



**ISSS-AISS-IBG
1924–1944**

Bulletin

of the International Society of Soil Science

Bulletin

de l' Association Internationale de la Science du Sol

Mitteilungsblatt

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EDITORIAL

The presidency of the activities of the ISSS falls for the next four years to France. As such, and with the contribution of all of you, we will have to pursue two goals: **the preparation of the 16th World Congress of Soil Science**, to be held in Montpellier in August 1998, and the **modification of the structures and the evolution of the activities of our society**, two ambitious tasks which will give an impulse to the society. We are glad that the ISSS has given us their confidence and, although it is an arduous task, we are sincerely grateful to the Council and the Assembly of the ISSS for this. We know that organizing an international congress is a great scientific opportunity for the French scientific community. But we also know that only the collaboration of the whole international scientific community will be able to make the 16th Congress successful: Vice-President Marcel Jamagne and myself appeal for a strong and demanding collaboration.

Concerning the **16th Congress in Montpellier**, those who were in Acapulco have already received some general and scientific information in a brochure given to all participants of the 15th Congress. More complete information will be given in the next ISSS Bulletin. We will do our outmost to make this Congress an event equal to the challenge that a good management of the relationship between soil and societies represent for the future of the world.

As regards the **ISSS** as a community of scientists concerned with the soil, I am convinced that we will have to work in four directions.

1. First, let's remain ourselves. Soil is an environment in itself, which deserves to be studied as such. Soil scientists should not always have to account for the relation of the soil to its possible uses. We still have to do a lot of fundamental research to get a better knowledge of the soil systems and their dynamics. We have to accelerate the implementation of this research, both in the field and in the laboratories.

2. We have to develop scientific relations between researchers in soil science and those in other sciences: physical, chemical, biological and geological sciences, social sciences, etc. Fortunately, soil science is a science of interfaces and of complex systems; therefore we need to achieve exchanges with other sciences, while the other sciences need our knowledge and our methodologies as well.

3. We have to develop studies on the relationship between soil systems and human activities. This will be the main theme of the Montpellier Congress: "present functioning of world pedological systems in relation with the various types of land use by human societies."

4. Soil Education: people know a lot about satellites, but nothing about soils! We have to convince them that knowledge of soils by everybody is vital for the future of the Earth; soil is in the midst of the Earth's ecosystems: without soil, no life; we have to explain this to everyone; we have to give everybody the possibility to become an active participant in the good use of soils. This is a true priority for all members of the ISSS.

I think that the future structure of the ISSS, on which we will work intensively during the coming months, will have to consider these four priorities. I commit myself to give this the attention it deserves.

Alain Ruellan, President, ISSS

NEW ISSS OFFICERS



Prof. Dr. Alain RUELLAN, new President of the International Society of Soil Science, 1994-1998. Prof. Alain Ruellan was born in Bourg-La-Reine, near Paris, on August 7, 1931. He has been Engineer of Agronomy since 1954 and obtained the Degree of Doctor of Sciences in 1970. He is an expert in the morphology of pedological covers.

He started his scientific career in Morocco, where he worked for 10 years studying the morphology of Mediterranean soils and the development of irrigated soils. After 2 years in Senegal, he became a Professor at the University of Rennes, where, for 10 years he developed teaching and research, correlating the various disciplines of soil science to other disciplines necessary for the understanding and the management of the human habitat. From 1982 to 1987 he was the Director General of ORSTOM (Institut Français de Recherche Scientifique pour le Développement en Coopération).

Subsequently, he put the interdisciplinary and international experience that he had gained in the course of this work at the disposal of CNRS (Centre National de la Recherche Scientifique), where he was in charge of environmental research. Since 1989 he has been the director of CNEARC (Centre National d'Etudes Agronomiques des Régions Chaudes) in Montpellier. Since 1979, he has also developed numerous activities in the fields of research and teaching and of making information available to the general public in Brazil. He is the author of approximately 300 publications and several books.

Alain Ruellan was the president of AFES (Association Française pour l'Etude du Sol), from 1989 to 1992. He was the president of Commission V of ISSS from 1986 to 1990. From 1986 to 1994 he dedicated himself to the Working Group "World Reference Base".

He founded the Standing Committee on Education in Soil Science of ISSS and presided it from 1990 to 1994.



Dr. Marcel G.H. Jamagne, new Vice President of the International Society of Soil Science, 1994-1998.

Marcel Jamagne was born in 1931 in Brussels, Belgium, and studied Agronomy, Forestry and Soil Science at the Universities of Gembloux and Ghent. He has been Engineer of Agronomy and Forestry since 1955, earned his degree of Master of Soil Science in 1966 and his Doctor's degree in Agronomical Sciences in 1973.

After three years' cooperation in the field of soil survey in Central Africa, he went to France to work at the National Institute for Agronomic Research (INRA), as head of the detailed soil mapping service for the northern part of the country. In 1968, he created the Service d'Etude des Sols et de la Carte Pédologique de France ("Soil Study and Pedological Map of France"), which in the meantime has been largely

developed and extended, and he became the director of its national soil survey staff of INRA in Orleans.

Since 1973 he has been working as a national delegate and international expert within the framework of different committees of the European Union dealing with the use and conservation of land and water. At present he is general coordinator for the extension of the European soil geographic data base to Central and Eastern European countries.

He also served as an expert for the Council of Europe and is a member of a number of soil science societies.

Marcel Jamagne has professional experience in different regions of Europe, Africa, South America and Asia. His special fields of interest are soil genesis, soil survey, soil geography and soil use and conservation, with numerous scientific publications.

As director of research, he is referee for different scientific publications, and lecturer at the Universities of Nancy and Poitiers as well as at the Ecole Nationale Supérieure Agronomique of Montpellier. He is a member of the Agricultural Academy of France and 1st Vice President of the French Soil Science Society (AFES).



MEXICO INVITED US!

FINAL REPORT

15TH WORLD CONGRESS OF SOIL SCIENCE

"SOIL UTILIZATION IN HARMONY WITH NATURE.
Learning from the past to face the future"

Acapulco, Mexico. 10-16 July, 1994

The 15th World Congress of Soil Science was held at the International Acapulco Centre with the participation of 1648 scientists from 91 countries. Included accompanying persons and organizing committee members, the Congress involved approximately 2000 persons.

Opening ceremony. During the 2-hour session chaired by Dr. Fernando González Villarreal (officially representing Dr. Carlos Salinas de Gortari, President of Mexico), Dr. Alcántar (Chairman of the Organizing Committee), Dr. Núñez (ISSS Vice-President), Prof. Láng (ICSU), Dr. Sombroek

(FAO), Dr. Ayoub (UNEP), Dr. Celecia (UNESCO), Dr. Blum (ISSS Secretary-General), and Dr. Aguilar (ISSS President) addressed the audience. Dr. González Villarreal declared the Congress opened.

Dr. Norman Borlaug delivered the first lecture of the Congress "Feeding a human population that increasingly crowds a fragile planet".

State-of-the-art lectures. Following up the opening ceremony, the Congress started with a series of lectures by some of our most distinguished colleagues representing each of the ISSS Commissions and Subcommissions; the corresponding papers integrated the first book of the Congress proceedings.

Symposia. The 45 held symposia treated a selection of important items related to basic and applied soil science and to relevant issues of social, economic and cultural nature. On the average, each symposium comprized eight invited 20-minute lectures and a brief discussion period. Symposia papers integrated seven A-volumes of the proceedings.

Poster sessions. The Organizing Committee accepted voluntary contributions to the Congress for poster presentation, and a 2-pages summary from each one was included into the proceedings (B-volumes).

All reasonably good papers were accepted and published (1422); all of them were given room at the poster sessions; 62 % of them were actually displayed during the Congress. As it is usual in our congresses, an ad-hoc Working Group for Poster evaluation and analysis was pointed out, chaired by Prof. Hartge, our 2nd Past-President. The best poster from each ISSS Commission was awarded a diploma.

Technical tours. The following 6-8 day tours were carried out: Cuba: Pinar del Rio-Villa Clara and La Habana-Villa Clara; Venezuela: Guayana-Maracay; USA: San Diego-San Francisco; and Mexico: Mexico-Acapulco, Acapulco-Cancun and Acapulco-Guadalajara. Furthermore, two one-day tours in the neighbourhood of Acapulco were conducted. Unfortunately three previously programmed tours in the USA and Canada could not take place due to insufficient registration.

Council meetings, business meetings. The ISSS council held five meetings in one of the venue hotels. The minutes of these meetings are to be found in this bulletin. The meeting on Monday evening was devoted to discuss challenges and opportunities of soil science for the 21st century and a declaration on this issue was adopted by the Congress (as published in this bulletin).

Additionally, around 40 reunions of different commissions, subcommissions, working groups, national societies, etc. were held during the Congress.

Exhibitions. The exhibition area at the Convention Centre comprized academic-scientific exhibitions and commercial exhibitions. Several international and national (Mexican) institutions displayed some relevant information; included were several national soil science societies.

Cultural activities. Worth mentioning are the cultural and artistic expressions; music, paintings, sculptures and traditional art craft, attempting to demonstrate the link between the soil as a natural resource and the human population.

Closing ceremony. The last activity in the 15th WCSS programme was integrated by a series of short reports by the President of the Mexican Soil Science Society, the Secretary-General of the ISSS, the Chairman of the Working Group of Poster evaluation, Prof. J. Bouma reporting on proposed activities to seize future opportunities for soil science, and a lively, cheerful, and most interesting series of remarks and words of gratitude by various ISSS members. The new ISSS President, Prof. Alain Ruellan, invited us to the XVth World Congress of Soil Science at Montpellier, France in 1998.

Dr. Manuel Contijoch, representing the Government of Mexico, declared the meeting closed.

Words of gratitude. The Organizing Committee takes this opportunity to thank all participants, sponsor institutions, involved private enterprises, and our families who made this event possible, no names are mentioned, the list would have hundreds; however, each one has got some room in our hearts and minds.

Andrés AGUILAR SANTELISES



Opening Ceremony of the 15th World Congress of Soil Science



Opening Ceremony of the XVth WCSS

From left to right: Dr. Rafael Rodríguez Montessoro, Director General, Colegio de Postgraduados, Dr. Norman Borlaug, Nobel Prize Winner 1970, Rogelio de la O. Almazán, Mayor, Acapulco, Dr. Winfried E.H. Blum, Secretary-General, ISSS, Dr. István Lang, Representative, ICSU, Rubén Figueroa Alcocer, Governor, State of Guerrero, Dr. Fernando González Villarreal, Representative of the President of Mexico, Dr. Andrés Aguilar Santelises, President, ISSS, Dr. Wim Sombroek, Representative, FAO



*Prof. Dr. Andrés Aguilar Santelises, President of ISSS,
addressing the audience*



Members of the ISSS Council during the Congress



*The Past Presidents and the Secretary-General,
honoured by the organizing committee during the banquet*



*Prof.Dr. Andrés Aguilar Santelises, President of the ISSS, receiving the V.V. Dokuchaev Medal from
the Russian Society of Soil Science, represented by Prof.Dr. V.O. Targulian*



The Closing Session of the 15th World Congress of Soil Science



*Farewell address by
Prof. Dr. Winfried E.H. Blum,
Secretary-General, at the Closing Ceremony*



*The new President (left)
and the 1st Past President of ISSS (right)
after the closing ceremony*

PROPOSED ACTIVITIES TO SEIZE OPPORTUNITIES FOR SOIL SCIENCE AND ITS APPLICATIONS IN THE 21st CENTURY*)

Soil science has a crucial role to play in realizing sustainable land use systems that satisfy the needs of an ever more global society. Activities in soil science research are broadening considerably beyond the traditional ones and include fundamental studies, ecosystem research and technology applications. Field work should continue to play an important role in generating research hypotheses and in their testing.

