

NEWSLETTER

2/2015

ESSC EUROPEAN
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Array of splash cups and throughfall collectors under four year old trees in an experimental forest in Xinganshan, Jiangxi Province, south-east China. Photo taken 14 June 2012 by Philipp Goebes (Tübingen, Germany).

E.S.S.C. NEWSLETTER 2/2015

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This issue of the ESSC Newsletter presents the 25th of our 'Guest Editorials.' This is an opportunity for leading authorities in the soil science community to offer their perspectives on issues relating to soil conservation. This contribution is from Thomas Scholten and his team from Tübingen, Germany.

Catena Verlag has kindly agreed to publish a book based on Guest Editorials. This will be entitled '**Global Perspectives on Soil Conservation.**' This will form part of the Catena 'Advances in GeoEcology' series. In principle, it is agreed that there will be future volumes, associated with the four year cycle of Congresses of the ESSC. Work on Volume 1 is progressing well.

SOIL EROSION UNDER FORESTS

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Soil erosion and its prevention are important issues from both ecological and economic perspectives and have been discussed for centuries (Figure 1). Severe and continuous soil losses particularly occur in regions with high rainfall intensities. Thus, soil degradation by erosion and its control are major environmental concerns and have been a major research topic during recent decades (e.g. in subtropical China: Thorp, 1936; Kolb, 2003; Wang *et al.*, 2005). Today, soil erosion by water is still one of the major soil threats in Europe, with a mean estimated soil loss rate of 2.46 t ha⁻¹ yr⁻¹, including agricultural, forest and semi-natural areas (Panagos *et al.*, 2015). Erosion causes enormous economic costs (Pimentel *et al.*, 1995; Lal, 1998; Montgomery, 2007) due to decreased land productivity, off-site effects caused by deposits, and pollutants from eroded sites. Hence, soil erosion affects human safety, food security and socio-economic development (Bork, 1989; Lin, 2002; Darilek *et al.*, 2009).

There is broad consensus that vegetation is a key control of erosion processes (Thornes, 1990; Morgan, 2005). Generally, forests have very low rates of soil loss (e.g. 0.07 t ha⁻¹ yr⁻¹ and 0.91% of total soil loss for Europe; Panagos *et al.* 2015). Therefore, afforestation is widely used as a measure of soil protection against soil erosion (Vertessy, 2001; Huang *et al.*, 2003). However, insufficient is known about the mechanisms and processes that cause the erosion protection functions of vegetation (e.g. Goebes *et al.*, 2015; Seitz *et al.*, 2015). Consequently, integrated land management, including afforestation as protection measures against soil erosion, is often based on experience rather than on sound scientific evidence.



Figure 1: Historical painting of soil erosion in 1342. Augustinian prior Dymes von Gomaringen versus Abbot Ulrich von Kaisheim: cause of complaint was that soil from a Kaisheimer vineyard was deposited in the domain of the Augustinian abbey. Abbot Ulrich asserted that the Augustinians excavated soil too close to his vineyard (source: R. Schreg, *Bodenerosion 1342: ein Rechtsstreit in Esslingen*. *Archaeologik*, 19. Januar 2013, *HStA Stuttgart H 107/15 Bd 7 Bl. 22*, via Wikimedia Commons).

Plant effects

The main effects of a plant cover regarding modification of erosion processes are modification of drop-size distribution, retention of direct raindrop impact (splash erosion), and changes in the spatial distribution of throughfall amount at the ground surface (Chapman, 1948; Levia and Frost, 2006). Rainfall characteristics alter when raindrops hit the plant canopy. Some will shatter, producing smaller drops, while some will coagulate on leaves before falling to the ground as large drops (Figure 2, Plate 1). The kinetic energy (KE) of throughfall in subtropical forests is ≤ 2.7 times higher than under open field conditions (Vis, 1986; Nanko *et al.*, 2008a; Geißler *et al.*, 2012). For example, Brandt (1989) has shown that large drops from leaves may be significant sources of splash detachment in forests, indicating that drop size may be more important than drop velocity in specific circumstances (Styczen and Høgh-Schmidt, 1988; Salles and Poesen, 2000; Goebes *et al.*, 2014). Therefore, a continuous and intact ground cover is a central measure to prevent soil erosion in forests (e.g. Zhou *et al.*, 2002; Ghahramani *et al.*, 2011). Based on these mechanisms, the processes of soil erosion under forest can be divided into two compartments: (i) the alteration of rainfall into throughfall and (ii) the drop impact on the soil surface, on litter or on the surfaces of shrubs and herbs, followed by potential overland flow generation.

There is no doubt that mechanisms that control soil erosion under forest are very dynamic in both space and time and soil loss may even increase with increased tree height, due to changes of the throughfall KE of rain (TKE). Thus, one of the central issues regarding TKE in forests is its relation to rainfall properties, specific species, forest stand variables and canopy architecture (Figure 3). Reflecting the relevance of TKE for soil erosion, TKE has been measured in different regions, under different rainfall conditions and below different vegeta-

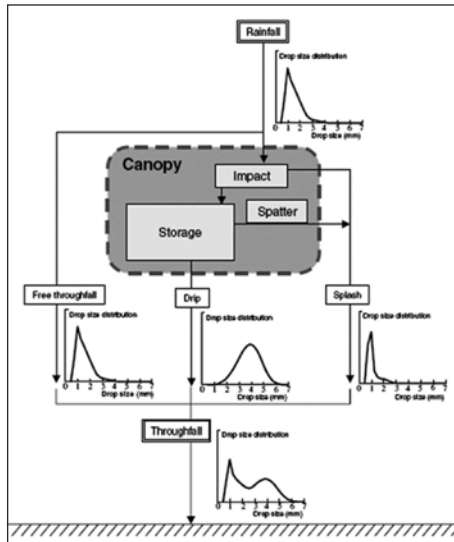


Figure 2: Partitioning of rainfall into the components of throughfall with characteristic drop size distributions (source: Nanko *et al.*, 2006).



Plate 1: A coagulated raindrop dripping from the tip of a *Schima superba* leaf. Photo taken 20 May 2010 by Christian Geißler.

tion types over the past 15 years (Zhou *et al.*, 2002; Nanko *et al.*, 2008a,b; Geißler *et al.*, 2012; Goebes *et al.*, 2015). In addition, several studies investigated the influence of different leaf and tree architectural traits and rainfall characteristics on TKE. For instance, a positive effect

on TKE has been reported for leaf area (Goebes *et al.*, 2015), tree height (Foot and Morgan, 2005; Geißler *et al.*, 2013), crown area (Nanko *et al.*, 2008b), crown base height (Brandt, 1989; Nanko *et al.*, 2008b) and throughfall amount (Brandt, 1989; Scholten *et al.*, 2011; Geißler *et al.*, 2012). Furthermore, deciduous tree species can cause higher TKE than evergreens (Goebes *et al.*, 2015). TKE is negatively correlated with Leaf Area Index (LAI) (Nanko *et al.*, 2008a) and the number of branches (Herwitz, 1987). Furthermore, TKE is highly spatially variable (Finney, 1984; Nanko *et al.*, 2011).

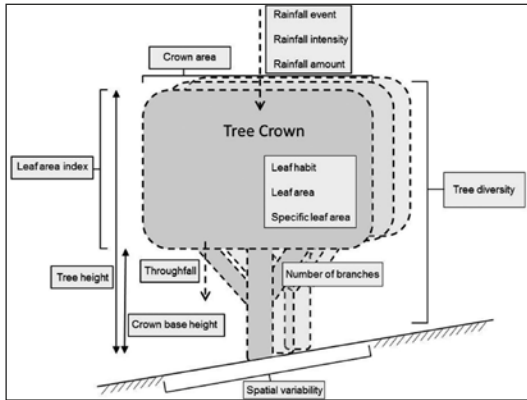


Figure 3: Rainfall characteristics as well as leaf and tree architectural traits influencing throughfall kinetic energy (TKE) under forests (Goebes *et al.*, 2015).

To consider such high variability within natural systems, one needs many measurements and replications per unit space and time. By refining the Ellison-type splash cups, calibrating them and optimizing the measuring procedure, a highly precise and reliable device was produced and applied in large numbers (Scholten *et al.*, 2011, Goebes *et al.*, 2015). By using different calibration measures and standard rainfall characterizing values (Geißler *et al.*, 2012), specifically a laser disdrometer (Scholten *et al.*, 2011), it could be shown that the Tübingen splash cups yielded precise and reproducible results (Plate 2). The feasibility of the approach, despite steep slopes, remote sites and harsh meteorological conditions, was shown by using a temporary network of over 450 splash cups at once with a team of three people in Gutianshan National Nature Reserve, Zhejiang Province, south-east China (Geißler *et al.*, 2012).

Rainfall amount and intensity markedly affect the relation between rainfall KE and TKE (Goebes *et al.*, 2015). Higher rainfall amounts and intensities lead to a narrower ratio between rainfall KE and TKE in young forests. These external factors strongly influence canopy storage, which is believed to be the main controlling factor for throughfall KE in the spatial scale of forest stands and the temporal scale of rainfall events (Geißler *et al.*, 2012; 2013). The rainfall KE/TKE ratio ranged from 1.37–7.61, which suggests a stronger dependency of TKE on event characteristics, as discussed in the literature.

In the earliest phase of forest succession, mechanisms controlling TKE become activated gradually. During growth, the relation of throughfall components (especially free through-



Plate 2: Laser disdrometer and array of splash cups and throughfall collectors in an 80-year old secondary forest at Gutianshan National Nature Reserve in Zhejiang Province, south-east China (photo taken 5 June 2010 by Christian Geißler).

fall and drip) to each other changes substantially, affecting the total amount and variability of throughfall. The velocity of canopy closure determines the descent rate of TKE during the first years after forest establishment (Geißler *et al.*, 2013). With ongoing growth, TKE increases and then, after passing a certain threshold, exceeds rainfall KE (Goebes *et al.*, 2015). While a species-specific effect on TKE was found in many studies, a biodiversity effect (tree species richness) on TKE is still under discussion in the literature. Splash cup measurements in Gutianshan National Nature Reserve, Zhejiang Province, south-east China, support a clear species effect for four species with strongly contrasting leaf morphologies (Geißler *et al.*, 2012). In addition, among 11 species in a biodiversity and ecosystem functioning experiment in subtropical China, TKE increased under *Choerospondias axillaris* and *Sapindus saponaria* and decreased under *Schima superba* compared to open field rainfall. Thus, planting *Schima superba* has the potential to decrease soil erosion in early successional stages. The differences in TKE among varying species occur due to positive effects of tree architectural traits, including tree height, Leaf Area Index, crown area and crown base height, as well as due to a negative effect of the number of branches (Figure 4). In addition, leaf traits, including leaf area, leaf habit or leaf margin, account for species-species TKE differences. Considering biodiversity effects, Goebes *et al.* (2015) showed that in early successional stages of a forest, neighbourhood biodiversity effects on soil erosion processes are present. Larger crown areas and taller tree heights explained higher TKE in more diverse neighbourhoods of young forests. However, biodiversity effects on a broader spatial scale were not found in this study.

