NEWSLETTER
1/2013

ESSC EUROPEAN SOCIETY for SOIL CONSERVATION

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Rill erosion on a conventionally tilled arable field at Dióskál, near Lake Balaton in western Hungary (photo by Balázs Madarász, Budapest, Hungary).

E.S.S.C. NEWSLETTER 1/2013

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This issue of the ESSC Newsletter presents the 20th 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 Ádám Kertész (Budapest, Hungary and ESSC Vice-President).

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.

Conservation agriculture as a tool for soil and water conservation

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Introduction

In Hungary, as in many European countries, farmers were absolutely convinced that cultivation operations such as inverting the soil are necessary and inevitable for successful crop production. Just a few decades ago, farmers and decision-makers became aware of the positive environmental and other benefits of conservation agriculture. Conservation agriculture is, in a way, the new discovery of 'old fashioned' agriculture (i.e. of the agriculture practised before the discovery and application of high-tech agricultural machinery). Even before the application of soil cultivation machines, cultivation was performed by inverting the soil using ploughs or similar tools. Conventional agriculture is based on tillage and it is highly mechanised. Conventional agriculture causes severe land degradation problems, including soil erosion and pollution, as well as other environmental damage, including decreased biodiversity and wildlife, low energy efficiency and a contribution to global warming (Boatman *et al.,* 1999).

Conservation Agriculture (CA) is a holistic approach to crop production, which encompasses 'conservation tillage' and seeks to preserve biodiversity in terms of both flora and fauna. Activities such as Integrated Crop, Weed, and Pest Management form part of Conservation Agriculture. Conservation tillage is practised on 45 million ha worldwide, mainly in North and South America, South Africa and Australia. In Europe, its area is increasing to reduce production costs, prevent soil erosion and retain soil moisture (Holland, 2004). In Hungary, the applied tillage systems can be characterized as a fight against extreme climatic and economic challenges (Birkás *et al.,* 2004). Soil preserving tillage systems used in Hungary nowadays are not unmitigated conservation tillage systems practised elsewhere in Europe. It is interesting that the application of CA in Europe has developed slower than in other parts

of the world. Table 1 shows data about CA and direct drilling in several European countries. Switzerland and the UK are in leading positions.

Table 1. Estimated surface under Conservation Agriculture and Direct Drilling in different European Countries (data obtained from ECAF National Associations)

	Surface under conservation agriculture (ha)	% Agrarian surface	Surface under no-till	% Agrarian surface
Belgium	140,000	10		
Ireland	10,000	4	100	0.3
Slovakia	140,000	10	10,000	1
Switzerland	120,000	40	9,000	3
France	3,000,000	17	150,000	0.3
Germany	2,375,000	20	354,150	3
Portugal	39,000	1.3	25,000	0.8
Denmark	230,000	8		
United Kingdom	1,440,000	30	24,000	1
Spain	2,000,000	14	300,000	2
Hungary	500,000	10	8,000	0
Italy	560,000	6	80,000	1
TOTAL	**10,054,000**		**960,250**	

There are several reasons why Europe is behind the rest of the world (European Conservation Agriculture Federation, 1999). (1) There is less need to take risks, because the reduction of costs is not as important as it is elsewhere. (2) Lack of technology. (3) Lack of technology transfer. (4) Lack of institutional support. CA is an important tool in those regions of the world where soil erosion is a major problem and where the retention of soil moisture is an important goal. Retaining water in the soil is equally important in preventing both floods and drought.

Benefits of conservation tillage

The main benefit of CT is that the soil will be preserved in semi-natural conditions as soil disturbance by cultivation is minimized and physical and chemical depletion is decreased. Soil structure and related properties (drainage, porosity, adsorption capacity and structural stability) remain in a good state (Lavier *et al.* 1997). Compaction and loss of soil structure can also be prevented or decreased by applying CT, since there is less traffic in the field and crop residues are not buried in the soil. CT also increases soil organic matter (SOM). SOM content diminishes under conventional cultivation rather quickly. Kinsella (1995) estimated that most agricultural soil types lose ~50 % of soil C. When CT is applied, crop residues remain on the soil surface offering very good protection against erosion.

Conservation tillage increases rainwater storage in fields, which increases specific yield compared to ploughed fields. Compared to conventional tillage, the amounts of surface

runoff and soil loss are less and more nutrients and herbicides remain in fields. Other benefits include: (1) maintenance of biological diversity (Field *et al.*, 2007), (2) production of food raw materials of better quality, (3) less CO_2-emissions from agricultural machines, due to decreased soil tillage and (4) decreasing CO_2-emission from soils due to shallow tillage, by up to an order of magnitude, or even more during hot and dry periods (Zsembeli *et al.,* 2006; Birkás *et al.,* 2007), and (5) reduced use of artificial fertilizers by ~25 % (Koós and Németh, 2007).

The SOWAP Project

Recognizing the benefits of CA, a demonstration project started in 2003 supported by the EU LIFE Programme. The organizations involved are listed at the end of this paper. This three-year, €4 million project was co-funded (50:50) by EU Life and Syngenta. SOWAP (SOil and WAter Protection) aims to assess the viability of a more 'conservation-oriented' agriculture, where fewer tillage practises replace the numerous cultivations carried out under more 'conventional' arable farming systems. The use of appropriate chemicals is tested and their potential for off-site contamination assessed to ensure that any suggested approaches are environmentally sound. The SOWAP Project funded by Syngenta Hungary ended in 2006. Runoff and soil loss measurements and ecological studies have been in progress on the SOWAP experimental plots in Hungary and they are also continuing in 2013. The emphasis now is on the role of field margins.

The main study topics of the Project include:

(1) Soil erosion studies on erosion plots to compare the effects of conventional and conservation tillage on soil loss, runoff, pesticides and nutrient loss.
(2) Biodiversity studies (birds and terrestrial ecology). Collected data include the number of foraging farmland birds in winter and during the breeding season, the abundance and availability of seed and invertebrate food resources and the number of earthworms as important indicators of soil 'health.'
(3) Soil microbiological investigations by monitoring biological indicators (i.e. recording indicator species and communities/populations, thereby indicating the levels of biodiversity in soil systems.
(4) Agronomy studies involve various assessments (e.g. crop cover, the date of emergence, disease prevalence, weed incidence).
(5) Economic aspects, especially the economic viability of the applied practises (the costs of land preparation, treatment application, cultivations and management practises, harvesting costs, marketing costs, transport, variable and fixed costs, gross margins) and outputs (yields).

