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HOT NEWS

ISSUE 7, 2019



WORLD ASSOCIATION OF SOIL AND WATER CONSERVATION

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WASWAC Website: www.waswac.org



Updated Information of WASWAC World Conference IV

Soil and Water Resources Management for Climate Smart Agriculture

and Global Food and Livelihood Security

At New Delhi, India, November 5th-9th, 2019



(1) Website change

The original website (<http://soilconservation.org/>) is no longer in use. The current website: <http://scsi.org.in/> of Soil Conservation Society of India has been updated with details of the WASWAC World Conference IV. You may visit this page (http://scsi.org.in/sw_index.html) for the updates, submission of abstracts and registration. The delegates who have submitted their abstract do not need to re-submit.

(2) Deadline of registration fee payment without late fees

- Last date for registration without late fees **October 1, 2019**

If you do not pay the extra late fees, it is time to pay the registration fee now.

(3) Contacts

Any problems about registration, payment or local information, please do not hesitate to contact Dr. Sanjay Arora via aroraicar@gmail.com

Any problems about WASWAC membership, please contact Dr. Pengfei Du via waswac@foxmail.com or waswac@vip.163.com

(4) If you need the conference permission, which is release by the Ministry of External Affairs of India, during the process of visa application, please download here:

<http://www.waswac.org/waswac/rootfiles/2019/09/30/1570787767392080-1570787767455416.pdf>

Using the USLE: Chances, challenges and limitations of soil erosion modelling

By Christine Alewell, Pasquale Borrelli, Katrin Meusburger, Panos Panagos

Highlights

- Soil erosion modelling is crucially needed for soil monitoring and mapping.
- Critical debate on USLE models requires discussion of model concepts and suitability.
- USLE type modelling strives from purely empirical to more process based concepts.
- Model comparisons illustrate that there is not one superior model.
- Model concepts need to be chosen dependent on data availability and project needs.

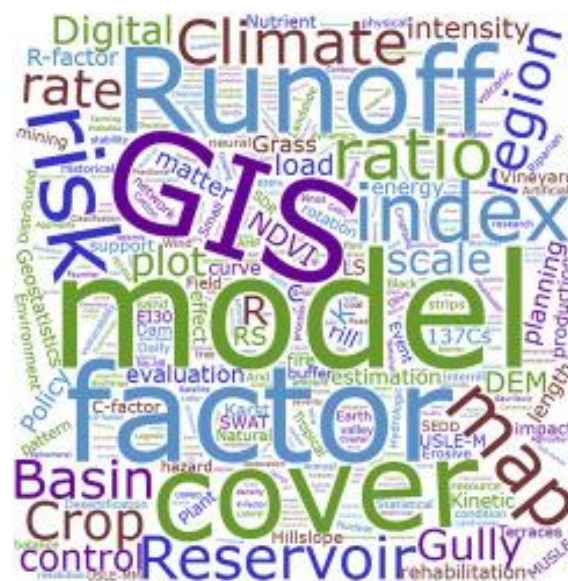
Abstract

To give soils and soil degradation, which are among the most crucial threats to ecosystem stability, social and political visibility, small and large scale modelling and mapping of soil erosion is inevitable. The most widely used approaches during an 80year history of erosion modelling are Universal Soil Loss Equation (USLE)-type based algorithms which have been applied in 109 countries. Addressing soil erosion by water (excluding gully erosion and land sliding), we start this review with a statistical evaluation of nearly 2,000 publications). We discuss model developments which use USLE-type equations as basis or side modules, but we also address recent development of the single USLE parameters (R, K, LS, C, P). Importance, aim and limitations of model validation as well as a comparison of USLE-type models with other erosion assessment tools are discussed. Model comparisons demonstrate that the application of process-based physical models (e.g., WEPP or PESERA) does not necessarily result in lower uncertainties compared to more simple structured empirical models such as USLE-type algorithms. We identified four key areas for future research: (i) overcoming the principally different nature of modelled (gross) versus measured (net) erosion rates, in coupling on-site erosion risk to runoff patterns, and depositional regime, (ii) using the recent

increase in spatial resolution of remote sensing data to develop process based models for large scale applications, (iii) strengthen and extend measurement and monitoring programs to build up validation data sets, and (iv) rigorous uncertainty assessment and the application of objective evaluation criteria to soil erosion modelling.