Litter cover and soil meso- and macro- fauna

In forests, litter cover decreases rainfall erosivity by absorbing the impact of raindrops, leading to a lower sediment discharge and runoff volume compared to bare ground (Morgan, 2005). Leaves of different species vary in their sizes, shapes, decomposition rates (Cornelissen, 1996) and thus in water storage capacities within the litter layer (Kim *et al.*, 2014), which has important influences on ground coverage and surface runoff. Litter decomposition can be very rapid, especially in warm and wet climates, and bare ground may occur, at least for some time during the year, thus allowing TKE to directly influence soil erosion rates. It is suggested that plant species and functional diversity of litter cover as well as a highly structured and diverse litter cover are important factors for soil erosion control on mountain slopes (Körner

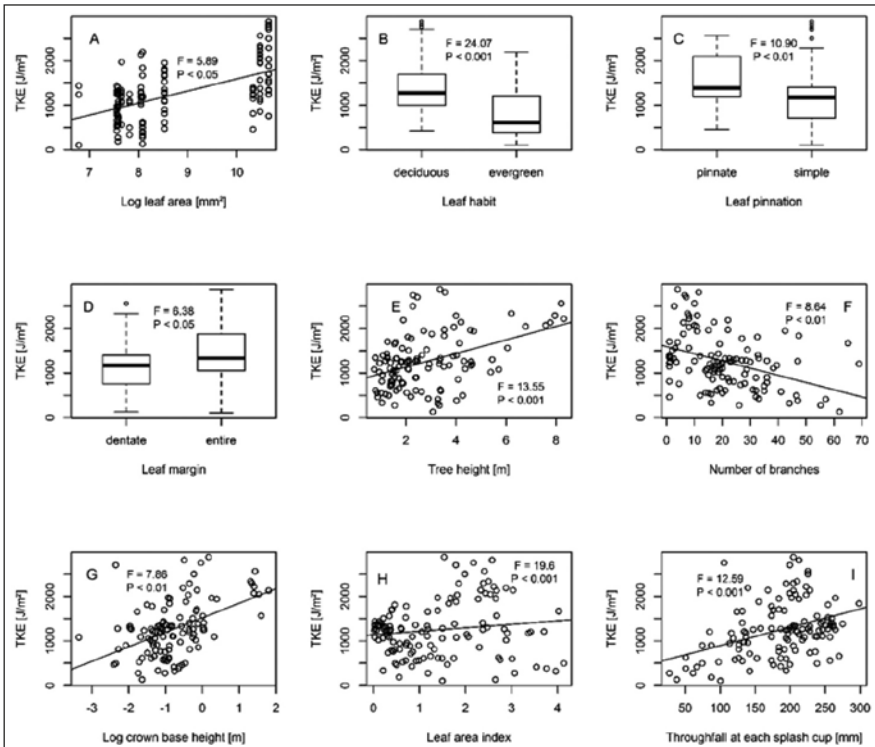


Figure 4: Throughfall kinetic energy (TKE) measured with splash cups (source: Scholten *et al.*, 2011) versus leaf traits (A-E), tree architectural traits (F-H) and abiotic covariates (I). Black solid lines indicate linear trend (source: Goebes *et al.*, 2015).

and Spehn, 2002; Martin *et al.*, 2010). Although the protective role of litter cover against soil erosion has long been known (e.g. Smith, 1914), little research has been conducted on the processes involved in the interaction of plant litter and erosion processes.

The quality and quantity of litter generally determines decomposer communities, ranging from microbes and fungi to animals of different size classes (Hättenschwiler *et al.*, 2005). Leaf litter provides habitats, maintains a favourable microclimate for soil fauna and provides an important food source (Sayer, 2006). Although the main part of litter decomposition is performed by microbes (Bardgett, 2005), the meso- and macro- fauna constitutes the dominant physical litter transformers. These in turn both promote litter decomposition (Hättenschwiler and Gasser, 2005) and influence soil physicochemical parameters (Gabet *et al.*, 2003). Hence, these organisms have the potential to influence geomorphological processes, including soil erosion (Butler, 1995; Wheaton *et al.*, 2011; Butler and Sawyer, 2012). Allen *et al.* (2014) linked ecological principles to geomorphological aspects in general. However, our knowledge about how these principles affect soil erosion remains rudimentary. Cammeraat and Kooijman (2009) considered both soil fauna and tree type as important ecosystem engineers. At the same time, most relevant studies on faunal effects deal with bioturbation and illustrate

the role of one or a few functional groups of soil meso- and macro- fauna as geomorphical agents (Viles, 1988; Hupp *et al.*, 1995). For instance, the crucial roles of earthworms influencing soil structure and related soil physical properties are relatively well studied (Blanchart *et al.*, 2004). Earthworms can decrease surface water runoff by increasing soil porosity (Edwards and Bohlen, 1996). Porosity is indirectly influenced by leaf litter and soil organic matter, as they are a major food supply to earthworms (Sayer, 2006). Ants and termites can also influence soil turnover (Butler, 1995). For example, Cerdà and Jurgensen (2011) indicated that the presence of ant nests decreases surface runoff, but increases sediment loss, due to the exposure of unconsolidated soil mounds. However, most studies did not investigate erosion processes and their relation to soil meso- and macro- fauna in situ. In addition, the impacts of soil meso- and macro- fauna in combination with different leaf litter covers on soil erosion within an experimental framework have not been investigated to date.

Seitz *et al.* (2015) studied the influence of leaf litter cover, litter diversity and soil meso- and macro- fauna on interrill erosion processes in a subtropical forest ecosystem in central China. They showed that sediment discharge rates on bare ground plots tremendously exceeded the rates on covered plots, regardless of their diversity level (Figure 5, left) and underpinned the general importance of leaf litter cover in protecting soil from erosion. A better overlap and gap-filling in highly diverse litter mixtures seemed relatively unimportant for soil conservation. Our observations from subtropical south-east China show that runoff in a forest (Plate 3) usually flows in rills rather than sheetflow. Initially, such rills can be formed by coagulated raindrops dripping from the tip of leaves from trees planted in-line. Alternatively, animal tracks and human trails, or headward erosion from drainage lines, can trigger linear erosion in a forest.



Plate 3: Water channel in a young secondary forest during an erosive event in Dexing Forest, Jiangxi Province, south-east China. Photo taken 5 March 2010 by Thomas Scholten.

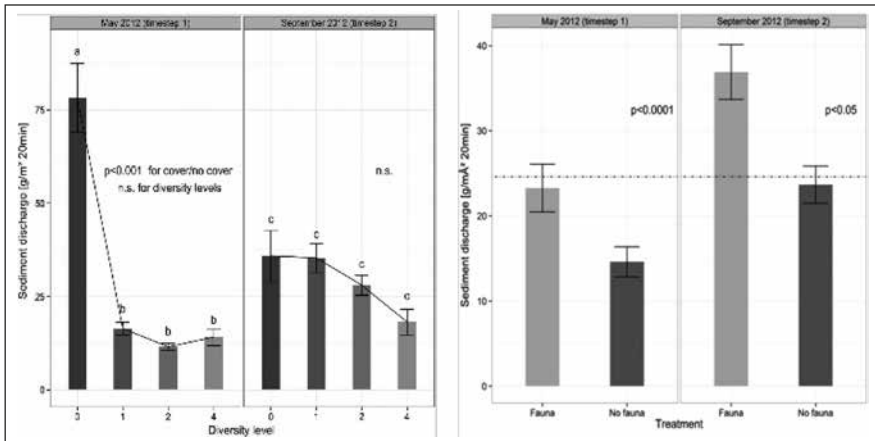


Figure 5. Effect of diversity levels and bare ground (diversity = 0, left) and of soil meso- and macro- fauna treatment (right) on sediment discharge. Small letters indicate significant mean differences (source: Seitz et al., 2015).

Nevertheless, single leaf species showed variable influences on sediment discharge if compared among each other, but only if decomposition had already set in. In the same experiment, they could show that the presence of soil meso- and macro- fauna increased inter-rill erosion (Figure 5, right). They assumed that this faunal effect arises from arthropods slackening and processing the soil surface, rather than participating in the decomposition process of the leaf litter.

Conclusions

Throughfall kinetic energy (TKE), as an indicator of rain power below vegetation, plays an important role in analysing soil erosion by water as complex systems of soil detachment, transport and deposition. TKE can directly influence soil erosion in the absence of a litter cover on the soil surface and is strongly affected by biotic (e.g. tree height, Leaf Area Index (LAI)) and abiotic (e.g. throughfall amount) factors. Results from our research in subtropical China show that leaf area, tree height, LAI and crown area are the most prominent vegetation traits to modify TKE. Rainfall characteristics, including intensity and amount, further influenced TKE. Species-specific effects on TKE are prominent, while biodiversity effects occur only at a small spatial scale. TKE modelling is important for the successful establishment of forest plantations, which aim to minimize soil erosion in young succession stages. A litter cover shows a strong effect on inter-rill erosion. However, leaf litter diversity does not play an important role in the amount of soil eroded. Interestingly, the presence of soil meso- and macro- fauna increases sediment discharge under forest. This effect can be attributed to arthropods slackening and processing the soil surface.

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The Centre for Contemporary Art and the Natural World (CCANW) is a 'not-for-profit' organisation which explores new understandings of our place within Nature through the Arts. Our aim is to use the arts to provide insights into today's pressing environmental and social challenges. Just as landscapes were painted on the walls of Roman villas in the 1st century BC at a time of over-cultivation and deforestation, so can new art forms provide us with valuable tools to raise eco-consciousness: to help people appreciate the importance of their everyday surroundings and the resources they might take for granted or otherwise abuse. They can touch people in ways that science and conventional advocacy frequently fail us.

'Soil Culture' is a programme that CCANW has developed over the past two years with Falmouth University (Cornwall, UK), which uses the arts to inspire a deeper public understanding of the importance of soil; a topic that, sadly, has never captured the level of attention devoted to the conservation of 'charismatic megafauna' such as the giant panda or humpback whale. Thankfully, it is increasingly being recognised that not only are healthy soils essential for the production of food for a growing world population, but they are also a vital part of our global ecosystem, acting as a carbon sink to reduce the impact of climate change. As we know, soils filter our water and protect us from flooding, and provide fibres for our clothing and timber for construction and fuel. Even so, we are all increasingly becoming aware that soils around the world are being threatened today by poor management and short-termism, resulting in compaction, contamination, erosion and salinization, together with loss of fertility, organic matter and biodiversity. In surveys conducted between 2002 and 2011 in south-west England alone (where our programme is largely based), 38% of soils were found to be significantly degraded, leading to increased run-off and serious consequences for the wider environment.

