Soil art: bridging the communication gap

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Abstract
The rise of industrial agriculture paired with a global demographic shift of populations from rural to urban settings has diminished everyday interaction with soil for most members of society. This has led to a deterioration of the aesthetic image and cultural value of soil. Among other efforts to increase soil awareness, concerned artists have been reclaiming the image of soil as a culturally, aesthetically and ecologically invaluable common good. From the early environmental art of the 60s and 70s to more recent artworks on urban and industrial brownfields, soil functions such as growth medium and habitat, archive and contamination filter have become subject matter for artistic expression and public discourse. In the following paper we present soil in the context of the environmental arts movement as well as art in the context soil science. How can art contribute to soil conservation – both with the aim of generating greater public understanding and promoting cultural values, but also by developing creative methods to directly confront problems such as contamination, erosion, or humus loss? Based on a brief review of well-known artworks, a survey of soil scientists, interviews with artists, and our own creative field experiments, we address the use of art in bridging communication gaps between soil conservation and the general public.

Key Words
Soil Art, soil communication, reclamation aesthetics, creative collaboration, interdisciplinary research.

Introduction
Cultural utilization of soil as expressive media, e.g. as pigment (see Ugolini 2010), sculptural or structural material, predates its appropriation for agriculture. While aesthetic uses of soil may be identified throughout human history, the rise of industrial agriculture paired with a global demographic shift of populations from rural to urban settings has diminished everyday interaction with soil for most members of modern society. In the absence of aboriginal or agricultural relationships with the earth, the aesthetic value and cultural context of soil deteriorates and the psychological gap between human populations and the earth widens. The image and identity of soil is reduced to dirt.

Despite this lack of appreciation, current soil conservation relies almost exclusively on soil scientific principles. In so doing, it neglects cultural values and strategies, which could improve human perception and also ideally human treatment of soil. In recent years several publications have addressed this issue by encouraging stronger integration of soil science in education from kindergarten through university (Herrmann 2006; Smiles *et al.* 2000), better public reference tools (Van Baren *et al.* 1998), consideration of social and cultural research (Greenland 1991; Minami 2009; Winiwarter 2006) and the introduction of art as a tool of environmental communication and consciousness-raising (Feller, Lardy and Ugolini 2010; Van Breemen 2010; Toland and Wessolek 2010). This last point is the focus of our present inquiry.

While scientific research provides lawmakers and public stakeholders with numerical analyses and expert prognoses, art plays a vital role in communicating environmental issues to the greater public. Because art is a free, experimental format where ideas can be independently and critically tested before ending up in mainstream media, art can be seen as an *indicator* of shifts in cultural values or norms. If we consider art not only as cultural indicator but also as *instrument*, which can be planned and integrated into public space and urban culture, we can regard art as a resource or *service* of environmental communication and conservation. The significance of art in scientific fields such as information and communications technology, robotics, and materials science is reflected at art festivals such as the Ars Electronica in Linz, Austria and the Transmediale in Berlin, Germany. However, an information gap seems to persist between environmental art and environmental science. Wilson (2002*a*) has suggested that art and science operate as intersecting cultural duties. “Bridging the communication gap” is therefore seen as a cultural duty of both scientists and artists working with soil, in order to improve public awareness and achieve a broader approach to soil conservation. Bouma and Hartemink (2002) have emphasized the need for interdisciplinary research programs to support

communication between soil scientists, planers, politicians, and other stakeholders. Yaalon (1996) has similarly suggested the need for soil technology transfer between societies of industrial and developing nations. The cultivation of professional research partnerships is also necessary for accurate knowledge transfer between scientific and artistic disciplines. Organizations such as the Leonardo International Society for the Arts, Sciences and Technology (ISAST), the Art and Science Collaborations Inc. (ASCI), and the Arts and Ecology Program of the Royal Society for the Arts attempt to bridge this divide. International projects such as Cape Farewell and the 350.org campaign have brought together artists, scientists and educators to raise awareness about climate change. Despite many individual examples, no equivalent interdisciplinary program yet exists to address soil conservation issues on a larger cultural scale.

By communicating examples of soil art to a mostly scientific audience, this presentation functions as one step in such a knowledge transfer process. Conversely, we are interested in the creative aspects of scientific research, and how these might inform and enrich artistic practice. Our larger goal is to encourage creative science-art collaboration. Based on a brief review of artworks, a survey of soil scientists, interviews with artists, and our own creative field experiments, we explore opportunities of collaboration, both with the aim of generating greater public understanding, but also by combining methodological expertise to confront problems such as contamination, erosion and stronger legal conservation.