The following activities are proposed:

1. *Agenda 21, accepted in Rio de Janeiro 1992 offers a real challenge for soil scientists to provide their unique expertise to research teams including many other disciplines, such as agronomy, ecology, engineering, biology, economics, and sociology. Global environmental issues imply the need for basic disciplinary soil science research in such areas as soil morphology, soil physics, soil chemistry, and soil biology. Research on complex global environmental issues requires, in addition, a holistic interdisciplinary approach that is dynamic and process-oriented.*

Recommendations:

a) Encourage soil scientists to participate in global environmental programmes such as the International Geosphere-Biosphere Programme (IGBP) with the objective to develop a better understanding of the role of soils in the exchange of water, heat and gases between atmospheric and aquatic environments.

b) Restructuring of the International Society of Soil Science (ISSS) in a number of appropriate divisions. Establishment of a new Division on Soil and the Environment.

2. The prevalent focus in soil science on agricultural production needs to be broadened to emphasize food security and ecological processes in natural and anthropogenic land use systems, including the urban environment.

Recommendation:

Multiple-use strategies need to be developed as options for land users and decision makers though enhanced activities in working groups and subcommissions (action Congress in 16th World Congress of Soil Science, Montpellier, France, August 1998).

3. Soil behaviour and risk assessment for actual and potential types of land use need to be characterized with quantitative methods to allow development of operational methods to prevent different forms of soil degradation. Such a pro-active research approach, requiring collaboration with land users and engineers, is most effective to obtain results. Soil characterization and formulation of land use options are ineffective when not implemented.

4. Increased emphasis on the relationships between soil processes and water quality is required. In contrast to air and water quality, soil quality is as yet poorly defined and this presents a barrier to proper consideration of the role of soils in ecological processes.

Recommendation:

Strive for definition of soil quality as a function of soil use and the establishment of soil quality as a key indicator in environmental science.

5. Research is necessary on the rate of soil formation, as influenced by human impact, because this often unknown rate is an important factor in the analysis of sustainability.

6. Many applications are now opening up for the use of genetically modified organisms in the soil. *Concern about the risks of intentional release or accidental escape will grow.*

Recommendation:

A careful watch needs to be kept for detrimental organisms becoming established in the soil, and research on this should be encouraged.

*) Declaration adopted at the 15th World Congress of Soil Science, Acapulco, Mexico, 16 July 1994, and developed by an ad-hoc committee chaired by Prof. Dr. J. Bouma.

7. Attention should be paid to the needs of soil scientists from developing countries and to effective interaction among all soil scientists.

Recommendation:

Development of joint projects, refresher courses, operational research methodologies and appropriate venues for information dissemination.

8. Communication with users of soil science expertise and products requires strong improvement because generally there is a narrow perception of soil science as a restricted discipline lacking dynamic interaction with other sciences. Modern communication and information technology needs to be applied to enhance interaction with such users as farmers, extension workers, planners, regulatory agencies, citizens-at-large and decision makers. Student curricula, from the earliest school years onward, should be revised to reflect increased appreciation of the role of soil science as a part of our global environment that is as important as are air and water.

Recommendations:

- a) Further development of the established Task Force on Education.
- b) Organize symposia with direct user involvement.
- c) Increased ISSS activity, through press releases, working group publicity and position statements to draw attention to soil sciences' central role in ecosystem research.

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J. Bouma, The Netherlands

SOIL CARE AWARENESS

Soil science is undergoing significant changes in its orientation. Despite the evident successes of soil science in increasing agricultural productivity, many aspects of soil research are receiving less support. Questions have surfaced about its place and function in the community of sciences. Various concepts have been discussed and solutions offered for a better integration of soil processes within the larger earth systems, especially for global and local environmental issues. Global environmental programs such as IGBP, require substantial input from soil scientists in several of its core programs. Much effort is needed for soil science to take its place alongside other fundamental research efforts for the protection of the Earth.

Both the fundamental and applied aspects need to be promoted. **Sustainable soil and land use** requires the simultaneous application of socio-economic concerns with sound environmental principles based on protecting the soil and biota. Though only 12% of the land surface are arable soils, the stress on the more common grassland and forest soils and on open spaces is of equal importance in evaluating a possible threat to soils - be it erosion, desertification, salinization or other forms of **soil degradation**. The consequences of various forms of land use or climatic change on possible soil degradation need to be predicted. For arable soils, sound environmental policy requires more quantitative answers to questions how far, when and in which concentration agrochemicals and pollutants will be transported. For industrialized environments past mismanagement requires advice on the best methods for **soil remediation**. For developing countries, where 70 % of the world's land and 80 % of its population is present, the need to increase **soil productivity** must be accompanied by an equal desire to avoid past mistakes, requiring a holistic and integrative approach to local soil research and technology transfer.

Soil awareness needs to reach decision makers in governments and the general public. The list of proposed activities to seize opportunities for soil science and its application in the 21st century, adopted at the 15th World Congress of Soil Science in Acapulco, Mexico, July 1994 (this issue) is a significant policy statement and indicator for the directions to follow. The recent report of the Federal German Advisory Council on Global Change (Executive summary in Global Change Prisma 1994, vol. 5, no. 2, pp. 10 - 17), focusing on the global threat to soils, diagnosed 12 "syndromes" of global anthropogenic threat to soils for industrialized, marginal and developing countries, indicates that such awareness can reach the policy makers.

It seems that an integrative name for much of this activity is needed, for which we suggest the term **soil care**. It integrates soil conservation, soil protection and soil remediation, already widely used terms, but each with its limited definition and specific interpretation. SOIL CARE can be defined as **selecting and implementing a system of soil and land use management that will maintain and improve its usefulness for any selected purpose**. This relates not only to agriculture but equally as an entity of the environment. I believe this suggested terminology and approach has several advantages. It is essentially equivalent to the already widely used German term **Bodenschutz** (Blume, 1992, Handbuch des Bodenschutzes, EcoMed, Landsberg). Though soil protection would be the more literal translation, the broader **soil care** is preferable because it is less liable to be equated with soil conservation only. A greater orientation of soil scientists and soil science to the problems of soil care could reverse the decline and devaluation of its status, which has recently worried some leading American and European soil scientists. Academic posts and chairs in soil care should be established to complement or broaden those of soil fertility and soil conservation. Any journal including soil care in its scope could accept a wide range of articles from goal oriented research projects.

In conclusion, **soil care** is a unifying concept and challenge for geo-ecological sustainability. The use of the term soil care is proposed for the activity of selecting and implementing locally and regionally a system of soil and land use management suitable for maintaining and improving its usefulness for any selected purpose. Research in soil care can have many facets, encompassing those of soil conservation, soil protection and soil remediation. This does not imply a lesser need for more fundamental research in soil genesis and soil processes, especially in the context of global systems. There is no successful applied research in soil care without corollary basic research.

Dan H. Yaalon, Jerusalem, Israel*)

*) useful references on this topic can be obtained from the author, Prof. Dr. Dan H. Yaalon, Chairman SC-CHP, ISSS, The Hebrew University, Institute of Earth Sciences, Givat Ram Campus, Jerusalem 91904, Israel, Fax: +972-2-662-581

ANNOUNCEMENTS – ANNONCES – ANKÜNDIGUNGEN

3RD INTERNATIONAL CONFERENCE ON THE BIOGEOCHEMISTRY OF TRACE ELEMENTS

May 15 - 19, 1995, Paris, France

The mission of this conference is dual:

- To establish the state of knowledge concerning the biogeochemistry of trace elements;
- To give some answers to the questions posed by the evaluation and management of risks for human health and biodiversity resulting from the presence of elements which are potentially toxic in soils and sediments.

Theme A – Biogeochemistry of Trace Elements

- Symposium A1 Speciation
- Symposium A2 Mobilization: Physico-chemical Processes
- Symposium A3 Mobilization: Biological Processes
- Symposium A4 Transfer and Transport

Theme B – Impacts and Pathways of Exposure

- Symposium B1 Terrestrial Ecosystems
- Symposium B2 Aquatic Ecosystems
- Symposium B3 Transfer to Man Via the Food Chain
- Symposium B4 Transfer to Man by Direct Ingestion of Soil, Dust, etc.

Theme C – Evaluation and Risk Management

- Symposium C1 Sources, Cycles, and Balances
- Symposium C2 Methods for Risk Evaluation
- Symposium C3 Comparing the Basis of Regulation
- Symposium C4 Choice of Objectives and Feasibility of Treatments

Two preliminary lectures will be delivered by keynote speakers:

- Effects of trace elements on human health; and
- Effects of trace elements on terrestrial and aquatic ecosystems.

**3RD INTERNATIONAL CONFERENCE ON THE
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Fax: +33-1-4219-1771

10TH INTERNATIONAL WORKING MEETING ON SOIL MICROMORPHOLOGY

Moscow, Russia, July 8–13, 1996

The 1996 IWMSM will be held at the Vorobiovy Gory campus of the Moscow State University (10 km from the city centre) and at the Main Building of MSU. Registration fees have not yet been fixed, but will be about USD 200 - 250.

Scientific Program

1. Soil genesis and micromorphology
 - Zonal soils of the East-European plain
 - Permafrost affected soils
 - Podzolic soils (soils with textural profile)
 - Chernozems
 - Salt affected soils
 - Aridic soils
 - Humid tropical soils
2. Diagnostics of soil forming processes
 - Weathering of primary minerals and rocks
 - Organic matter transformations in soils
 - Neoformations: sesquioxides, salts, carbonates, etc.
3. Methods and terminology
 - New approaches in submicroscopy
 - Image analysis in soil micromorphology
 - Data base and computerization in micromorphology
 - Terminology: State-of-the-Art
4. Applications
 - Early diagnostics of man-induced changes in soils
 - Micromorphology in agricultural research
 - Application in archaeology and paleopedology
 - Teaching: problems and advances

Papers on these and other aspects of micromorphology will be accepted as either oral or poster presentation. Abstracts of papers, included in the program of IWMSM, will be published before the beginning of the meeting.

Pre-conference tour: East-European taiga landscapes and soil catenas. Vicinity of St. Petersburg (3-4 days)

Mid-conference tour: Agricultural landscapes of Central Russia. Moscow district - research stations of MSU. (1 day)

Post-conference tour: Soil zonality in the Russian Plain. Moscow-Pushchino-Kursk-Kherson (Askania-Nova reserve) (5 days).

10TH INTERNATIONAL WORKING MEETING ON SOIL MICROMORPHOLOGY

Moscow, July 8–13, 1996

NOTICE OF INTENT

Family Name M/F

Given Names

Title

Name of Institute

Full Address

.....

.....

.....

.....

City/Postal Code

Country

.....

Telephone

Telefax

E-mail

I expect to be accompanied by persons

I hope to attend the meeting ¹	YES	NO	
I will present a paper ¹	YES	NO	
I intend to go on field trip(s) ¹	PRE	MID	POST
Preferred type of accommodation ¹	University	Hotel	Hostel

Please return this Notice of Intent before February 1st, 1995, to:

Dr. V.M. Safonova
Faculty of Soil Science
Moscow State University
Moscow 119 899
Russia

Fax: +7-095-939-0989, E-mail: fater.inbox@parti.inforum.org.su

¹) Please encircle your choice.



ISSS-AISS-IBG

Notice of Intent/Registration Form

Note d'Intérêt/Fiche d'Inscription

Absichtserklärung/Anmeldeformular

To: Organizing Committee of

.....
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.....