The linking of the words 'soil' and 'culture' may seem strange, but it should be remembered that the word 'culture' was originally used in the 'agri-cultural' sense, and it was only from the 16th century that it increasingly came to be used figuratively; as the soil was improved by good husbandry, so the mind was improved by education and the arts. Perhaps it is now time for the arts and education to help put culture back into the soil?

Graham Harvey noted in his 1997 book 'The Killing of the Countryside': "*it remains the sobering fact that even in the age of global communications and the Internet, civilisation continues to depend on a few inches of topsoil for its very existence.*" Indeed, the Soil Culture programme has its origins in conversations over a decade ago with Graham, when I was curating an art exhibition on the history of British livestock farming, in the aftermath of the last foot-and-mouth epidemic, in particular on the damaging effects of insecticides and nitrogen fertilizers

on the environment which were increasingly being noticed in the 1960s.

The programme developed in earnest when, in early 2013, we entered into a partnership with Falmouth University, which secured support for a period of research from the UK Arts and Humanities Research Council (AHRC). Coincidentally, the United Nations proclaimed 2015 to be 'the International Year of Soils.' The research phase culminated in a forum in Falmouth, in July 2014, which brought together over 90 artists, writers and environmentalists.

The second phase of Soil Culture, from August 2014 to August 2015, was funded through partnership working and grants from Arts Council England, the Heritage Lottery Fund, the British Society of Soil Science and South West Water. It involved us supporting 12 artist residencies across the south-west of England and at the Royal Botanic Gardens, Kew (Plate 1), together with a commission for a roof garden for a new Primary School in Bristol. Nine of the residencies were selected from an open submission, attracting 655 applications from 39 different countries; a strong indication of the increasing number of artists becoming engaged with environmental issues.



Plate 1: 'Something and Son' artist residency at Royal Botanic Gardens, Kew, London.

The residencies were held in a wide range of organisations from the Eden Project in mid-Cornwall and the University of Exeter's Environment and Sustainability Institute in Penryn (Plate 2), to the new Hauser & Wirth Arts Centre in Somerset and Daylesford Organic Farm in Gloucestershire. Each host sets a different brief for the artist, but all offered dedicated time for experimentation and the development of new work, and unparalleled access to facilities and expertise. The briefs were distinct and wide-ranging. They involved invitations to explore the role of soil in carbon sequestration, peat in national parks in the region, soil formation, and soil from holistic and ecological perspectives.



Plate 2: Field investigations at the Environment and Sustainability Institute, Penryn, Cornwall, UK

The outcomes of the residencies/commission were brought together in an exhibition 'Young Shoots,' which was launched over the summer of 2015 at 'Create,' Bristol's flagship environmental centre, during the City's year as European Green Capital. This exhibition tours around South West England until June 2016. We also exhibited 'Dirt Dialogues,' curated by Dr Alexandra Toland and first shown at the World Soil Congress in Korea in 2014. Another arts/environment organisation, 'Touchstone Collaborations,' co-ordinated a series of soil-inspired activities over eight 'Soil Saturdays,' which successfully engaged visitors with soil scientists, local allotment holders, organic and biodynamic farmers, market gardeners and community food-growing projects. Touchstone also organised a World Soil Day event at Hawkwood College in Stroud on 5 December 2015.

'Deep Roots,' a second exhibition of work by several established international artists, whose work has engaged with soils, sometimes over several decades, was shown at Falmouth Art Gallery in the autumn of 2015 and will be shown again at Peninsula Arts, Plymouth University from 16 January to 19 March 2016. This will include work by Mel Chin, whose artwork uses special hyper-accumulator plants to extract heavy metals from contaminated land (Plate 3), and Claire Pentecost, whose work includes refashioning soil into the shapes of gold ingots, a reflection of its true worth (Plate 4). Claire says: "*my soil ingots propose a new system of value based on living soil, a form of currency that anyone can create by composting.*"

Both exhibitions continue to be accompanied by a range of other participatory activities. During the Dartington Food Fair in Devon in May 2015, landscape architect Charlotte Rathbone ran a 'Tasting the Place' workshop inspired by the work of Californian artist Laura Parker, connecting the 'taste' of local soils with local wines and cheeses. Artist Peter Ward ran a workshop using earth pigments. He explains: "*the adoption of earth pigments in my work has allowed me to celebrate that which inspires my existence – Nature itself.*"



Plate 3: Mel Chin, Revival Field 1991-93, Pig's Eye Landfill, St Paul, Minnesota (MN), USA.



Plate 4: Claire Pentecost, Soil-erg, in Deep Roots at Falmouth Art Gallery, Cornwall, UK.

Of course, we are all aware that 2015 was the International Year of Soils (IYS), and we are delighted that Soil Culture was accepted as part of the official programme. The downside is that, against the expectation of the UN that governments of participating countries will support IYS contributions, the UK Department for Environment, Food and Rural Affairs (DEFRA) refused to provide any funding that would have supported the Soil Culture programme and the raising of public awareness of the plight of our soils. We find this surprising because, as early as 2005, DEFRA's audit of soils-related education and awareness found that existing

provision was hard to find and interpret. Although it indicated that exhibitions provided an excellent form of learning, it noted that no UK museum had produced one on the subject since 1984. What perhaps we should find less surprising is that DEFRA's lack of support was consistent with the role that the UK coalition government and farming unions played in 2014 over wrecking the European Soil Framework Directive, an initiative that aimed to give our soils the same protection as air and water.

As the International Year of Soils drew to a close, I could not fail to be somewhat disappointed by its achievements in the UK. The United Nations itself never seems to have had the resources to support IYS, and the UK's Environment Agency and Natural England both seem to have largely ignored the opportunities it might have given. Given more adequate resources, IYS and Soil Culture might have attracted far greater media attention than they have which, in turn, would have boosted public awareness to a far greater extent.

Perhaps it was too much to ask, too soon? We can now start to plan for the opportunities that the next 'World Soil Congress' in Glasgow in 2022 might offer: but let's hope we do not have to wait that long!

Footnote

Dr Clive Adams is the founding Director of the Centre for Contemporary Art and the Natural World, which in December 2015 moved from the University of Exeter Campus to Schumacher College at Dartington Hall in Devon. Schumacher will soon launch a new MA course in Arts and Ecology. A version of this article first appeared in 'Resurgence & Ecologist' in March/April 2015.

'Soil Culture', a 120 page full colour book which encompasses all aspects of the three-year long programme, and was published on 16 January 2016 to coincide with the start of the 'Deep Roots' exhibition at Peninsula Arts, Plymouth University, at a special exhibition price of £13. It includes a foreword by Patrick Holden, essays by Bruce Lascelles and Daro Montag, together with a full catalogue of exhibitions and documentation of research and activities.

Further details can be found at: www.ccanw.co.uk

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EVIDENCE OF WATER EROSION IN THE DESERT (OMAN)

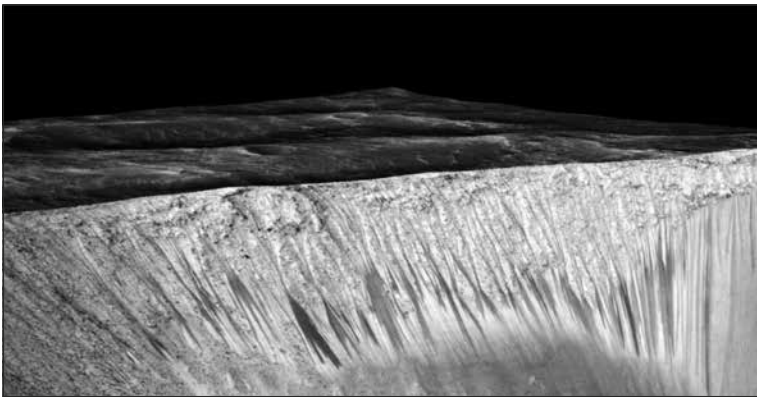


NASA astronaut Kjell Lindgren took this photograph on 11 November 2015 from the International Space Station, which he described as *"the delicate fingerprints of water imprinted on the sand"*. The area is approximately 20 km west-northwest of Hamra Al Drooa, Oman.

Source:

<http://www.nasa.gov/image-feature/fingerprints-of-water-on-the-sand>

EVIDENCE OF WATER EROSION FORMING GULLIES ON MARS



Dark narrow streaks, called 'recurring slope lineae,' emanate from the walls of Garni Crater on Mars, in this view constructed from observations by the High Resolution Imaging Science Experiment (HiRISE) camera on NASA's Mars Reconnaissance Orbiter.

The dark streaks here are up to few hundred metres long. It is postulated that they were formed by flow of briny liquid water on Mars. The image was produced by first creating a 3-D computer model (a digital terrain map) of the area based on stereo information from two HiRISE observations, and then draping an image over the land-shape model. The vertical dimension is exaggerated by a factor of 1.5 compared to horizontal dimensions. The draped image is a red waveband (monochrome) product from HiRISE observation ESP_031059_1685, taken on 12 March 2013 at 11.5 degrees south latitude, 290.3 degrees east longitude.

Source:

<http://www.nasa.gov/image-feature/jpl/pia19917/dark-recurring-streaks-on-walls-of-garni-crater>

CONFERENCE REPORTS

Report on the '7th Congress of the ESSC, held in Moscow (Russian Federation) from 18 – 22 May 2015 (continued from Newsletter 2015/1)

MINUTES OF THE ESSC GENERAL ASSEMBLY, MOSCOW (RUSSIAN FEDERATION), 22 MAY 2015

The ESSC General Assembly of all participants attending the 7th ESSC International Congress was held on 22 May 2015 in Moscow.

Agenda

1. Welcome and introductory remarks (C. Dazzi; N. Nechaev; I. Vasenev).
2. Report by the Treasurers (W. Cornelis and D. Gabriels).
3. Report by the Secretary (E. Costantini).
4. Report by the Editor-in-Chief (M.A. Fullen)
5. Election of new ESSC President (C. Dazzi)
6. Council elections for the period 2016-2020.
7. New ESSC Secretariat
8. ESSC Awards (Gerold Richter and Young Person).
9. Reflection on ESSC future (C. Dazzi; I. Pla Sentis).
10. Future activities: next ESSC Conference and Congress.
11. Any other items.

Report

1. The President welcomed the participants and expresses appreciation for the good quality of the 7th Congress in Moscow and thanked Professor Ivan Vasenev and his group for the excellent organisation. Professor Vasenev expressed his satisfaction with the Con-

gress and highlights that this experience was very important for Russia, as it contributed to greater government awareness of soil conservation issues and organic farming. The President informed about the ESSC Soil Petition initiative and results obtained. The President informed that two ESSC grants for young researchers were assigned to the Congress, to Sarah Buckingham (UK) and Simone Priori (Italy).

