NEWSLETTER 1 / 1999

ESSC EUROPEAN SOCIETY for SOIL CONSERVATION

† ***Professor Gerold Richter*** born 23 December 1932
died 12 February 1999

E.S.S.C. NEWSLETTER 1 / 1999

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ESSC EUROPEAN SOCIETY for SOIL CONSERVATION

Third International Congress

MAN AND SOIL AT THE THIRD MILLENIUM

28 MARCH - 1 APRIL 2000

Valencia, Spain

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† PROFESSOR GEROLD RICHTER

born 23 December1932 died 12 February 1999

The whole membership of the European Society for Soil Conservation, his colleagues at the University of Trier and the geomorphological and scientific community at large will mourn the death of Professor Gerold Richter.

Professor Richter was one of the founder members of the ESSC and proved to be one of its most devoted servants. He assumed the mantle of both Secretary and Treasurer of the Society for its first eight years before finally admitting that the two jobs were too much for one person. Through Richter's efficiency and enthusiasm, the Society was so well run from Trier that too few people perhaps appreciated the time and effort involved. In addition, he twice took over the task of preparing and publishing the Newsletter. Still further, it was the skill and wisdom of Richter that guided the Society so smoothly through its initial years, setting out its statutes and getting the Society registered in Trier. Through his administrative abilities and calm organisation, he was able to implement successfully the ideas and vision of our founding President, Professor Jan De Ploey.

Some three years ago, several members of the Council persuaded a partially-reluctant Gerold to take on the role of President, a position to which he was elected unanimously. Gerold had a clear vision of how the Society should be positioned to allow it to fulfill its role in promoting soil care and protection European-wide, based on sound science. It was his idea to establish the Task Forces. It was he who proposed waiving the membership fees for scientists in the former countries of Eastern Europe and the Soviet Union to allow them to participate more fully in the Society's activities.

Gerold was born in Böhmisch-Leipa, Sudeten (now Česka Lipa in the Czech Republic). Following an education in his home town, he entered the University of Greifswald in 1952, graduating with a Diplom in Geographie und Bodenkunde "mit Auszeichnung" in 1956. He then became an Assistant at that university where he completed a PhD thesis on *Der spätglaziale Gletscherrückgang im mittleren Mecklenberg*. After a period of employment in the Bundesanstalt für Landeskunde und Raumforschung at Bad Godesberg, he joined the Technische Universität Braunschweig where, in 1965, he completed his Habilitation on *Bodenerosion - Schäden und gefährliche Gebiete in der Bundesrepublik Deutschland*. Next, he spent short periods of time at the Universities of Braunschweig and Stuttgart before working on an agricultural and population geography project in Mozambique.

His major interest in the late 1960s focussed on anthropogenic geomorphology. He investigated the post-glacial evolution of valley heads in central Europe, drawing attention to the role of human impact on phases of gully initiation and development.

From this work and studies of soil profiles, he was able to map the incidence and severity of erosion. The reputation he obtained from this research led to his appointment in 1970 as Professor of Physical Geography at the University of Trier. In 1976, he brought together his own work and papers of other geomorphologists over the previous two decades in *Bodenerosion in Mitteleuropa* (Wissenschaftliche Buchgesellschaft), thereby creating awareness of the extent of erosion in the Federal Republic of Germany. It was at this time too that he renewed his interest in eastern Europe and began collaboration with colleagues on erosion mapping in what was then Czechoslovakia.

Although essentially a field geomorphologist, he recognised the importance of laboratory investigations, particularly with rainfall simulation. He pioneered the development of field stations for erosion measurement using automatic recording equipment. In 1974, he established the research station at Mertesdorf, 10 km east of Trier, initially to quantify the loss of soil on steeply-sloping vineyards and more recently to investigate the effects of different conservation measures. Some 20 years of data now exist for this station, making it one of the longest running experiments in Europe. He also helped develop the Trier rainfall simulator which successfully reproduced the drop-size distribution and energies of natural rainfall.

His recent work has concentrated on a major collaborative programme with Hungarian scientists to investigate the contribution of soil erosion to the sediment budget of Lake Balaton. Fortunately, he was able to complete this work and bring it to publication before becoming ill. A summary of the research was presented in the ESSC Newsletter 1997/2+3. He was also involved in studying erosion under potato production in Prince Edward Island, Canada, working with scientists from Agriculture Canada to quantify and find solutions to the problem of snow-melt erosion. His last major publication was an edited volume, *Bodenerosion: Analyse und Bilanz eines Umweltproblems* (Wissenschaftliche Buchgesellschaft, Darmstadt, 1998) which stands as the first definitive German-language text on the subject.

Gerold's academic legacy is some 120 scientific publications in the field of soil erosion, hillslope processes and landscape assessment, and the memories of the inspiration and guidance he gave to his students and to the many colleagues throughout the world who looked upon him as a friend.

R P C Morgan, Past President, ESSC

Note: The following publication, prepared on Professor Richter's retirement from the University of Trier, contains details of his work and a full list of his publications. It may be of interest to members who wish to learn more of his achievements:

Klink, H.J. 1998. Gerold Richter - ein engagierter Forscher in Bodenerosion und Förder der deutschen Landeskunde. *Berichte zur deutschen Landeskunde*, 72 (1): 9-32.