Art-historical context: soil as subject matter

Depictions of soil and geologic forms may be identified in almost all major artistic genres. However, artwork explicitly dealing with soil and soil conservation issues is characteristic to the environmental arts movement spanning over the last 50 years. From the Land Art of the 60s and 70s to more recent environmental art projects, it is important to distinguish between artworks that utilize a symbolic reference to "earth," and those that contextualize "soil" as a geophysical and biochemical body. We introduce soil art as: *art consciously in or with soil or about soil conservation issues, expressed via a wide range of artistic disciplines, resulting in a multisensory aesthetic experience* (Toland and Wessolek 2010*a*).

Two main approaches to soil art should be articulated: artwork that is primarily concerned with the formal aesthetic properties of soils, and artwork that is ecologically restorative and thus "functional." Barbara Matilsky (1992 p. 56) makes a similar distinction between artists who have "proposed or created ecological artworks that provide solutions to the problems facing natural and urban ecosystems," and artists who hone their skills to attract attention or create awareness of environmental issues by "framing the problems through a variety of media…" The early Land Artists, for example, were mainly occupied with aesthetic form, embedding visual symbols from the minimalist and post-modern movements into remote natural settings. Artists such as Michael Heizer, Walter de Maria, Robert Morris, and Robert Smithson provoked new ways of perceiving the environment by bulldozing monumental shapes into the landscape and exhibiting piles of soil and rocks as sculptural works. Around the same time period a more reactionary group of environmental artists, including e.g. Alan Sonfist, Newton and Helen Mayer Harrison, Agnes Denes, and Joseph Beuys, concentrated their artistic efforts on repairing and restoring urban ecosystems.

Art facilitates dialog, afterthought and the transference of new ideas. It has the ability to reach unexpected audiences and provide new perspectives on the environment and our relation to it. While it might be difficult to literally transform equations for preferential flow into meaningful artwork, we may link different *artistic motifs* to specific *soil functions* that most everyone can relate to and understand. In this sense, we may associate human fertility with soil fertility in the works of Charles Simonds, Ana Mendieta or Shai Zakai, or learn to appreciate the archival function of soils in the survey and documentation projects of Betty Beier, Daro Montag, and Marianne Greve.

Despite "a profusion of terms" (Bower 2009), including Land Art, earth art, environmental art, and now soil art, the term *eco-art* historically refers to art *with* and *for* nature as opposed to art simply *about* or *in* nature (Aagerstoun 2007). In areas with weak mitigation policies, eco-art has come to fill a planning void in degenerate landscapes. Land remediation and mitigation is disguised as sculpture and performance art. Some interdisciplinary projects are unique in that they are either initiated by or include artists in solving local and regional environmental problems. For example, the Acid Mine Drainage and Art project (1994 – 2005) in Vintondale, Pennsylvania is a tribute to the cultural and environmental heritage of the mining region. Artist Stacy Levy designed a passive water treatment system, or "Litmus Garden," to help communicate soil processes of buffering and filtration. Initiated by art professors Tim Collins, Reiko Goto and Bob Bingham

of the Carnegie Mellon Studio for Creative Inquiry, the *Nine Mile Run* greenway restoration project in Pittsburg, Pennsylvania also addresses complex soil remediation processes. On a smaller scale, artist Georg Dietzler has confronted soil contamination issues by using mycoremediation (*i.e.*, remediation facilitated by fungi) in his long-term installation projects. In works such as *Self-Decomposing Laboratory* (1999) and *Moveable Oyster Mushroom Patch* (1996-1997), Dietzler makes use of the edible oyster mushroom (*Pleurotus ostreatus*) to break down organic pollutants such as PCBs (polychlorinated biphenyls). In a similar bioremediation project, the "Revival Field" (1990 – 1993), artist Mel Chin planted a field of heavy metal absorbing "hypo-accumulators" at the Pig's Eye Landfill in Minnesota. In his most recent project, "Paydirt," Chin launched a public awareness campaign about the high lead content in New Orleans' soils, a problem that has increased long after the floodwaters of Hurricane Katrina receded.

Soil science context: art as vehicle

The examples given above are icons of eco-art. They challenge traditional art forms with the development of a new visual vocabulary, *reclamation aesthetics* (Spaid 2002, p. 109; Toland and Wessolek 2010*b*). As soil resources become scarcer and scientists look for new approaches to soil protection, eco-art and its derivative soil-art might be considered new cultural allies. While relatively more people are involved in the arts than have access to the complicated topics of soil science, a combination of soil science and art could offer soil a new public image (Wessolek 2002). Art may be seen as a "vehicle" to spark interest and promote a wider understanding of the hidden resource beneath our feet. Artistic involvement, however, need not always result in a conventional object or exhibition, but can be seen as a creative phase in conservation, education and public awareness programs. Because cities boast a concentration of cultural and artistic activity as well as acclaimed research and academic institutions, urban soils can be considered a natural starting point for interdisciplinary collaboration. This is reflected in the selection of artworks above, many of which were created in urban and industrial areas. While the field of soil science has traditionally focused on optimizing soil as a resource for the production of food and fuel, city soils have historically been evaluated on different terms – that is, as medium for buildings and infrastructure. An increase in urban ecological research has led to new forms of perception and environmental protection objectives in cities. For example, urban soils offer a unique perspective into history. An archive of war, peace, cultural, and environmental change is preserved beneath our backyards and sidewalks. Urban agriculture and on-site rainwater harvesting have also become important topics for subsistence farmers in developing nations as well as slow-food activists in industrialized nations. The diversity, dynamics and vulnerability of urban soils demand a need for awareness, acceptance and education and thus provide creative stimulus for artistic involvement.