2. Both Treasurers apologised for their absence. They sent a report (Appendix 1) and a presentation that the President showed to the Assembly. The Assembly approved the Report. The President informed on the letter to national Soil Science Societies for stimulating subscriptions by means of incentives for cumulative applications: €15 per year and €40 per person for three years.
3. The Secretary of ESSC (Dr Edoardo Costantini) sent his apologies for his absence from the ESSC Assembly. The President read the Secretary's Report (Appendix 2) and the Assembly approved the Report.
4. The Editor-in-Chief of the ESSC Newsletter (Professor Mike Fullen) sent his apologies for his absence from the ESSC Assembly. The President read the Report (Appendix 3) and the Assembly approved the Report.
5. The President wishes that young members could promote their candidature for the ESSC Presidency and Secretariat. I. Pla Sentis proposed for the next four years the same President and Secretary. J. Rubio reminded the Assembly that elections are made by the ESSC General Assembly. After verified the availability of the actual President, the Assembly unanimously approved the proposal of Professor Pla Sentis and the composition of the Executive Committee and Council for the period 2016-2020 (as reported in Newsletter 2015/1).
6. The President informed the Assembly that Mike Fullen (UK) and Idelfonso Pla Sentis (Spain) are the winners of the 'Gerold Richter Award 2015' and that Maria Fantappiè (Italy) is the winner of the 'ESSC Young Person Award 2015'. The Assembly welcomed the winners with a burst of applause.
7. The President and I. Pla Sentis highlighted the importance both to involve young generations of scientists for the future of the ESSC and to expand collaboration among ESSC members and between ESSC and other scientific societies relative to soil conservation topics.
8. The ESSC International Conference 2016 will be in Romania. I. Pla Sentis proposed to organize the International Congress in Lleida (Spain) in 2017. He read the statement and proposed a joint international conference together with other organizations (ISCO and WASWAC). This Statement will be presented officially on the occasion of joint meetings between ESSC and other associations. The President informs that he received availability from Latvian members to organize the ESSC International Conference 2018 and from Albania to organize the 8th Congress in 2019.
9. No other items were discussed.

Moscow, 22 May 2015.

Carmelo Dazzi
ESSC President





Plate 1: Some of the participants in the opening ceremony of the 7th ESSC International Congress in front of the Russian Timiryazev State Agrarian University.



Plate 2: Participants on the field trip organized by Professor I. Yashin (between J. Rubio and C. Dazzi) (both photos by Slava Vasenev).

Editor's Note: The three reports below are edited and abridged versions. The full reports and the Council Meeting Report are available on the ESSC web site.

Appendix 1: Treasurers' Report

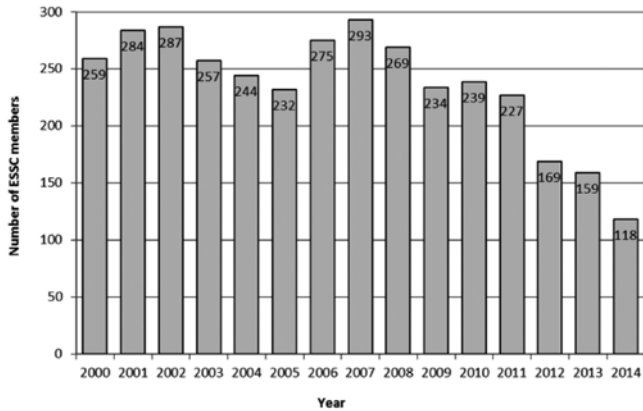


Figure 1: Evolution of ESSC membership (2000-2014).

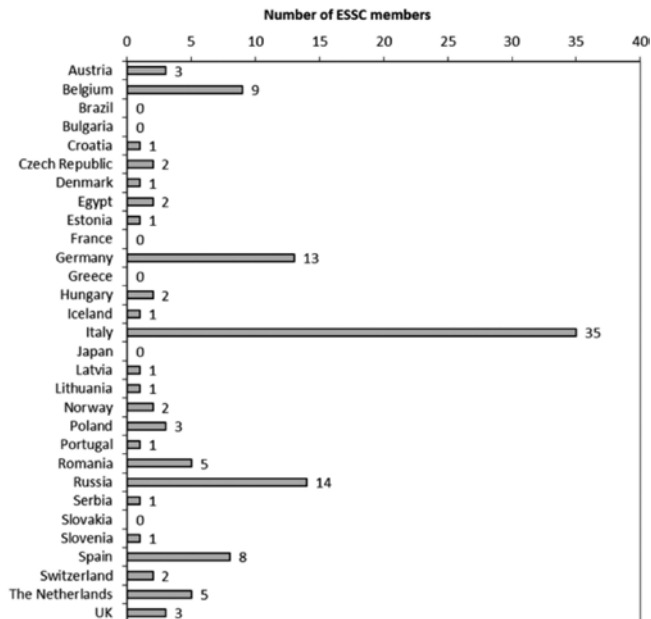


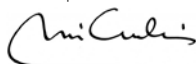
Figure 2: ESSC membership per country in 2014.

Note: Due to recent membership changes, the Romanian and Russian numbers are being updated.

Financial Report 2010-2014

Year	2010	2011	2012	2013	2014
Budget 1 January (€)	13313.31	11858.64	14064.77	14335.92	12535.34
Income (€)					
Membership Contribution	2135.15	4670.12	1824.62	2366.01	463.00*
Interest (bank account)	22.43	20.31	22.83	17.96	8.43
Books sold	0.00	0.00		0.00	0.00
Conferences	0.00	0.00		0.00	0.00
Other Income	0.00	0.00		0.00	0.00
Total (€)	2157.58	4690.43	1847.45	2383.97	471.43
Expenses (€)					
Newsletters	3291.50	2367.20	1533.00*	2817.30*	0.00**
Bank Account	31.20	31.20	31.20	31.20	0.00
Conferences	283.50	0.00		1330.00**	1100.00***
Other Expenses	6.05	85.90	12.10**	6.05***	0.00****
Total (€)	3612.25	2484.30	1576.30	4184.55	1132.60
Balance (€)	-1454.67	2206.13	271.15	-1800.58	-661.17
Budget December 31 (€)	11858.64	14064.77	14335.92	12535.34	11874.17
<p>*Since Newsletter 2014/1 (with membership invoice enclosed) was only sent in November 2014, many members paid their contribution only from January 2015 onwards.</p> <p>**Invoice for Newsletter 2014/1 was paid in 2015.</p> <p>***Grants for the Imola (Italy) Conference (2 x €500) + four ESSC plaques for honorary members (€100).</p> <p>****Transfer costs.</p>					

Ghent, 11 April 2015



Wim Cornelis
ESSC Treasurer



Donald Gabriels
ESSC Co-Treasurer

Appendix 2: Secretary's Report

The Secretary's activity has continued, supporting the Presidency in all his societal actions, as well as the Newsletter Editor, the Treasurer and the web-master. In addition, the Secretary has maintained the Facebook page. In that respect, it is worthy to summarize the state of health of the soil conservation discipline and the ESSC, based on Facebook statistics. Currently, 389 people 'like' the ESSC and read the Facebook page. The trend is increasing, but this last year less than 2014 (Figure 1).

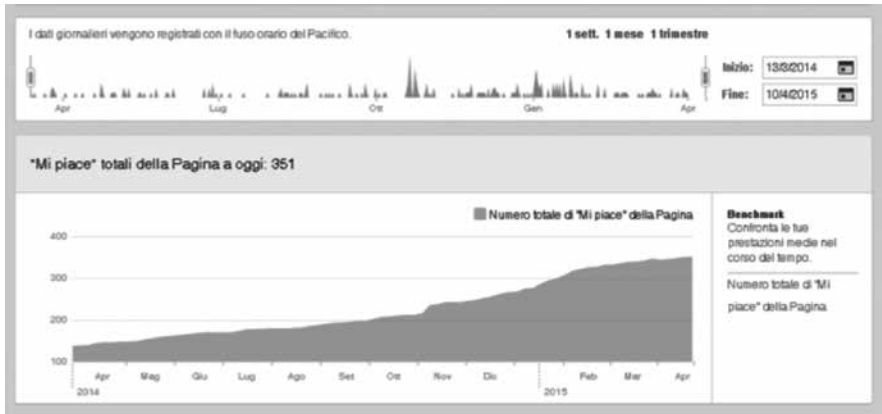


Figure 1: "I like" trend during the last 12 months.

The number of posts on the site in the last year is on average about 50 (Figure 2), which is much higher than the previous 12-months. About four people per day visit the ESSC webpage (Figure 3). The visiting people are mainly from Italy, Brazil, Spain, Egypt, the USA, Germany and India. It is worthy stressing that, apart from Italy, there are apparently more people from non-European countries interested in our web page, than from Europe. Palermo and Florence, the cities of the President and Secretary, are the most important, thus Italian is the most common visualization language, followed by English.



Figure 2: The number of posts during the last 12 months.



Figure 3: The number of people per day visiting the ESSC web-page.

Conclusions

1. There is much interest in the information provided by the ESSC through the Facebook page, much larger than the Society's membership.
2. That information is also appreciated beyond Europe.
3. ESSC members (apart from members in Italy, Spain and Germany), are not particularly active in following the Facebook web page.

Edoardo A.C. Costantini (ESSC Secretary).

Attachment 3: Report by Mike Fullen (Editor-in-Chief) to the ESSC Council, Moscow (Russian Federation), 21 May 2015

1. The Editor-in-Chief (Mike Fullen) sends his apologies for absence from the ESSC Council meeting.
2. The ESSC Newsletter is progressing well. Since the appointment of the new editorial team in May 2004, 30 Newsletters have been published. The Editor-in-Chief (MAF) thanks the commitment and support of the Assistant Editor (Dr Colin Booth, CAB), the Editorial team in Bratislava, Professor Carmelo Dazzi, Professor José Rubio and the ESSC Executive Committee. The 'Guest Editorials' are proving popular and, to date, 23 have been published. Issue 2014/2 is now at the printers in Bratislava and issue 2015/1 is in preparation. Several logistical problems, both in Wolverhampton and Bratislava, have slowed the delivery of Newsletters. However, we are confident these problems are resolved and we will proceed with timely publications.
3. Catena Verlag has kindly agreed to publish a book based on Guest Editorials. This will be

entitled **'Global Perspectives on Soil Conservation.'** This will form part of the Catena 'Advances in GeoEcology' series. In principle, it is agreed that there will be future volumes, associated with the four year cycle of Congresses of the ESSC. Work on Volume 1 is progressing well. To date, most of the 19 Chapters have been received and are going through the refereeing and editing process. There is some delay, as MAF is also the Chief Editor of 'Advances in GeoEcology 44' (a book based on papers presented at the ESSC Congress in Thessaloniki in May 2011; please see Note 4). However, the book will be completed as soon as possible in the near future. On completion of the Thessaloniki book, work on the Guest Editorials book will recommence in earnest.

