HOT NEWS

ISSUE 1, 2021

WASWAC

Contents

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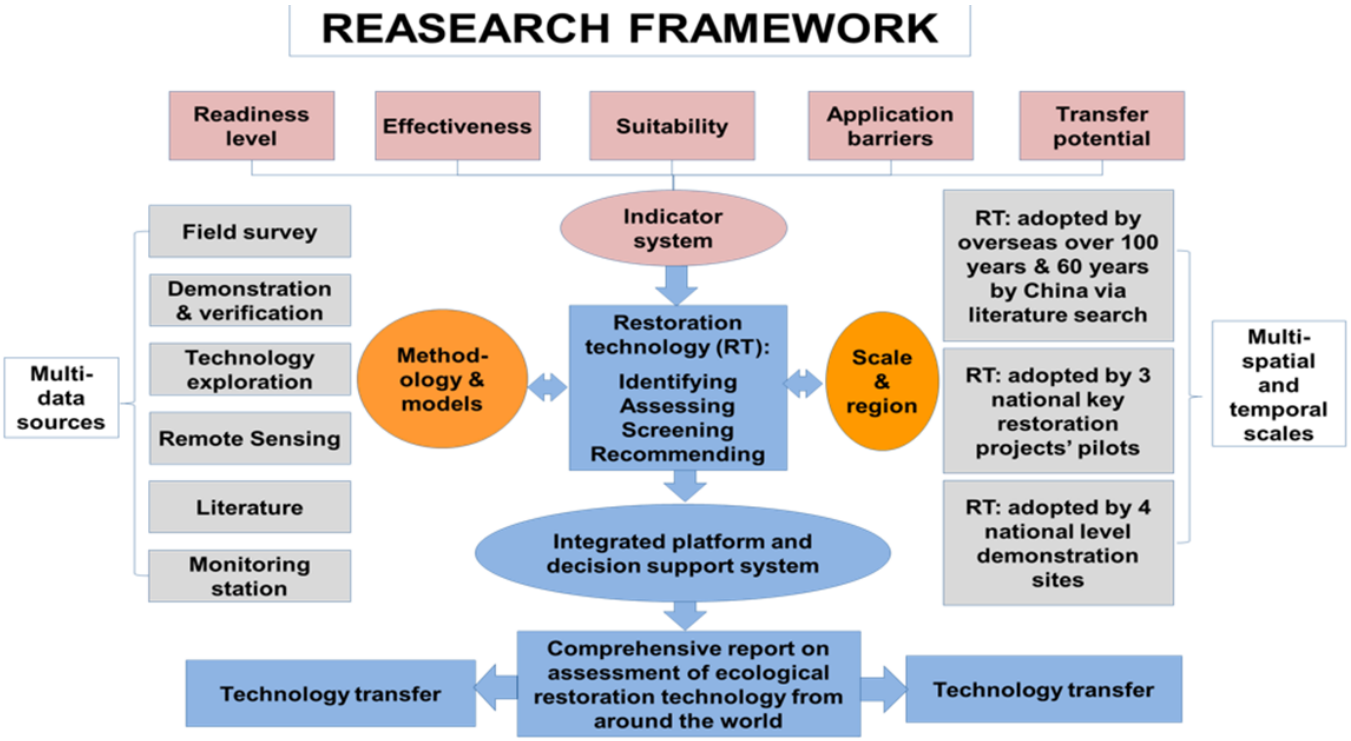
Chinese New Year Message of WASWAC

Comments on Proposal for Initiating Global Assessment of Ecological Restoration Technology and Ecosystem Rehabilitation Technologies

By Prof. Liu Xiaoying, Secretary General of WASWAC

With rapid economic development, the pace of global ecological degradation has been accelerated. By the end of the 20th century, ecological problems were found worldwide, affecting almost every aspect of human life, and causing universal concern. To deal with these problems, most governments have brought environmental conservation into political and legal processes, and have adopted different technologies and measures to control and restore ecosystems. Hence, ecological technologies and ecosystem rehabilitation technologies have been developed and the technologies closely integrate three elements: humanity, nature and society. They aim to promote the co-evolution of humanity and nature, facilitating the mutual and sustainable development of both. Those have significant effects on the solution of problems. However, the lack of systematic research on methods to assess ecological technologies and ecosystem rehabilitation technologies has a detrimental influence on the application and promotion of ecological management in the future.