The full text can be acquired at:

<https://www.sciencedirect.com/science/article/pii/S2095633919300048>



Overturning the truth on conservation tillage

By Rachel Leege

Just as we blend, cut, and fold ingredients together to follow a recipe, farmers use equipment to stir together soil and crop residue (stalks and roots of previous crops) before planting. This mechanical action is called tillage.

Similar to our kitchen cupboard with a blender, mixer, and beater, farmers have access to a variety of tillage equipment. Farmers choose the “right” piece of tillage based on many factors, including location, soil type, crop, and landscape.

Tillage has been around for thousands of years. “It is difficult for nearly anyone to grow a crop, or even a garden, without unconsciously going through the motions of tillage,” says Aaron Daigh. “I

see it as a near equivalent to muscle memory or a natural reflex.” Daigh is a researcher and professor at North Dakota State University.



Aerial photo of on-farm tillage research in fall.

Tillage strips include chisel plow, two types of strip till, and a shallow vertical till. Credit: Dorian Gatchell.

Modern conservation tillage practices protect the soil and environment. For example, they can reduce erosion from water or wind and keep nutrients in the right place.

Farmers are showing more and more interest in adapting conservation practices on their operations. But, adopting a new tillage system can be intimidating due to many real and perceived concerns. For example, some farmers presume conservation tillage will lead to lower yields and an increased risk for seedling diseases.



Disks (left), shanks (middle), and coulters (right) are commonly found on tillage equipment. Credit: Addison Dahmer

Scientists are making it easier for farmers in the Midwest to make the right tillage decisions when considering modern conservation practices. Daigh and his team compared the effects of three common conservation tillage systems to the traditional method of a chisel plow with field cultivation:

1. Shallow vertical till
2. Strip till using shanks
3. Strip till using coulters

After four years, researchers observed that yields rarely, if ever, differed among the four tillage systems at any of the farms. Still, change is never easy. The study by Daigh and his team suggests that adapting conservation tillage practices will not cause yield losses. In fact, conservation tillage practices will lower on-farm costs while preserving long-term productivity.

“These results may ease farmers’ concerns about switching to conservation tillage,” says Daigh. “Perhaps more farmers will consider if conservation tillage practices are a good fit for their operations.” “I encourage farmers who are interested, but hesitant, to try conservation tillage practices on one field to get more accustomed to the new system,” he says. “Then, try it out on more fields until you get your farm designed to meet your needs and goals.”

As always, the whole picture should be evaluated before making on-farm decisions. “It’s not just about yield,” says Daigh. “Economics and crop-residue for erosion protection should also guide farmer decisions.” The research team continues to investigate. “We are currently looking at the incorporation of cover crops into reduced tillage practices,” says Daigh.



Photo of strip till (left) and chisel plow (right) strips for on-farm research. Credit: Aaron Daigh

This study focused on farms with one type of tillage used per field. However, newer equipment allows for variable tillage methods at once. For example, it may be capable of vertical tillage and strip tillage at the same time. In the future, Daigh and his colleagues would like to see researchers evaluate the effects of these new technologies.

Read more about this work in **Agricultural & Environmental Letters**. This research was partially funded by the North Dakota Soybean and Corn Councils, Minnesota Soybean and Corn Research and Promotion Councils, North Dakota Agricultural Experiment Station, University of Minnesota Extension, North Dakota Extension, USDA-NRCS Conservation Innovation Grant 69-3A75-17-282, and USDA-NIFA Hatch project 1005366.