E.S.S.C. COUNCIL MEETING, TECHNISCHE UNIVERSITÄT, GRAZ, AUSTRIA, 1-4 OCTOBER 1998

This report highlights the main topics discussed and the decisions made at the Meeting.

Present: Dr K.Helming (Germany), Dr A.Kertész (Hungary), Prof. O.Nestroy (Austria), Prof. I.Pla Sentis (Spain), Prof. J.Poesen (Belgium), Prof. G.Richter (Germany), Dr J.Rubio (Spain), Dr R.Schulin (Switzerland), Dr D.Torri (Italy).

Apologies: Dr C.Dazzi (Italy), Dr D.Gabriels (Belgium), Dr J.Gallardo Díaz (Spain), Dr Y.Le Bissonnais (France), Prof. R.Morgan (UK), Dr C.de Oliveira Alves Coelho (Portugal), Dr P.Schjønning (Denmark), Dr R.Shakesby (UK).

1 Opening remarks by the President (G.Richter)

Given that there are only 9 Council Members present, the Council cannot make final decisions at this Meeting (a minimum of 10 Council Members is required). However, since more than one-third of the ESSC Executive Committee Members are present (i.e. 6 out of 10), all decisions at the Meeting are taken by the Executive Committee.

2 Present state of the Society

The Treasurer (Dr K.Helming) and the Secretary (Prof J.Poesen) reported on the present state of the Society.

Following the proposal of the Treasurer, the Executive Committee recommends that, in future, ESSC membership contributions can be paid in both DM (50.00) and in € (25.00) per year.

In order to lower expenses, printing and mailing of the ESSC Newsletter will be done in Müncheberg.

Sponsors of the ESSC through advertising in the Newsletter. Dr J.Rubio will establish a list of selected potential sponsors. The ESSC is entitled to collect sponsoring up to DM 7000 per year without paying taxes.

3 ESSC Council Members

Cooption. Following the suggestions made by Dr F.Kwaad and Dr A.De Roo, the Executive Committee proposed to coopt Prof A.Imeson (University of Amsterdam) as Council Member for The Netherlands. Prof. Richter will write a letter to announce this

decision to Prof. Imeson. Prof. Richter will also contact non-active ESSC Council Members in order to ask them if they want to resign and, if so, to look for suitable replacements.

4 ESSC Newsletter

A written report on the status of the Newsletter, CABI Link and the ESSC Leaflet, prepared by Prof. Morgan, was presented by Prof. Richter.

Prof. Morgan had contacted CABI concerning possible publications of the outcomes of the various Working Groups.

Newsletter 1998 / 3+4 will include a report of this Council Meeting.

Newsletter 1998 / 3+4 will also include a report of the ESSC Workshop held in Müncheberg (Long-term effects of land use on soil erosion). Dr Helming will provide the report.

Dr D.Torri and Dr A.Kertész will organise a special issue of the ESSC Newsletter on an overview of the various EU-funded projects dealing with soil erosion and soil conservation.

Dr Rubio will set up a special issue on soil pollution in Europe.

Prof Richter and Dr Kertész will investigate the possibility of a special issue on desertification in Europe and one on soil protection laws in the EU countries.

Prof Poesen will report on the forthcoming tillage erosion conference to be held at KU Leuven (April 1999).

Dr Rubio will write a short report on the Proceedings of the ESSC Workshop held in the Canary Islands (July 1995) and published recently.

Dr Helming will contact Dr K.Auerswald to write a short report on the Proceedings of the ESSC Conference held at Weihenstephan (September 1996) and published recently.

Prof I.Pla Sentis will write a report on three doctoral theses dealing with soil conservation and soil pollution.

Prof Richter will provide Dr Kertész with a book on *Soil protection in Germany* who will then write a report for the Newsletter.

All ESSC Members, and Council Members in particular, are requested to send in reports on any soil conservation issue in the various European countries. The ESSC welcomes short (1-2 p.) reports of recent PhD theses related to soil conservation. Reports can be sent directly to Prof Morgan (Editor-in-Chief of the ESSC Newsletter) or to the President (Prof Richter) or Secretary (Prof Poesen).

5 ESSC Leaflet

Dr Helming prepared a leaflet which was distributed at the ISSS Conference in Montpellier (August 1998). Prof Morgan also prepared a draft leaflet. A new leaflet, combining both, will be prepared by Dr Helming. Dr Helming will also provide all ESSC Council Members with a file containing the leaflet.

All Council Members as well as any other ESSC members are encouraged to reproduce the leaflet for distribution together with copies of the ESSC Newsletter in their country to non-members at appropriate meetings.

6 ESSC Homepage

Dr Helming will put the contents of the leaflet as well as the text related to the various Working Groups on a homepage of the Internet (connected to the homepage of ZALF).