From: Name and title

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full address:

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Dear Madam, Sir,

☐ I intend to participate in the conference, meeting, seminar, workshop* mentioned above.
Please send me detailed information.

☐ I intend to present a paper/poster*, entitled:

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Comments:

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*) please delete if not applicable

REPORT OF THE AD-HOC WORKING GROUP FOR POSTER EVALUATION AND ANALYSIS AT THE XVTH WORLD CONGRESS OF SOIL SCIENCE IN ACAPULCO

In order to emphasize the importance of the presentation of posters and to take maximum advantage of the poster exhibition, the organizing committee of the congress installed an ad-hoc-working group in a similar way as it had been done at the previous congress in Kyoto, 1990.

The results of the evaluation showed in general that the quality of presentation of posters had greatly improved, thus having gained importance and become a firm part of our congresses. The posters of each commission were evaluated for quality of presentation and for scientific content by a group of colleagues who were nominated by the presidents of the commissions. For each commission a best poster was selected, using a key which was based on the one used in Kyoto (see Bull. 78/1990, p. 25), but gave some more weight to the scientific content. The ad-hoc-working group decided this to be the logical consequence of the increased quality of presentation. This new key is explained below. It is important to stress that because of the new key this award means more than a mere recognition of formal attractiveness. The names of the winners of the award and the titles of their posters are shown in tab.1.

CRITERIA FOR EVALUATION

		max. score
1	Presentation	
	1.1 ease of reading at 2 m	5 points
	1.2 ease of understanding activity and results	5
2	Content	
	2.1 definition of objectives	10
	2.2 scientific quality	40
	2.3 importance of result	30
3	Special considerations	10

MAXIMUM OBTAINABLE SCORE 100

The rich material which had been presented during the poster exhibition was analysed by the members of the ad-hoc working group as to several different items. There is of course general interest in the worldwide distribution of topics and of approaches in the broad field of soil science. Furthermore, for the first time an opportunity arose to try to locate changes, as compared with the analysis of four years ago. In addition, the use of exactly the same key as last time showed shortcomings of the body of keywords, and thus, how it could be improved. And finally, the big number of posters and the short time interval between the exhibitions of all sets, forced to distribute the whole work on all members of the ad-hoc working group. At the same time, it became inevitable to lean more heavily on the extended summaries than this had been the case at the Kyoto congress. So the analysis is based on all posters of which summaries were printed in the transactions, whereas the evaluation included only those posters which were actually exhibited. These were definitely fewer than those accepted. The percentage of posters that were actually shown varied between 80 and 60 % of the accepted ones with printed summaries. For all of these reasons, in some cases the analysis was performed twice and the relation between both results was noted. The results of this procedure are shown in Tab.8 at the end of this report. For the worldwide distribution of contributors see appended map.

The results of the analysis are presented here in the same order as those of the XIVth Congress. Before studying the tables, the reader should please keep in mind the difficulty of representing results as mere figures. Where percentages are given, they are rounded up to whole numbers or even to whole tens.

Table 2 shows the most frequent general topics towards which the scientific work of the posters was directed. One can say that, compared with the results of the 1990 Kyoto Congress, generally the interest in environmental protection and soil reclamation has increased. The proportion of posters which cannot easily be categorized remained fairly constant. On the other hand, the number of posters aimed at topics related to the increase of scientific knowledge diminished. One could also say that attention paid to "curiosity research" decreased, whereas interest in "yield improvement" kept its place. This underlines the continuous importance of food production in all considerations of soil scientists

Tab.3 shows the absolute number of accepted posters per commission and the relative numbers for both the congresses 1990 and 1994. This clearly shows that the attention which soil scientists pay to different parts of our science - as represented by poster submission to our commissions - did not change greatly.

Tab.4 shows the distribution of methodical approaches in per cent for 1994 and for 1990. From this table it can be seen that the contributions were a little easier to categorize and that those using theoretical approaches or modelling were more numerous or easier to identify. Comparing the results of different analysers, it is extremely difficult to assign every individual contribution to one of the groups for methodologic approach. One of the reasons for this is a feature that is specific for soil research: the fact that an appreciable part of all research is performed on samples that were taken from soil profiles or from specific areas or places. Since the weight that the individual scientist assigns to the different aspects of his work is frequently not too easy to assess, it is difficult to distinguish between lab and non-lab methodology.

Tab.5 shows the most frequent items dealt with by each commission. Two features can be stressed here: The most important item and the most drastic changes.

Tab.6 shows which lines of work (codified by the Commission numbers) is dealt with most frequently in the different regions. More research is directed towards practical problem-solving than to theoretical work. Commissions IV, V and VI received most poster submissions. The interest in basic sciences is mainly concentrated in highly industrialized regions.

Tab.7 shows that most contributors of posters are affiliated to educational institutions. Contributions from institutions devoted completely to research are somewhat less frequent. International co-operation seems to be a minor factor in our worldwide community. This is a remarkable feature that needs attention.

There was an opportunity to assess the degree of reproducibility by comparing the results of different analysers. Since the number of observations (here the code words) was small, only a rough estimate could be given. Rank correlation coefficients (Spearman) were chosen and listed in tab. 8. The resulting values are in most cases not significant at any reasonable level. Nevertheless they reflect the relative difficulty of assigning posters to code words for different questions.

It is obviously easy to identify regions, affiliations of authors and their research aims. It proved to be much more complicated to categorize the objective of research and most difficult to find out the methodology used. An important cause for the difficulty to assign methodology and object-keywords reproducibility, is the frequently inadequate assignment of a poster to an individual commission.

These facts might be interpreted in two ways: On one hand the key of codewords should be changed. This would mean a new start, sacrificing comparability with earlier results. On the other hand, authors should be encouraged to be more specific about these two questions.

The results which were presented here allow some remarks as to future evaluations and analyses:

If we want to use the chance of information on worldwide activities in soil science that the world congress poster exhibition gives us, we should:

- Stress the requirements to explain methodologic approach in extended summaries
- Demand that the central object of the investigation should be clearly stated
- Revise the body of codewords, so that it will cover all lines of research for the next analysis in 1998.

Table 2
Aims of scientific investigation

	1994	1990 (Kyoto)
increase of scientific knowledge	54	64
yield improvement(predominantly agricultural crops)	24	27
environmental protection	15	5
soil reclamation	3	1
others(not easily catalogised)	4	4
	100	100

Table 3
Number of posters accepted, absolute and relative numbers per commission, comparison with relative numbers at the XIV-Congress 1990 in Kyoto

Commissions	I	II	III	IV	V	VI	VII	Sum
absolute	142	216	113	242	205	164	44	1126
%	13	19	10	22	18	14	4	100
% in 1990	10	13	14	29	18	11	5	100

Table 4
Methodological approaches

subdivided for commissions in %								1990
Commissions	I	II	III	IV	V	VI	VII	mean%
Laboratory exp.								
(+Greenhouse)	20	54	46	37	43	7	2	30
Field experiments	28	11	16	42	6	54	9	24
Field measurements	10	9	0	9	15	7	0	7
Field observ./								
survey/map	3	15	33	4	9	20	0	12
Sampling/work on								
samples	15	2	0	1	1	0	75	13
Models/theoretic								
approaches	20	6	2	3	17	10	0	8
not categorized	4	3	3	4	9	2	14	5
	100	100	100	100	100	100	100	99
								94

Table . 5

Most frequent items per commission

Comm.	first code words (%)	second code words (%)
I	mechanics/structure (42)	hydrologic proc. (40)
II	trace elements /heavy metals (30)	others/salinity (21)
III	microbiol.(40)	N-fix (26)
IV	fertility (51)	others/nutrient uptake (22)
V	not categorized (43)	genesis (31)
VI	not categorized(36)	reclamation (22)
VII	minerals in soils (32)	weathering (25)
		temp., gas (1)
		not noted
		ecology(10)
		not categorized (26)
		not noted
		not noted
		oxides(7)

Table 6

Importance of lines of work in different country groups -codified by frequency of assignment to commissions

Comm.	1st frequency	2nd frequency
I	—	Australia+Oceania
II	East Asia	Europa, Meditaer.+Middle East, North America, (central Asia)
III	—	—
IV	Latin America, Africa, Austr.+Oc. Mediterr., Middle East	Mexico, South-East Asia East Asia
V	Europa, North Amer. Africa (s.Sah)	—
VI	Mexico, Southeast Asia, (Central Asia)	Africa(s.Sah), South Asia, Lat.Amer.
VII	—	—

NB.: (s.Sah)= south of Sahara desert. North Africa = medit.+ Near East.

Some changes in assigning countries to groups were made due to political development in the Eurasian continent. For example: New Central Asia

Table 7
Affiliation and administrative assignation of first authors
per commissions (%)

affiliations	I	II	III	IV	V	VI	VII
educational institutions (Univers. &ct.)	44	68	59	51	43	40	91
researchstations & organisations	35	30	40	45	41	60	18
extens.+ governm. services	20	1	0	3	13	0	14
others	1	1	1	1	3	0	0
author relationships							
national institutions	88	89	88	88	83	89	91
cooperation ,authors from							
different countries	11	9	6	7	13	10	9
international insitutions	1	1	5	4	3	1	0
non-govnm.org. + others	<1	1	1	1	1	<1	<1

Table 8
Reliability of the assignment to codewords
rank correlation coefficients after Spearman

authors relationship	rS = 1.00	p = 0
country groups	0,98	0,001
aims of research	0,80	0,025
Authors affiliations	0,80	0,025
first objective	0,60	>0,1
second objective	0,45	>0,1
methodologic approach	-0,25	>0,1

Members of the ad-hoc-working group:

Dr. K.H.Hartge, Germany, Past President ISSS

Dr. J.S.Kanwar, India ,Past President ISSS

Dr. A.Tanaka, Japan, Past President ISSS

Dr. Reggie J.Laird, Collegio de postgraduados, Mexico

Dr. R.Moreno Dahme, Collegio de Postgraduados, Mexico

K.H. Hartge, Germany

TRANSACTIONS OF THE XV WORLD CONGRESS OF SOIL SCIENCE

The 17-book set of transactions of the World Congress of Soil Science, Acapulco, July 10 - 16, 1994, is available for US\$ 150 plus shipping (US\$ 35 - 70, depending on the country).

For orders please contact:

Dr. Jorge D. Etchevers Barra
Mexican Society of Soil Science,
P.O.Box 45
56230 Chapingo
MEXICO

Fax: +52-595-45701 or -45723

REPORT ON THE DEVELOPMENT OF THE WORLD REFERENCE BASE FOR SOIL RESOURCES (WRB)

The ISSS, together with the International Soil Reference and Information Centre (ISRIC) and FAO, has been developing a World Reference Base for Soil Resources (WRB) in order to provide scientific depth and background to the Revised Legend of the Soil Map of the World, and to support improvements to it on the basis of new inputs in soil formation, properties and suitability for uses, as well as in the spatial and temporal relationships between the different soils.

On the occasion of the XV World Congress of Soil Science in Acapulco, Mexico, July 1994, participants received a copy of the draft World Reference Base for Soil Resources which was prepared by the undersigned on the basis of many contributions from collaborators. Several aspects of the WRB were highlighted during the WRB symposium, in particular the contrasting properties of acric, allic, lixic and luvic soils, the concepts of soils with gleyic and stagnic attributes, the new approach concerning the concepts and major units of Andosols, the proposals dealing with Leptosols and Fluvisols, and FAO's work on developing consistent soil subunits.

At the business meeting of the WRB working group, which was attended by some 20 people, the next steps to be taken were discussed. It was noted that some reservations still exist concerning several major soil groups. Therefore it was recommended to initiate an external review by a selected number of experts, to invite comments and criticism from the world's soil science community in general, and to call on the national societies of soil science to state their interest in and possible use of the WRB. The reactions received are to be evaluated by ISSS, ISRIC and FAO during a meeting in spring 1995 after which the next step will be formulated.