The SOWAP Project started in the UK, Belgium and Hungary in August 2003, in co-operation with Syngenta UK/HU, Väderstad UK/HU, Cranfield University, Harper Adams University, The Royal Society for the Protection of the Birds, The Ponds Conservation Trust, the University of Leuven and several other national organisations. The aim of this Guest Editorial is to present results obtained in Hungary regarding the environmental impacts of conservation tillage.

Methods

Plot experiments were conducted in western Hungary, in Zala County, at Szentgyörgyvár and Dióskál, in the Zala River Catchment (Figure 1, Plates 1 and 2).

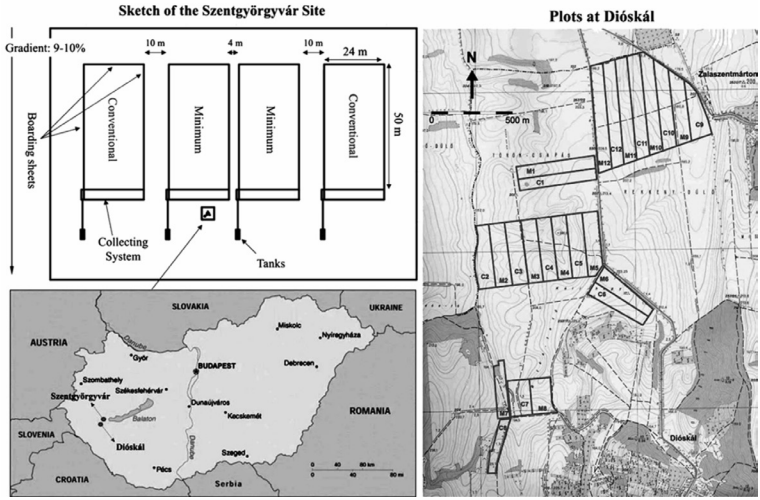

Figure 1. Location and plan of the conservation agriculture experimental plots in Zala County, Hungary.

Plate 1. Experimental plot at Szentgyörgyvár, Western Hungary. Three of the four plots are shown. The first and the second plot on the left are conservation tillage plots and the third one on the right is a conventional tillage plot.

Plate 2. Stem-crunching on the experimental plots.

The experiments have been on-going since 2003 (Bádonyi *et al.* 2008a,b; Kertész et al. 2010; Madarász and Kertész, 2010) on medium-sized plots to compare the effects of conventional (inversion) tillage and conservation (non-inversion, shallow) tillage at two scales:

Medium-sized (1200 m^2) plot experiments on soil loss, runoff and nutrients (two treatments and two replicates) at Szentgyörgyvár.

Large-plot experiments (18 plots, 4 – 5 ha each) on crop production at Dióskál.

The size of each plot at Szentgyörgyvár is 50 × 24 m = 1200 m^2 (Figure 1). This size allows for cultivation carried out by common farm machinery. Contour tillage was applied here to protect the soil on a gentle (10 – 11%) slope. Since October 2003, the two outer plots have been cultivated in a conventional way (inversive ploughing), while conservation tillage (non-inversion shallow disking) has been applied to the inner plots.

Surface runoff is captured by a collecting system (Plate 3), consisting of two runoff gutters to collect runoff from small and major rainfall events (Bádonyi *et al.,* 2008b; Kertész *et al.* 2010). Runoff efficiency from these plots is 95 – 97% (i.e. 95 – 97 mm of runoff was measured from a 100 mm rainfall event). The volume of runoff and mass of sediment were determined. Organic carbon and nutrient contents were measured during 2004 – 2006.

Plate 3. Runoff collecting system consisting of two runoff gutters, a small one for smaller events and a large one below it for major rainfall events.

Results

Measurement results during the period of 2004-2009 are presented below. During six years, annual mean precipitation was 611 mm. Some 35% (213 mm) of precipitation caused measurable runoff on the plots (Table 2). The total rainfall was approximately the same during 2004-2006 and 2007-2009. There was no significant difference between rainfall amounts causing runoff. However, there were significant differences between treatments concerning runoff and soil loss.

Table 2. Total amount of runoff and eroded soil at the experimental site of Szentgyörgyvár

Years	Rainfall (mm)			No. of rainfall events with erosion	Runoff (mm)		Runoff rate	
	Total (A)	Leading to runoff (B)	B/A		Conv.	Cons.	Conv.	Cons.
2004 – 2006	1859.6	625.4	0.336	27	130.5	45.6	0.209	0.073
2007 – 2009	1805.4	653.7	0.362	31	26.2	9.4	0.040	0.014
2004 – 2009	**3665.0**	**1279.1**	**0.349**	**58**	**156.7**	**55.0**	**0.122**	**0.043**
Mean/year	611	213		10	26.1	9.2		

Years	Soil loss (t/ha)			Infiltrated water (mm)			Infiltration rate (proportion)	
	Conv.	Cons.	Cons./Conv.	Conv.	Cons.	Cons./Conv.	Conv.	Cons.
2004 – 2006	10.95	0.35	0.032	494.9	579.8	1.172	0.791	0.927
2007 – 2009	1.54	0.58	0.379	627.5	644.3	1.027	0.960	0.986
2004 – 2009	**12.49**	**0.93**	**0.074**	**1122.4**	**1224.1**	**1.091**	**0.878**	**0.957**
Mean/year	2.08	0.15		187	204			

Note: Conv. = conventional tillage treatment. Cons. = conservation tillage treatment.

Evaluating the six years of runoff measurements, the following observations can be made. On the conventional plots 157 mm of runoff was measured, while on the conservation plots 55 mm runoff was recorded (i.e. the value of runoff was 2.85 times higher on the conventional plots than on the conservation plots). Rainfall events had approximately the same erosive effects throughout the whole measurement period. Concerning runoff, there is a remarkable difference between the first and second halves of the observation period. In the first three years (2004-2006), runoff volume was five times more than during the second period (2007-2009), attributable to more intense rainfall events during the first period.

The positive effect of conservation tillage is also evident from soil loss data. The mean soil loss from conventional plots was 12.5 t/ha and only 0.93 t/ha (7.4% of the control) from the conservation plots. Four heavy rainfall events of the first period were responsible for ~90% of soil loss on the conventional and ~66% of loss from the conservation plots. During the second period, rainfall intensities rarely exceeded the water holding capacity of the soil. Some 88% of total eroded soil was recorded during the first period, when 27 rainfall events occurred. Runoff from the conventional plots was 130.5 mm, and only 45.6 mm from the conservation plots. During the first period, the soil of the conservation plots was able to receive a mean of 28.3 mm more rainwater annually. Thus, a greater proportion of water was available for crops, while soil and nutrient losses were less (Table 3). The amount of eroded soil on conservation plots was one-thirtieth of that on the conventional plots. That value increased when runoff moved over saturated soil surfaces caused by prolonged rainfall events, but even so it remained under one-tenth.