7 Third ESSC International Congress. Valencia, Spain, March 2000

Dr Rubio reported on the work in progress for the organisation of this congress. The main theme will be *Man and soil in the third millennium*. The following topics will be dealt with:

- history of soil conservation
- traditional soil and water conservation systems
- soil functions, soil quality and indicators
- soil degradation processes
- soils and global change
- soil and land use resources
- biodiversity and soil resources
- new technologies for soil assessments
- soil and society
- proposal for soil sustainability in the third millennium
- the future of soil conservation

The Executive Committee welcomed all these topics but suggested that the organisers to reduce their number. Cheap accommodation during the congress would help attract

young participants.

8 EUROSOIL 2000 Conference (4-6 September 2000, Reading, UK)

Dr Helming reported on a planning meeting held at Montpellier (August 1998).

The plan is to organise every two years such a meeting in Europe instead of annual national soil science society meetings. The ESSC could organise a symposium on soil degradation and soil conservation during this conference.

Prof. Richter will write to Dr J.Gauld (Contact Person) for more information regarding the organisation of such a symposium.

9 Future ESSC Conferences

Soil conservation in large-scale land use, 12-15 May 1999, Bratislava, Slovakia. The first circular has already been sent out by the Organising Committee. Dr Helming will announce this meeting in Newsletter 3+4 / 1998.

Man and soil in the third millennium. Third International ESSC Congress, March 2000, Valencia, Spain (Dr Rubio): see above.

Snowmelt erosion and related problems, Autumn 2000, Oslo, Norway (Dr P.Botterweg). Prof Richter will ask Dr N.Vagstad whether he still wants to organise this meeting following the departure of Dr Botterweg from Jordforsk.

In addition to these conferences, the ESSC is co-sponsoring the following:

- Second International Symposium on *Tillage erosion and tillage translocation*, 12-16 April 1999, KU Leuven, Belgium
- ISCO '99. Tenth International Soil Conservation Organisation Conference, 23-28 May 1999, West Lafayette, USA
- Fifth International Meeting on *Soils with a Mediterranean type of climate*, 4-9 July 1999, Barcelona, Spain.

10 Working Groups - First reports

A brief report on the activities of the various task forces was presented by various Council Members.

Prof Pla Sentis proposed a new Working Group on *Research for effective soil and*

water conservation in Europe. The aim of the Group is to analyse critically soil and water conservation research in Europe. Prof Pla Sentis will produce text informing interested members for the next ESSC Newsletter.

11 ESSC policy related to collaboration with other national and international societies

Below is a synthesis of the answers given to questions asked by the President, see report of the ESSC Council Meeting, October 1997 (ESSC Newsletter 1988/1).

The ESSC is a European Society. What are the main targets for the future? Only conferences, workshops and publications?

The ESSC promotes soundly-based policies of soil conservation in its broadest sense throughout the countries of Europe by all available means, e.g. conferences, newsletters, internet forum (homepage, e-mail), working groups and personal contact between members.

The ESSC pursues its aims by (see Statutes):

- supporting investigations on soil degradation, soil erosion and soil conservation;
- informing the public about major issues concerning soil conservation; and
- collaborating with institutions and individuals concerned with practical soil conservation work.

Do you agree that the ESSC should avoid carrying out activities that lead to competition with national societies?

The objective of the ESSC is not to compete with national societies but to complement their activities.

Should collaboration with national societies comprise more formal items like exchange of information and sponsorship?

The ESSC Council Members are of the opinion that no formal contacts should be established with national societies; however, exchange of information and co-sponsorship should be encouraged.

Could and should the ESSC try to become some kind of bridge between national societies which deal with soil conservation?

If the ESSC is successful, it will perform this function automatically.

What are the principles of collaboration with other international societies, e.g. ISCO, ISTRO, WASWC?

With the Réseau Erosion, the ESSC has a formal agreement in that there is an exchange of observers, i.e. Dr Kertész (ESSC) and Dr G. De Noni (Réseau Erosion).

For the other international organisations, no formal contacts have been established. Instead, there is an exchange of information via Prof Pla Sentis who happens to be a member of all these international societies. Prof Richter will write to these organisations to inform them of this decision. The ESSC tries to be complementary to the objectives of these organisations.

12 Soil Convention: Preserving soils for life

Following the distribution of this document (Tutzing project paper) to all Council Members, Prof Richter proposes to produce a short document to focus on the European situation. This document will be sent to each European country (Ministries of Environment and Agriculture) as well as to the European Parliament. Prof Richter, Dr Kertész, Dr Rubio and Dr Poesen will prepare a first draft of the text for the next Council Meeting. Prof Richter will also contact Prof W.Blum in order to collect the basic documents cited on p. 6 of the Tutzing project paper.

13 Other items

Dr Rubio will represent the ESSC at the next meeting of the parties involved in the Convention to Combat Desertification (Dakar, December 1998).

Prof Poesen reported on the activities of the IGBP-GCTE Soil Erosion Network and the forthcoming COST action on *Soil erosion under global change.*

Dr Helming will reorganise the list of research topics that ESSC Members are working on.

14 Next Council Meeting

12-15 May 1999, Bratislava, Slovakia

Notes signed on 14 October 1998 by:

G Richter
ESSC President

J Poesen
ESSC Secretary

ESSC TREASURER'S REPORT 1998

At the end of 1998, the ESSC had 481 members within 41 countries. The ESSC budget for the year is given in the Table below. The costs for printing and mailing include the Newsletters 1997/2+3, 1997/4 and all the 1998 Newsletters.