Finally, the ISSS Council has agreed to reinstate the Working Group RB which had been active *within the ISSS Commission V from 1982 to 1986 as working group for the International Reference Base for Soil Classification (IRB)*. The mandate of the present working group is (a) to prepare the first edition of the WRB based on the draft issued on the occasion of the XV World Congress of Soil Science, (b) to assess recent advances in the knowledge of soils at a global scale with a view to update the WRB, and (c) to promote the world-wide use of WRB by soil scientists and scientists in related disciplines. Prof. J. Deckers of the Catholic University Leuven, Belgium, has been asked to chair the working group as Prof. A. Ruellan, who expertly led the WRB panel to date, has insufficient time to combine the WRB chairmanship with his ISSS presidency for the next four years.

Otto Spaargaren, ISRIC, Wageningen, the Netherlands

ANNOUNCEMENT

on the World Reference Base for Soil Resources (WRB)

During the WRB symposium it was announced that comments were invited from the soil science community world-wide on the draft World Reference Base for Soil Resources. In particular, additions, improvements or suggestions for modification (including background materials such as soil profile descriptions with analyses, environmental data, etc.) are welcomed on the following issues:

- completeness of information, especially with respect to the properties, distribution, land use and management of the soils;
- temporal and spatial relationships within and between the soil groups;
- usefulness of the proposed division in soil units with respect to their global importance as well as to land use and environmental issues;
- clarity of the text, also for non-soil scientists; any ambiguity in the diagnostic characteristics proposed; and
- existence of practical field methods for easy recognition of the soils.

A copy of the draft World Reference Base for Soil Resources can still be obtained from:

The Director, ISRIC,
P.O. Box 353,
6700 AJ Wageningen, The Netherlands.
Tel.: +31 8370 71711 / Fax: +31 8370 24460 /
E-mail: ISRIC@RCL.WAU.NL

or

Chief AGLS,
Land and Water Development Division, FAO,
Via delle Terme di Caracalla,
00100 Rome, Italy.
Tel.: +39 6 52253068 / Fax: +39 6 52256275 /
E-mail: ROBERT.BRINKMAN@FAO.ORG

All interested persons, organizations and institutions are kindly requested to send their comments by March 1995 to:

Prof. J. Deckers
Institute for Land and Water Management, K.U. Leuven
Vital Decosterstraat 102, B-3000 Leuven, Belgium
Tel.: +32 16 231381 / Fax: +32 16 230607

or to the contact addresses mentioned in the draft World Reference Base for Soil Resources.

15TH WORLD CONGRESS OF SOIL SCIENCE

EXCURSION REPORTS

GUADALAJARA - MEXICO CITY

The excursion Guadalajara - Mexico City began with a reception at the Holiday Inn Crown Plaza in Guadalajara, and an introductory talk about the region to be visited, its soils and agriculture was presented by Jorge Riviera, who accompanied the participants as technical expert. During the excursion, Heine Wolfram, a professional guide, provided background information about Mexico, the Mexicans and their history. During the week-long excursion, six soils were examined and several cultural visits undertaken. The general verdict of the participants was that it was an excellent combination of pedology and an informative insight into an important cultural region of Mexico. For detailed descriptions of the soils and analytical figures, see Tour Guide 1, Guadalajara - Mexico City, which also includes comments on the places of historical interest.

Profile 1. (Rhodic Nitosol/Kandic Paleustalf) was situated at the Campo Alto de Jalisco Experimental Station, where studies of rainfed agriculture have been under way since 1974 in collaboration with the University of Guadalajara and in support of the local agricultural community. The profile was developed in a layered basaltic parent material on an elevated plateau at 1780 m above sea level. In discussion around the pit, comments were made regarding the accumulation of the soil material, the lower part of which was considerably more clayey than the upper; the possibility of loessial/volcanic additions was raised and questions were also asked about the possibility of erosion. The scientific interest of the day continued with a visit to the warm geyser at Ixtlan. This continually flowing source of water produced a fountain of water 30 - 40 m high.

Profile 2. (Haplic Andosol/Typic Hapludand) was situated in wooded land at 2129 m above sea level, surrounded by many well-formed volcanic peaks rising to 3860 m. The soil could be seen to have at least two main layers of volcanic ash the upper layer of which was only 50 years old. Heavy thunder showers in the late afternoon limited the possibilities of a closer inspection of the site of Paracutin (erupted in 1943), which was over-looked by the terrace of the lunch-time restaurant. The remains of a church could be seen emerging from the lava which had flowed from the volcano.

The site of profile 3 (Eutric Fluvisol/Typic Tropofluvent) was the drained Zacapu lake basin. Drainage work began in the first decade of the present century to provide an extensive (11,000 ha) flat area of organic-rich soils. The ground-water having been lowered, crops of maize or alfalfa were grown using irrigation water from two dams. The profile consisted of a deep dark humus-rich silt loam with bands of silt/ash at intervals. Some loss of soil through blowing was reported and some shrinkage had occurred. A talk by a representative of the irrigation and drainage board provided answers to many of the potential questions about the origin of the parent material and operation of the drainage/irrigation system.

The fourth profile (Eutric Vertisol/Udic Ustert) occurred on the land of a vegetable grower of some local repute for the size of his crops. The parent material was alluvium and the soil was dark coloured and very clayey, but cracking was not obvious in the topsoil. Vertic features were not clearly developed until 97 cm but in the original profile description slickensides begin in the 77-79 cm horizon. So, the name Eutric Vertisol was agreed to be appropriate.

Irrigation of 45,000 ha in the Mezquital valley by waste-waters from the sewerage system of Mexico City provides a practical use of water and the nutrients contained in the effluent. Profile 5 (Fimic Anthrosol/Cumulic Haplustoll) was selected from an area which had been used in this way for 40 years on the northeastern side of Mexico City. Despite being irrigated with sewage, the soil did not have an offensive smell, but was clearly influenced by the addition of organic material from the waste waters. Some figures for heavy metals were presented in the guidebook, and others were shown by the irrigation authority. These did not appear to be excessive, however the figure for coliform bacteria was well in excess of permitted levels. Inevitably, reactions centred on the problems of using sewage

waters for irrigation of food crops and the permissible limits of heavy metals and other noxious contaminants which were being added to the soil.

The final profile (Gleyic Solonchak/Vertic Epiaquoll) of the Technical Excursion was located at the Graduate College of Chapingo at an elevation of 2240 m above sea level on the floor of the former lake Texcoco. The surface horizon was a firm silty loam with whitish concretions towards the base. Below the surface was a uniform silty clay cracking into large prisms and still thixotropic. The parent material was composed of lacustrine silt, organic materials and additions of ash which had fallen into the lake.

The Mexican Soil Science Society is to be congratulated on a well-organized excursion with interesting soils which gave rise to constructive discussions at each pit. Pit chairmen on successive days were J.Riviera, H.P. Blume, E.M. Bridges, G.M. Coen, V.W.P. van Engelen and M.F. Purnell.

It would be impossible to visit Mexico without noting the influence of past and present cultures on the landscape and soils. The cultural guide Heine Wolfram gave an excellent account of the economic, cultural and political affairs of the country. Interesting former colonial towns, such as Patzcuaro and San Miguel de Allende were visited and explained. However, Mr Wolfram was at his best when dealing with the impressive archaeological sites at Tula (Toltec) and Teotihuacan (Aztec) where the pyramids of the Moon and Sun were visited, as well as the pyramid of Quetzacoatl with its preserved decoration of plumed serpent's heads. This tour truly combined the best traditions of the International Society of Soil Science's activities.

E.M. Bridges, ISRIC, Wageningen

Compte Rendu du Post-Tour No 6 "Hot Tour" – Californie – USA 17 - 24 Juillet 1994

Cette trounée scientifique, remarquablement organisée dans le cadre de la Société Américaine de Science du Sol et avec l'aide du SCS-USDA, et dirigée conjointement par le Professeur Mike SINGER de l'Université de Californie - Davis, et le Dr. Terry COOK du PSSCA, fut particulièrement intéressante à de nombreux points de vue, et notamment:

- par l'observation de paysages pédologiques typiques de la partie Ouest des Etats-Unis
- par l'examen de sols caractéristiques sur de nombreux matériaux de mise en place quaternaire
- par la prise de connaissance des problèmes cruciaux de gestion des terres et des eaux, de mise en valeur et de conservation des sols, dans des zones climatiquement relativement difficiles.

Très internationale, et suivie par 40 scientifiques de 12 nationalités différentes, elle se déroula sur une grande partie du territoire de la Californie, de San Diego à San Francisco. Elle a donc permis de rencontrer des situations agro-pédo-climatiques très variées: grandes plaines alluviales, paysages collinaires, déserts, montagnes, et d'aborder de multiples aspects de l'utilisation et de la conservation des sols et des eaux.

Les conditions climatiques de la Californie: climat contrasté et faibles précipitations, nécessitent une gestion de l'eau particulièrement efficace. L'infrastructure hydraulique est donc très importante: Dérivation et canalisation des grandes rivières, création de grands canaux, construction de vastes barrages, nombreux canaux d'alimentation, centres de gestion et de distribution. Il convient de noter immédiatement que compte tenu de la demande croissante en eau pour les zones urbaines, l'hydraulique agricole fait l'objet d'un ajustement de plus en plus serré et délicat.

La production agricole de la Californie est particulièrement diversifiée. On y trouve les cultures céréalières, le maïs, la luzerne, le coton, les cultures légumières, l'arboriculture fruitière particulièrement développée: agrumes, palmiers datiers, amandiers, abricotiers, pêcheurs, pistachiers, noyers,... et les fameux vignobles californiens....

Une grande majorité de ces cultures sont bien entendu soumises à l'irrigation sous différentes formes technologiques. L'irrigation gravitaire est la plus répandue, et les apports d'eau, très importants, représentent une lutte constante contre les risques de salinité toujours très élevés. L'irrigation



Participants du post-tour No. 6 (Californie -USA)

par micro-asperseurs ou par tuyaux enterrés perforés représente le stade le plus avancé d'une recherche sur l'économie de l'eau. Elle est testée en vraie grandeur sur culture d'amandiers, associée à des recherches sur des modes d'apports d'éléments nutritifs et phytosanitaires.

Les problèmes de mécanique des sols sont également traités, car importants pour la culture cotonnière où le tassement des sols constitue un réel obstacle à la production. D'importants programmes de recherches sur les techniques culturales les plus appropriées sont en cours.

En ce qui concerne la géographie et la différenciation des sols, les paysages de Californie mettent fort bien en évidence l'importance de la connaissance de la stratigraphie du Quaternaire et de la géomorphologie pour la compréhension de la distribution spatiale et du développement génétique des sols.

De nombreux sols ont pu être observés et leur particularités abondamment discutées. Notamment fait l'objet de ces présentations: les sols de l'«Imperial Valley», de la «Coachella Valley», des expérimentations de l'Université de Californie à Riverside, du désert de Mojave, de l'«Antelope Valley», du «Yosemite Park», de la Merced river valley, du delta et de la «Joaquim Valley», et enfin des vignobles de la «Napa Area» et de la «Sonoma Valley». Il s'agit essentiellement de sols de type «Orthids», «Argids», «Xerals», «Xerolls», ainsi que différents «Entisols», «Inceptisols», et «Histosols», la majorité d'entre eux étant bien entendu sous climat «Xérique» selon la nomenclature et la taxonomie américaine.