Ecological degradation is a major environmental problem for public concern. It not only increases the depletion of natural resources and decrease biodiversity, but also hampers the sustainable de-

velopment of social economy, and even threatens the survival of human race. Therefore it has attracted the attention of governments and research scholars from various countries with focus on the problems of soil erosion, desertification, rocky desertification and degraded ecosystems. In response to these problems, various ecological technologies have been developed. Unfortunately, methods, models to identify ecological technologies, ecosystem rehabilitation technologies are still lacking behind in the field. China is making effort to define, clarify, identify and assess ecological technologies and ecosystem rehabilitation technologies through various methods and models (AHP\Patentometric method\DHP\Models). We do hope that this can become a global action and thus we propose that the initiative of global assessment of ecological technologies and ecosystem rehabilitation technologies can become reality, and through this, the world ecological environment becomes better and better.

You are kindly invited to provide your comments and suggestions on the proposal to the Secretariat of WASWAC.

Related information:

A Key National Research and Development Programs on "Methodology and Indicator System for Assessing Ecological Restoration Technology and Evaluation of Global Ecosystem Rehabilitation Technologies (2016YFC0503700, 2016-2020)" in 2016, the starting year for the 13th Five-year national plan.

The project focuses on the three most important ecological degradation issues in China and other representative countries, and includes degradation issues such as soil and water erosion, desertification, and karst rocky desertification.

Eco-Holistic Soil Conservation to support Land Degradation Neutrality and the Sustainable Development Goals

Juan Albaladejo, Elvira Díaz-Pereira, Joris de Vente
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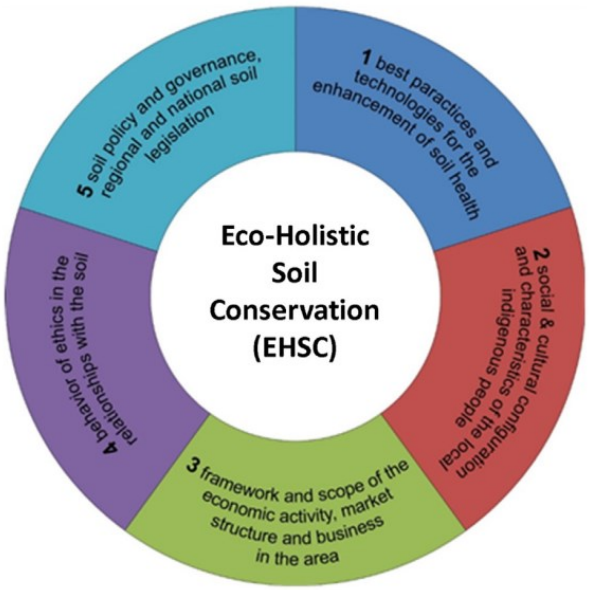
Soil degradation continues to be of the major threats for sustainable development and human well-being. Despite the advances in research, there is still a gap between research and effective conservation. To fill this gap, a change is needed in the paradigm of soil conservation research. Therefore, this paper aims to: (i) introduce the concept of Eco-Holistic- Soil Conservation (EHSC) to support the Sustainable Development Goals, (ii) present a framework for the implementation of EHSC, and (iii) show practical examples and recommendations of EHSC. The theory behind the concept of EHSC builds on a critical review of the main causes for success or failure of previous conservation projects and evaluation of latest holistic concepts and visions on conservation of soils and socio-ecosystems. The key principles underlying EHSC are: (1) perception of soils as living-systems, (2) holistic ecosystem approach, (3) central role of soil conservation for climate change mitigation and adaptation, and (4) ethical behavior in soil use. Implementation of EHSC requires a transdisciplinary approach involving a range of actions in three iterative phases: (1) diagnosis of the causes and processes of land degradation and the socioeconomic context, (2) integrated assessment of the interactions and synergies between the factors and actors involved and the selection of EHSC actions, and (3) participatory evaluation and monitoring of impacts. Successful conservation requires more research on the resilience and adaptation of soils to climate change, integrated economic valuations of soil conservation, and protection of native peoples right to land in international legislation.