Source: <https://www.soils.org/discover-soils/story/overtuning-the-truth-on-conservation-tillage>

Scientists call for infiltration to be better incorporated into land surface models

By Kaine Korzekwa



Soil structure is one of many factors that affects infiltration of water. Credit: J. Sebastián Silva O.

Soil scientists can't possibly be everywhere at once to study every bit of soil across the planet. Plus, soils are constantly changing.

Conditions like weather and land use have a major impact on soil over time. So, to understand everything about soil, we would need to be continuously studying soil around the world. Since this isn't possible, soil scientists are turning to math to predict what happens at the soil's surface.

Soil models – just like economic models – are helpful to predict trends and make suggestions. An example might be the impact of climate change on water processes in the soil. Models help fill in the gaps of measured data.

Since soil is a complex environment, a soil model consists of many pieces that represent different processes. One important aspect of soil models – how water interacts with soil at the land surface – was recently discussed by a group of almost 30 scientists. Their work was recently published in *Vadose Zone Journal*.

Water infiltration at the land surface is a crucial area of study. Infiltration refers to what fraction of the water is getting absorbed by the soil. Being able to predict if precipitation will run over the soil surface or soak in is crucial in land management decisions. It affects aspects of land management like erosion control. It is also important in making sure we have a safe and clean water supply. Land surface models can help scientists predict and simulate the water and energy cycles from the soil's surface into the atmosphere.

Each piece of a land surface model is important. The study team found that information about infiltration warrants more attention in land surface models.

In order to be truly useful, land surface models need to include loads of information. This includes soil structure, soil moisture and temperature, precipitation, terrain, plants, and more. Scientists use the information to calculate the Earth's climate or see how land use changes may affect it.

Harry Vereecken, Forschungszentrum Jülich in Germany, was the lead author of this effort. "The review found important gaps in the current treatment of infiltration processes in land surface models," says Vereecken. "Current models don't account for the effect of structural properties on soil water dynamics. Also, we saw the lack of a consistent framework to upscale infiltration processes from different scales and the large diversity in approaches to describing them."



Slower infiltration can lead to increased soil erosion. Credit: Martha Pings

The group is calling on scientists to work together and lend their skills to better include this information in land surface models. This is so the models better reflect the reality of what's happening at the Earth's surface.

Their review was a way to compile scientific research from over a long period of time and give suggestions about where soil scientists should focus their efforts next. In looking over lots of research, they found there's no consistent way to predict infiltration. They also found that some aspects of soil that affect infiltration are often ignored.

"The climate and Earth sciences community typically operate at a larger scale than the soil science community," Vereecken explains. "Soil scientists have mostly worked at smaller scales, such as plot to field scale to study processes and often did not include atmospheric processes in their studies. We wanted to write about the importance of these communities coming together. This is the first review ever that addressed the handling of infiltration processes in these models."

He adds that they hope their work provides a common understanding about how infiltration processes are dealt with in land surface models. While it can be difficult to quantify these complex processes and combine them into larger models, it's important in studying the state of the planet. Both groups need each other. Without soil scientists working on a smaller scale, others won't have data for their models.

“Because soil exerts a key control on climate-related processes, it can add relevance to the research we are doing as soil scientists,” Vereecken says. “We hope this can serve as a kind of reference paper for other scientists and connect those that work on different aspects of land surface models.”

Read the full review in *Vadose Zone Journal*. This review is the result of work from a workshop held on this topic in Germany and the International Soil Modeling Consortium (ISMC) effort.

Source: <https://www.soils.org/discover-soils/story/nitrogen-from-biosolids-can-help-urban-soils-and-plant-growth>

Conference: Soil and the SDGs Challenges and need for action



A Meeting of policy makers, scientists, civil society and industry

November 25, 2019

Brussels environment

Site de Tour & Taxis, Havenlaan-Avenue du Port 86C, Brussels, 1000

About the conference

Soil and the SDGs conference is organised on behalf of the European Commission, and it is an opportunity for policy makers, public institutions, researchers, industry and civil society to come together to exchange knowledge and practices on the implementation in the EU of soil and land-related SDGs, and particularly the Land Degradation Neutrality target.