There is a major difference between the mean values of the six-year runoff (9-16 mm/year) and soil loss (0.15-2.0 t/ha/year) data on conservation plots and in good conventional plots. Cultivation of the plots was carried out along the contour lines on all plots. The most important result is that with consistent conservation tillage practise, runoff decreased to one-third and soil erosion dropped to one 30th-40th of control values. Concerning the macro-elements, a mean of 15.5 kg/ha fertilizer (NPK) active substance was washed off the conventional plots annually and only 4.3 kg/ha from the conservation plots. The plots retained 80% of applied nitrogen, 88.5% of phosphorus and 63.5% of potassium (Table 3). To decrease nutrient loss it is essential to decrease runoff and increase infiltration. That can be achieved in practise by protecting soil fauna, so that it can maintain and continuously develop adequate soil physical conditions (Figure 2).

Table 3. Nutrient loss (kg/ha/year, 2004-2006)

	N	P_2O_5	K_2O	NPK
Conventional	6.597	0.887	8.073	15.556
Conservation	1.306	0.102	2.938	4.346
Ratio Conservation/Conventional	0.198	0.115	0.364	0.279
%	19.8	11.5	36.4	27.90
Nutrient content under conventional tillage (%)	42.4	5.7	51.9	100
Nutrient content under conservation tillage (%)	30.0	2.3	67.6	100

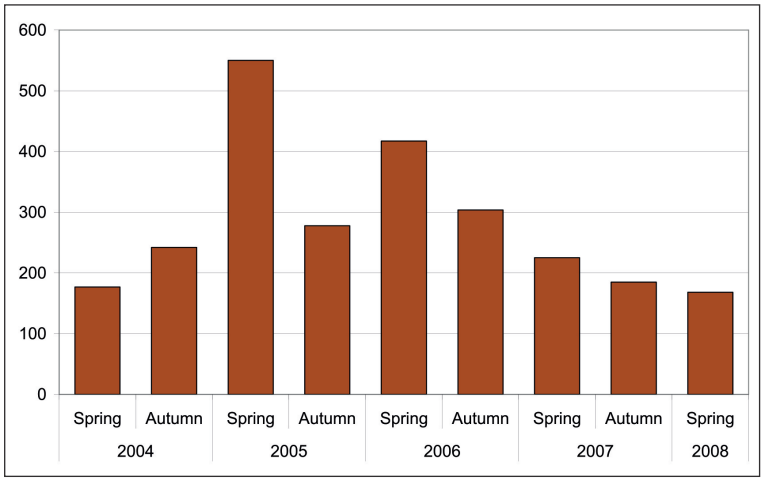

Figure 2. Mean number of earthworms on the conservation plots at Dióskál (% of conventional plots).

Crop Yields

The experiments started on nine plot pairs in autumn 2003. Winter wheat, maize and later oil seed rape were grown. After the initial three years, a yield decline was established, but during the last four years the crop yields measured on the conservation plots exceeded those on the conventional plots (Figure 3). It seems that on the basis of the rather short seven-year period, the trend of initial decline reversed (probably due to the technological switch). That coincides with the results of Nicolas (2007). The mean variation of crop yields (conservation in percentage of conventional) was: +0.4 % (winter wheat), -5.2 % (maize) and +12.0 % (oil seed rape) (Figure 4). The initial yield decline of maize (>10 %) can be explained by the lack of appropriate machinery or agronomic experience.

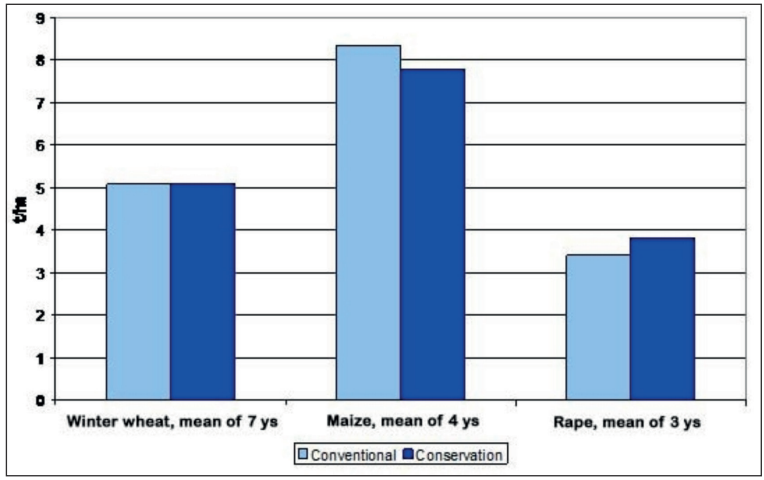

Figure 3. Yield by treatment at Dióskál (2003 – 2010).

The first year was unfavourable for wheat, but proved to be good for maize, indicated by the 4.5 t/ha and the 10.2 t/ha yields, respectively. Weather conditions affected the experimental site in the same way. However, the conservation plots showed more favourable trends, which can be explained by the fact that conservation tillage gradually modifies the water and nutrient system in the soil. Those facts draw attention to the importance of close and attentive observation of crops and their environmental conditions when conservation tillage is applied and the need for a higher level of professional knowledge of agronomy and technology.

Figure 4. Annual crop yields on conservation plots compared with conventional plots (% values indicate the surplus/deficit on the conservation plots).

Costs of cultivation

In conservation tillage systems fewer passes by agricultural machinery are necessary. Thus, cultivation costs were 12 – 13 % less. Material costs of conservation tillage were slightly higher, but even taking that into account, it was still possible to save 2 – 6 % of costs (Table 4). However, one should keep in mind that conservation tillage needs considerable initial investment, which returns in the long run. Proper machinery is essential for conservation tillage along with sufficient knowledge and proper attitudes to the need to harmonize agricultural production with soil and nature conservation.