The whole target is the Eco-Holistic Soil Conservation (EHSC). The EHSC involves partial targets (1 to 5) and only can be achieved from the success of each of these partial targets. All these parts are in intimate interconnection, so that they only should be understood in reference to the whole target. The isolated achievement of partial targets is not a guarantee of the success of the EHSC. Only through the synergic interlinkages between all the parts involved it is possible to achieve the EHSC.

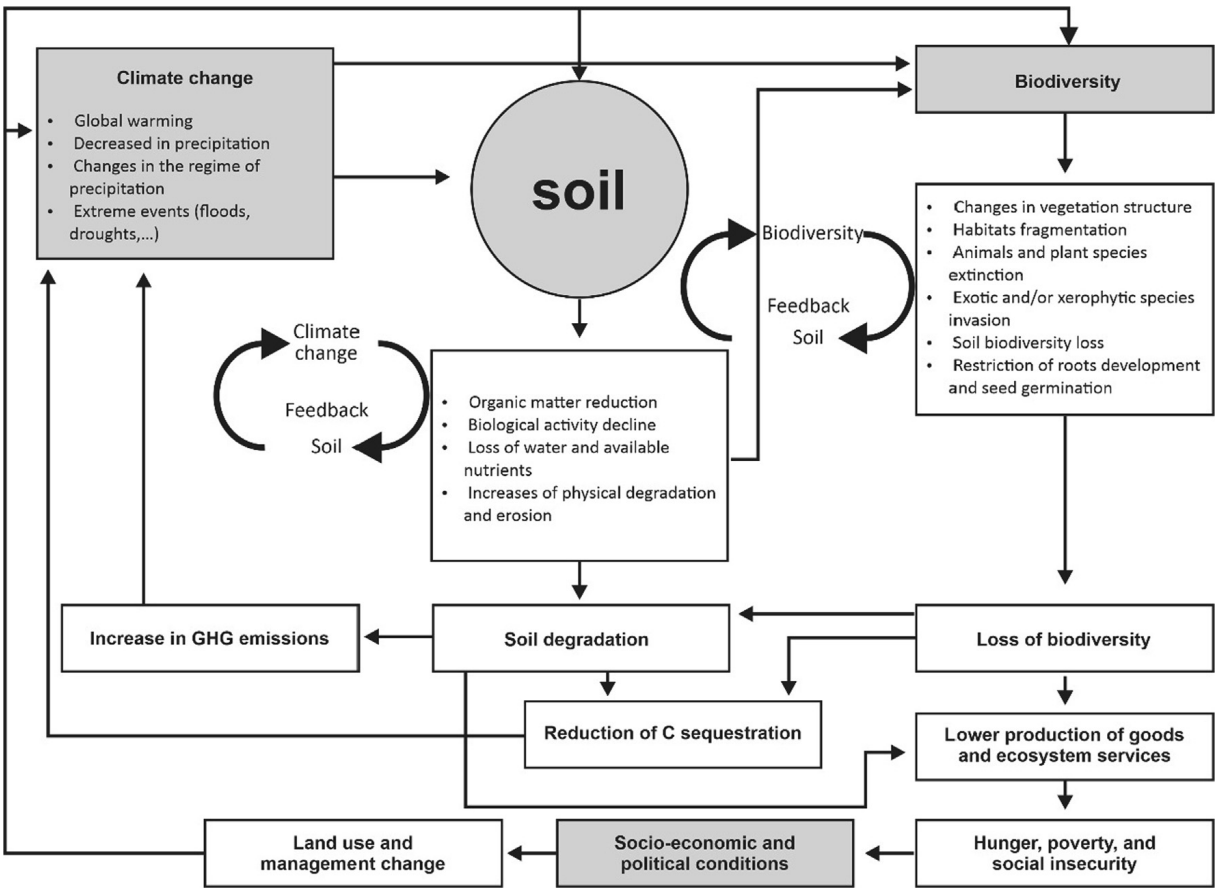


Fig. 1. Synergies and feedback processes between the four main drivers (climate change, land degradation, biodiversity loss, and socio-economic and political environment) of the environmental change.