During this one-day conference with a rich agenda, we will first address the challenges related to soil and land degradation in the EU and then we will explore the opportunities for urgently needed

action. Throughout the day, representatives from the EU institutions, the European Environment Agency, the scientific community and the United Nations Convention to Combat Desertification will provide insights on the issue from different perspectives. Selected Member States will present their cases on the implementation and monitoring of the relevant SDGs.

Agenda

Monday, November 25th

08.30 Registration and welcome coffee

09.00 Welcome address

Moderated by Claudia Olazabal (Head of Unit, DG Environment)

with

Daniel Calleja (Director-General for Environment, European Commission) (TBC)

Ibrahim Thiaw (Executive Secretary of the UNCCD)

Representative of the Finnish Presidency of the Council of the EU (TBC)

09.45 The need to address land and soil degradation in the EU

Moderated by Linda Maring (Deltares)

1) Implementation of land and soil-related SDGs in the EU

Saskia Keesstra (Wageningen Environmental Research)

2) Soil condition in Europe 2020

Rainer Baritz (European Environment Agency)

3) Combating desertification in the European Union

Phil Wynn Owen (European Court of Auditors)

10.45 Coffee break

11.15 4) The World Atlas of Desertification

Michael Cherlet (Joint Research Centre, European Commission)

5) The Land Neutrality Target Setting Process

Juan Carlos Mendoza (Global Mechanism of the UNCCD)

12.00 Panel Discussion: A growing sense of urgency for healthy soils

Moderated by Saskia Keesstra (Wageningen Environmental Research)

With Rainer Baritz, Phil Wynn Owen, Michael Cherlet, Juan Carlos Mendoza



13.00 Lunch break

14.00 **Time for action**

Moderated by Melanie Muro (Milieu)

6) The role of research

Cees Veerman (Chair of the Horizon Europe mission on Soil Health and Food)

7) Experiences with land degradation neutrality in the EU

Germany: Kirstin Marx (German Environment Agency)

Italy: Anna Luise (Italian National Institute for Environmental Protection and Research)

8) IPCC Special Report on Climate Change and Land

Jean-François Soussana (TBC)

9) Linking diets to soils: political economy issues

Olivier De Schutter (Co-chair International Panel of Experts on Sustainable Food Systems)

10) Importance of soil awareness for actions needed to address soil degradation in the EU

Gabriele Broll (Osnabrück University)

16.00 Coffee break

16.30 **Panel discussion: the way forward**

Moderated by Linda Maring (Deltares)

With Claudia Olazabal, Jean-François Soussana (TBC), Olivier De Schutter and Gabriele Broll

17.30 End

Data: Chemical properties at European scale based on LUCAS topsoil data

This group of datasets contains 8 chemical properties: pH, pH (CaCl), Cation Exchange Capacity (CEC), Calcium carbonates (CaCO₃), C:N ratio, Nitrogen (N), Phosphorus (P) and Potassium (K) using soil point data from the LUCAS 2009/2012 soil surveys (around 22,000 points) for EU-26 (not included Cyprus and Croatia). The chemical properties maps for the European Union were produced using Gaussian process regression (GPR) models. Resolution: 500m

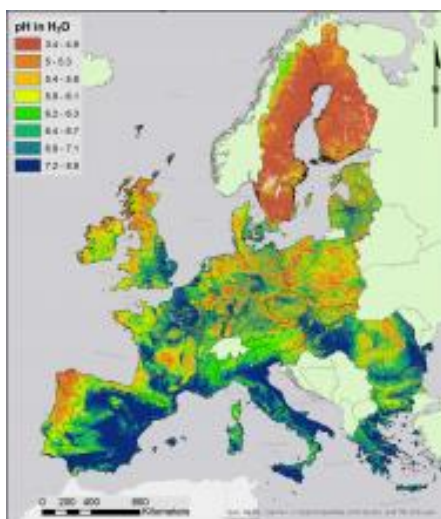
Resource Type: Datasets, European Soil Database & soil properties

Registration is requested: Yes

Publisher: European Commission, Joint Research Centre (JRC)

Year: 2019

Language: English



Metadata

Data are available for the following **Chemical properties**:

- pH (measured in H₂O)
- pH (n CaCl₂ 0.01 M solution)
- Cation Exchange Capacity (CEC)
- Calcium carbonates (CaCO₃)
- C:N ratio
- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)

Note that these data are based on the LUCAS topsoil data for ca 22,000 samples across EU.