4. The book based on the papers presented at the ESSC Congress in Thessaloniki in May 2011 is making good progress. The book will be 'Advances in GeoEcology 44, **OUR SOILS: Strategies and Policies for Soil Conservation.'** The Editorial team consists of Mike Fullen, Joseph Famodimu, Theodore Karyotis, José Rubio, Christos Noulas, Andreas Panagopoulos and Donald Gabriels. A total of 25 papers have been received and have gone through the refereeing and editing process. So far, 19 papers have progressed to the proof stage. There are several minor issues with the remaining six papers. These are nearing completion and the complete book should be in press in June 2015.
5. The 'ESSC members citation list (2000-to date)' and the 'PhD theses completed by ESSC Members (2004-to date)' are proving popular in both the printed and web-versions of the Newsletter. The citation details of Ph.D. theses by ESSC members since and including 2004 have been added as an additional page to the ESSC web site. To date, the citation details and abstracts of 51 Ph.D. theses are quoted. Currently, the number of quoted publications cited on the web page is 721. These information sources are proving useful for both teaching and research. It is suggested that the Council discuss whether the database should be revised into an interactive format on the ESSC web site. This would improve searches on the web site.
6. Council members who have not already done so, are requested to provide MAF or CAB with the citation details of papers in international refereed journals and book chapters published since (and including) the year 2000.
7. We are not getting as many articles as anticipated relating to the Ph.D. process.
8. The web site is developing well, and the team in Bratislava continue their splendid work in supporting web site development and maintenance. Karol Végħ (KV) is leading ESSC publications (Newsletter and ESSC web site) at Bratislava. Our sincere thanks go to Karol. The publication activities of the ESSC based at Bratislava is receiving the full support of Professor Dr Jaroslava Sobocká (the Director of the National Agriculture and Food Centre, Soil Science and Conservation Research Institute at Bratislava).
9. KV has developed and launched a new version of the ESSC web site. There is also a new ESSC Facebook page, which is proving popular. For administrative purposes, Karol has arranged for the web site to be hosted on an external server.
10. As agreed at the ESSC Council Meeting in May 2011, all Presidents of European Soil Science Societies have been offered a paper copy of the ESSC Newsletter. Four Presidents have accepted the invitation. Most stated they were happy to view the Newsletter online.
11. At the ESSC Council meeting in Průhonice (Czech Republic) on 23 June 2009, it was

agreed that ESSC Newsletters should carry reports on soil erosion and conservation in specific countries. To date, there have been four reports:
Czech Republic by Jana Podhrázská (Issue 2010/3, p. 25 – 31).
Greece by Theodore Karyotis and Constantine Kosmas (Issue 2011/1, pages 11 – 25).
Iceland by Andres Arnalds and Johann Thorsson (Issue 2012/2, pages 10 – 21).
Italy by Edoardo Costantini (Issue 2013/2, p. 7 – 18).

12. A request was made to the National Representative for Russia for a report in advance of the 2015 Congress in Moscow. However, to date, there has been no paper. It is suggested the Committee discuss if they would like to see a post-Congress paper on soil erosion and conservation in the Russian Federation in the Newsletter.
13. It is suggested the Council discuss a publication reviewing the first 25 years of the ESSC since its launch in 1989. Thus, the review should report progress to 2014.
14. MAF has received suggestions for a soil photo archive to be made available on the ESSC web site. It is suggested the Committee discuss this possibility.

Mike Fullen (Editor-in-Chief).

PRESENTATION OF THE GEROLD RICHTER PRIZE TO ILDEFONSO PLA SENTIS

The ESSC Gerold Richter Award is awarded every four years to a person who has, over the period of his or her career, made significant and internationally recognized contributions to the investigation and/or promotion of soil conservation in Europe.

Professor **Ildefonso Pla Sentis** (Spain) has been named as the joint winner of the Gerold Richter Award 2015 from the ESSC, for outstanding contributions to soil conservation and protection within Europe.

Ildefonso Pla Sentis is Emeritus Professor and Co-ordinator of the Doctoral Programme in Soils, Water and Environment of the Universitat de Lleida and Co-Director of the International College on Soil Physics (International Centre of Theoretical Physics), Vice-President of WASWAC, Member of the ISCO Board and President of the Soil and Water Conservation Section of the 'Sociedad Española de la Ciencia del Suelo'.



Ildefonso was founder and President of the International Soil Conservation Organization (ISCO), President of the Soil Science Societies of Latin America and Venezuela, President of the Sub-Commission on Soil Conservation and Environment of the International Society of Soil Science (now IUSSS), Member of the International Board of Soil Research and Management (IBSRAM) and FAO International Consultant and Expert on Soil Salinity and Soil and Water Conservation. Ildefonso has many distinctions for academic and research activities



Plates 1 and 2: Professor Ildefonso Pla Sentis (University of Lleida, Spain).

around the World. These include being founder and Honorary Member of the World Association of Soil and Water Conservation (WASWAC) and Honorary Member of both the Venezuelan and Colombian Soil Science Societies. He has been Visiting Professor at several Universities in Latin America, the USA and Europe. His research activities have been mostly dedicated to soil and water management and conservation, with experiences in Latin America, the USA, Central Africa and Mediterranean Europe (Plates 1 and 2). He has published and edited over 200 papers and books. Ildefonso has supervised 15 Ph.D. theses and 13 M.Sc. theses. Ildefonso is on the Editorial Board and scientific committees of and referee for several international journals.

The presentation to Ildefonso was made by ESSC President Carmelo Dazzi at a Presentation Ceremony in Moscow on 21 May 2015.

To Ildefonso best congratulation from all ESSC Members.

Carmelo Dazzi
Dipartimento di Scienze Agrarie e Forestali
Università di Palermo
Viale delle Scienze, Ed. 4
90128 Palermo
Italy.

Editor's note

Below is the agreed text of the World Association for Soil and Water Conservation (WASWAC) position statement on climate change. It would be useful if we could debate whether the ESSC wishes to also adopt this statement, endorse it or have a separate statement.

WORLD ASSOCIATION OF SOIL AND WATER CONSERVATION POSITION STATEMENT ON CLIMATE CHANGE AND SOIL AND WATER CONSERVATION

The world climate is changing and is going to alter humanity's future. Among the greatest threats that climate change is projected to pose to the future of humanity is decreased food security. The world population is expected to increase by several billion people over the next few decades, and a large increase in worldwide agricultural productivity will be needed to achieve food security. A changing climate threatens the important worldwide system that is needed to produce this food, and our soils, which are a key world resource for humanity. Now that we have so many cities with millions of people, the steady flow of food to these cities is needed, and a changing climate poses a threat to the system. Humans have depended on soil resources for their survival on this planet, and they have been using soil resources for thousands of years to produce food, biodiversity, and ecosystem services. **Human activities have contributed to degradation of the world's soils, and current erosion and degradation rates already threaten the soil that supports human civilizations.**

Demands on soil from expansion of cities, industries, and roads are contributing to soil scarcity. Additionally, erosion, desertification, deforestation, and the salinization and depletion of surface and underground water resources that are key in agricultural production, pose a threat to the future of food security and thus the national security of countries, a threat that will grow with climate change. A changing climate threatens to accelerate all of these impacts.

It is clear that these challenges pose a threat to the future of humanity. Fortunately, soil and water conservation practices have the potential to conserve the soil and water resources needed to sustain/increase agricultural productivity to the levels needed by 2050.

For these reasons, WASWAC is releasing this position statement about the critical need to implement policies and management practices that conserve soil and water across the world for climate change mitigation and adaptation and the survival of the human species. **WASWAC recommends that governments and institutions:**

Develop policies that improve soil management to achieve a balance between increasing productivity and maintaining organic matter in the soil, reducing soil losses, and improving soil health and soil security. The carbon cycle is tied to how we manage soils, and

soil carbon is one of the larger pools in the carbon cycle and contributes to improved soil productivity.

Encourage communication of soil and water conservation programs by developing communication that connects science to land managers and the public; teaching the value of soil carbon; increasing training; and enhancing exchange (at meetings, fora etc.).

Develop, maintain, and/or expand programs for soil and water conservation practices for climate change mitigation and adaptation that keep surface residue covering the soil surface; promote no till systems; improve soil function with soil carbon; use multiple conservation practices at a field level and off-site; use precision conservation; promote energy efficiency; value water more; minimize greenhouse gas losses; and improve nutrient cycling, nitrogen use efficiencies and soil health. *In summary, apply soil and water conservation principles and practices to improve worldwide sustainability and ecosystem services.*

Fund research in soil and water conservation that pays dividends long term.

Reference:

Delgado, J.A., Groffman, P.M., Nearing, M.A., Goddard, T., Reicosky, D., Lal, R., Kitchen, N.R., Rice, C.W., Towery, D. and Salon, P. (2011). Conservation practices to mitigate and adapt to climate change. *Journal of Soil and Water Conservation* 66(4), 118A-129A.

CLIMATE CRISIS: LINKING SOLUTIONS THROUGH THE SOIL

Andrés Arnalds and Guðmundur Halldórsson
Soil Conservation Service of Iceland
Gunnarsholt
851 Hella
Iceland

The global community will be unable to achieve goals of food and water security and meet several other sustainable development targets without major improvements in conservation and restoration of the world's soil resources. Despite the important linkages with environmental, social, economic and cultural issues (the pillars of sustainability) the silent crises of ecosystem degradation and the potential of restoration of land health have not gained sufficient attention.

Carbon dioxide: A resource out of place

Large scale global loss of carbon through land degradation is one of the major sources of carbon emissions and threatens food security. In the past, increasing food needs have mainly been met by clearing and irrigating more land, converting more natural forests to agriculture, diverting more water resources, using improved varieties and applying more



Cover of the policy brief of the Nordic Council of Ministers (2015).

Cover photo: Gunnarsholt, Iceland,
Photo by: Magnús Reynir Jónasson

fertilizers. Those options are narrowing, however, and soil and land quality need to be highlighted. Soil is one of the foundations for global sustainability, linking land care with climate, biodiversity, water, food security, poverty reduction and peace:

<http://www.land.is/images/pdf-documents/baekur/eur23784.pdf>

The global understanding of this need is increasing and this is reflected in a new Nordic Statement on Innovative Climate Finance:

<http://www.norden.org/en/news-and-events/news/nordic-statement-on-innovative-climate-finance-launched-at-cop21>

However, the global community must not look for narrow financial and technical solutions of the climate crisis. An understanding of much broader scope is needed; where the soil is central.

The global need to recharge the organic carbon pools: A policy brief

Even if we cut our emissions of CO₂ today, the decay of atmospheric CO₂ is slow, and climatic changes would still occur. There is a global action plan required to provide incentives to conserve and restore degraded soils and ecosystems. Carbon projects should be planned for multiple benefits, but there are several barriers that need to be analysed and overcome in order to create such multiple 'win-win' situations.