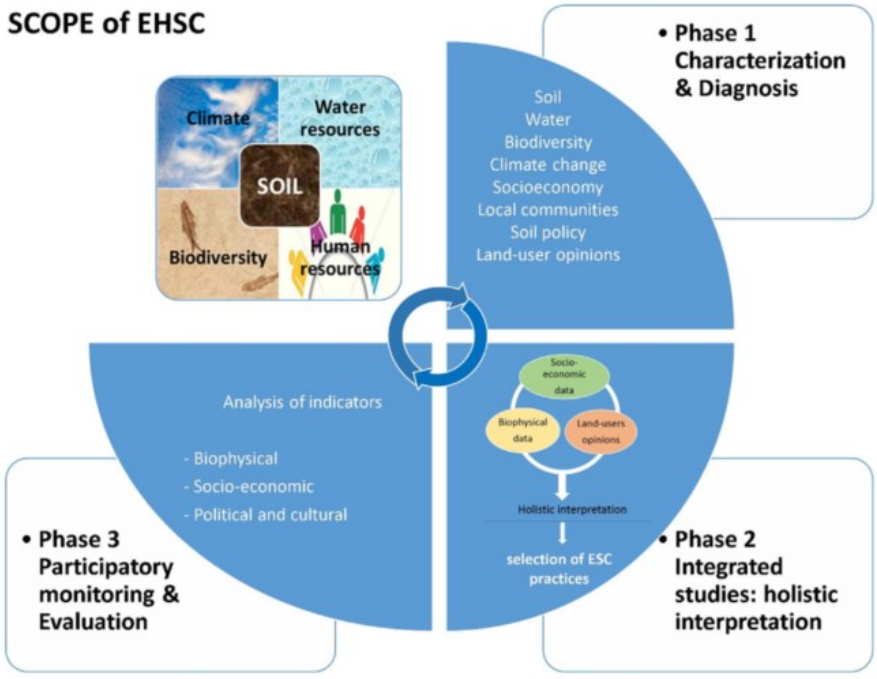


Fig. 2. Framework for the implementation of EHSC

Albaladejo, J., Díaz-Pereira, E., & de Vente, J. (2021). Eco-Holistic Soil Conservation to support Land Degradation Neutrality and the Sustainable Development Goals. Catena. 196, 1-10. https://doi.org/10.1016/j.catena.2020.104823

Subsidence: a threat to the soil and a global challenge

By Edoardo A.C. Costantini
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Secretary – European Society for Soil Conservation
Norman Hudson Memorial Award - WASWAC

Over half of the world's population lives in urban areas and the quality of urban soils and the management of their ecosystem functions is nowadays recognized as of primary importance by soil science (Calzolari et al., 2020). Much of the more densely populated, cultivated, and urbanized areas are located in coastal areas, often near river deltas, like Alexandria in Egypt in the Nile delta, New Orleans in the Mississippi delta, Calcutta in the Ganges delta, Bangkok in the Chao Phraya delta or Shanghai, in the Yangtze delta region. With fertile soils and easy access to the coast, deltas are critical points of food production. Vietnam's Mekong Delta alone provides nearly 20% of the world's rice (Dunn and Darby, 2019). These areas are among the most dynamic in the world and are witnessing a tumultuous increase in population and land use. But many of the world's deltas are now facing an existential crisis. The deltas themselves are sinking while the relative sea level is rising fast.

Deltas are built from sediments that are carried downstream by rivers and eventually settle where the river meets the sea. When these sediments compact under their weight, the deltas sink naturally. Where left undisturbed, the addition of new river sediments can compensate for subsidence and help keep the delta's surface above sea level. But the reality is that we are witnessing accelerated subsidence in many of the delta areas. The results of a study conducted by the University of Padua (Italy) and by the Institutes for hydrogeological protection (Cnr-Irpi) and of geosciences and georesources (Cnr-Igg) of the National Research Council of Italy highlight that subsidence is a global phenomenon that can cause relevant environmental, social, and economic impacts. Potential areas of subsidence involve 1.2 billion people and 21% of the world's major cities, with 86% of the exposed population living in Asia (Herrera-García et al., 2021). Accelerated subsidence is occurring in several regions of the world, including Iran, Mexico, and Indonesia where, in Jakarta, the impact is so severe that the government is planning to move the capital to the island of Borneo. To get an idea, just think that the Semarang delta in Indonesia is encountering increasing flood problems, due to the subsidence of the soil of more than 16 cm per year. Subsidence caused

Subsidence: a threat to the soil and a global challenge

by the exploitation of groundwater and the buildings that reduced sediment accumulation (Sekarsih et al., 2010). Indeed, the rise in sea level resulting from climate change is certainly important, but the exploitation of groundwater extracted from aquifers used to irrigate crops and supply water to rapidly growing cities, is much more serious. Soil sealing and the construction of dams along the rivers, which block the flow of sediments and prevent the natural nourishment of the coastal beaches.