Resolution: 500m

Geographical Coverage: European Union (EU-26 excluding Cyprus and Croatia)

Input data: LUCAS 2009 Topsoil 22,000 sample point data

Model: Gaussian process regression (GPR)

Description

The Physical property maps (clay, silt and salt content; coarse fragments; bulk density; USDA soil textural class; available water capacity) are available in ESDAC from September 2015. In September 2019, we concluded the development of the LUCAS Chemical parameters [pH, pH CaCl, Cation Exchange Capacity (CEC), Calcium carbonates (CaCO₃), C:N ratio, Nitrogen (N), Phosphorus (P) and Potassium (K)] and we made them available for download together with the scientific publications. With 22,000 sampled locations the LUCAS soil database is unique in Europe for the number of available observations, its spatial coverage and its temporal resolution. While LUCAS point data are available upon request from the European Soil Data Centre (ESDAC), the interpolated maps of chemical properties offer a better overview of the distribution of soil chemical properties in the EU to the scientific community and to policy makers. The derived maps will establish baselines that will help monitor soil quality and provide guidance to agro-environmental research and policy developments in the European Union. The chemical properties datasets, together with the physical properties, contribute to one of the main objectives of the GlobalSoilMap project.

The modelling is based on Gaussian Process Regression technique that allows the estimation of prediction uncertainty. The best performing prediction was obtained for the C:N ratio ($R^2=0.91$), followed by phosphorus and potassium ($R^2=0.75$). The performance prediction of the rest of chemical properties in terms of R^2 is higher than 0.60 with the exception of CEC ($R^2= 0.35$).

References

Ballabio, C., Lugato, E., Fernández-Ugalde, O., Orgiazzi, A., Jones, A., Borrelli, P., Montanarella, L. and Panagos, P., 2019. [Mapping LUCAS topsoil chemical properties at European scale using Gaussian process regression](#). *Geoderma*, **355**: 113912.

Call for nominations for prize and award



Glinka World Soil Prize

The nomination process for the Glinka World Soil Prize 2019 is still open

Take the opportunity to win a USD 15 000 check and the Glinka gold-plated medal! The nomination process for the Glinka World Soil Prize is officially open and all GSP Partners are invited to nominate candidates, either directly or on behalf of a third party. If you think you are an eligible candidate, propose your nomination to your GSP country focal point or to the closest GSP partner. Submit the nomination form by 15 October 2019 to GSP-Secretariat@fao.org.

The Glinka World Soil Prize is an annual award for dynamic change-makers dedicated to solving one of our world's most pressing environmental issue: soil degradation. The Glinka honors individuals and organizations whose leadership and activities have contributed, or are still contributing to the promotion of sustainable soil management and the protection of soil resources.

Who can submit nominations?

All GSP Partners are invited to nominate candidates, either directly or on behalf of a third party. Self-nominations are not allowed and will be disqualified. Nominations can be submitted in English, French, Spanish, Russian, Arabic or Chinese.

If you think you are an eligible candidate propose your nomination to the GSP country focal point or to the closest GSP partner (full list available [here](#))

Once completed, the nomination form should be submitted to:

GSP Secretariat

Viale delle Terme di Caracalla, B708bis

00153 Roma, Italy

Email: GSP-Secretariat@fao.org

Who can be nominated?