These issues were addressed at the Conference 'SOIL CARBON SEQUESTRATION, for Climate, Food Security and Ecosystem Services':

<http://scs2013.land.is/>

The main outcomes of the Conference have been published in a policy brief, by the Nordic Council of Ministers:

<http://norden.diva-portal.org/smash/get/diva2:868306/FULLTEXT02.pdf>.

The policy brief contains several recommendations and conclusions highlighting restoration and protection of soil organic carbon as key solutions to many of the most pressing global challenges facing mankind today. The soil certainly must be considered as an engineer in combatting climate change and that its role is essential for finding solutions. Several actions are recommended to accomplish these goals, such as for building bridges between science, policy and action; guidelines for enhancing carbon sequestration in forests, cropland, degraded land and wetlands; and recommendations for verification and permanency of carbon sequestration. The policy brief also stresses the need for better linking of soils to the global agenda in an interdisciplinary way, including environmental, social, economic, ethical and aesthetic values.

Main reference

Halldorsson, G., Sigurdsson, B.D., Finér, L., Gudmundsson, J., Kätterer, T., Singh, B.R., Vesterdal, L. and Arnalds, A. (2015). NORDEN (Nordic Council of Ministers) policy brief on 'Soil Carbon Sequestration – for climate, food security and ecosystem services', Copenhagen, 15 pp. (ISBN: 978-92-893-4399-2 (print), ISBN: 978-92-893-4400-5 (pdf)). Available at:

<http://norden.diva-portal.org/smash/get/diva2:868306/FULLTEXT02.pdf>

E-mails:

Andrés Arnalds: **andres@land.is**

Guðmundur Halldórsson: **gudmundurh@land.is**

Web site: **<http://land.is/>**

“Feeding the Planet, Energy for Life:”
this was the core theme of ‘Expo Milano 2015’

Over six-months (1 May–31 October 2015), Milan became a global showcase, where over 140 countries exhibited the best of their technology in assuring healthy, safe and sufficient food for everyone, while respecting the Planet and its environmental equilibrium.

‘Expo Milano 2015’ provided a platform for the exchange of ideas and shared solutions on the theme of sustainable development. The cultural legacy of ‘Expo Milano 2015’ was the ‘Charter of Milan.’ This is a participatory and shared document that calls on every citizen, association, company and institution to assume their responsibility in ensuring that the current and future generations can enjoy the right to food and to live in a sustainable environment.

The European Society for Soil Conservation (ESSC) fully supports the Charter of Milan. The Charter was signed by ESSC President Professor Carmelo Dazzi (University of Palermo, Italy) on behalf of the ESSC.

The ‘Charter of Milan’ is available at:
<http://carta.milano.it/the-milan-charter/>

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90128 Palermo
Italy.

LIVING IN THE SOIL

A snail, a worm and a group of young people are some of the characters who star in ‘Living in the Soil,’ a comic produced in the context of ‘The International Year of Soils’ that aims to raise awareness about the most significant environmental and social issues related to soil and its need for protection. Through some 60 sketches, the authors report various aspects of the characteristics, functions and implications related to the use of this non-renewable resource. It reflects both the view of humans and the living organisms that inhabit soil. The comic, which is conceived as an educational resource, is aimed both at children and the general public and for students at all educational levels.

The web-links are:
Introduction (in Spanish):
<http://www.suelos2015.es/materiales/comic/vivir-en-suelo>

Comic in Spanish:

http://www.ciudadciencia.es/doc/files/comic/COMIC%20castellano%20WEB_ok.pdf

Comic in English:

http://www.suelos2015.es/sites/default/files/pdf-materiales/living_in_the_soil.pdf

Authors: **M^a Pilar Jiménez Aleixandre, Estudio Tangaraño, María Teresa Barral Silva** and **Francisco Díaz-Fierros V.** (2015). Co-ordination: **Montserrat Díaz-Raviña**

Contact address:

Montserrat Díaz Raviña

Instituto de Investigaciones Agrobiológicas de Galicia del CSIC (IIAG-CSIC)

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Report by:

José Luis Rubio

Centro de Investigaciones sobre Desertificación- CIDE

(CSIC, Universitat de Valencia, Generalitat Valenciana)

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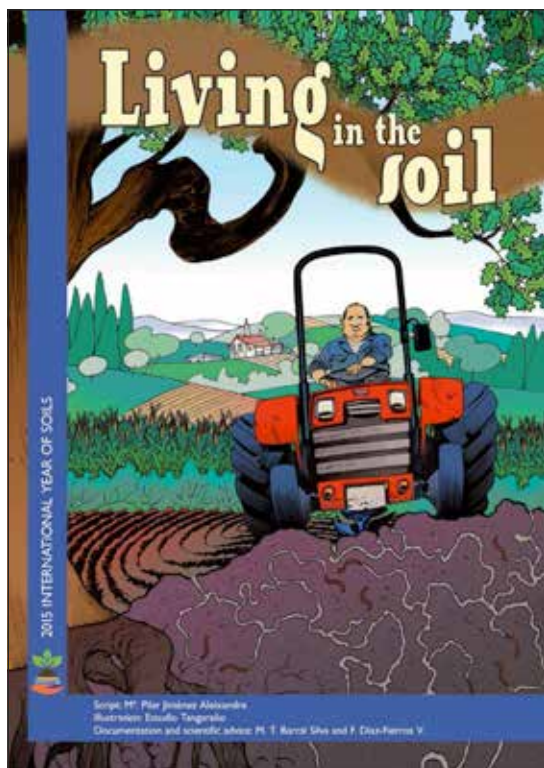
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The Newsletter and supporting Ph.D. research

Editor's note:

At the ESSC Council meeting in Lleida (Spain) in September 2006, the interactions between the ESSC and younger soil scientists were discussed (see Newsletter 2006/3, p. 5-8). It was decided that the ESSC should be more proactive in its support of younger scientists. As part of that initiative, we welcome articles from both Ph.D. researchers and supervisors. We would like to hear from recent Ph.D. graduates; what advice and experience do you have which you would like to share with your colleagues in earlier stages of their research? We would also like to hear from current Ph.D. researchers; what are the factors which both encourage and limit progress? What are the particular challenges facing part-time Ph.D. researchers? We also invite contributions from experienced Ph.D. supervisors. What experience would you like to share with less experienced colleagues? If you are a less experienced Ph.D. supervisor, what supervisory issues do you find challenging? In short, please tell us "what I know now, which I wish I knew then!"

Editor's note:

The citation details of Ph.D. theses by ESSC members since and including 2004 have been added as an additional page to the ESSC web site. To date, 52 Ph.D. theses are quoted. On the ESSC web site, please look under 'Publications.' Please forward the citation details of any additional Ph.D. thesis completed since the year 2000 by an ESSC member to any of the Editorial team. We will then add the thesis citation details to the web site.

Recent Publications by ESSC Members

Included are the citation details of papers and books produced by ESSC members. These provide a growing resource for exchange of valuable information to both research and teaching. The cumulative citation list is being added to and updated on the ESSC web site. Students of ESSC members (both undergraduate and postgraduate) are increasingly accessing this facility in their literature searches. Currently, the number of quoted publications cited on the web page is 729. Please e-mail the citation details of papers in international refereed journals since and including the year 2000 to any member of the Editorial team.

PUBLICATIONS

M.A. Fullen, J. Famodimu, T. Karyotis, C. Noulas, A. Panagopoulos, J.L. Rubio and D.R. Gabriels (Eds) (2015). Innovative Strategies and Policies for Soil Conservation. Advances in GeoEcology 44. Catena, Reiskirchen, 274 pp. (ISBN: 978-3-923381-62-3, US ISBN: 1-59326-266-3).

Fullen, M.A., Famodimu, J., Karyotis, T., Noulas, C., Panagopoulos, A., Rubio, J.L. and Gabriels, D.R. (Eds) (2015). Editorial, p. i-v In: M.A. Fullen, J. Famodimu, T. Karyotis, C. Noulas, A.

Panagopoulos, J.L. Rubio and D.R. Gabriels (Eds). Innovative Strategies and Policies for Soil Conservation. *Advances in GeoEcology* 44. Catena, Reiskirchen, 274 pp. (ISBN: 978-3-923381-62-3, US ISBN: 1-59326-266-3).

Halldórsson, G., Sigurðsson, B.D., Finér, L., Gudmundsson, J., Kätterer, T., Singh, B.R., Vesterdal, L. and Arnalds, A. (2015). NORDEN (Nordic Council of Ministers) policy brief on 'Soil Carbon Sequestration – for climate, food security and ecosystem services', Copenhagen, 15 pp. (ISBN: 978-92-893-4399-2 (print), ISBN: 978-92-893-4400-5 (pdf)). Available at: <http://norden.diva-portal.org/smash/get/diva2:868306/FULLTEXT02.pdf>

I. Ionita, M.A. Fullen and W. Zgłobicki (Eds) (2015). Gully Erosion as a Natural and Human-Induced Hazard. *Natural Hazards, Special Issue 1* 2015. Springer, Dordrecht, The Netherlands, 314 pp. (ISSN: 0921-030X).

Ionita, I., Fullen, M.A., Zgłobicki, W and Poesen, J. (2015). Editorial, p. 1-5 In: Gully Erosion as a Natural and Human-Induced Hazard. *Natural Hazards, Special Issue 1*, 2015.

Jokubauskaite, I., Amaleviciute, K., Lepane, V., Slepeliene, A., Slepetyus, J., Liaudanskiene, I., Karcauskiene, D. and Booth, C.A. (2015). High performance liquid chromatography (HPLC) – size exclusion chromatography (SEC) for qualitative detection of humic substances and dissolved organic matter in mineral soils and peats of Lithuania. *International Journal of Analytical and Environmental Chemistry* 95, 508-519.

Kelay, A., Williams, C.D. and Fullen, M.A. (2015). Remediation of oil spills using zeolites, p. 199-209 In: M.A. Fullen, J. Famodimu, T. Karyotis, C. Noulas, A. Panagopoulos, J.L. Rubio and D.R. Gabriels (Eds). *Innovative Strategies and Policies for Soil Conservation. Advances in GeoEcology* 44. Catena, Reiskirchen, 274 pp. (ISBN: 978-3-923381-62-3, US ISBN: 1-59326-266-3).

Marcinkonis, S., Karpaviciene, B. and Fullen, M.A. (2015). Linking floral biodiversity with nitrogen and carbon translocations in semi-natural grasslands in Lithuania. *Ekologija (Bratislava)* 34(2), 137-146.

Oyediji, A.A., Kayode, J., Besenyei, L. and Fullen, M.A. (2015). Germination of seeds of selected leguminous tree species moistened with varying concentrations of crude oil-contaminated soil water extracts. *American Journal of Plant Sciences* 6, 1575-1580.

ESSC membership list and contact details

WEB BASED BULLETIN BOARD

The ESSC wishes to rapidly disseminate information to its members. Please forward information to the ESSC web site to be placed on our ESSC Bulletin Board. These could include searches for potential collaborators for research proposals, calls for research proposals, job opportunities, research studentship opportunities, impending conferences and other items of important information for rapid dissemination. Of course, we will also continue the regular circulation of information via our Newsletter.