Budget as at 1 January 1998: DM 14 046.09

Income	DM	Expenses	DM
Membership contributions	11 520.00	Newsletters	17 225.33
Interest (bank account)	38.39	Bank account	117.80
Books sold	59.00	Mailing costs	292.40
		Money transfers	436.60
		Conferences	234.25
		Other expenses	231.72
Total	**11 617.39**	**Total**	**18 538.10**

Budget as at 1 January 1999: DM 7 125.38

K Helming
ESSC Treasurer

SOIL PROTECTION EFFECT OF IRRIGATION IN UKRAINE

In Ukraine, the area of irrigated sloping lands was about 500,000 ha in 1993 which represented some 20 per cent of the total irrigated land in the country. Whilst the recent economic crisis has led to a decrease in the overall irrigated land, the area of irrigated sloping land has increased, mainly in the South and Droughty Steppe zones

If sprinkler irrigation takes place without overland flow, the basic soil destruction process is water-drop erosion since snowmelt erosion does not occur in the areas of irrigated sloping land. Research on the influence of irrigation on rainfall erosion has been conducted using a modification of the mathematical model of Shvebs (Shvebs, 1974; Shvebs et al. 1993; Chorny, 1996). The basic form of the modified model is:

$$W = k_p K_{gm} Jr F (L, i) f_p$$

where W is the computed soil loss (t ha^{-1} y^{-1}), k_p is a proportioning coefficient with dimensions ($k_p = 2.6 \times 10^6$), K_{gm} is a hydro-meteorological factor expressing rainfall erosion (the product of k_p . K_{gm} has the dimensions of t ha^{-1} y^{-1} under standard conditions), Jr is the erosion-resistance of the soil (dimensionless), $F(L,i)$ is a relief function (dimensionless), and f_p is the plant cover management factor (dimensionless).

The model was chosen for the following reasons. First, it was developed specifically for the conditions of the Steppe Zone of Ukraine. Secondly, the hydro-meteorological factor incorporates soil humidity which therefore enables it to take account of the specific influence of irrigation in generating overland flow. Shveb's method determines the soil erodibility by experimental research which gave the opportunity for further specific research. The modified model is multiplicative so that a change in any multiplier as a result of irrigation permits a general estimate of the effects on water erosion to be made without expensive field research.

Obviously, on irrigated lands, the overland flow is greater than on unirrigated land. Studies in Russia and Ukraine conducted by Kharchenko (1975) and Korbutyak and Zuzansky (1984) show that the runoff coefficient increases as a result of irrigation from 0.31 to 0.58 on perennial grasses, 0.32 to 0.58 with grain crops and 0.17 to 0.66 on land without vegetation. If the structure of irrigated and non-irrigated crop rotations is considered along with the intra-annual distribution of storm precipitation, the runoff coefficient increases by a maximum of twice for the sloping agro-landscapes of the South and Droughty Steppe Zones. However, if the value of K_{gm} for high-intensity storms is considered, the influence on soil humidity is insignificant. Although such storms account for most of the mean annual soil loss, for other reasons the value of K_{gm} increases by no more than 20-30 per cent as a result of irrigation.

A study of the erosion-resistance of irrigated and non-irrigated chernozems and

chestnut soils showed that Jr was increased some 1.2-1.6 times in value by the influence of irrigation (Shvebs et al. 1988; Chorny, 1996). The inference about the erosion-resistance of the soils of the South and Droughty Steppes being improved by irrigation is confirmed by other popular water erosion models used in Ukraine, e.g. USLE, RUSLE and the hydro-dynamic model of Mirtskhoulava (1970). The erodibility of irrigated soils is very similar to that of virgin soils (Chorny, 1998).

The erosion protection effectiveness of plant cover is increased considerably in irrigated conditions. This is connected with the non-limiting water regime of irrigated cropping. Compared with dry farming, the irrigated rotations include post-cut and post-harvest crops and do not include bare fallows. The latter are a major component of dry farming arable crop rotations in the South and Droughty Steppes. Calculations have shown that the plant cover management factor of Shveb's model is increased by irrigation some 1.4-1.6 times for arable crop rotations and 2.8-3.2 times for fodder crop (soil-protecting) rotations. The second value relates to the Black Sea Coast and Crimea where the maximum erosive precipitation is in the middle to late summer.

Overall, Shveb's model indicates that for identical relief conditions, water erosion is reduced by irrigation some 1.8-3.3 times in arable crop rotations and 3.3-6.6 times in fodder crop (soil-protecting) rotations in the zone of the chernozem soils or South Steppe and 1.3-1.7 and 2.7-3.1 times respectively in the zone of chestnut soils or Droughty Steppe. Obviously, on irrigated sloping lands the potential increase in the danger of erosion from surplus surface flow has not happened. Moreover, on these lands, the increase in flow has been compensated by the intensification of soil-protecting field vegetaion and an increase in the erosion-resistance of the soils.

Therefore, the flawless irrigation by sprinklers is an effective erosion-control measure for the South and Droughty Steppes. It is necessary to emphasize, however, the word 'flawless', if sprinkler irrigation is to become an important component of the region's erosion protection programmes.