Table 4. Mean cultivation costs (€ per hectare) for (a) Winter Wheat and (b) Maize at Dióskál (2004 – 2006)

(a)	Winter wheat				
System	Cultivation	Materials	Transport	Other	Total
Conventional	207	209	35	7	459
Conservation	182	211	33	6	431
(b)	Maize				
System	Cultivation	Materials	Transport	Other	Total
Conventional	193	257	68	23	540
Conservation	167	285	60	23	535

Conclusions

The presented results show that soils and the environment could be protected, even under intensive agricultural production systems. With conservation tillage, both soil erosion and nutrient loss can be reduced considerably. The extent of soil erosion can be kept below the value of tolerable soil loss, thus productivity can be maintained and long-term sustainable production can be secured. The farmers as well as nature and water protection can benefit from the conscious and consistent application of soil conservation technology. It can be recommended that non-inversion tillage should be promoted by means of agricultural policy in both Hungary and other EU countries. This should be an active area of research, development and consultancy. Certainly, there is a need for further development of appropriate agrotechnologies concerning nutrient supply and effective physical, chemical and biological weed control techniques. Considering the very positive effects of conservation agriculture, it is important that agricultural practise should support and that society should appreciate the application of conservation agriculture technology.

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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, 51 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.

NEW Ph.D. THESIS

Julian Campo Velasquez (2012). Effects of Experimental Repeated Fires on Soil Aggregation and its Temporal Evolution. Ph.D. thesis, The University of Valencia (649 pp.) (In Spanish and English)

Forest fires can be considered one of the main disturbances of soils and vegetation. Although the affected area in EU Mediterranean countries has decreased since 1980, in Spain and Portugal the affected areas has tended to increase, confirming climate change trends. Fires can affect soil properties as a function of their severity, but there are other factors, including vegetation and soil type. Of these characteristics, aggregate stability has been used as an indicator of soil quality, although its post-fire response is complex, depending on other soil properties.

The stability of soil aggregates (macro, Ø >250 µm, and micro, Ø <250 µm) was studied, as well as soil organic matter and calcium carbonate contents, aggregates size and water erosion processes, in relation to fire severity and its recurrence. These were studied in two environments (under canopy and bare soils), and in the short- and medium-term after two fires. The research was conducted in the Experimental Station of La Concordia (Valencia, Spain) and at

the laboratory of the Desertification Research Centre. The rendzic Leptosol analysed in this research showed higher macroaggregates stability (SMS), mean weight diameter (MWD) and soil organic matter (SOM) under the plant canopy (UC) than in bare soil (BS). The latter showed higher calcium carbonate contents ($CaCO_3$) and microaggregate sizes (MMD) than the former.

Laboratory studies confirmed that up to 220 °C, no changes were observed in the studied soil properties. The SOM content and SMS decreased above 220 °C. The MWD, $CaCO_3$ and removable iron of macroaggregates peaked at 750°C and reached their lowest values at 1000 °C. The diameter and mean stability (MSA) of microaggregates did not change up to 1000 °C (maximum observed). SOM was considered the main cementing agent of macroaggregates in UC. Chemical composition of SOM, studied by pyrolysis gas chromatography/mass spectrometry, showed no differences between soil fractions or between UC and BS (polyphenols, polysaccharides, lignin and alkanols were mainly found).

In 1995, different fire treatments were applied to the nine plots of La Concordia (20x4m): three were burned with high severity fire, three with moderate severity, and three were left unburned (control). In 2003, they were burned again with low severity fires. Plots were unaltered between fires, and the study was performed until summer 2007. In general, soil environment explained significant differences in soil properties between under canopy and bare soils (except MSA). Only in the short-term of repeated fires, $CaCO_3$, MWD and MMD values were similar in both soil environments.

The different severities of 1995 fires, and its recurrence in 2003, did not cause any change in the SMS. However, an upward trend was observed (final values 35 – 40 % UC, 25 – 30 % BS). The aggregate size distribution changed significantly in the short-term after both fires and consequently, the final MWD decreased (~30 % UC). Control soils in both environments were characterized by high percentages of less stable microaggregates (32.5 – 4.1 µm Ø). After fires, the MMD of burned BS decreased, but MSA hardly changed. A final recovery was observed in burned soils (MMD: 16 – 18 µm Ø, MSA: 16 – 21 %). SOM content of the UC burned with high severity tended to decrease after the first fire, but increased in those soils burned at moderate severity. Decreasing SOM trends were found in the short-term after this fire. After repeated fires, no changes were measured. Low organic matter incorporation was demonstrated (8 – 10 % UC, 6.5 – 7.5 % BS). The $CaCO_3$ content was very high and continued increasing after the 1995 fires. There were no short-term changes after the 2003 fires, but in the medium term contents tended to decrease (50 – 55 % BS, 45 – 50 % UC).

The organic matter seemed to be responsible of macroaggregate stability in the control soils; meanwhile, CaCO had little participation. The role of both cementing agents in burned soils was not clearly established, although it is assumed that the high SOM content was more important than that of $CaCO_3$, which might have some involvement in the MMD. Finally, it was established that runoff and sediment yields depend on fire severity, as well as intensity and precipitation volume. Such erosion rates were significantly higher on burned plots than unburned. Although in the medium term runoff tended to decrease, the high sediment rates confirmed the poor recovery of burned plots.

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Announcements

ESSC joins the Global Soil Partnership

GLOBAL SOIL PARTNERSHIP

APPLICATION TO BECOME A PARTNER OF THE GLOBAL SOIL PARTNERSHIP (GSP)

Please submit completed application form to the nearest Regional Soil Partnership,

or in their absence, directly to the GSP Secretariat (GSP-**Secretariat@fao.org**) at FAO HQ in Rome, Italy

We, the EUROPEAN SOCIETY for SOIL CONSERVATION – ESSC

apply to become a Partner of the Global Soil Partnership.

The organization hereby:

- agrees to abide by the World Soil Charter Principles;
- pledges a willingness to actively participate in the GSP network;
- acts in accordance with the Terms of Reference for the Global Soil Partnership;
- confirms that the information submitted with the application is correct, and ensure that any changes in the information will be reported to GSP.