The NEW ESSC web site is:
<http://www.soilconservation.eu/index.html>

ESSC membership list and contact details

The full ESSC membership list is held on the ESSC web site. Under 'members' you can obtain a full listing. Also under 'members' you can click on any member country and find a listing of members in the selected country.

We are trying to keep the membership list on the web site up-to-date. Please check your details and let us know if there are any necessary correction(s). If your details change, also please let us know. Some members have requested that we do not add their e-mail addresses to the web site, to avoid uninvited 'spam' e-mails. Of course, we respect this request. Therefore, while we retain a list of the e-mail addresses of ESSC members, this list will not be available on the web site.

Editorial matters in Bratislava are handled by Ing Karol Végh. In terms of membership lists, contact details and the ESSC web site, please send updated information to Karol at:

E-mail: kajove@gmail.com

Please also use and refer to the '**Directory of European Organizations and Persons Working on Soil Protection**' as a reference source for European colleagues, both members and non-members of the ESSC. This publication contains the e-mail addresses of most ESSC members and will be subject to periodic updates. The reference citation is:

Rubio, J.L., Imeson, A.C., Bielek, P., Fullen, M.A., Pascual, J.A., Andreu, V., Recatala, L. and Ano, C. (2006). *Directory of European Organizations and Persons Working on Soil Protection*. Soil Science and Conservation Research Institute, Bratislava, 190 pp. (plus CD-Rom).

This publication is available as a pdf document on the 'Publications Archive' on the ESSC web site.

**'ADAPTABILITY OF AGRICULTURE
AND CONSERVATION SYSTEMS IN A CHANGING ENVIRONMENT'**

AgroEnviron 2016

10th International Symposium on Agriculture and the Environment
May 23-27, 2016
Stewart Center, Purdue University
West Lafayette, Indiana, USA

Our environment continues to evolve, as factors such as global climate change and atmospheric warming alter local weather and growing conditions for agricultural crops. To some extent increasing carbon dioxide levels and higher temperatures may enhance plant growth, but other factors such as more variable and extreme precipitation events, flooding, drought, and excessively high temperatures may act to diminish crop production. This '10th International Symposium on Agriculture and the Environment' seeks to provide a forum for scientists to present new research on environmental studies, agricultural research, processes of soil erosion by wind and water, conservation policies, and innovative practices to preserve and protect the soil, water, and air resources, while at the same time providing for a sustainable agriculture.

Thematic Sessions:

- 1. Mitigation of and adaptation to climate change (Climate Smart Agriculture).**
- 2. Soil conservation under climate change, and effect of extreme weather events.**
- 3. Modeling effects of climate change on agriculture and forestry.**
- 4. Sediment and water source fingerprinting and measurement techniques.**
- 5. Agricultural water conservation and water resource utilization.**
- 6. Future sustainability of healthy soils for agricultural production.**
- 7. Soils and diffuse pollution, and pollution control.**
- 8. Use of the concept of connectivity to assess water and sediment transfers.**
- 9. New technologies for agro-environmental studies.**
- 10. Risk assessment and environmental management.**
- 11. Science policy interface on biodiversity and ecosystem services.**

Abstract Submission is now open! Please submit your abstract Word document online now, at:

<http://docs.lib.purdue.edu/agroenviron/>

The Symposium is currently soliciting submissions of quality presentation abstracts, related to one of the 11 session topics listed on the previous page. The full detailed abstract may contain up to 600 words, as well as tables and figures, and should be submitted as a Word (.doc or .docx) format file, with single-spaced lines, 12 pt Times New Roman font, and 1" margins all around. An example abstract document is available to use as a template. Please see the abstract submission site for more information, and to download the example template document. Contact the meeting chair, Dennis Flanagan, with any questions at: flanagan@purdue.edu

To provide maximum opportunity for participant interactions, all presentations will be combination oral and poster. For each technical session, half of the time will be used for short oral presentations followed by poster viewing and individual discussions. Each presenter will explain the rationale and key finding of his/her research in three minutes using a maximum of three PowerPoint slides. With this oral-poster format, participants will be able to have an overview of all the papers presented in a session during the short oral presentations (or advertisements) and seek out specific presenters to further discuss the details or raise questions during the poster viewing period.

The main meeting website is:

<http://topsoil.nserl.purdue.edu/AgroEnviron2016/>

This meeting will be held concurrently with the 7th International Symposium on Gully Erosion' (ISGE), with cross-over registration privileges and combined mid-week tour. Both meetings are being jointly hosted by the USDA-ARS National Soil Erosion Research Laboratory and Purdue University. Conference facilities, lodging, and meeting registration will be provided through Purdue.



INTERNATIONAL CONFERENCE ON CONSERVATION AGRICULTURE AND SUSTAINABLE LAND USE

Dear Colleagues

We are glad to inform you that the **Geographical Institute of the Hungarian Academy of Sciences** is organising the *International Conference on Conservation Agriculture and Sustainable Land Use*. The Conference will be held in **Budapest, Hungary**, on **31 May – 02 June 2016**, at the Hungarian Academy of Sciences. The aims of the Conference are to share knowledge of conservation agriculture internationally and across different scientific fields.

The application of Conservation Agricultural Systems is spreading world-wide. New re-

sults in the field of scientific and practical applications are accumulating continuously and, therefore, it is important to present and discuss new achievements. Conservation Agriculture is practised on over 125 million hectares around the world, covering approximately one-tenth of the global arable land surface. The largest and most rapid expansion has been in North and South America, Australia/New Zealand, and some parts of Africa. Compared to this, the adoption and extension of Conservation Agriculture in Europe has been slower, despite the considerable amount of damage caused by land degradation, mainly because of agricultural mismanagement. Land degradation affects much of Europe, particularly the semi-arid regions. The already unsustainable rates of soil erosion are projected to increase significantly over the next century, due to changes in land cover and precipitation patterns. Improving conservation agricultural techniques by scientific research and practise and the dissemination of results and experiences are therefore crucial and present important challenges for specialists developing sustainable land use systems. The aim of the Conference is to face these challenges by inviting scientists to meet and discuss the results, problems and possibilities of further development in this field.

Keynote speakers: **Márta Birkás** (Szent István University, Hungary), **José Alfonso Gómez** (Consejo Superior de Investigaciones Científicas, Córdoba, Spain), **Gerard Govers** (Catholic University of Leuven, Belgium), **John Quinton** (Lancaster University, UK).

For details, please visit the Conference website: <http://caslu2016.mtafki.hu/>

Kind regards from the Conference Organisers:

Adrienn Tóth, Balázs Madarász, Gergely Jakab, Ádám Kertész, Zoltán Szalai.



The Hungarian Academy of Sciences, Budapest, is in the historic centre of the City, immediately adjacent to the River Danube and near the famous Buda Castle Hill and Parliament Building (photo by Mike Fullen on 10 July 2013).

View of Buda Castle Hill from the Hungarian Academy of Sciences, Budapest (photo by Mike Fullen on 10 July 2013).



ESSC 2016

European Society for Soil Conservation **CONFERENCE**
Cluj-Napoca • Romania • June 15-18

European Society of Soil Conservation,
Babeş-Bolyai University Cluj Napoca
University of Agricultural Sciences and Veterinary Medicine Cluj Napoca
Office for Pedologic and Agrochemical Studies Cluj-Napoca

International Conference

“Soil - Our Common Future”

Cluj-Napoca (Romania), 15 – 18 June 2016

Welcome Message

Dear Colleagues

Babeş Bolyai University (BBU), the University of Agriculture Sciences and Veterinary Medicine (UASMV) and the Office for Pedologic and Agrochemical Studies (OPAS) from Cluj Napoca are glad to announce the great honour and important scientific challenge for us to organize the ESSC International Conference at Cluj Napoca, Romania, between 15 – 18 June 2016. Following the great success of former ESSC International Conferences, scientists from all over the world are invited to participate in this Conference. The main topic of the Conference **‘Soil – Our Common Future’** is the vital interconnection between soil on one the one hand and humans, animals and plants on the other hand. Thus, the scientific programme covers the main research areas regarding soil science and related fields.

We look forward to meeting you in Cluj Napoca (Romania) and we are sure that the ESSC Conference will be an excellent opportunity to prove that science and scientists are prepared to face present and future challenges, where the soil is a crucial component.

Reader dr. Nicolae HAR

Head of the Department of Geology
Babeş-Bolyai University, Cluj Napoca.

Registration and payments (€)

	Early Registration (Before/On 30 April 2016)	Regular Registration (Before/On 1 June 2016)	Late Registration (After 1 June 2016)
Regular participant	250	300	350
Students / Ph.D. student*	100	125	150
Accompanying Person	100	150	175
Gala Dinner	50	60	70
Publication of additional abstract	25	25	25
Field trip	50	60	70
*Students must upload their current student certificate to the registration system.			

The registration fee includes:

Regular participants, students and Ph.D. students:

- Welcome Cocktail at the venue on Wednesday 15 June 2016.
- Access to the opening and closing ceremony.
- Admission to all scientific sessions.
- Publication of one abstract in the Book of Abstracts.
- Conference materials (Conference bag, Name badge, Printed final programme, Book of Abstracts).
- Coffee breaks at the Conference venue.
- A certificate of attendance.

Accompanying persons:

- Welcome Cocktail at the venue on Wednesday 15 June 2016.
- Admission to all scientific sessions.
- Coffee breaks at the Conference venue.

The registration fee does not cover hotel accommodation in Cluj.

FORTHCOMING DATES FOR YOUR DIARY

Registration fee cancellation policy:

- Cancellation before 30 April 2016: 80% of paid sum will be refunded.
- Cancellation from 30 April 2016 to 1 June 2016: 50% of paid sum will be refunded.
- Cancellation after 1 June 1 2016: there will be no refund.
- All refunds will be made within two weeks after the end of the Conference.

Deadlines:

1 November 2015	Registration	Start of online registration
1 November 2015	Abstracts submission	Start of abstract submission
31 January 2016	Abstracts submission	Deadline of abstract submission

1 March 2016	Abstracts submission	Confirmation of acceptance and inclusion of abstracts in the scientific programme of the Conference
30 April 2016	Registration fees	Deadline for early registration fee payment
30 April 2016	Registration fees	Deadline for cancellation of participation with 80% refund of the registration fee pays (except bank charges)
1 June 2016	Registration fees	Deadline for regular registration fee payment
1 June 2016	Registration fees	Deadline for cancellation of participation with 50% refund of the registration fee pays (except bank charges)
1 June 2016	Registration fees	After this date, fees will not be refunded
1 June 2016	Field trip	Deadline for booking and payment of excursions

Scientific Sessions

The scientific topics of the ESSC Conference are organized into the following main sessions:

1. Desertification and food security.
2. Organic soils, protection and conservation.
3. Management of soil functions: monitoring and remediation.
4. Soil management after natural and anthropogenic fires.
5. Urban soils: technical evaluation and engineering.
6. Soil conservation issues in organic farming and conservation agriculture.
7. Forest soils: conservation policies.
8. Land management in a changing environment.
9. Soil quality improvement using natural materials.
10. Climate-smart agriculture: modelling and prediction.
11. Pedotechniques in large scale farming.
12. Remediation of mine, quarry and oil fields soils.