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16ème CONGRÈS MONDIAL DE SCIENCE DU SOL MONTPELLIER, FRANCE, 26-28 AOÛT 1998

Compte-rendu du symposium 31: " Prise en compte de l'ensemble des dimensions de la couverture pédologique dans la caractérisation et la modélisation de l'érosion".

Ce symposium proposé par la sous-commission C, "Conservation de l'Eau et des Sols" avait pour objet de faire le point sur la prise en compte de la variabilité des sols (et des volumes pédologiques) comme facteur essentiel dans l'érosion hydrique et éolienne. En effet, la connaissance de la distribution spatiale de la couverture pédologique est utilisée le plus souvent de manière très limitée dans la prévision des risques d'érosion, la modélisation et la définition de méthodes de conservation appropriées aux contextes particuliers.

L'animation du symposium a été confiée à Jean Poesen (Laboratory of Experimental Geomorphology, Belgique) et Christian Valentin (ORSTOM, France); 70 contributions, en provenance d'une quarantaine de pays, ont été proposées. Parmi celles-ci, et compte tenu des contraintes de temps imposées, 7 ont été présentées oralement le 25 août, les autres l'ont été sous forme de posters lors d'une session qui a eu lieu les 24 et 25 août.

Par leur diversité, ces contributions élargissaient largement le sujet du symposium. Les communications orales ont porté sur l'impact des variations de propriétés du sol sur les processus et les taux d'érosion (Poesen, Van Wesemael et Govers), la modélisation des interactions entre propriétés des sols et érosion (conférence invitée, Kirkby), l'impact des structures végétales sur la redistribution de l'eau et la dégradation structurale du sol (Cammeraat et Imeson), les relations entre comportement physique et hydrique des sols et érosion le long d'une toposéquence (Soares Da Silva et Castro), l'influence des conditions de surface et des conditions hydrologiques sur l'érosion (Römkens, Helming et Prasad), les effets des pratiques culturales sur la localisation des rigoles (Souchère, King, Couturier et al.), les effets des conditions de surface et de la position relative le long du versant sur les processus de ruissellement et d'érosion (Huang, Gascuel-Odoux, Darboux et al.).

Dans sa synthèse, Christian Valentin, président de la sous-commission, a regroupé les posters en six grands thèmes : (1) les effets sur les terres cultivées et les effets aval, notamment la pollution par les pesticides, (2) la prévision et la cartographie de l'érosion à différentes échelles spatiales, basée notamment sur des indicateurs expérimentaux, (3) le contrôle de l'érosion, (4) l'impact des conditions et des changements socio-économiques, politiques et culturels, (5) les facteurs d'érosion, avec une référence particulière aux effets de la structure du couvert végétal et du microrelief (rugosité) et (5) la modélisation.

L'origine des contributions assurait une large variété de conditions pédologiques, climatiques, socio-économiques, culturelles et politiques. On a cependant noté une sous-représentation des pays d'Afrique de l'Est et du Sud de l'Asie, l'Inde étant le grand absent.

Si le symposium a regroupé une assemblée nombreuse et diverse, on notera cependant qu'il n'a pas permis de combler le fossé entre le développement nécessaire de méthodes de conservation et un ancrage fort de celles-ci sur la progression des connaissances fondamentales, qui ne peut se limiter au domaine strict de la Science du Sol mais devrait s'appuyer davantage sur des approches multidisciplinaires.

Dr. V. Auzet
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NEW EUROPEAN COST ACTION

No. 623 - SOIL EROSION AND GLOBAL CHANGE

A new European Union COST Action programme has started. The Action will fund workshops, conferences, small meetings and exchanges of students and staff between laboratories. It will last for five years. So far 14 European countries have signed up.

The aim of a COST Action is to coordinate European research efforts by means of regular meetings around designated themes. Three themes are proposed for this programme. They are issues of temporal and spatial scales; thresholds; and data sets.

The Action is chaired by John Boardman (University of Oxford, UK). Working groups with co-chairs organise the thematic meetings and the whole Action is run by a management committee. The initial meeting will be in Leicester, UK, in April. Future meetings are planned for Leuven, Helsinki and Berlin.

For more details, see http://www.cost623.leeds.ac.uk/cost 623

NEW PhD THESES

Interceptación en bosque y matorral mediterráneo semiárido: balance hídrico y distribución espacial de la lluvia neta

Francisco Belmonte Serrato

Departamento de Geografía Física, Universidad de Murcia
Directora: Dra Asunción Romero Díaz

Dos grandes problemas medioambientales que afectan a la regiones arídas y semiáridas son: la degradación y erosión de los suelos y la escasez de agua.

En esta doble problemática se vislumbra un difícil equilibrio, ya que aunque la mejor forma de conservar y preservar el suelo es mantener una buena cubierta vegetal, también es cierto que la presencia de una cubierta vegetal densa, puede suponer una pérdida importante de recursos hídricos, pérdida que se produce, fundamentalmente, por medio de dos procesos: por transpiración y por interceptación. El primero, es un proceso esencial para la supervivencia de las plantas, el segundo, es un proceso inevitable que afecta a cualquier tipo de cobertura.