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منظمة الأغذية والزراعة للأمم المتحدة | 联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Продовольственная и сельскохозяйственная организация Объединенных Наций | Organización de las Naciones Unidas para la Alimentación y la Agricultura

Council

One Hundred and Forty-eighth Session
Rome, 3-7 December 2012
Observance of World Soil Day

Executive Summary

Soil is a finite natural resource. On a human time-scale it is non-renewable. Soils, the foundation of agricultural development and ecological sustainability, provide the basis for food, feed, fuel and fibre production, clean water, nutrient cycles, organic carbon stocks, one-quarter of global biodiversity, and also serve as a platform for construction, as well as being a source of construction materials. However, despite the essential role that soil plays in the life of humanity, degradation of soil resources is increasing due to inappropriate practises, growing population pressures and inadequate governance of this essential natural resource. Maintaining healthy soils required for feeding the growing population of the world and meeting their needs for biomass (energy), fibre, fodder and other products can only be ensured through joint efforts by the global community, such as the proposal to observe World Soil Day annually on 5 December.

Suggested action by the Council

The Council may wish to:

a) Endorse the Observance of the World Soil Day (5 December) as a valid platform for raising awareness on the importance of soils for food security and ecosystem functions.

b) Request the 38th Session of the FAO Conference (June 2013) to endorse the proposal to establish 5 December as 'World Soil Day,' and to request the Director-General of FAO to formally request the Secretary-General of the United Nations to table the proposal at the General Assembly of the United Nations.

Queries on the content of this document may be addressed to:
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1. Given the importance of soils, in 2002 the International Union of Soil Sciences (IUSS)[1]

[1] http://www.iuss.org

made a resolution to propose 5 December as 'World Soil Day.' The date was chosen to honour His Majesty King Bhumibol Adulyadej, King of Thailand, for his promotion of soil science and soil resource conservation. The purpose of the proposed World Day is to celebrate the importance of soil as a critical component of global ecosystems and as a vital contributor to human wellbeing through its contribution to food, water and energy security in mitigating biodiversity loss and climate change. At present, World Soil Day is celebrated mainly by the global community of some 60,000 soil scientists charged with responsibility of generating and communicating knowledge and understanding of the key role of soil in supporting life and agricultural production on earth.

2. Despite the commendable efforts by the IUSS and the soil scientists globally, soils are often perceived as a second priority during national and global decision-making processes. Indeed, degradation of soils is a silent process that does not attract the attention of decision-makers. Yet soils are clearly the key to addressing the current and future pressures of a growing population. Recognition, advocacy and support for promoting sustainable management of soils is the only alternative if the international community is going to guarantee healthy soils for a food secure world based on stable and sustainable ecosystems.

3. Within the framework of the 'Global Soil Partnership,' FAO advocates for international recognition of the importance of soils for achieving sustainable food security, as well as for its pivotal role in helping to enable the survival and growth of healthy ecosystems.

4. After the Rio+20 Conference, it is evident that there is still need to raise awareness and to promote and facilitate actions towards the sustainable management of soils, in order to reach the agreed sustainable development goals of a zero-hunger and land-degradation neutral world.

5. FAO, through the Global Soil Partnership, under the leadership of Thailand, the Asian Regional Group and G77, and with support of their members as expressed during a presentation made at the 144th Session of the FAO Council (11 – 15 June 2012), will request the UN system to recognize 5 December as World Soil Day and institutionalize its observance accordingly. Activities such as the observance of World Soil Day by national governments, international and national organizations and civil society will assist in raising awareness and achieving recognition for soil as an essential, finite and non-renewable natural resource and as so mobilize the international community to actions towards its sustainable management.

The Celebration of 'World Soil Day 2012' in Italy. Workshop 'Man and Soil: A Never-ending Story' held at Bolzano (Italy) on 4-5 December 2012

The Italian Society of Soil Science (SISS) and the Italian Society of Pedology (SIPe), in collaboration with the South Tyrol Museum of Nature, organised the celebration of World Soil Day 2012 on 4 – 5 December 2012, in Bolzano.

Over 100 participants from throughout Italy, including soil scientists, students, teachers and national and local administrators, celebrated *"the importance of soil as a critical component of the natural system and as a vital contributor to the human commonwealth through its contribution to food, water and energy security and as a mitigator of biodiversity loss and climate change,"* as proposed during the 17th International Union of Soil Science Congress in Bangkok in 2002.

The programme of the two-day workshop 'Man and Soil: a Never-ending Story' consisted of oral and poster presentations and a large public debate on links between soil and society. The contributions from participants highlighted the essential role that soil plays for humankind and emphasized the vulnerability of this vital resource. The contributions pointed out that soil is a finite resource, non-renewable on a human time-scale, and that inappropriate management practises, increasing demands and population pressure drive unsustainable and inadequate governance over this essential resource. The 1,000-year old relationship between soil and man was illustrated, and key-questions, such as developing awareness

Plate 1. Hand that sustains a soil sample. A sculpture exhibited at the South Tyrol Museum of Nature during the exhibition devoted to soil.

about the importance of soil for the Man of Tomorrow, were discussed. Thus, special emphasis was placed on soil education and the activities developed by schools and museums on this topic. The closing event of the World Soil Day 2012 was to present the conclusions drawn from the Workshop, coupled to a visit of the interactive education activity for primary schools on soil 'Scava scava: Kosmos Boden' (Plate 1) organised by the South Tyrol Museum of Nature. This is a good example of links between soil science and society.

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Water Erosion and Conservation Video of Melsterbeek Catchment, Belgium

Melsterbeek Catchment (area 264 km^2) is situated in the eastern part of the loess belt of Belgium. It has a gently rolling topography. Loess is very susceptible to soil erosion, but due to its high soil fertility, there is a long agricultural tradition in the Catchment. Arable land covers 65% of the total surface. The Melsterbeek Catchment is frequently affected by both riverine and muddy floods. An increase in the frequency of muddy floods has been observed during recent decades. During the period 1992-2002, some parts of the Catchment were affected by flooding at least 10 times. Several types of conservation measure were implemented to mitigate these floods. These measures are presented in a short video simulation. The video shows a run of about one-minute of fields eroding in a storm; then a repeat with soil conservation measures in place.

To view the video, please visit:
http://www.land-en-water.be/english.html

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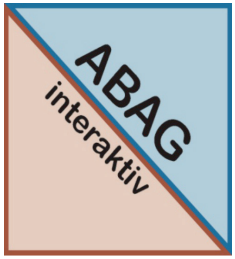

ABAGinteraktiv implementation of the Universal Soil Loss Equation on smartphones and handheld devices

For over 30 years the Universal Soil Loss Equation has been adapted, validated and is frequently used in Germany, where it has become well-known as 'Allgemeine Bodenabtragsgleichung ABAG.' Hence, this version has reached maturity for practical applications in agricultural extension, land infrastructure planning and environmental monitoring. However, technical developments proceed apace and new technologies, such as smartphones, opened the opportunity of transferring calculations from the desk and office to the field and thus to directly and effectively support agricultural extension work. Consequently, the former PC version of the ABAG (PCABAG) was implemented for online-use with smartphones and laptops/handheld devices. To account for the new applications, the name has been changed to 'ABAGinteraktiv'. These versions can be accessed at:

http://www.lfl.bayern.de/iab/bodenschutz/06558/index.php

The version for handheld devices is available at:
http://www.lfl.bayern.de/iab/abag/web/

The version for smartphones is available at:
http://www.lfl.bayern.de/iab/abag/mobile/

During implementation, small changes and improvements were made compared to the previous version. In particular, the menu for the C factors has become easier and new crop rotations were included to consider biofuel rotations.