Although subsidence is a slow and gradual process, it can permanently reduce the water storage capacity of aquifer systems, damage buildings and infrastructures, increase the risk of flooding in floodplains and coastal plains. In these areas, even a few centimetres of subsidence increases the likelihood of flooding (Herrera-García et al., 2021).

There are not many successful experiences in the world dealing with possible local actions to combat subsidence. In Indonesia, in the Semarang delta area, territorial planning was carried out according to the zoning of the groundwater. The concept of groundwater zoning - in which land use planning identifies the most degraded areas and areas at risk of degradation due to groundwater abstraction - was considered a very practical and effective solution to counteract more harmful water extraction (Sekarsih et al., 2010).

A study from Virginia University in the United States proposes a solution to the New Orleans soil subsidence crisis. The “Big Leak” designs a rainwater transport system adaptable to areas of the city, which intentionally "leaks" to keep the aquifers high. The project intends to replace the current rainwater conveyance system with surface channels that would act as a filtering infrastructure to recharge the water table, thus stopping or reducing the rate of subsidence of the soil (Pijnappels et al., 2010). The Big Leak is considered a smart way to combat land subsidence and offer an integrated and applicable solution for a sinking city.

Agricultural technology can also play its part. The Ebro delta, in Spain, is an intensely cultivated area and it is also affected by subsidence, which leads to an increase in soil salinization. Local farmers have formed Operational Groups to mitigate the effects of soil salinization and develop adaptation strategies, such as new irrigation models, land arrangement, crop choice (https://ec.europa.eu/eip/agriculture/en/focus-groups/soil-

Subsidence: a threat to the soil and a global challenge

salinisation).

In conclusion, it should be noted that the problem of land consumption by subsidence is certainly complex and affects various production sectors and planning activities. However, a common trait can be noted in both agricultural and engineering strategies for contrast, mitigation and adaptation that are being proposed in the various parts of the world. The interventions must necessarily be based on a detailed zoning of the soil until the water table, with an integrated and interdisciplinary approach, in order to identify, place and size the interventions as precisely and effectively as possible. From a perspective of management of soil ecosystem functions, it is desirable that the skills already acquired in precision agriculture integrate with geological and engineering studies, both in jointly addressing the study of the soils of urban areas subject to subsidence and in proposing solutions based on the understanding of natural and human-induced processes.

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Climate Change: is Viticulture under threat?

By Paolo Tarolli

In the afternoon of August 29, 2020, an intense supercell, which is a thunderstorm characterized by the presence of a deep, persistently rotating updraft, affected the province of Verona in the north of Italy (Figure 1). It was not the first event of this kind; several other events, including tornado episodes, had already occurred during summer 2020.

Fig. 1 - Supercell reaching Soave hills, north-eastern Italy. (Photo credit: Elizabeth Zanella, Coffele Estate Wine Farm)

Intense downburst events: a new threat for vineyards?

We made a field trip to make a post-event assessment and to map possible slope failures. Due to the severity of the storm, our first thoughts went to the activation of shallow landslides or a massive quantity of soil eroded by rainfall and surface runoff. Indeed, according to literature, a significant threat for vineyards, especially those located in steep-slope agricultural landscapes, is soil erosion. However, once on the site, we realized that soil erosion was not the major issue. Of course, some areas were affected by rill erosion (Figure 3, photo a) and developing gullies along the rural roads (Figure 3, photo b), but these were limited. The most significant damage we saw was hectares of vineyards destroyed because of the strong wind generated by a very intense downburst episode (Figure 2).