En regiones con precipitaciones abundantes, las pérdidas de recursos hídricos debido a la presencia de cubiertas vegetales densas, no tienen gran importancia, y en muchas ocasiones, el problema es el exceso de agua. Sin embargo, en regiones áridas y semiáridas, el agua es un recurso esencial pero escaso. Por ello, en estas regiones, es muy importante el estudio de todos los procesos que pueden tener incidencia en el balance hídrico, y de ellos, el proceso de interceptación de la lluvia por parte de las cubiertas vegetales, tiene una gran importancia.

La necesidad de aumentar el número de estudios, que ayuden a comprender mejor el proceso de interceptación de la lluvia en coberturas de bosque y matorral mediterráneo semiárido, ha sido el motivo fundamental que nos ha llevado a emprender este trabajo de investigación.

El objetivo fundamental ha sido medir el balance hídrico de interceptación en varias especies de matorral y en pino carrasco, cuantificando la cantidad real de lluvia que alcanza el suelo bajo los distintos tipos de coberturas y obteniendo, por diferencia con la precipitación, las pérdidas de recursos hídricos ocasionadas por interceptación. Se presenta, al mismo tiempo, una propuesta de modelización sencilla del proceso, basada en ecuacuones empíricas de regresión, entre la precipitación y la energía cinética de la lluvia y los distintos flujos del proceso de interceptación.

Durante cuatros años (1992-1995) se han medido, en el área experimental de "El

Ardal" en la Cuenca de Mula (Murcia, SE de España), los flujos hídricos del proceso de interceptación en cuatro especies del matorral mediterráneo semiárido (*Juniperus oxycedrus, Thymus vulgaris, Rosmarinus officinalis* y *Pinus halepensis*), así como el flujo de trascolación en dos parcelas: una de matorral y otra de matorral con pinos.

De los resultados obtenidos, cabe destacar que la pérdida media anual, oscila entre el 25% y el 27% de la precipitación, en condiciones normales, mientras que en condiciones de sequía, con bajos promedios de precipitación por episodio, las pérdidas pueden alcanzar entre el 34% y el 37% de la precipitación.

Por otro lado, se ha comprobado que existe una gran diferencia en cuanto a la importancia de los distintos flujos hídricos en el balance final, entre el pino y las especies de matorral, de forma que mientras bajo coberturas de pino, prevalece la dispersión de la lluvia neta, debido a que la trascolación supone el 95% de la lluvia que llega al suelo, sin embargo, en los matorrales entre el 30% y el 60% de la lluvia neta, alcanza el suelo escurriendo por los troncos, concentrándose, por tanto, en una pequeña área en torno al mismo.

Esta circunstancia puede tener una gran trascendencia a la hora de seleccionar especies para repoblación, en función de su capacidad de proteger el suelo frente a la erosión. Los resultados obtenidos nos indican que las especies de matorral, son mucho más adecuadas en la recuperación o restitución de cubiertas vegetales. De las especies estudiadas aquí, es el romero la que tiene menor capacidad de almacenaje, y por tanto, la que provoca una menor pérdida por interceptación, además de ser la que tiene la menor tasa de trascolación, lo que indica un bajo volumen de precipitatión neta con capacidad erosiva, ya que la lluvia que alcanza el suelo escurriendo por el tronco tiene una energía cinética prácticamente despreciable.

Por último, a la vista de los resultados obtenidos, se abren numerosos interrogantes y, sobre todo, nuevas e importantes líneas de investigación, que indican que es todavía necesario seguir profundizando en el estudio de los fenómenos asociados a la interceptación de la lluvia, fundamentalmente en regiones que se ven seriamente afectadas por problemas de erosión y degradación del suelo, y en las que, en las últimas décadas, se ha llevado a cabo una política de repoblación forestal basada, casi exclusivamente, en el *Pinus halepensis*, sin hacer estudios previos de la consecuencias que podían tener estas nuevas coberturas, en la reducción de los recursos hídricos en las áreas repobladas (agotamiento de manantiales, descenso del nivel de pozos, etc).

Application of the EPIC model for erotopes

Tamás Huszár

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The aim of the study is to apply the EPIC model to the watershed of Örvényesi-Séd lying in the northern subcatchment of Lake Balaton. First, a soil erosion damage map was created based on the analysis of soil profiles in the field. This map gives information on the degree to which erosion has affected the soil, by the analysis of erosion forms and the changes in the soil profile. Areas where soils are eroded to parent material occur scattered over 15 per cent of the catchment. Erosion here is mainly the result of intensive viticulture. Intensive erosion occurs also on arable land because of inappropriate tillage techniques. Strongly eroded soils (occupying 7 per cent of the catchment) can be found next to the spots eroded to parent material as well as, in limited distribution, on the steep slopes of the limestone hills in the middle of the basin.