L'ensemble des participants à cette remarquable tournée a largement fait savoir sa satisfaction aux organisateurs à l'occasion d'une soirée d'«adieu» particulièrement sympathique, et arrosée d'excellents vins de Californie. La délégation française a notamment tout particulièrement apprécié les dégustations qui avaient été prévues par nos amis californiens.

Il convient donc de remercier très chaudement les organisateurs de cette tournée, d'une part pour le haut niveau scientifique et la qualité de ce qui nous fut montré et commenté, d'autre part pour l'organisation matérielle remarquable, et enfin et peut être surtout pour la chaleur de l'accueil et l'ambiance particulièrement amicale qu'ils ont suscité tout au long de notre séjour en Californie.

Marcel Jamagne, France

California Soils and Land Use Tour "Hot Tour"

In connection with the XV World Congress of Soil Science in Acapulco, a field tour through California was arranged. The tour leaders Michael J. Singer, University of California, Davis, and Terry Cook, soil consultant, had planned a tour that crossed the state of California, from San Diego to San Francisco, and revealed the diversity of biotopes and land use.

The first part of the tour went through the Imperial Valley of which half the area is irrigated cropland. The Imperial Valley Irrigation District provides the water, which makes agricultural production at all possible. Once the Imperial and Coachella Valleys were parts of the Gulf of California, which extends from Mexico 320 km north. The soils are stratified alluvial material of different textures and thicknesses. The Valley slope declines towards the north, where it finally reaches the Salton Sea. The floor of the Salton Sea is 90 meters below sea level. The U.S. Salinity Laboratory made information available about problems with salinity and measures for soil amendment.



San Andreas Fault, California

Travelling into the Mojave desert area, soils and some of the native vegetation of the region were studied. A deep duripan characterised the soils. In the Antelope Valley of the Mojave desert, the combination of erosive soils from abandoned farmland, strong winds, intensive sheep grazing and several years of draught have created severe dust clouds which cause health problems. To mitigate the problem of dust and soil erosion in the Antelope Valley the Dustbusters Task Force was formed.

An interesting roadcut exposure of the San Andreas Fault zone along the Antelope Valley was presented. The fault zone is 1.6 km wide where it is crossed by the Antelope Valley Freeway west of Lake Palmdale (a reservoir developed within a closed depression along the fault). About 3 km to the east, the fault zone is 3.2 km wide. The roadcut exposure of contorted rocks (photo) within the fault zone provides a visual proof of the existence of the fault and dramatically displays the effects of powerful forces that have acted along the fault for a long time.

Leaving the fault zone exposure, the group headed towards the A.D. Edmonston pumping plant, which is located at the foot of the Tehachapi Mountains and which is the largest pumping facility of the State of California Water Project. Since 1971 it has pumped water nearly 600 vertical meters up the Tehachapi mountains to Southern California. High technology drip irrigation was studied at some fruit orchards before the tour headed towards the Sierra Nevada mountain range and Yosemite National Park.

On June 30, 1864, Yosemite Valley and the Mariposa Big Tree Grove were granted to the state of California to "be held for public use, resort and recreation" to be inalienable for all time" by President Abraham Lincoln. The giant sequoia trees (*Sequoiadendron giganteum*) that made the park famous are the largest living things on earth. The oldest tree is 2,700 years old.

After an adventurous bus tour downhill from Yosemite, organic soils in San Joaquin County and vineyard soils in the Napa Valley were studied. The group also enjoyed a wine cellar tour. The last stop of the tour was at the Golden Gate Bridge with a beautiful view of San Francisco. On behalf of the tour participants I thank the organizers for a most interesting and enjoyable "Hot Tour".

Agneetha Alriksson, Sweden

REPORT OF POST CONGRESS TOUR 11 Acapulco-Cancun-Villahermosa, July 16 - 26, 1994

Acapulco, Mexico, served as the host-city for the 15th World Congress of Soil Science. This Congress proved to be one of the most memorable of the Congresses of the International Society of Soil Science. The more than 26 Symposia, Keynote addresses and the very large Poster Sessions clearly showed not only the advances in Soil Science but also the contribution of global soil scientists to enhancing the quality of life on this planet. Without doubt, this was a memorable event and the success of the Congress is also largely due to the excellent organization of the Mexicans under the leadership of the President, Dr. Andrés Aguilar-Santelises. The spirit of the participants was dampened only by the hot and humid climate but even that would be memorable.

As part of the Congress, several pre- and post-Congress tours were arranged. This report is of the post-Congress tour No. 11, which commenced from Acapulco on the afternoon of July 16 and ended at Cancun on July 26. Again, we must state that this was a most efficiently run field tour and one that benefited every participant, including the spouses. We were also very fortunate to have a tour-guide who is very knowledgeable about archeology and ancient civilizations. Thus, we not only had a soils tour but also an opportunity to re-live the Mayan age of prosperity. The local scientists, including the staff of the many research stations we visited, also added to our understanding of past and current agriculture, land use, and the understanding of past and current agriculture, land use, and the rise and fall of a civilization. We had an enviable experience and those who did not participate, missed a unique opportunity.

During the tour Maurice Purnell and Rienk Miedema provided the classification according to the FAO-UNESCO Legend of the Soil Map of the world. DeWayne Williams of USDA-SCS provided the Soil Taxonomy classification.

At each field site, we had more than 2 hours for discussions. After a brief period for photographing the profile, Drs. Francisco and Octavio gave us a background of the site and other relevant information. At some sites, this was complemented by additional information by persons from research stations close to the profile site. This background information gave a wealth of information on agriculture, land use and constraints and problems faced by the farmers. This was followed by pit examination, when the participants pierced, dug, tickled, scratched, argued, discussed, compromised, and sweated for about one hour. After this, every one was given an opportunity to present his/her opinion. Properties, processes, genesis, and classification consumed much of the discussion time. Land use and options were also discussed. At the end of the discussions some recommendations were provided.

Despite the heat stress and pedon-fatigue, everyone was in a good mood and was even willing to climb the 91 steps up the Mayan pyramid. The tour ended in the touristic city of Cancun which was, in a sense, an anti-climax. After enjoying the peace and nature of the Yucatan countryside, it was a cultural shock to come back to the concrete jungle and visualize the problems of modern society.

Dr. Francisco Orozco (Mexico)
Dr. Octavio Perez-Zamora (Mexico)
Dr. Hari Eswaran (USA)
Mr. Pande Zdruli (Albania)

POST-CONGRESS TOUR IN CUBA

July 18 - 23, 1994

This tour is the combination of post congress tours 5 and 14, which were planned to take place in Cuba. The tour started in Havana City, where the participants arrived from Mexico, and crossed the major part of Cuba (1000 km) by bus. Ten visitors from The Netherlands, France, Spain, Greece, Germany and Mexico participated in the excursion.

On the first day, the Villa Clara Sugarcane Experimental Station was visited, where a brief explanation about the National Sugarcane Research Institute (INICA) was given by a representative of the Ministry of Sugar (MINAZ). The profile of a calcareous chernozem soil could be seen at the experimental station.

Subsequently, the National Soil Reference Collection and Database (NASREC), established in collaboration with ISRIC, was shown to the participants. This collection contains 23 profiles, representing the main edaphoclimatic conditions of the country.

For the second day, the presentation of a Hypereutric Haplic Ferralsol was planned, but a local rain storm (65 mm precipitation per hour) only allowed a theoretical discussion.

In the Holguin province, two profiles were discussed: a Sodi-Calcic Vertisol in a sugarcane plantation near the "Cristino Naranjo" sugar mill and an Acric-Geric Ferralsol in a mountain forest area. The latter is an example of an extremely poor soil.

After a long (5 hours) but beautiful trip through coffee and cocoa plantations in the mountains, the excursion arrived in the province of Guantanamo (eastern Cuba), where a Sodi-Calcic Solonchak was presented. In the same area, reclaimed salinized soils were visited and management technologies discussed.

On the last day, an Orthic-Calcic Cambisol was visited in the province of Santiago de Cuba. The profile was very interesting, as it showed the process of pedogenesis. The tour finished with a visit to the Santiago de Cuba Sugarcane Experimental Station and a typical Cuban lunch, with wines and rums elaborated from sugarcane. The participants traveled back to Havana by airplane.

At each of the visited sites, the participants received information about the use and management of the soils by agricultural experts and researchers of the Ministry of Agriculture, the Ministry of Sugar, the Ministry of Science, Technology and Environment, Universities and Experimental Stations of the region.

For all the people involved in this tour it was a memorable experience and further strengthened the bonds of friendship between scientists of different countries.

M. López, Organizing Committee, Cuba

ACTIVITIES OF COMMISSIONS AND WORKING GROUPS
ACTIVITES DES COMMISSIONS ET GROUPE DE TRAVAIL
AUS DER TÄTIGKEIT VON KOMMISSIONEN UND ARBEITSGRUPPEN

Report of the Committee on Standardization (CST)

CST is cooperating with ISO/TC 190, the Technical Committee for Soil Quality of the International Organization for Standardization, with its secretariat in the Netherlands. The scope of TC 190 is "Standardization in the field of soil quality", including classification, definition of terms, sampling of soils and measurement, and reporting of soil characteristics. Members are national standards bodies; TC 190 has 14 active members and 29 observing members (Table 1). National experts of these members prepare standards together with representatives of ISSS, FAO, ICID, IWRA, WHO and other international organizations in 5 subcommittees (SC) with several working groups since 1985. Many standards of soil terminology and sampling, chemical, biological and physical methods are in preparation, and some are finished, published and adopted by national standards bodies (Table 2).

Table 1: Member bodies of national organizations of ISO TC 190 (Soil Quality)

P-members (active)	O-members (observing members)	
Austria (ON)	Algeria (INAPI)	Mexico (DGN)
Finland (SFS)	Australia (SAA)	Mongolia (DGN)
France (AFNOR)	Belgium (BIN)	New Zealand
(SANZ)		
Germany (DIN)	Canada (SCC)	Norway (NSF)
Hungary (MSZH)	Chile (INN)	Portugal (IPQ)
India (BIS)	China (CSBS)	Romania (IRS)
Italy (UNI)	Czech R. (CSN)	Saudi Arabia (SASO)
Jamaica (JBS)	Denmark (DS)	Slovakia (UNMS)
Netherlands (NNI)	Egypt, Arab Rep. (EOS)	South Africa (SABS)
Poland (PKNMiJ)	Greece (Elot)	Spain (IRANOR)
Sri Lanka (SLSI)	Ireland (NSAI)	Syria (SAMSO)
Sweden (SIS)	Kenya (KEBS)	Tunisia (INNORP)
Switzerland (SNV)	Korea (KEBS)	Turkey (TSE)
U. K. (BSI)	Malaysia (SIRIM)	USA (ANSI)
		Yugoslavia (SZS)

H.-P. Blume (Germany) was the representative of ISSS-CST for the last eight years, now S. Northcliff (U.K.) has taken over this task.