Fig. 2 – Effect of the downburst of August 29, 2020, on the Soave vineyards (Photo credit: E. Straffelini and P. Tarolli)

Similar episodes have probably already occurred in other regions of Italy and abroad. However, the intensity and extent of this event, and also the sequence of supercells that affected the north of Italy during summer 2020, is posing a real question. Will this be the new normal for the future? Specifically, if climate change makes the occurrence of extreme wind events such as intense downbursts a new normality, then it will represent a serious threat to viticulture, as it is for coniferous forests (such as the Vaia storm example).

Major hazards in vineyard landscapes

But downburst events are only the latest hazard threatening vineyards. The complex morphology that characterizes steep-slope vineyards makes these areas intrinsically susceptible to hydrogeological instability. One of the main threats is soil loss due to surface erosion while more severe mass movements could also be activated, for example, due to extreme rainfall events, and the presence of rural roads (Figure 3, photo c). Another issue, for vineyards on terraced hillsides, is drystone wall collapse. If a terrace system is not adequately maintained or correctly designed, local instability problems may occur (such as gully ero-

Fig. 3 – Illustrations of some significant threats for a vineyard. (a) erosion (such as rill), (b) erosion along a preferential flow path induced by a rural road, (c) shallow landslides, (d) hailstorm damages. (Photo credit: a, b, d Paolo Tarolli; c UAV survey by Cambisol).

sion that can evolve as a landslide) creating hazards for settlements and cultivations.

Steep-slope viticulture: historical heritage and cultural ecosystem services to be protected from the increasing of natural hazards

Agricultural landscapes cultivated in hilly and mountainous areas can represent the historical heritage and cultural ecosystem services in some regions. Some of these sites are already listed in the UNESCO World Heritage List, but also on the Food and Agriculture Organization (FAO). The recognized value of traditional rural landscapes has led, for example, FAO to launch the Globally Important Agricultural Heritage Systems (GIAHS) programme, to protect, preserve and manage traditional agricultural knowledge and the landscapes in which they develop. For example, the site where the episode of August 29 occurred, is part of such a programme to protect the traditional hillside viticulture of Soave wine, which has been practised through a sustainable management system that promotes the uniqueness of the landscape. Here, the so-called 'heroic viticulture' system survives. Within this system, vines are grown on steep terraced slopes that are designed and constructed according to traditional techniques. This traditional management practice is, however, very fragile. Steep terraces represent an important heritage from the landscape, historical, economic, and cultural point of view. At the same time, they are intrinsically fragile and susceptible to hydrogeological risk, as mentioned before. Such areas need to be adapted to climate change adopting a series of sustainable strategies with the purpose to preserve the ecosystems but also tradition and people.

Looking at the literature and farmers associations technical reports, one can easily feel that the climatic impact on viticulture is generally well-recognised. The indications to mitigate such criticalities are already there: the 2030 Agenda for Sustainable Development. The sustainability of an agricultural practice must be assessed in the economic, social, and environmental context. It must combine the themes of productivity, profitability, resilience, land/water management, decent working conditions, and well-being, to capture its multidimensional nature. Particularly, in an articulated system such as steep-slope terraced vineyards, the sustainability of agricultural practice must manifest in all its components.

Find more about the research: *https://blogs.egu.eu/divisions/nh/2020/12/21/climate-change-is-viticulture-under-threat/*

Data: Land degradation in global arable lands

Title: Land degradation in global arable lands.

Description: Land degradation is a global environmental issue that affects the world's arable lands on a large scale, thus threatening global food production systems. This study analyzes the land degradation footprint on global arable lands, using complex geospatial data on certain major degradation processes, i.e. aridity, soil erosion, vegetation decline, soil salinization and soil organic carbon decline. By applying geostatistical techniques that are representative for identifying the incidence of the five land degradation processes in global arable lands, results showed that aridity is by far the largest singular pressure for these agricultural systems, affecting ~40% of the arable lands' area, which cover approximately 14 million km^2 globally. Therefore, the world's arable lands are particularly vulnerable to uni-degradation (the incidence of a single degradation process), through large-scale aridity conditions. Also, it was found that soil erosion is another major degradation process, the unilateral impact of which affects ~20% of global arable systems.

Resolution: 1km

Time Reference: 2012

Format: GeoTIFF

Projection: Equal-area Mollweide

Input data: Aridity, soil erosion, vegetation decline, soil salinization and soil organic carbon decline.