The field survey was followed by soil loss assessment using the EPIC model 5300 version (Williams et al. 1990). EPIC is a field-scale model allowing a choice between the USLE and its modified versions. The model was applied to small territorial units, i.e. the so-called erotopes defined by Richter et al. (1995) as areas with unconcentrated runoff of more or less the same direction. They are bordered by the lines of diffluent or confluent runoff direction and by linear structures such as ditches, brooks, roads, field paths and terraces. Forested areas, settlements and flat valley bottoms are excluded. The erotope map was created with the help of a digital elevation model and maps of slope category, land use and the location of linear structures of the agricultural landscape. For calibration of the model, soil erosion measurement data of experimental plots were used.

The erodibility of the various soil types in different topographical positions was determined by the USLE. Input data were derived from the available GIS data base. Daily meteorological data were provided from the Mencshely meteorological station (3 km distant). Soils data originated from the laboratory analysis of 40 soil pits and 179 boreholes. Information on farm management (tillage, crop rotations) was obtained from the state farm which rents the land of private owners and cultivates it on a large scale. With the help of agricultural experts, the model parameters for the various crops and tillage operations were adjusted for Hungarian conditions. Actual crop yield data were also available. Since the smaller vineyards of the watershed are privately owned, no data could be obtained and the erotopes in this category were excluded from the investigation. Thus the model was run for the arable land and grassland only. Erotope homogeneity by soil type and land use was established by selecting the predominant category with each unit.

The results obtained from the USLE and EPIC models on soil loss were compared. The major conclusion is that the values obtained from the two models do not show significant differences. The maps of calculated soil loss also correspond very well to the soil erosion map, e.g. the strongly-eroded areas agree with the areas with the highest values of calculated soil loss.

The mean sediment yield calculated by the EPIC model is 12.68 t ha^{-1} y^{-1} for the whole investigated area. By land use type the average value for the erotopes on arable land is 22.14 and on grassland is 6.08. The respective results calculated by the USLE are 4.18, 2.35 and 3.1 t ha^{-1} y^{-1}. The cartographic representation of the results shows mosaic-like patterns similar to the erosion damage map. The EPIC model is proven to be sensible from the point of view of slope steepness. Correlation coefficients between soil loss from grassland and slope angle (0.78) and between soil loss from arable land and slope angle (0.85) indicate a strong relationship. After performing the statistical analysis, the results correspond to the relationship between slope angle and sediment yield given by Wischmeier and Smith (1978). It is interesting that this quadratic relationship applies only to the data for the arable land and not to the grassland.

References

Richter, G., Kertész, A. and Márkus, B. 1995. Assessment of soil erosion in a small watershed covered by loess. *GeoJournal* 36(2-3): 285-288.

Williams, J.R., Dyke, P.T., Fuchs, W.W., Benson, V.W., Rice, O.W. and Taylor, E.D. 1990. *EPIC - Erosion/Productivity Impact Calculator. 2. User manual.* USDA Technical Bulletin No. 1768.

Wischmeier, W.H. and Smith, D.D. 1978. *Predicting rainfall erosion losses: a guide to conservation planning.* USDA Agricultural Handbook No. 537, US Government Printing Office, Washington DC.

FORTHCOMING MEETINGS

- **17-22 July 1999 - International symposium on gully erosion**
  Rio de Janeiro, Brazil

Main topics: the initiation and development of gullies; monitoring gully erosion; modelling gully erosion; restoration and remediation of gullies.

In addition to the paper sessions, there will be a one-day field trip to Petrópolis, a city situated in the Serra do Mar, 60 km from Rio de Janeiro. The trip will provide an opportunity to see spectacular rill and gully erosion, as well as the effects of mass movements, in an urban context.

The symposium forms part of a Regional Meeting of the International Association of Geomorphologists. A First Circular will be available soon.

For further details from: Dr Tony Guerra, Department of Geography, LAGESOLOS, Federal University of Rio de Janeiro, Cidade Universitária, Ilha do Fundão, Rio de Janeiro - RJ, CEP 21940-590, Brazil.
e-mail: guerra@igeo.ufrj.br
http://www.ecu.ox.ac.uk/ld/gully/main.html

- **29-31 October 1999 - Reconstructing landform change by soil erosion during the Holocene in Europe**
  Bonn, Germany

Second workshop of the ESSC Task Force on long-term effects of land use on soil erosion in an historical perspective.

Mid-conference field trip to Bonn area and Eifel.

Further details from: Dr Richard Dikau and Dr Andreas Lang, Department of Geography, University of Bonn, Meckenheimer Allee 166, 53115 Bonn, Germany
tel: + 49 - 228 - 737480
fax: + 49 - 228 - 739099
e-mail: alang@slide.giub.uni-bonn.de
http://www.slide.giub.uni-bonn.de

- **9-18 December 1999 - Colloque international: l'homme et l'érosion**
  Yaoundé, Cameroun

L'objectif de ce colloque est d'évaluer les conséquences de las pression anthropique sur l'environnement rural et urbain, d'estimer l'efficacité des méthodes de lutte antiérosives et de réhabilitation des sols dégradés, et enfin, de donner la parole aux chercheurs et aux acteurs du développement afin de sensibiliser l'opinion nationale et régionale sur la nécessité d'une gestion durable des ressources en eau et en sol de l'Afrique. Dix thèmes: dégradations des terres dan les exploitations agricoles traditionnelles ou industrielles; influences de l'élevage sur la dégradation et la restauration de la productivité des sols; efficacité des techniques antiérosives traditionnelles ou modernes; ruissellement et érosion en zone montagneuse ou sur versant en pente forte; ruissellement et érosion en milieu urbain; effets de l'érosion sur la productivité des sols; restauration ou amélioration de la productivité des sols tropicaux; influence de l'érosion sur la qualité de l'environnement; influence des activités humaines sur l'hydraulicité des bassin versants; autres (en fonction des propositions de communications orales, écrites ou de posters).