ABAGinteraktiv is applicable in Germany and neighbouring countries, in particular in Switzerland, Austria and Poland. The seasonal distribution of rainfall and the seasonality of crop developments are sufficiently similar to German conditions, so that C factors also apply in these countries.

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Editor's note

There is some debate as to whether we should restrict our ESSC material to Europe, or take a broader global perspective. The news item goes well beyond either perspective and reports gully erosion on Mars (Plate 1). The item was abstracted from the NASA 'Image of the Day' for 15 March 2013.

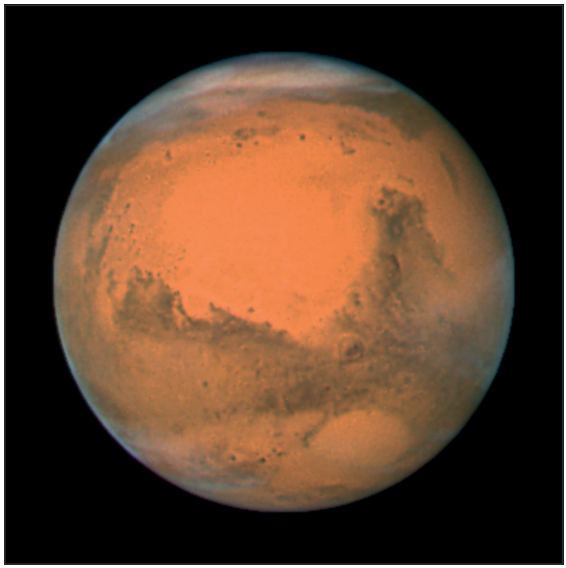

Plate 1. The Hubble Space Telescope view of the close approach of Mars on 18 December 2007 from a distance of 88 million kilometres (source: http://www.nasa.gov/).

Plate 2 was taken by the High Resolution Imaging Science Experiment (HiRISE) flying onboard the Mars Reconnaissance Orbiter mission. Gully landforms like those in this image are found in many craters in the mid-latitudes of Mars. Changes in gullies were first seen in images from the Mars Orbiter Camera in 2006, and studying such activity has been a high priority for HiRISE. Many examples of new deposits in gullies are now known. This image shows a new deposit in Gasa Crater, in the Southern mid-latitudes. The deposit is distinctively blue in enhanced-colour images. This image was acquired in southern spring, but the flow that formed the deposit occurred in the preceding winter. Current gully activity appears to be concentrated in winter and early spring, and may be caused by the seasonal carbon dioxide frost that is visible in gully alcoves in the winter.

Colin Dundas
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Image Credit: NASA/US Jet Propulsion Laboratory (JPL)/University of Arizona. The image is reproduced with the kind permission of HiRISE Media, The University of Arizona, USA.

To access the image, please visit:
http://www.nasa.gov/multimedia/imagegallery/image_feature_2470.html

Further Reading

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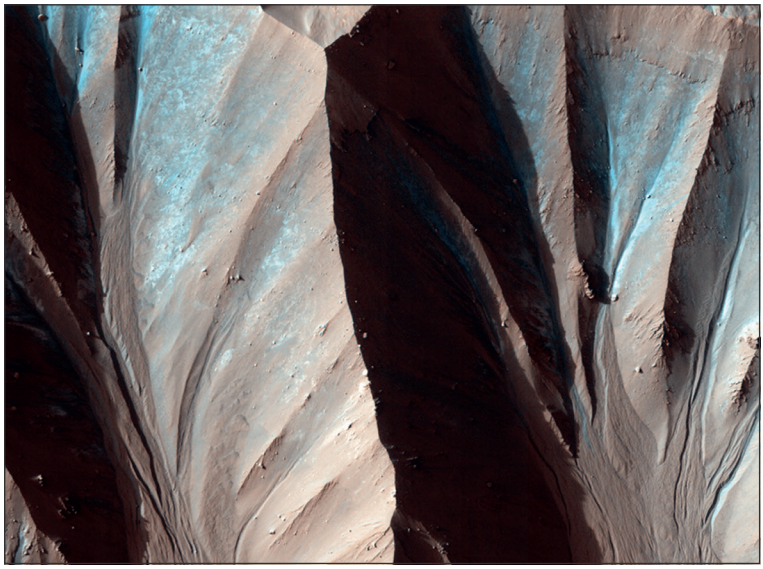


Plate 2. Image taken by the High Resolution Imaging Science Experiment (HiRISE) flying onboard the Mars Reconnaissance Orbiter mission and shows gully erosion in Gasa Crater, in the southern mid-latitudes.

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 ESSC web site is:

http://www.essc.sk

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: **k.vegh@vupop.sk**

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).

First International Conference on Global Food Security
Noordwijkerhout, The Netherlands,
29 September-2 October 2013

The First International Conference on Global Food Security aims to deliver state-of-the-art analysis, inspiring visions and innovative research methods arising from interdisciplinary research. Join us in this exciting opportunity to ensure that the best science is garnered to support the emergence of the Sustainable Development Goals.

Achieving global food security whilst reconciling demands on the environment is the greatest challenge faced by mankind. By 2050 we will need to feed 9 billion people. The urgency of the issue has led to huge scientific strides forwards; making it difficult to keep up with the rapidly expanding volume of scientific research.

We aim to better understand economic, social, biophysical, technological and institutional drivers of current and future global food security.

For more information about the topic list, visit the website:
www.globalfoodsecurityconference.com.

Contact information:

http://globalfoodsecurityconference.com/contact-us.html.

Conference Chairs
Ken Giller, Wageningen University, The Netherlands
Martin van Ittersum, Wageningen University, The Netherlands.
Supporting Journal: **www.elsevier.com/locate/gfs**

INTERNATIONAL SOIL SCIENCE MEETING

'SOILS IN SPACE AND TIME'
30 September-4 October 2013 in Ulm (Germany)

'Soils in Space and Time' is one of the key issues documenting the variability of the pedosphere. Therefore, it is of the utmost importance to exchange knowledge from different subjects.