Nominees should have made outstanding achievements in implementing the principles and recommended actions of the revised World Soil Charter adopted by the FAO Conference in June 2015, and the achievement should contribute to one of the five pillars of the GSP (a proven impact at field level will be an added value).

What is the deadline for submitting a nomination?

Completed nominations can be submitted by post or email and must be received by 15 October 2019 cob Rome time.

Who is Konstantin Dmitrievich Glinka?



Konstantin Glinka (1867-1927) was a prominent Russian soil scientist who is credited for his unique contribution to understanding the principles of the geographical distribution of soils and extensive activities on the exploration, mapping and assessment of vast areas of Siberia, the Far East and Central Asia, as well as his important studies in the areas of soil mineralogy, chemistry and paleopedology.

Details: <http://www.fao.org/world-soil-day/glinka-world-soil-prize/en/>



World Soil Day Award

The call for application for the World Soil Day Award is now open

The World Soil Day Award (WSDA) consists of a medal and a USD 15,000 check. If you organized an exciting WSD event for the campaign 2018 'Be the Solution to Soil Pollution', don't miss the chance to compete. Submit the Call for Application by 30 September 2019 to the GSP Secretariat.

This Prize is an annual award that honors individuals, communities, organizations and countries that organized remarkable and engaging World Soil Day activities or campaigns in the previous year. It will be awarded for the second time in Bangkok, Thailand on 5 December 2019 to prize the best WSD event held in the framework of the communication campaign of the previous year.

About the award

The 6th GSP Plenary Assembly endorsed the establishment of the annual World Soil Day Award (WSDA), as a recognition tool for individuals and/or institutions that have made an effort to organize successful celebrations.

The objective of the WSDA is to encourage organizers of WSD events at all levels to facilitate challenging and outstanding celebrations around the globe.

The Award is sponsored by the Kingdom of Thailand, the champion country in the establishment of the now-famous World Soil Day. The UN General Assembly decided in December 2013 to officially designate 5 December as World Soil Day to acknowledge the lifelong work and commitment of His Majesty the late King Bhumibol Adulyadej of Thailand who has significantly contributed to improving the quality of lives of millions through sustainable soil management.

Who can apply?

The Award may be granted to individuals, institutions, NGOs, academia, colleges and universities, private companies or any other entities;

A wide range of WSD events can be considered for the award. The event has to follow the WSD theme of the year and has to take place between 1 - 15 Dec.

How to apply?

After the completion of the event, the organizers should submit the WSD report to the Global Soils Partnership (GSP) Secretariat (GSP-Secretariat@fao.org) in any of the official UN languages;

Along with the report, WSD organizers are invited to complete their application by sending to the Secretariat:

- high quality photographs (preferably accompanied by captions);
- videos (showing the work-in progress and the results);
- communication material or any related publications,
- digital coverage (website/web stories/blog/ social media); and
- demonstrated wide appeal in the media (i.e. media coverage and press release);

Pictures taken throughout the event must be shared on social media (Facebook, Twitter, Instagram, LinkedIn) with the hashtags #WorldSoilDay and #GlobalSoilPartnership #UNFAO.

It is crucial that the organizers submit testimony or proof of the success of the World Soil Day celebration, and of the impact that the event had on raising awareness for the cause of healthy soils.

Details: <http://www.fao.org/world-soil-day/world-soil-day-award/en/>

Happy Chinese National Day



October 1 is the Chinese National Day. National Day, celebrating the foundation of the People's Republic of China, is one of the seven legal holidays in China. October 1, 2019 will be the 70th anniversary of the founding of the People's Republic of China.



There will be a variety of grand ceremonies and activities in China during National Day, such as a great ceremonial review of troops and lighting fireworks in the evening. National Day lasts 3 days since the year 1997. But people actually get a 7-day vacation which combines National Day holiday and two weekends on either side.

National Day holiday is another golden week in China. People will rush out to do some long-cherished travel, go shopping and do some other things.

Every year, China National Day Holiday lies between Oct.1 and Oct.7.

Wish all members of WASWAC a very happy Chinese National Day!