9-12 décembre - excursion dans les savanes du Nord-Cameroun
13-15 décembre - colloque à Yaoundé
16-18 décembre - excursion dans les agroforêts de l'Ouest-Cameroun.

Langues du colloque: Le français et l'anglais.

Inscriptions: 300 FF (Bulletin du Réseau Erosion 19, résumés, rafraîchissements); 2500 FF (excursion Nord-Cameroun); 1000 FF (excursion Ouest-Cameroun).

Contacts: E.Roose / G. de Noni / J-M. Lamachère, ORSTOM, BP 5045, 34 032 Montpellier, France.
tél: + 33 - (0)467 - 41 62 65 ou 61 ou 68
fax: + 33 - (0)467 - 41 62 94
e-mail: roose ou denoni@mpl.orstom.fr

- **16-19 April 2000 - International symposium on gully erosion under global change**
  Leuven, Belgium

Meeting sponsored by European Union Cost Action 623 and ESSC. The symposium is designed to review current understanding of, report progress in and identify priorities for future research on the impacts of global change on gully erosion. Topics include: monitoring techniques and experimental investigations of various gully types; subprocesses of gully erosion; critical thresholds for the initiation, development and

infilling of gullies; factors controlling gully erosion rates; contribution of gully erosion to soil degradation and sediment production; historical studies of gully erosion; interaction between gully erosion and other land degradation processes; modelling rates of gully erosion; on-site and off-site impacts of gully erosion; gully prevention, control and restoration. Language of the symposium is English.

A mid-conference excursion will be organised to see results of studies on land degradation processes in the Belgian loam belt.

Deadlines: one-page abstracts for oral and poster presentations - 30 November 1999. Publication of oral and poster presentations is anticipated in appropriate international scientific journals, subject to normal peer review.

Registration: € 150.00 - deadline for receipt is 1 February 2000. The registration fee covers mid-symposium tour, banquet and conference materials. It does not include meals and hotel costs.

Further details from: Prof J. Poesen, Laboratory for Experimental Geomorphology, Katholieke Universiteit Leuven, Redingenstraat 16, B-3000 Leuven, Belgium.
tel: + 32 - 16 - 326425
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http://www.kuleuven.ac.be/facdep/geo/fgk/pages/expgeom/htm

- **23-28 August 2001 - Fifth international conference on geomorphology**
  Tokyo, Japan

The Japanese Geomorphological Union hosts the 5th ICG at the Korakuen Campus, Chuo University, Tokyo. Papers, posters, videos or computer displays may be submitted on any geomorphic topic but the organising committee wish to emphasize themes related to *Geomorphology in tectonically, climatically and anthropologically sensitive zones*, as exemplified by the Japanese islands. Tentative themes are: rock control in geomorphological processes; rapid mass movements and related fluvial processes; geomorphological significance of active faults and seismo-tectonics; volcanic landforms; hydrogeomorphological processes in humid regions; geomorphic response to global change; geomorphic processes and lake sedimentation; laboratory approaches to geomorphological problems; geomorphological consequences of large-scale anthropogenic transformation of the earth's surface.

A range of pre-conference and post-conference field trips is available in Japan, China and Korea.

Registration: Preliminary registration is accepted electronically. Use the home page address given below for details and forms. Register by 31 May 1999, if possible.

A second circular with full registration details and firm prices will be sent in February 2000 to all colleagues who have completed preliminary registration.

Further details from: Fifth International Conference on Geomorphology, c/o Convention Linkage Inc., Akasaka-Nihon Building, Minato-ku, Tokyo 107-0052, Japan.
tel: + 81 - 3 - 5770 - 5531
fax: + 81 - 3 - 5770 - 5532
e-mail: 5icg@aptech.co.jp
http://wwwsoc.nacsis.ac.jp/jgu

LATE NEWS

Following the death of Professor Gerold Richter, our Vice-Presidents, Professor Adám Kertész and Dr José Rubio have consulted.

They have agreed that Dr Rubio will take on the position of President of the ESSC.

This change in officers will be put to the vote of the Executive Committee and Council at the meeting in Bratislava, Slovakia, 12-15 May 1999.

Dr J.L.Rubio can be contacted at:

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AIMS OF THE SOCIETY

The ESSC is an interdisciplinary, non-political association, which is dedicated to investigating and realising 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,*
- *by informing the public about major questions of soil conservation in Europe,*
- *by collaborating with institutions and persons involved in practical conservation work in Europe*

The ESSC aims at coordinating the efforts of all parties involved in the above cited subjectx: 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 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-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 ecologia, agricultores, servicios de extensión agraria, industrias e instituciones gubernamentales.

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