Within the disciplines embracing soil morphology, micromorphology, soil genesis, soil geography, soil classification, palaeopedology and pedometrics, several interesting symposia will be presented at this Conference. These include:

- Pedogenesis and carbon sequestration.
- Quantitative modelling of soil processes and formation.
- Soil morphological indicators of past environments.
- Stabilization of soil organic matter by inorganic soil constituents.
- Changes of wetland soils with time (natural and anthropogenic).

Furthermore the Workshop 'Soils and Dust in the Mediterranean' (AEOMED: **https://ppsg2011.uni-hohenheim.de/84832)** will take place as an integral component of the Conference.

We have planned and organized a **unique programme of excursions** on 3 and 5 October 2013.

The Conference is the first divisional meeting of all commissions and working groups of Division I 'Soils in Space and Time' of the International Union of Soil Science (IUSS) and **everyone is invited.**

Conference fees: Student € 150, Regular participant € 250.

Registration is open until: 1 July 2013.

Venue: Ulm University, Germany.

For further Information, please visit our homepage:
https://iuss-division1.uni-hohenheim.de/

or e-mail: **info-division1@uni-hohenheim.de**

International Conference BCD 2013
Biochars, Composts and Digestates. Production, Characterization, Regulation, Marketing, Uses and Environmental Impact, Bari, Italy, 17-20 October 2013

The International Conference BCD2013 'Biochars, Composts and Digestates. Production, Characterization, Regulation, Marketing, Uses and Environmental Impact' will be held in Bari (Italy) from 17-20 October 2013, presided by Professor Nicola Senesi of the University of Bari. The Conference will focus on and develop the various scientific and applied aspects of biochar, compost and digestate science and technology, including field approaches and implications in a sustainable environment.

The Conference is scheduled in four general sessions and several special sessions. The 1st Circular is now available in the Conference website (**www.bcd2013.eu**), where detailed information can be found, including the General Provisional Programme, the Call for Proposals to convene Special Sessions, the Call for Abstracts, the Registration fees, all deadlines, and much more. For more details please visit:

www.bcd2013.eu.

Nicola Senesi
e-mail: **nicola.senesi@uniba.it**

INTERNATIONAL CONFERENCE and field excursion
1st Announcement

Biogeochemical Processes at Air-Soil-Water Interfaces and Environmental Protection, Imola, Italy, 9-12 June 2014

Short rationale:

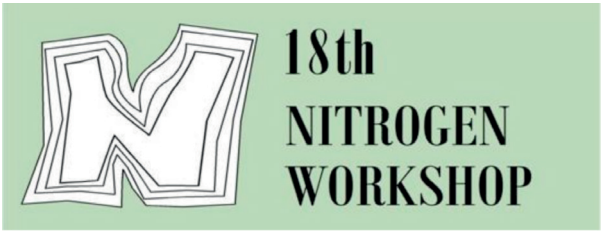
Knowledge of the complex processes occurring at the Air-Soil-Water interfaces contributes to the sustainable use of natural resources and is essential for the protection of the environment. The feedback mechanisms and rates of biogeochemical processes must be empirically studied in different natural environments, in the laboratory and in controlled environments, and through validated models. Our ability to investigate both natural and anthropogenic soil features, and their relationships with air and water, is advancing rapidly, particularly through new techniques. For instance, recent advances in geophysical probes now allow high-spatial-resolution field measurements. Isotopic analysis permits to us to follow the water cycle inside soil and ground-water. However, this considerable improvement in our knowledge and ability is insufficient. Improved biogeochemical understanding in natural and anthropogenic soils also depends on accurate conceptual models able to take into account both the interactions of the various components and the fluxes of matter and energy influencing the quality of water and air, thus ultimately the quality of the environment.

Organizing Committee

G. Vianello (Co-ordinator); C. Dazzi; E. Costantini; G. Corti; L. Vittori Antisari; G. Falsone; G. Lo Papa; S. Cocco; A. Buscaroli.

Scientific Secretariat:

G. Falsone (**gloria.falsone@unibo.it**); G. Lo Papa (**giuseppe.lopapa@unipa.it**).



18TH NITROGEN WORKSHOP, 30 JUNE-3 JULY 2014, LISBON, PORTUGAL

Venue: INIAV, Oeiras.

Visit our website for the latest news:
www.nitrogenworkshop.com

Organization: INIAV-ISA, CEER.

Executive Secretariat:

AIM GROUP INTERNATIONAL

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iniav

Instituto Superior de Agronomia
Universidade Técnica de Lisboa

CEER Biosystems Engineering

UTL

ENGINEERING GEOLOGY AND THE ENVIRONMENT
GÉOLOGIE DE L'INGÉNIEUR ET DE L'ENVIRONNEMENT

50TH ANNIVERSARY CONGRESS OF THE INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY,15-19 SEPTEMBER, TURIN, ITALY

The International Association of Engineering Geology (IAEG) celebrates its 50th anniversary, holding its IAEG XII Congress 'Engineering Geology for Society and Territory' in Turin (Italy) from 15-19 September 2014. The declared aim of the Congress is to analyse the role of Engineering Geology in our changing world through a series of topics and sessions spanning environment, processes, issues and approaches. As Environment is among the main themes, soil is a central topic to discuss and present in some of the proposed sessions. The sessions are:

1. CLIMATE CHANGE AND ENGINEERING GEOLOGY

1.4. Climate change: impacts on natural resources and hazards. Convener: Dr Maurizio Polemio, Co-conveners: Dr Marta Chiarle, Dr Marco Turco.

1.9. Environmental and engineering geological problems in permafrost regions in the context of a warming climate. Convener: Professor Wei Shan. Co-conveners: Dr Tonglu Li, Dr Marten Geertsema, Dr Marina Leibman, Dr Marta Chiarle, Dr Ying Guo.

1.15. Slope dynamics and its control in a climate change scenario. Convener: Dr Mauro Rossi, Co-conveners: Professor Dino Torri, Professor Jean Poesen.