Table 2: Working Programme of ISO TC 190

SC1 Terminology (secretary AFNOR)	Stage
Terms and definitions relating to	
1. Soil protection and pollution	IS
2. Sampling	CD
3. Risk assessment	WD
Description of soils and sites	CD
SC2 Sampling (secretary DIN)	
1. Guidance on the design of sampling programmes	CD
2. Guidance on sampling techniques	CD
3. Guidance on safety of sampling	CD
4. Investigation of natural and cultivated soils	CD
5. Soil contamination of urban and industrial sites	CD

	6. Collection, handling and storage for the assessment of microbial processes in the laboratory	IS
SC3	Chemical Methods and Soil Characteristics (DIN)	
	1. Dry matter and water content on a mass basis	IS
	2. Potential CEC and base saturat. at pH 8.2 after Bascomb	CD
	3. Metals by flame and flameless AAS Cd, Cr, Cu, Mn, Ni Pb, Zn	CD
	4. Water extraction of trace metals	IS
	5. Determination of total N, Kjeldahl method	IS
	6. Water and acid soluble sulfate	IS
	7. Cyanide	CD
	8. NaHCO ₃ soluble P	IS
	9. Mineral oil content	IS
	10. Polynuclear aromatic hydrocarbons	CD
	11. Total N after dry combustion	WD
	12. Phenols and chlorophenols	CD
	13. Organochlorine pesticides and biphenyls	CD
	14. Persistent herbicides	WD
	15. Determination of pH	IS
	16. Carbonates, volumetric method	IS
	17. Organic and total C after dry combustion	IS
	18. CEC and base saturation w. BaCl ₂	IS
	19. Electrical conductivity	IS
	20. Pretreatment of samples for physico-chem. analyses	IS
SC4	Biological Methods (secretary BSI)	
	1. Biodegradability in soil under aerobic conditions	IS
	2. Collembola inhibition by pollutants	WD
	3. Effects of pollutants on earthworms (<i>Eisenia fetida</i>)	
	Acute toxicity in artificial soil substrate	IS
	Effects on reproduction	IS
	Field testing	WD
	4. Effects of pollutants on soil flora	
	Inhibition of root growth	IS
	Emergence and growth of higher plants	CD
	Germination	CD
	Field testing with higher plants	WD
SC5	Physical Methods (secretary NNI)	
	1. Water retention - laboratory methods	IS
	2. Hydraulic conductivity	WD
	3. Water content, Neutron depth probe	IS
	4. Water content, TDR method	WD
	5. Pressure potential, tensiometer method	IS
	6. Soil water content volume basis, gravimetric m.	IS
	7. Particle size distribution	IS
	8. Dry bulk density	IS
	9. Particle density	IS
	10. Aggregate stability	
	Crushing test	CD
	Shear test	CD
	Redox voltage, field method	WD

WD Working Draft

CD Committee Draft

IS International Standard

IS International Standard published

H.-P. Blume, Germany

REPORT OF THE WORKING GROUP PADDY SOIL FERTILITY

Prof. Zhu Zhao-liang
Chairman of WG-PS, 1990 - 1994

The 3rd International Symposium on Paddy Soil Fertility was held on September 15 - 19, 1992 in Nanjing, People's Republic of China. It was jointly organized by the Working Group PS with the East and Southeast Asia Federation of Soil Science Societies. The Proceedings of this Symposium were published and distributed at the meeting.

The 4th International Symposium on Paddy Soil Fertility was suggested to be held in Malaysia in 1994. However, it will be postponed and probably be moved to Thailand.

Change of Chairman of the Working Group

After negotiation with a number of national societies of soil science and through communication voting, the new Chairman of the Working Group on Paddy Soil Fertility for 1994-1998 is Dr. Tasnee Attanandana of Kasetsart University, Thailand. She is an active researcher in the field of paddy soils and presently serves as Vice-President of the Soil and Fertilizer Society of Thailand.

**REPORTS OF MEETINGS
COMPTE-RENDUS DE REUNIONS
TAGUNGSBERICHTE**

**4th Annual Meeting of the Group of Analytical Laboratories
Sault Ste. Marie, Ontario, Canada
October 7-9, 1993**

The 4th annual meeting of the Group of Analytical Laboratories (GOAL) was held at the Great Lakes Forestry Centre, Sault Ste. Marie, Ontario, October 7-9, 1993. This association is a working group of the analytical services laboratories of the Canadian Forest Service, Natural Resources Canada. The common objective of the group is to provide cost-effective, accurate, timely analyses to scientific teams and their clients. The working group consists of seven members, the supervisors of analytical laboratories of each of the six forestry centres and one institute.

Dr. Paul Addison, Director, Forest Resources and Environment Research, welcomed the participants to the region. In his remarks he commented that working groups were an important activity in the organization for consistency and continuity of service within Canadian Forest Service and also for what is derived personally in development and communication.

Each representative summarized the recent yearly activities characterizing their operational process and highlighting specific activities or accomplishments. Emphasis is placed on producing accurate results. Quality control has been maintained by these laboratories through participation in several check sample programs, such as a foliage study coordinated by the Quality Assurance Subgroup of



*Participants of the meeting, from left to right:
Owen Plank (University of Georgia, Athens, Georgia, USA),
Evelyn Turcotte (Petawawa National Forest Institute, Chalk River, Ontario),
Ann Van Niekerk (Pacific and Yukon Region, Victoria, British Columbia),
Jo Ramakers (Ontario Region, Sault Ste. Marie, Ontario),
Alain LePage (Quebec Region, Sainte-Foy, Quebec),
Don Trenholm (Newfoundland and Labrador Region, St. John's, Newfoundland),
Yash Kalra (Northwest Region, Edmonton, Alberta),
and Saman Amarakone (Maritimes Region, Fredericton, New Brunswick)*

the Research and Monitoring Coordinating Committee (RMCC) of the Long Range Transport of Air Pollutants (LRTAP) program (conducted from the Great Lakes Forestry Centre) and International Plant Exchange (IPE) and International Soil Exchange (ISE) programs (coordinated by the Wageningen Agricultural University, Wageningen, the Netherlands). Our laboratories have also participated in a collaborative study carried out by the AOAC International and the Soil Science Society of America to validate procedures for pH measurements in soils. These are the first soils methods to be validated by the AOAC International. Many AOAC validated procedures eventually are chosen as official methods in various organizations. Northern Forestry Centre is coordinating this project. The October 7 business concluded with a tour of some of the laboratories of the Great Lakes Forestry Centre.

A tour of the Ontario Forensic Laboratory at the Roberta Bondar Centre was enjoyed on the morning of October 8. A seminar explaining the role of the laboratory and the extent of the program opened the tour, followed by a walk-through of the facilities. Forensic laboratory staff were on hand throughout the tour to explain their role in the laboratory and demonstrate unique applications of instrumentation and techniques. The Centre was named after Dr. Roberta Bondar, the first Canadian female astronaut. It was interesting to learn that Dr. Bondar had worked at one time at the Great Lakes Forestry Centre.

On the afternoon of October 8, there were two seminars. The first presentation was by John McCarthy, Safety Officer at the Great Lakes Forestry Centre. He discussed the supervisor responsibility in the workplace. His topic covered loss control through security measures, and health and safety. He clarified the role of the supervisor in training, safety equipment operation, occupation health evaluations and record keeping. The third role and most subjective was in handling and responsibilities of harassment issues. The second presentation was by our special guest Dr. C. Owen Plank, President, Soil and Plant Analysis Council, Inc. He spoke on the past and future roles of the Council. He highlighted the objectives, mission, and approaches of the Council with special emphasis on the accreditation program and its role in nutrient management. He discussed the benefits of accreditation as well as problems associated with maintenance and observance. Identified ongoing issues are the standardization of methodologies and difficulties in interstate compliance of standards.

On October 9 members attended the Agawa Canyon wilderness tour. It is operated by the Algoma Central Railway. It consisted of an excursion with a 2-hour stop at scenic Agawa Canyon. The train travelled through the rugged Algoma region, which offered breathtaking views of unspoiled forests, streams, lakes and hills. This is the area that inspired famous Canadian landscape artists, the Group of Seven (formed in 1920 and included Lawren Harris, A.Y. Jackson, J.E.H. MacDonald, F.H. Varley, Arthur Lismer, Frank Johnston, and Franklin Carmichael). They captured the spirit of Canada and its natural beauty.

The next annual meeting of GOAL will be held at the Maritimes Forestry Centre, Fredericton, New Brunswick, October 13-14, 1994.

Y.P. Kalra, Edmonton, Alberta, Canada

The 7th Annual Western Enviro-Agricultural Laboratory Association and Alberta Water Analysts Committee Workshop Edmonton, Alberta, Canada

About 100 people attended the 7th annual workshop sponsored by the Western Enviro-Agricultural Laboratory Association (WEALA) and the Alberta Water Analysts Committee (AWAC). It was held on April 12, 1994 at the Alberta Research Council in Edmonton. The theme of the workshop was "Environmental sampling, analysis, and interpretation". Speakers from the U.S. Environmental Protection Agency (EPA), Alberta Environmental Protection as well as representatives from Alberta industry, consulting and laboratory sectors addressed the issues related to the sampling and analysis of soils, wastes, and waters and the interpretation of the acquired data.

Louis Blume of EPA, Chicago, Illinois presented the keynote address on interrelationships of environmental sampling, analysis, and interpretation. Sampling methods for wastes and wastewaters

were discussed by Tony Fernandes and sampling methods for soils and groundwater were discussed by Bob Innis. Mary Mayes and Erv Callin presented information on the analysis of liquid/fluid materials and solid/soil materials. Gerry Lutwick, Kelly Moynihan, and Graham Hawkins dealt with the interpretation of environmental data from the perspective of government, industry, and consultants, respectively.

The organizing committee (Salim Abboud, Mary Mayes and Erv Callin) is to be complimented for an excellent program. Information on the proceedings of the workshop is available from Salim Abboud, Alberta Research Council, Box 8330, Edmonton, Alberta, Canada T6H 5X2, Phone (403) 450-5470, Fax (403) 450-5083.

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2nd International Symposium on Forest Soils Guri, Ciudad Guayana, Venezuela, November 22 - 28, 1993

Working group "Forest-Soil Relationships" organized its 2nd international symposium with the help of SADA-AMAZONAS (its director Dr. W. Franco) and INSTITUTO DE SILVICULTURA, UNIVERSIDAD DE LOS ANDES (Dr. A. Torres). Other agencies involved in the organization were MARNR, SEFORVEN, ODEPRI, EDELCA, PROFORCA and FUNDACITE-GUAYANA. The theme of the symposium "Forest Soil: An Essential Component of Land Management" was a befitting topic for discussion in the tropics. 64 participants representing 13 different countries presented 28 papers and 3 posters during the deliberations lasting three days. Most topics related to the management of soils under forestry and agroforestry landuse.

Participants at the symposium expressed in a resolution their strong concern regarding the irreversible changes which are occurring to the forest ecosystems of the world, usually leading to deterioration of soils and degradation of the natural resources. It was felt that the capacity of forest land to remain useful for human beings is diminishing, i.e. its capacity to provide water for domestic use and irrigation, to provide suitable areas for food, fuel and fibre production and for recreation, to conserve biodiversity and to provide a living environment free from air, water and soil pollution and greenhouse effects. Participants expressed the strong desire for the following necessary but stern actions by the governments of the world after becoming aware of their responsibility for the irreversible changes and the diminishing stability of forest ecosystems which are presently occurring:

1. To conserve the existing forested land and recuperate deforested areas through the development of sustainable land-uses.
2. To promote the necessary political and economical measures to ensure rural development in order to release social and market pressures causing the clearance of forested land.
3. To urge scientific investigators to increase research, teaching and communication efforts to promote the consideration of forest soils as essential component of land use planning and the stability of forest ecosystems.

In addition to experiencing interesting discussions on forest soils as a component of landscape, we also experienced a military coup (emergency conditions and the associated chaos for a short while) providing lasting memories to those who attended this symposium. A small group of participants had the opportunity to attend the post conference tour of rain forests in the Amazonas territory. We visited the research station under construction at Puerto Ayacucho and the regional research laboratory at La Esmeralda of the CAIAH, which in future will provide excellent facilities to work in the Amazonas region. For many of us it was the first time to experience the vastness of Amazon Rainforests, the problems associated with its use, and the research and socio-political efforts required to avoid the misuse of this vast resource.