The Department of Soil Protection at the TU-Berlin has been investigating several approaches to art-pedology in recent years. Our own attempts of cultivating art as a vehicle of communication include: a soil and art group that was founded in 2000, the organization of several soil-art exhibitions, and a permanent collection of soil-art on display in the Gorbatschow Building of the TU Campus. In 2007 and 2008, we led a series of creative field exercises in an overgrown urban lot near the TU campus. Landscape planning and environmental engineering students and staff were encouraged to paint their impressions of the site with materials found on or buried in the soil. Since 2002, several thesis papers and three semester-long student projects have also dealt with the topic of soil and art. For example, Andreas Vetter created plans for an urban soil park and Hardy Buhl installed a giant "soil cake" sculpture to demonstrate the remediation of a former wastewater-leaching field. In another example Fritz Kleinschroth and the student project group *Soil Art on Urban Brownfields* created an oversized "ecological footprint" made of onion peels and other kitchen scraps from a city homeless shelter (Figure 1). The footprint was "stamped" on the "Gleisdreieck," a former goods depot in Berlin. A time-lapse video of the disappearing footprint was made to illustrate processes of humification and mineralization. More student films can be found on youtube under: *media, soil, tu-berlin*.

Figure 1. "Ecological Footprint" by Fritz Kleinschroth and the student project group "Soil Art on Urban Brownfields." Time Lapse Documentation of 20 m^2 of food scraps and carrot peels, Gleisdreieck Berlin, 2007.

Bridging the gap: creative collaboration, opportunities, and challenges

To address the idea of creative collaboration between soil scientists and soil artists, we have been gathering opinions from both fields. In 2007, we drafted a questionnaire on soil science, aesthetics and art, which was distributed at the German Soil Science Society's annual conference at a session on soil science, society and education and subsequently carried out at conferences in Australia, New Zealand and China. We asked members to share their opinions about the aesthetic properties of soil and their potential willingness to collaborate with artists. 85% answered that they would be personally willing to cooperate with an artist, while about 64% regarded the interdisciplinary direction of "soil art" as important. The results of this inquiry are included in our contribution to the book *Soil and Culture* (Landa and Feller 2010).

In January 2010 we carried out fifteen in-depth interviews with ecological artists who have worked with soil or soil conservation issues. Artistic formats included sculpture, ceramics, installation, illustration, painting, performance, video, graphic design, interactive or participatory interventions, educational events, and landscape design. Environmental themes included moor degradation, acid mine drainage, rainwater harvesting, urban agriculture, pedodiversity, and coastal reforestation. Given this wide range of soil issues and artistic approaches, the topics of didactic aesthetics and restoration aesthetics came up in almost all interviews. Although most of the artists answered that they thought about content first and then form, about half of the artists felt that art should inspire through innovative form, rather rely too heavily on informative texts or educational props. One artist described her art as a form of subservience – a service to community and environment. Other artists spoke of their work as an ethical or spiritual duty to nature. All but one artist described instances of collaboration, which differed when working with other artists, scientists, city planners and educators. All artists described an interdisciplinary nature to their work and expressed interest in collaborating with scientists, although most had already worked together with scientists and engineers.

We are continuing our inquiry into collaborative science-art research with an extended questionnaire to be distributed in 2010 and 2011 at academic conferences and online venues. Further interviews as well as a more comprehensive analysis of completed interviews are also planned. A list of other projects, organizations, and artists, can be found on our soil arts website, as well online platforms such as the green museum, eco art space and arts and ecology website (see references below). In a contemporary integration of art and science, we must constantly examine the parallels that arise between an ever converging critical art-world and a culturally literate scientific community. This is necessary for any attempt to combine soil science and art. Both fields must inform themselves of the others' developments if they are to take part in constructive dialogue. Conscious cross-referencing and frequent communication is needed. This is not an observation, but a call to action. Professional artists and cultural theorists should be invited more often to academic conferences, into laboratories, and to contribute to engineering and agricultural research, while soil scientists might offer their expertise at environmental art symposiums, exhibitions and seminars.

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