More Information:

Release Date: 28/1/2021

Reference of source (Citations) :
Prăvălie, R., Patriche, C., Borrelli, P., Panagos, P., Roşca, B., Dumitraşcu, M., Nita, I.A., Săvulescu, I., Birsan, M.V. and Bandoc, G. 2021. Arable lands under the pressure of multiple land degradation processes. A global perspective. Environmental Research, 194, art no .110697.

Sources: *https://esdac.jrc.ec.europa.eu/content/land-degradation-global-arable-lands#tabs-0-description=0*

Special Issue of ISWCR: soil erosion assessment, tools and data

This special issue was proposed and organized by the FAO's Global Soil Partnership (GSP) after the Global Symposium on Soil Erosion (GSER), held at the Food and Agriculture Organization of the United Nations (FAO of the UN) headquarters, Rome, Italy on 15–17 May 2019.

The special issue compiles eleven research articles coming from Asia, Europe, and Latin America. The topic covers soil erosion assessment, tools, and data creation, consolidation and harmonization present advances in soil erosion research with a focus on new tools that are being used to assess soil erosion rates. Articles of the special issue present different means of assessing soil erosion, such as isotopic approaches, remote sensing, field measurements, or modeling, amongst others.

Here are some facts about the organizing of the special issue.

- Proposal Submitted to the Editorial office on Dec. 17, 2019
- The system was set up for receiving submission on Jan. 21, 2020
- The first submission on Jan. 21, 2020
- The final submission on March 18, 2020
- The special issue was officially released on Dec. 9, 2020
- 26 articles were planned, 18 of them were received and 11 was finally published (excluding the editorial)
- For accepted papers, there are 1 accepted with the 3rd revised version, 5 went through 2 rounds of revision, and 7 of them went through 1 round of revision.
- The average processing is 121 days for all submitted papers. For accepted papers, the shortest processing is 113 days and the longest was 240 days.

Special Issue of ISWCR: soil erosion assessment, tools and data

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Updated CiteScore of ISWCR in January 2021

Calculating the CiteScore is based on the number of citations to documents (articles, reviews, conference papers, book chapters, and data papers) by a journal over **four years**, divided by the number of the same document types indexed in Scopus and published in those same **four years**. Below is the updated information on Scopus website:

International Soil and Water Conservation Research

Open Access

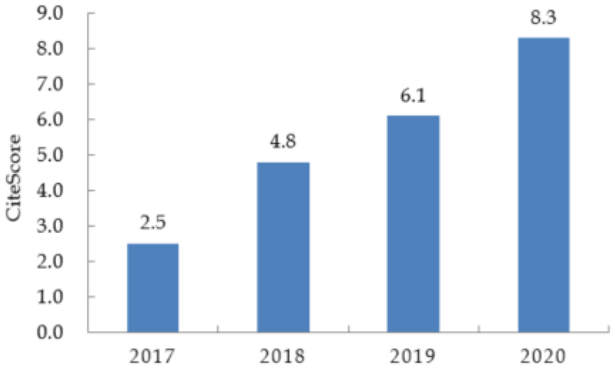
Scopus coverage years: from 2013 to present

Publisher: International Research and Training Center on Erosion and Sedimentation & China Water and Power Press

ISSN: 2095-6339

Subject area: Environmental Science: Water Science and Technology
Environmental Science: Nature and Landscape Conservation
Agricultural and Biological Sciences: Agronomy and Crop Science
Agricultural and Biological Sciences: Soil Science

Category	Rank	Percentile
Environmental Science └ Water Science and Technology	#17/217	92nd
Agricultural and Biological Sciences └ Agronomy and Crop Science	#28/334	91st
Environmental Science └ Nature and Landscape Conservation	#14/160	91st
Agricultural and Biological Sciences └ Soil Science	#17/126	86th