P.K. Khanna, Chairman WGFS

**International Symposium on "Sealing, Crusting, Hardsetting Soils:
Productivity and Conservation"**
The University of Queensland, Brisbane, Australia
7 - 11 February 1994

The 2nd International Symposium on Sealing, Crusting and Hardsetting Soils was held following the (first) Symposium on Soil Crusting at the University of Georgia, USA in May 1991. The Symposium was held at The University of Queensland, Brisbane and organised by the Queensland Branch of the Australian Society of Soil Science, Inc. The Symposium was well attended by 118 Scientists representing 21 countries bringing a variety of problems and perspectives to the conference. The organising committee was drawn from The University of Queensland (Dr. H.B. So, Chairman; Dr. B.M. Schafer, Treasurer and Dr. G. Kirchhof, Convenor for Local Arrangements), CSIRO Division of Soils (Dr. B Bridge, Vice-Chairman), Queensland Department of Primary Industries (Dr. G Smith, Program Convenor and Dr. R. Loch, Tour Convenor) and the Bureau of Sugar Experiment Station (Dr. S. Raine, Secretary). A number of representatives from other states assisted the organising committee. Co-sponsoring agencies include the ISSS, ISTRO and ASTM. The major theme was on the productivity and conservation of these soils. The program consists of 13 invited keynote papers, 34 presented papers, 29 poster papers and a one day field excursion. The symposium was concluded with a half day workshop facilitated by Dr. M. Hunter, Principal Soil Scientist with the Queensland Department of Primary Industries, to summarise and prioritise the major issues as well as promote links between scientists with similar interest.

These were the themes of the conference sessions and at the same time of the keynote papers:

1. Soil Crusting: Chemical and Physical Processes. The View Forward from Georgia (Dr. M. Sumner, USA)
2. Sealing, Crusting and Hardsetting conditions in Australian soils (Dr. R. Isbell, Australia)
3. Sealing, Crusting and Hardsetting soils in Indian Agriculture (Dr. I.P. Abrol, India)
4. Sealing, Crusting and Hardsetting soils in Sahelian Agriculture (Dr. C. Valentin, France)
5. Relating soil erosion by water to the nature of the soil surface (Dr. P. Hairsine, Australia)



Demonstration of the portable oscillating-nozzle rainfall simulator on a vertisol with an without mulch conducted by the Queensland Department of Primary Industries research staff during the mid-week excursion.

6. Structure breakdown on wetting (Dr. R. Loch, Australia)
7. Mechanisms and characterisation of hardsetting in soils (Dr. C. Mullins, Scotland)
8. Modelling effects of surface seals and crusting on water entry and redistribution in soils (Dr. K. Bristow, Australia)
9. Soil parameters for modelling effects of surface sealing and crusting on catchment hydrology (Dr. B. Bridge, Australia)
10. Modelling the impact of soil structure degradation on infiltration, water storage, crop growth and economics of cropping systems (Dr. D. Freebairn, Australia)
11. Methods of managing problems in crusting and hardsetting soils (Dr. W. Hoegmoed, The Netherlands)
12. The role of biological practices and the soil biota in management of sealing, crusting and hardsetting soils (Dr. L. Cogle, ICRISAT)
13. Management of crusting and hardsetting soils under rangeland conditions (Dr. D. Eldridge, Australia)



Dr. Brian Schafer describing the soil profile during an inspection of a salt affected duplex textured soil (Typic Natrudalf of Orthic Solonetz) in the Lockyer Valley, with typical hardsetting properties. This soil is prone to gully erosion and the profile was exposed on the side of an erosion gully.

A welcome reception was held at the Common Room of the Women's College where most of the participants were accommodated. On Monday morning the participants were welcomed to the University Campus by Professor B. Wilson, Vice-Chancellor of the University of Queensland and the Symposium was officially opened by the Honourable Mr. Ed Casey, The Queensland Minister for Primary Industries. The conference dinner on Tuesday night was a pleasant affair on board the Kookaburra Queen, a beautiful paddle-wheeler of yesteryear on the Brisbane River. A successful and pleasant one-day mid-conference tour was organised by Dr. Rob Loch and Dr. Bryan Schafer to the Darling Downs and Lockyer Valley regions west of Brisbane, to view some of the local problems associated with the surface soils and some of the management practices in place.

Financial sponsorship was received from The University of Queensland, CSIRO Division of Soils, Queensland Department of Primary Industries, Cooperative Research Centre for Land and Water Management, Arco Coal Australia, Grains Research Development Corporation, Rural Indu-

stries Research and Development Corporation and the Australian Tourist Commission. Financial assistance to attend the conference for participants from developing countries was provided by the Australian International Development Assistance Bureau (AIDAB).

Discussions were free, lively and friendly throughout the conference, particularly in relation to hardsetting properties of soils, a term originating and its usage mostly confined to Australia. The six issues considered by the workshop as being most important and in need of resolution are in order of decreasing priority:

1. The need for a consensus on terminology and definitions in relation to sealing, crusting and hardsetting terms, e.g. sealing, skins, crusting, hardsetting, washed-in layer, indurated, lensing (below surface seals) etc.
2. Standardisation of aggregate stability measurements
3. The role of matrix packing in sealing, crusting and hardsetting: are 3 particle size classes of texture description adequate, the role of particular size aggregates e.g. $>$ or $<$ 0.125 mm.
4. The role of crust/seal development of hydraulic properties of the soil
5. Need to classify biotic factors/biological crusts and soil biota for grazed non-cultivated soils and their role for ameliorating the effects of crusts
6. The role of slaking and dispersion in sealing, crusting and hardsetting soils.

The workshop concluded that the properties of the immediate soil surface is a major factor limiting soils productivity and that it should receive greater attention than it has to date. There is a general consensus that the series of conferences should be continued and tentative offers for organising the next conference have been received from the Netherlands, India and South Africa, providing they have the support of colleagues in their home countries. Concern has been expressed at the possibility of the group becoming a splinter group away from the mainstream societies. It was suggested that the possibility of this series of symposia becoming a part of the mainstream organisations such as the ISSS or ISTRO should be canvassed by the next organising group.

Hwat Bing So,
Brisbane, Queensland, Australia

INTERNATIONAL SYMPOSIUM ON "SEALING, CRUSTING, HARDSETTING SOILS: PRODUCTIVITY AND CONSERVATION

7 - 11 February 1994

The University of Queensland, Brisbane, Australia

WORKSHOP REPORT

Friday, 11 February 1994

The workshop commenced immediately after the official closing of the symposium by the Chairman (A/Prof. Bing So) who introduced Dr. Malcolm Hunter, Principal Agronomist with the Queensland Department of Primary Industries, as an impartial and experienced facilitator for the workshop. Dr. Hunter then took over as Chairman of the proceedings assisted by members of the organising committee. *The workshop proceeded through three phases of (1) Issue identification, (2) Issue prioritisation and (3) Group discussions.* The workshop was initially attended by approximately 80 participants, but many had to leave early to catch the plane home and about half were still in attendance at the end.

(1) ISSUE IDENTIFICATION

Because time available for the workshop was limited, this part of the workshop was conducted throughout the symposium. Participants were encouraged to identify major issues of concern arising out of the keynote or presented papers as well as poster papers, and to submit on paper (boxes were provided at the registration desk) or on butcher paper provided and displayed in the registration hall. Prior to lunch, the typed up lists were shown and participants asked if there were additional items. A total of 36 issues were listed over the four and a half days of discussions.

(2) PRIORITISATION PROCESS

The 36 issues were amalgamated into 15 items. Then, the plenary session was asked to assign priorities to the 15 listed items. The assessment of priority was based on three questions:

1. Will a resolution of the issue fill a knowledge gap?
2. Will a resolution of the issue solve problems of value to the community?
3. Will a resolution of the issue inform and raise awareness of the problem of sealing, crusting and hardsetting?

Votes were counted and the outcome was then discussed to ensure acceptance by the group.

This is the **list of priorities** from the workshop:

1. (73 votes) The need for consensus on terminology and definitions in relation to sealing, crusting and hardsetting terms e.g. sealing, skins, crusting, hardsetting, washed-in and washed-out layers indurated, lensing etc. The relationship between these terms and taxonomic units. Is the hardsetting concept applicable to Vertisols? Is hardsetting a profile or horizon phenomenon? Quantitative and qualitative limits or classes to hardsetting are needed for pedological descriptions. A library of good seal/crust/hardset soil photos will be very useful.
2. (57 votes) Standardization of measurements for aggregate stability and degradation of soil tilth is needed. There is also a need for field methods for diagnosis and rating of soil structural conditions, workability etc. as well as standard methods for measuring hardsetting for land use evaluation. The latter will have to be useful for degraded as well as virgin soils.
3. (50 votes) A clarification is needed on the role of matrix packing in sealing, crusting and hardsetting; are three particle size classes for texture description adequate? What is the significance of aggregate sizes $< \text{or} > 0.125 \text{ mm}$? What is the significance of the type/amount of clay and micro-aggregates in these phenomena? A clarification is needed on the chemical effects (e.g. EC, SAR, OM, soil conditioners, cementing agents) on these phenomena?
4. (42 votes) A clarification is needed on the relationship between the hydraulic properties of the soil and (a) crust/seal development, (b) sorptivity and hydraulic conductivity of single aggregates? When does an inherently slow rate of wetting become water repellency?
5. (42 votes) Classification of biotic factors and soil biota for grazed non-cultivated soils and their roles for ameliorating the effects of crusting: (a) how do biota ameliorate soils?, (b) what is the role of plant roots in the management of hardsetting soils? Is there a role for matching plant species/cultivar to soil types/conditions? The importance of linking soil biological and physical measurements to explain the interaction and effects of management practices.
6. (34 votes) Clarification of the role of slaking and dispersion in sealing, crusting and hardsetting phenomena. The effect and degree of hydration on dispersion and plastic deformation of the soil.
7. (32 votes) How do we account for soil variability in predictive relationships on a range of scales, such as a watershed?
8. (22 votes) How can we form stable aggregates? How can we farm stable aggregates?
9. (20 votes) The effect of pre-treatments, rate of wetting, kinetic energy and wetting and drying cycles on properties of seals, crust or hardset surfaces.
10. (15 votes) The relationship between the surface dynamics (roughness, seals, protective water layer, erosion, run-on water etc), rainfall dynamics and soil hydraulic properties.
11. (14 votes) The energy input versus output dilemma: does cover repay its cost in fodder or tillage energy?
12. (12 votes) Modelling: should all measurements contribute to models? How do we look at long term implications? Are too many of our measurements dead ends?
13. (10 votes) Are we the farmers' friend?
14. (10 votes) Can we maximise soil resistance to erosion by increasing sealing, crusting or hardsetting? Can we maximise sealing for water harvesting and pond sealing?
15. (0 votes) Are we scientists objective?

(3) DISCUSSION - ACTION PLAN

Interested participants were asked to select one of the top six items and form a discussion group to discuss if any action need be taken in the area of their interest, e.g. forming a working group, network etc. Reports from the first 6 groups (according to priority) are as follows:

Group 1 was lead by Dr. Chris Mullins and was pre-occupied with the definitions of hardsetting soils. A definition was proposed by Chris as "A hardsetting soil is structurally unstable and, if cultivated, the clods/fragments will partially or totally disintegrate upon wetting. On drying, the soil sets to an almost homogenous mass that may have occasional cracks at a spacing of > 0.1 m. Soils that crust are not necessarily hardsetting. Air-dry hardset soil is hard and brittle, and it is not possible to push a forefinger into the profile face. It has a tensile strength of typically > 90kNm⁻²". Anyone with comments should write to Chris to collate, who will send it to Colin Chartres to present at the next ISSS board meeting. For a definition on crusting, C. Valentin was appointed as coordinator.