2. LANDSLIDE PROCESSES

4. MARINE AND COASTAL PROCESSES

5. URBAN GEOLOGY, SUSTAINABLE PLANNING AND LANDSCAPE EXPLOITATION

5.10. Geohazards in urban scenarios: forecasting and protective monitoring. Convener: Dr Daniele Giordan. Co-conveners: Dr Paolo Allasia, Dr Andrea Manconi, Dr Mauro Rossi, Dr Fausto Guzzetti, Dr Giorgio Lollino.

6. APPLIED GEOLOGY FOR MAJOR ENGINEERING PROJECTS

7. EDUCATION, PROFESSIONAL ETHICS AND PUBLIC RECOGNITION OF ENGINEERING GEOLOGY

8. PRESERVATION OF CULTURAL HERITAGE.

The four sub-sessions listed under Sessions 1 and 5 are among those where soils and their inter-relationships with land use and landscape are most pertinent. Certainly soil erosion and slope dynamics (1.15) are extremely relevant and Session 1.15 explicitly includes mass movements, ephemeral-permanent gully erosion and diffuse soil loss and their interactions with vegetation, soil management and events exceeding thresholds. Relevant topics include droughts, rain-storms, wet spells, fires and processes by which climate changes can change soil and slope dynamics.

For more information, please visit:
http://www.iaeg2014.com/

Summary of Forthcoming Conferences

Information on forthcoming conferences will be presented both in the ESSC Newsletter and on the ESSC web site. Below are the essential details of forthcoming conferences which have already been announced in the ESSC Newsletter.

8th International Conference on Geomorphology of the International Association of Geomorphologists (IAG) on 'Geomorphology and Sustainability,' 27-31 August 2013, Paris (France)

Conference website:
http://www.geomorphology-iag-paris2013.com/

22nd International Symposium 'Soil Forming Factors and Processes from the Temperate Zone,' 20-22 September 2013, Iaşi (Romania)

Symposium website:
www.soilscience.ro

Reminder for the next issue:

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 four 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. 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).

I. On the Arrival of the Three Months of Winter

Verse 22

The sky looks like a huge hat made of bamboo strips,
Covering everyone wherever he/she is,
Protecting him/her from harm,
No matter how far he/she travels.

Verse 28

The trees are still alive,
Yet leaves fall on the earth and turn mouldy.
The Longlan in the village
Pretends to be dead,
And the teak in the village
Becomes bald without any green leaves.
If you do not approach,
How can you tell whether the tree is hollow or solid?
If you do not come close,
How can you know whether the trunk is wet or dry?
The root is the same,
While the leaves are no longer the old ones;
The roots of various grasses are vigorous,
But the leaves have fallen down and perished.

Verse 34

Without the right kind of farming tools,

Even the fertile soil for planting water gourd trees,

Cannot be transformed into buckwheat fields.

If nobody works in the fields,

The fields will be full of weeds;

If the cattle do not graze by the fields,

Weeds will be everywhere around the fields.

Verse 56

I cut down water gourd trees,

And turned over straw ash for the need of growing buckwheat.

The leaves of water gourd trees and the straw ash are good fertilizer,

So the buckwheat surely grows well

With plump seeds.

Do remember to cultivate the field in the coming year,

No matter what a good harvest of buckwheat it is.

Editor's Note:

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

Then he told them many things in parables, saying: "A farmer went out to sow his seed. As he was scattering the seed, some fell along the path, and the birds came and ate it up. Some fell on rocky places, where it did not have much soil. It sprang up quickly, because the soil was shallow. But when the sun came up, the plants were scorched, and they withered because they had no root. Other seed fell among thorns, which grew up and choked the plants. Still other seed fell on good soil, where it produced a crop – a hundred, sixty or thirty times what was sown".

(The Bible (New International Version 2011), Matthew, Verse 13, Chapters 3 – 8)

Soil isn't a granular medium suffused with chemicals, it is alive and must be alive to function. (Gary Jones, 2005)

The thin layer of soil covering the earth's surface represents the difference between survival and extinction for most terrestrial life. (J. W. Doran and T. B. Parkin, 1996)

We travel together, passengers on a little spaceship, dependent on its vulnerable supplies of air and soil; preserved from annihilation only by the care, the work, and I will say, the love we give our fragile craft. (Adlai Stevenson, 1965)

A hundred times every day I remind myself that my inner and outer life depend on the labours of other men, living and dead, and that I must exert myself in order to give in the same measure as I have received and am still receiving. (Albert Einstein, 1879 – 1955)

Learn to be silent. Let your quiet mind listen and absorb. (Pythagorus, 580 – 500 BC)

The breeze at dawn has secrets to tell you. Don't go back to sleep.

(Jalaluddin Rumi, 1207 – 1273)

Every single point extends to infinity in all directions. No matter where you go, the same infinity extends in all directions. You are thus the centre of the Universe, no matter where you go. (Deepak Chopra, 1995)

Tough times don't last. Tough people do. (Simon Devereaux)

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 Öffenlichkeit 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 problemes 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-politica, dedicada a la investigación y a la realización de acciones orientadas a la conservación del suelo en Europa. La ESSC persigue sus objectivos en los sectores cientificos, educacionales y aplicados, en al ámbito europeo:

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

Informanto 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, selvicultura y ecología, agricultores, servicios de extensión agraria, industrias e instituciones gubernamentales.

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

MEMBERSHIP FEES

I wish to (please mark appropriate box):

- Join the ESSC
- Renew my membership of the ESSC
- Know whether I have outstanding membership contributions to pay

Membership rates:

Standard Rates:

- One year € 25.00
- Three years € 70.00

Institutional Membership € 15 per member per year.

Institutional membership involves the payment of a flat rate of € 15 (per member per year) for institutes/societies with at least 10 members. This fee is irrespective of the country.

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

Students:

50 % reduction on above rates for three years
Your supervisor must provide written confirmation of student status

I wish to pay my membership contribution by (please mark appropriate box):

- Credit card (MasterCard, Visa)
- PayPal (from your personal PayPal account or with your credit card as a PayPal guest; send an e-mail to Wim.Cornelis@UGent.be and you will receive a money request)
- Bank Transfer (Branch address: Fortis Bank, Zonnestraat 2, B-9000 Ghent, Belgium; International transaction codes: IBAN – BE29 0014 5139 8064 and BIC – GEBABEBB ; Account name: European Society for Soil Conservation; Account number: 001-4513980-64)

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MEMBERSHIP NUMBER (if known): M0 .....

Please send this form to: ESSC Treasurer, Professor Dr Wim Cornelis
Department of Soil Management, Ghent University,
Coupure links 653, B-9000 Ghent, BELGIUM
Wim.Cornelis@UGent.be