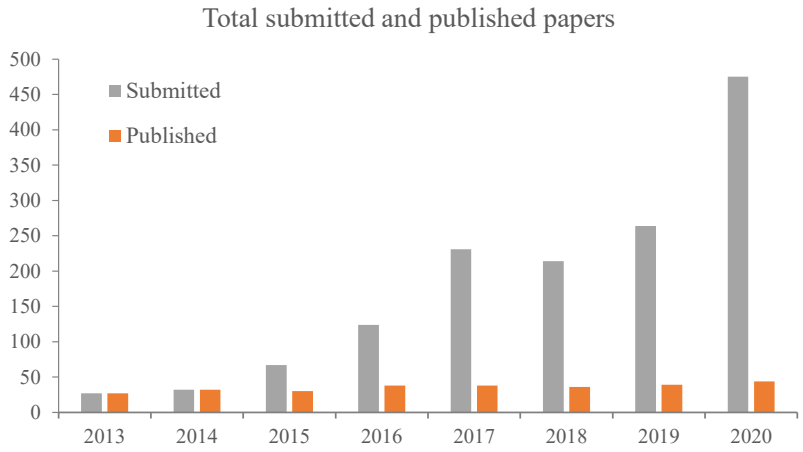


8.3 = 1,272 Citations to date / 154 Documents to date

Last updated on 10 January, 2021 • Updated monthly

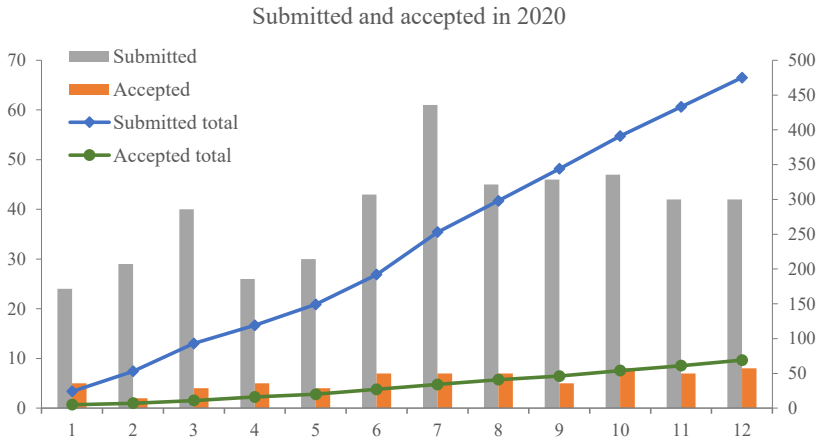
Annual Volume of Submissions and Publishing since 2013

Year	Published	Submitted
2013	27	27
2014	32	32
2015	30	67
2016	38	124
2017	38	231
2018	36	214
2019	39	264
2020	44	475



Monthly Submissions & Acceptance in the current year (2020)

Month	Submitted	Accepted
1	24	5
2	29	2
3	40	4
4	26	5
5	30	4
6	43	7
7	61	7
8	45	7
9	46	5
10	47	8
11	42	7
12	42	8



The International Soil and Water Conservation Research (ISWCR), initiated in June 2013, is a quarterly academic journal in English and publishes in Science Direct of Elsevier with open access globally. Since initiation, ISWCR has developed rapidly and established a good reputation in both international academia and publishing industry. It was indexed by Chinese Science Citation Database (CSCD) in April 2015, covered by SCOPUS in January 2017, and was indexed by Emerging Sources Citation Index (ESCI) of Clarivate Analytics in October 2017. In July 2019, ISWCR was officially indexed by SCIE and the first impact factor, obtained in June 2020, is 3.770.

Contents of Issue 4, 2020 for ISWCR

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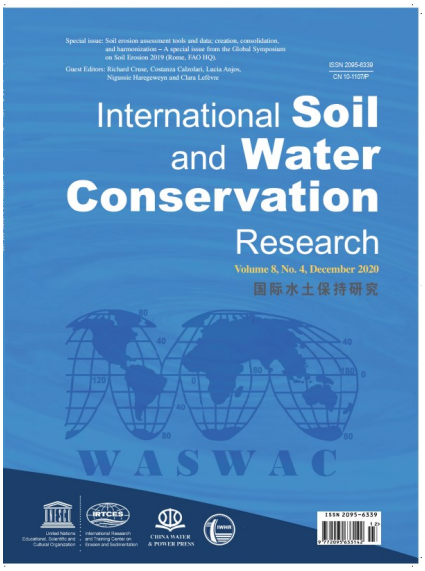

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Papers Published in the ***International Journal of Sediment Research*** Volume 36, No. 1, 2021
Pages 1-163 (February 2021)

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https://www.sciencedirect.com/journal/international-journal-of-sediment-research with free access to the paper abstracts.

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