promising and effective communications vehicle; in fact, according to Lazzari and Schlieser (2015), art is "*a primarily visual medium that is used to express ideas about our human experience and the world around us*". Visual arts have been demonstrated to function as ways of communicating important issues (e. g. cultural, political, environmental, societal etc.) with the aim of generating awareness in wider society (Perumal and Sharjii, 2012).

Kurt (2003), in a play on words, contrasted two entities: science, as *Wissenschaft*, (literally "the making of knowledge"), and art, *Wissensform* (literally "the form of knowledge"). Kurt stated that one is definitely the counterpart of the other in the pursuit of a complete understanding of nature (Toland and Wessoleck, 2010). While science is compelled to describe nature through a rationale/objective approach using standardized rigid languages and tools, art, conversely, requires an unavoidably subjective attitude, filtered through human emotions and perceptions, to communicate nature and its various expressions.

Therefore, visual communication shows a great potential and may prove a helpful vehicle for knowledge where oral communication fails, whether a result of linguistic barriers or just because complex concepts are more easily and rapidly spread visually than orally (Stenchly et al., 2019).

In the "global arena of image-based communication" (Pente, 2010) soil contents may benefit from an extraordinarily effective instrument to spread knowledge and raise awareness about their complexity, dynamism, symbolic and cultural dimensions.

Artists can, in fact, assist and complement the work of soil scientists in the dissemination of a soil culture increasing the spheres of action of scientific investigation by adding unusual and innovative forms of visual, symbolic and cultural representation of soil.

Taking into consideration the difficulties in focusing on the real nature of soil due to the various obstacles that have been deeply

analysed in the previous paragraphs, visual arts represent a promising and effective instrument through which to communicate and improve soil literacy. From prehistoric paintings to the most recent contemporary forms of art including installations, soil has necessarily been considered, either directly or indirectly, as the surface on which a scene and/or characters were displayed. However, until the first half of the XX century, apart from very rare examples, soil can be hardly observed in the foreground of a painting represented *per se* with its typical features. These exceptions regard scenes related to agricultural practices and rural life, mythology and allegories, burials and/or hell scenes (Jenny, 1968; Feller et al., 2015). To this purpose, these authors provide a comprehensive and well documented list of examples ranging from medieval art to the most recent contemporary artworks highlighting how soil perception and representation as a natural matrix, integral part of the landscape, has changed across centuries. In fact, from being represented as a mere straight line, sometimes even colourless displaying neither three-dimensionality nor life, soil awareness among artists increased over time leading to the artistic movement known as *Soil art*. Soil art, proposed by Toland and Wessolek (2010), was defined as an “artistic work about, in, or with soil or soil protection issues, that is produced by artists in a multitude of genres and media, to be understood, among other things, as artwork that may contribute to wider environmental and soil protection and awareness-raising discourses.” From the above authors an important contribution to this discussion is the book “Field to Palette: Dialogues on Soil and Art in the Anthropocene” (Toland et al., 2018) where many examples of visual methodologies help understanding of the “ground beneath our feet”.

Interestingly, many of these soil artists are also soil scientists confirming how researchers themselves are the first to perceive the obstacles that scientific language poses in conveying the demands of soil. Therefore, they invoke, and propose at the same time, different communication systems to talk about soil properties and current issues. Some of these researchers and their effective artworks are Ken van Rees (<https://www.kenvanrees.com/soil-art.html>), J.S. Noller and G. Wessolek. Above all, mention should be made to G. Wessolek, pioneer of the soil-art relationship, who already in 2002 introduced the need to convey the demands of soil through artistic language by introducing the concept of soil aesthetics through his own paintings of soil profiles (Wessolek, 2022).

Focusing on contemporary art, Feller et al. (2015) provide some successful examples of installation/immersive art that introduce a three-dimensional aspect combined with a sensory experience that constitute an added value to the traditional fields of vision.

Among these, *New York earth room* (Walter De Maria 1977, <https://www.diaart.org/visit/visit-our-locations-sites/walter-de-maria-the-new-york-earth-room-new-york-united-states/>) and *You* (Urs Fischer 2007, <https://www.jasonhaam.com/artists/65-urs-fischer/works/550-urs-fischer-you-2007/>) transferred the physical experience of land art within the indoor, familiar space of a museum. Courageously, both artists literally brought the soil into a room although antithetically: the first one deposited about 200 m<sup>3</sup> of soil in a museum room while the second one excavated a huge crater about 12 × 9 × 3 m removing the art gallery's floor. In both cases, the visitor is granted a physical experience with soil even along its profile depth. In this way, the artists, by placing dirt within a museum room, elevated soil to the status of an artwork *per se*, ascribing to it an immaterial value.

A similar, but more recent and interactive, example is the large-scale project, *Absorption/Plot* by the american artist Asad Raza (<https://www.youtube.com/watch?v=mGvu64b3CEM>; <https://youtu.be/QsgEIG7SuE4>). Artists, performers, architects, students, community gardeners, cultivators and visitors work and interact in a metabolically active installation where tons of soil up to a meter in depth fill the space (Museion, Bolzano, Italy for Plot or Kaldor Public Art Projects, Sydney, Australia). The project is a dialogue between visual art, science, architecture, dance and local participants linked by a strong relationship with soil.