Conference Secretariat:

Babeş-Bolyai University Cluj-Napoca, Mihail Kogalniceanu Str, no. 1, 400084, Cluj-Napoca, Romania. Reader dr Nicolae HAR, e-mail: nicolae.har@ubbcluj.ro

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Manastur Street, no. 3-5, 400372, Cluj-Napoca, Romania. Professor dr Teodor RUSU, e-mail: trusu@usamvcluj.ro

Office for Pedologic and Agrochemical Studies Cluj-Napoca, Fagului Street, no. 1, 400483, Cluj-Napoca, Romania. Dr Horea CACOVEAN, e-mail: turda75@yahoo.com

Accommodation

Cluj Napoca has numerous 3 to 5 stars hotels. A map of the hotels locations and a list with contact details will be soon available soon on the Conference website.

Contact

Web: <http://essc2016.conference.ubbcluj.ro/>

E-mail: nicolae.har@ubbcluj.ro

Abstract submission is now open!

It is a pleasure to welcome you to the 19th Nitrogen Workshop, which will take place in Skara, Sweden on 27 – 29 June 2016.

For more information, visit our website:

www.nitrogenworkshop.com

Kind regards, The Organizing Committee:

Sofia Delin (Chair), Helena Aronsson, Georg Carlsson, Lena Engström
and Johanna Wetterlind

Swedish University of Agricultural Sciences



Articles, reports, letters, views or comments on any aspect of soil erosion and conservation in Europe are always welcome.

We invite proposals for special thematic issues of the Newsletter. We also welcome any comments on the ESSC Newsletter and suggestions on how it can be improved and developed.

Do not forget to send in your details of the following information:

- (i) Reviews of recent conferences.
- (ii) Recent grant awards.
- (iii) The citation details and abstracts of completed Ph.D. and M.Sc. theses.
- (iv) Newly enrolled Ph.D. research students, title of their research topic and names of research supervisors.
- (v) Recent staff institutional movements/promotions.
- (vi) A reference list of your 'new' international refereed scientific journal papers, which have been published recently (since and including the year 2000).
- (vii) At the ESSC Council at Průhonice (Czech Republic) in June 2009, it was agreed that the Newsletter will present a series of national reports on soil erosion and soil conservation activities in individual European countries. If you would like to volunteer a contribution, please contact any member of the Editorial team.

Send these details to either:

Professor Mike Fullen: **m.fullen@wlv.ac.uk**

or

Dr Colin Booth: **colin.booth@uwe.ac.uk**

and they will include this information in the next issue.

PLEASE NOTE:

**We publish two Newsletter issues per year. The deadlines are:
1 March and 1 September.**

The following three verses are a selection of translated ancient songs (ballads) of the Hani minority people of Yuanyang, Yunnan Province, south-west China. The Hani are world-famous as the builders and guardians of the rice terraces of Yuanyang (Plate 1). Until recently, the Hani had no written language. These ballads were collated by Hongzhen Zhang, based on meetings with the Mopi (elders of the Hani). The verses were abstracted from:

Hongzhen Zhang (2010). Interpretations of the Hani Seasonal Production Ballads. Yunnan Press Group Company and Yunnan Art Press Company, Kunming, 248 pp. (ISBN 978-7-5489-0034-4).



Plate 1: The family vegetable garden of a Hani farmer in Qingkou village, Yuanyang. Photo taken by Mike Fullen (Wolverhampton, UK) on 23 October 2009.

III. On the Arrival of the Three Months of Summer



Verse 176

*After the three months of spring,
Summer months come,
And everything changes in summer.
Remiaowuru, the god of summer was born in summer,
On the day under the animal sign of pig or rat.*



Verse 180

*Be sluggish for one day in the farming season,
Ten days work will be delayed;
Be laggard behind for one day,
It is hard to make up even ten years later after marriage.*

*We work hard in the fields,
Wearing old clothes,
Despite the trouble in preparing straw fertilizer.
Bamboo hats and coir raincoats
should be taken to shield from the sun and rain,
And let's prepare straw fertilizer for growing seedlings.*

*Our ancestors initiated the farm work,
So we have food supply from farming;
Otherwise, we have to pull and dig edible grass with our hands,
Not for fear of grinding the nails.*



Verse 188

*Hani's happy Kuzhazha Festival falls in June,
It is time for the Hani to play swing;
The swing is set by the Quifang house on the verge of the village,
And quality bamboo is used in making the swing,
Attached to the swing,
Four strong ropes are put firmly into the earth,
And the ropes are fastened together at the top,
With a pedal board being pegged at the bottom,
And a bridge-like beam being set between.*

*The swing is played high,
With one's arms extending like birds;
With the first swing,
Bad plants are swung out,
And good plants are swung in;
With the second swing,
Evil persons are swung out,
And pure persons are swung in;
With the third swing,
The lazy domestic animals are swung out,
And diligent ones are swung in;
Playing the swing symbolizes the bumper harvest,
And safety for every household,
As well as the prosperity of domestic animals.*

Thanks to Professor Li Yong Mei (Yunnan Agricultural University, P.R. China) and Professor Wang Weiguang (The University of Wolverhampton, UK) for their editorial help with the Hani ballads.

"Essentially, all life depends upon the soil ... There can be no life without soil and no soil without life; they have evolved together"
(Charles E. Kellogg, 1938, USDA Yearbook of Agriculture).



"Civilization has its roots in the soil" (Charles E. Kellogg).



"Land, then, is not merely soil; it is a fountain of energy flowing through a circuit of soils, plants, and animals"
(Aldo Leopold, 1949).



"Where the bottom layer of the sky rubs up against the top horizon of the soil, all terrestrial life is found"
(William Bryant Logan).



"...only rarely have we stood back and celebrated our soils as something beautiful and perhaps even mysterious. For what other natural body, worldwide in its distribution, has so many interesting secrets to reveal to the patient observer"
(Les Molloy).



*This lonely hill was always dear to me,
and this hedgerow, which cuts off the view
of so much of the last horizon.
But sitting here and gazing, I can see
beyond, in my mind's eye, unending spaces,
and superhuman silences, and depthless calm,
till what I feel
is almost fear. And when I hear
the wind stir in these branches, I begin
comparing that endless stillness with this noise:
and the eternal comes to mind,
and the dead seasons, and the present
living one, and how it sounds.
So my mind sinks in this immensity:
and floundering is sweet in such a sea.*

L'infinito (The Infinite) by Giacomo Leopardi (1819), translated from Italian by Jonathan Galassi and kindly provided by Edoardo A.C. Costantini (Florence/Firenze, Italy).



"What lies behind us and what lies before us are tiny matters compared to what lies within us"
(Ralph Waldo Emerson).



"What you dismiss as an ordinary coincidence may be an opening to an extraordinary adventure"
(Deepak Chopra).



"Do the right thing.... Especially when no one is watching" (Cherie Carter-Scott).



"Experience is not what happens to you; it is what you do with what happens to you"
(Aldous Huxley, 1894-1963).

AIMS OF THE SOCIETY

The ESSC is an interdisciplinary, non-political association, which is dedicated to investigating and realizing soil conservation in Europe. The ESSC pursues its aims in the scientific, educational and applied sectors by:

Supporting investigations on soil degradation, soil erosion and soil conservation in Europe.

Informing the public about major questions of soil conservation in Europe.

Collaborating with institutions and persons involved in practical conservation work in Europe.

The ESSC aims at co-ordinating the efforts of all parties involved in the above cited subjects: research institutions; teachers and students of geosciences, agriculture and ecology; farmers; agricultural planning and advisory boards; industries and government institutions.

ZWECK DER VEREINIGUNG

Die ESSC ist einer interdisziplinäre, nicht politische Vereinigung. Ihr Ziel ist die Erforschung und Durchführung des Schutzes der Böden in Europa. Die ESSC verfolgt dieses Ziel auf wissenschaftlichem, erzieherischen und angewandtem Gebiet:

Durch Unterstützung der Forschung auf den Gebieten der Boden-Degradierung, der Bodenerosion und des Bodenschutzes in Europa.

Durch Information der Öffentlichkeit über wichtige Fragen des Bodenschutzes in Europa.

Durch Zusammenarbeit mit Institutionen und Personen, die an der Praxis des Bodenschutzes in Europa beteiligt sind.

Die ESSC will alle Personen und Institutionen zusammenführen, die sich für die genannten Ziele einsetzen: Forschungsinstitutionen, Lehrer und Studenten der Geowissenschaften, der Landwirtschaftswissenschaften und der Ökologie, Bauern, landwirtschaftliche Planungs- und Beratungsstellen, Industrieunternehmen und Einrichtungen der öffentlichen Hand.

BUTS DE L'ASSOCIATION

L'ESSC est une association interdisciplinaire et non politique. Le but de l'association est la recherche et les réalisations concernant la conservation du sol en Europe. L'ESSC poursuit cette finalité dans les domaines de la recherche scientifique, de l'éducation et de l'application:

En encourageant la recherche sur la dégradation, l'érosion et la conservation du sol en Europe.

En informant le public des problèmes majeurs de la conservation du sol en Europe.

Par la collaboration avec des institutions et des personnes impliquées dans la pratique de la conservation du sol en Europe.

L'ESSC souhaite favoriser la collaboration de toutes les personnes et institutions poursuivant les buts définis ci-dessus, en particulier: institutions de recherche, professeurs et étudiants en géosciences, des agriculteurs, des institutions de planification et des conseil agricole, de l'industrie, et des institutions gouvernementales.

OBJECTIVOS DE LA SOCIEDAD

La ESSC es una asociación interdisciplinar, no-política, dedicada a la investigación y a la realización de acciones orientadas a la conservación del suelo en Europa. La ESSC persigue sus objetivos en los sectores científicos, educacionales y aplicados, en el ámbito europeo:

Promocionando la investigación sobre degradación, erosión y conservación de suelos.

Informando al público sobre los principales aspectos de conservación de suelos.

Colaborando con instituciones y personas implicadas en la práctica de la conservación de suelos.

La ESSC aspira a coordinar los esfuerzos, en los temas arriba mencionados, de todas las partes implicadas: centros de investigación, profesores y estudiantes de geo-ciencias, agricultura, silvicultura y ecología, agricultores, servicios de extensión agraria, industrias e instituciones gubernamentales.

Visit the ESSC Website: <http://www.essc.sk>

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Members of the specific institute or society would be full members of the ESSC and receive the ESSC Newsletter.

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