Koichi Kurita, a Japanese artist collected French soils, across twenty-

eight departments bordering the Loire Valley from its source to the estuary. In his artwork, *Bibliothèque de Terre/Loire*, (presented at the exhibition Jardins, Grand Palais, Paris in 2017) 400 soil samples were displayed on the ground, on squares of paper, in a simplicity that echoes Zen philosophy: according to Kurita, ‘everything comes from the earth and everything will return to the earth’. Furthermore, the different soil colors and granulometry provide a good example of pedodiversity ([https://spectacles-selection.com/archives/expositions/fiche\\_expo\\_J/jardins-V/jardins-P.html](https://spectacles-selection.com/archives/expositions/fiche_expo_J/jardins-V/jardins-P.html)).

Among the many recent artworks aiming to raise soil awareness, and become popular through the social media, the Instagram account *wonderofsoil* (<https://www.instagram.com/wonderofsoil?igsh=ZW12YzEzYmMxYg==>, dr. Y. Pressler) effectively communicates, for example, the pedodiversity concept. The 12 orders of soil taxonomy are simple sketches, a one-line drawing moving from the bottom to the upper level of each soil profile. The continuity of the line informs the viewer that each soil is a unique entity, the final product of a series of pedogenetic processes where each of them (addition, transformation, translocation and loss) are clearly drawn and represented by a diverse movement of the line. No definitions are necessary to inform about soils diversity, pedogenetic processes and three-dimensional properties. Furthermore, the short title for these sketches “good things take time to develop” introduces the time component informing on the length of soil forming process. Six words and a line: a successful synthesis of the basic features of pedogenesis and soils diversity.

Always within Instagram platform, another interesting account is *The art of soil* (<https://www.instagram.com/theartofsoil?igsh=MWQ1ZGUxMzBkMA==>, by Karen Vaughan) where soils and earth pigments are used to craft soil-based watercolours. Paintings, videos and DIY reels, complete the account providing a further didactic function vehiculating soils properties and their esthetic value.

A peculiar way to combine soil science with soil art was represented by the project *Tripmarks* ([https://tripmarks.at/?page\\_id=1471](https://tripmarks.at/?page_id=1471)) through the form of a cycling trip. In the year 2012, the artist Wolfgang Burtscher started a bicycle tour through 17 countries documenting the diversity of soils. This was achieved by daily ‘signing’ with the dirty bike tires a great number of paper sheets which were further used for an art exhibition. Moreover, a scientific investigation carried out at Innsbruck University's Institute of Microbiology (Austria), under the supervision of prof. H. Insam, on the different soil samples collected, assessed changes in the genetic diversity of microbial community along the travelled path.

Within the land art movement, the ephemeral artworks of Strijdom Wan Der Merve, an african artist, (<https://www.strijdom.com/land-art/>) deal mostly with soil, highlighting its hidden localization (the rolled-up lawn is an effective example), its composition, the dry crust originated by arid climate, the various soil colours, the close relationship of soil with rocks.

Nice and simple infographics are routinely used by FAO; in 2015, to celebrate the International Year of Soils, a very impressive and effective infographic clearly showing the origins of food (<https://www.fao.org/documents/card/en/c/ffa480bd-2b3c-476c-a01b-da5bcd43aee7>) was released with the aim to highlight the close relationship between soil and food.

In conclusion, transdisciplinary integration, as also underlined by Toland (2016), between soil science and art is necessary if awareness of the importance of soil is to be rapidly and effectively vehiculated.

The use of alternative communications tools such as videos/reel, photos, posters, comics, drawings, exhibitions, recently started being adopted by most scientific societies of soil science (IUSS, International Union of Soil Sciences and SISS, Italian Society of Soil Science) or those dealing with soil (FAO) through various social media platforms. During the recent Centennial of the International Union of Soil Sciences, held in Florence, Italy, May 2024, a side event entitled “The Soil Dialogues” consisted in an exhibition bringing together artists from around the world presenting ways in which they are addressing the multiple crises facing soils.



Apart from policy makers, whom these new ways of communicating soils are specifically addressed, another important target audience is represented by the younger generations, either as they are used to quick and easy communications tools or, ultimately, because they represent the real objective to which the message of soil protection is addressed. A survey, undertaken among high school students, reported a weak knowledge of soil's intrinsic features and serious difficulties in recognizing the precious soil functions including even the most obvious as its role as a source of food (Moscatelli et al., 2019). As reported by other authors (Tavin and Hausman, 2004; Chung and Kirkby, 2009) all visual cultural forms are sites of ideological struggles and embodiments of social reality. An integrative pedagogical field such as critical media literacy art education proposes ways to raise social awareness and start possible changes through art among young generation (Chung and Kirkby, 2009). A further call for interdisciplinary and transdisciplinary approaches has been recently invoked by Wessolek and Toland (2024) who stated that collaboration between soil scientists, artists, cultural agents and science communicators is imperative to revitalize educational processes.

## 7. Conclusions

A shift of perspective, attitude and language is necessary if soil literacy is to be spread and awareness raised about its fragile status. This can be achieved, across a broad audience, through language and communications tools other than the technical-scientific ones *sensu stricto*. Different branches of human sciences play a central role in effective communication of scientific issues because they hit the emotional, sensitive, spiritual side of humans going beyond the conventional language of science that is almost unknown to the broader public. Art and artworks, in particular, talking through images, are the best candidates and show great potential to attract attention towards the soil resource bypassing technical language. Visual arts in general are the best candidates to reach a broader public and, most importantly, younger generations who will be in charge of soil management and protection in the near future.

## CRediT authorship contribution statement

**M.C. Moscatelli:** Conceptualization, Writing – original draft, Writing – review & editing. **S. Marinari:** Writing – review & editing.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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*The authors herewith declare that they did not use either generative AI or AI-assisted technologies during the writing process*

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