Group 2 was chaired by Dr. Cliff Hignett and concluded that:

- (1) Work is needed for the standardisation of measurements of soil structure at two levels:
 - a. Farmers level
 - b. at a more rigorous level in 4 categories:
 - aggregate
 - crusting potential
 - field rainfall test
 - hardsetting test.
- (2) Cliff Hignett to act as contact person on this matter and expect to put out a newsletter after approximately 6 months.

Group 3 was lead by Dr. Richard Greene and decided to put the following position statement on why they felt it was important to understand the role of matrix packing, clay type (and amount) and chemical effects on the developments of sealing, crusting and hardsetting soils: "The management of sealing, crusting and hardsetting soils for productivity and conservation is currently severely limited by our lack of understanding of the nature and role of various critical soil constituents."

The lack of understanding was due to: (1) most scientific papers having insufficient details on the nature of soil constituents and their particle size, making it difficult to make comparisons, (2) lack of a universal system of reporting particle size classes and suggest that in future the ISSS system of using 5 particle size classes should be used and (3) more research is needed specifically on the role of clay.

Group 4, chaired by Dr. C. Roth issued a statement "The hydraulic properties of the soil surface play a crucial role in partitioning rainfall into run-off and infiltration, and subsequent evaporation. These hydraulic properties are often controlled and modified by interactions between rainfall, surface flow and soil characteristics. The quantification of these interactions and their spatial and temporal variability are of fundamental importance for sustainable landuse and environmental protection."

Group 5, with Ian Packer as chairman and contact person, named themselves "The Tree Huggers Group". This group felt that a network of interested people from around Australia and overseas is needed that can interact and cover a wide area of soils and biology. They identified three areas of major interest: (1) Biological crust research in semi-arid rangelands and no till/direct drill situations, (2) Role of Plants, both roots and above ground parts on soil structure and (3) Soil microbiological measurements.

The group felt that there is a need to develop standard laboratory tests to study the effect of roots on aggregate formation. In addition standard field tests are needed to assess soil biomass activity, as well as standard lab tests for the classification of soil fauna and their effects on soil physical and chemical properties.

Group 6, with Gary Ham and Steven Raine suggested that slaking and dispersion are already covered by the Sodic Soil Coordinator and should be combined.

Hwat Bing So, Brisbane, Australia

**Conference on Salt-affected Soils
Hungary, April 26 - May 1, 1994**

**Greeting address of the Deputy Secretary-General of ISSS,
Drs. Hans van Baren, at the Opening Ceremony**

Mr. Chairman,

Thank you for giving me the opportunity to say a few words. It is with great pleasure that I am again in Hungary. My last visit in the field was in 1967, at a meeting for the preparation of the World Map of Salt-affected Soils.

If we speak about salt-affected soils in Europe, we think about the development of soil science in Hungary. From the start of Soil Science, Hungarian scientists have been working and publishing about these soils.

Names which are of great importance are: Prof. P. Treitz, A.A.J. de Sigmond and R. Ballenegger. I have been fortunate to have met Prof. Ballenegger once. The staff of the Hungarian Geological Institute, to which Treitz belonged, was the organizer of the First International Conference on Agrogeology in Budapest in 1909. It is this particular meeting which led to the foundation of the ISSS.

De Sigmond was working in the Hungarian Central Institute of Chemistry. He and others played an exceptionally important role in the study of salt-affected soils, as well as in the different Commissions and Subcommissions of the ISSS. Quite a number of them became Honorary Members of the Society.

We are near to 19 May and it is on that day that the ISSS was founded in 1924, just 70 years ago! This year (1994) we also celebrate the 45th year of existence of the Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences. The ISSS presents its congratulations to the Director of RISSAC and his staff!

Prof. Szabolcs, as we all know, not only played an important role in Hungarian soil science: he was the director of RISSAC for many years, before Prof. Varallyay took over this important position. Prof. Szabolcs was Chairman of the ISSS Subcommission on Salt-affected Soils, but he also was my predecessor as Deputy Secretary General. He held both positions for many years.

The fact that we, foreigners, know so much about Hungarian soil science and its researchers is in a large part also due to the well established journal "Agrochemistry and Soil Science", of which Prof. Szabolcs is Editor-in-Chief.

Seeing the accomplishments of Hungarian research in salt-affected soils, this introduction could be much longer, but I would like to keep it short. Maybe just one more remark: I hope that there will be more contacts between geomorphologists, physical geographers and soil scientists in the years to come.

On behalf of the ISSS, I wish the organizers and participants an interesting and enjoyable meeting. Thank you.

**Workshop on Indigenous Soil and Water Conservation in Africa
Addis Ababa, June 6 - 10, 1994**

Research on indigenous soil and water conservation measures in Africa was initiated by the Centre for Development Co-operation Services of the Free University of Amsterdam and the International Institute for Environment and Development in London. The Soil Conservation Research Project of the Ministry of Natural Resource Development and Environmental Protection organised the workshop on behalf of the a.m. institutions in Addis Ababa. Mr. Kebede Tato arranged the programme and the field trip to Nazret. The workshop was attended by 35 participants from 14 countries. The Workshop was opened and welcomed by the Head of Watershed Development and Land Use Department, Dr. Nurhussen Taha. Dr. Chris Reij, Dr. Ben Haagsma and Mr. Ian Scoon served as Moderators.

The participants presented more than 20 case studies from different agro-ecological and socio-economic conditions of Africa. The research results were presented by oral presentations, posters and videos. The workshop intended

- to formulate proposals to enhance and strengthen the research capacities of African countries to solve the huge environmental problems by giving emphasis to local knowledge in the field of Indigenous Soil and Water Conservation Techniques.
- to discuss and evaluate the methodologies used and share methodological challenges faced during the research, means and ways to overcome the challenge.
- to create an African network, links between researchers and the sharing of experience.
- to define areas for future studies.

Themes of the Workshop sessions included **The Dynamic of Technical Changes, Actors and Institutions Settings, Rational for and Perception of ISWC Techniques and Interaction between "Development" and Indigenous Conservation Systems.**

The participants stated that the knowledge, skills and survival strategies of farmers operating with low levels of external inputs have been ignored or even eroded by outsiders promoting "modern" agriculture technology. However, with increasing awareness of the limitations and hazards of conventional agriculture, a growing number of scientists has begun to recognise indigenous knowledge as a major untapped resource for developing sustainable agriculture. First results indicate the potential of some indigenous soil and water conservation techniques to assure a sustainable land use. The detailed understanding of the rationale of indigenous soil and water conservation techniques will establish pre-requisites for the further improvement of conservation systems.

Hans-J. Krüger, Addis Ababa, Ethiopia

Report on Postgraduate Seminar

"SALT AFFECTED ECOSYSTEMS: AGRICULTURE AND ECOLOGY"

Universidad Internacional Menéndez Pelayo

Valencia, 3 - 7 October 1994

Director: Prof.Dr. Jorge Batlle-Sales

Secretary: Prof.Dr. István Szabolcs

OBJECTIVES

This Seminar was designed to highlight the increasing global importance of soil and water salinity problems as degradation factor that menaces the sustainability of agriculture in many countries and the survival of millions of people, underlying the need of harmonization between agricultural practices, environment quality and ecosystems conservation.

To accomplish such objectives, a holistic approach was adopted and reputed lecturers, largely experienced on different aspects of the problem all over the world, were invited to participate. These lecturers, coming from 6 different countries, develop their activity in Research Institutions, Universities and International Organizations.

DEVELOPMENT

During the Seminar 12 lectures were presented, each one followed by questions and discussions. Also a round table was organized for general discussion. The topics of lectures covered a wide spectrum with special attention paid to:

- natural salt-affected ecosystems characterization
- nature, genesis and effects on plants and environment quality of soil salinity and alkalinity
- evolution of the global extent of salinity and forecast for the next century

- aspects related to sustainable agriculture
- research methodology for data acquisition, modeling, mapping and data handling of salinity of soils and waters
- methods for the amelioration of soil properties and salinity prevention and reclamation
- restoration of degraded salt-affected ecosystems

Several examples and experiences were presented to the students, who participated very actively with questions and discussions in a friendly atmosphere.

The media (papers, radio, TV) were very receptive to the contents and the social utility of the topics covered, reporting daily on the activities in the seminar.

About 10 % of the surface of the emerged lands is covered with different types of salt-affected soils in more than 100 countries. Parallel to the development of irrigation, deforestation and overgrazing, the formation of salt-affected soils increases and represents a global problem.

In this respect, the coordinated national and international studies and projects are essential and the Seminar was a good contribution for the training and the exchange of experiences in combatting salinization. This Seminar was one of the milestones in the preparation of the forthcoming "International Symposium on Salt-Affected Lagoon Ecosystems" to be held in Valencia, from 18 - 25 September 1995, organized by the Universitat de València and the International Soil Science Society, and sponsored, among others, by UNEP and UNESCO.

ACKNOWLEDGEMENTS

The Director, the Secretary and the Lecturers of the Course want to express their gratitude to the following Institutions and sponsors that have supported the Seminar:

- Universidad Internacional Menéndez Pelayo
- Generalitat Valenciana
- Obra Cultural de la Caja de Ahorros del Mediterráneo
- United Nations Environment Program
- Universitat de València
- Crison Instruments

SPEAKERS

(in alphabetical order)

1. Prof.Dr. A. Aguilar-Santelises (ISSS), Mexico
2. Dr. A. Ayoub (UNEP), Kenya
3. R. Barco-Alcón (INISEL ESPACIO), Spain
4. Prof. Dr. J. Batlle-Sales (Universitat de València), Spain
5. Prof.Dr. M. Costa-Talens (Universitat de València), Spain
6. Dr. K. Darab (Hungarian Academy of Sciences), Hungary
7. Prof.Dr. Gumuzzio-Fernández (Universidad Autónoma de Madrid), Spain
8. Dr. J. Rhoades (USDA), USA
9. Prof.Dr. A. Rodríguez (Universidad de la Laguna), Spain
10. Prof.Dr. I. Szabolcs (Honorary Member, ISSS), Hungary
11. Dr. S. Yates (USDA), USA
12. Prof.Dr. Zhao Qui-Guo (Academia Sinica), China.

J. Batlle Sales, Spain

**NEWS FROM REGIONAL AND NATIONAL SOCIETIES
NOUVELLES DES ASSOCIATIONS REGIONALES ET NATIONALES
BERICHTE VON REGIONALEN UND NATIONALEN GESELLSCHAFTEN**

WEST AND CENTRAL AFRICAN ASSOCIATION OF SOIL SCIENCE

**Recommendations of the First International Colloquium, Ouagadougou, Burkina Faso,
December 1993.**

The importance of sustainable soil management and environmental protection in Tropical Africa can not be overemphasized because of the current food situation crisis and environmental degradation on the continent due to increasing population pressure and lack of good land management practices. The aim of the Colloquium was to create a forum for soil scientists assembled to address these problems and propose appropriate solutions. Most of the participating scientists were drawn from West and Central African countries. Other participants came from Belgium, France, the Netherlands, the United Kingdom and the USA, and the following organizations: ISRIC, IFDC, ICRISAT, SCDLO, TROPISOIL, ORSTOM, CTA, FAO, CNRS (France) and SOFERNET. The financial support for the colloquium was provided by CTA, CNRS (France), FAO, ORSTOM, USAID and SOFERNET.

The logistics was provided by CNRST, BUNASOLS, and other local research centers and the University of Ouagadougou.

There were seven plenary sessions:

- Session 1 - Distribution and major soil groups in tropical Africa
- Session 2 - Mode, dynamics and causes of land degradation in West and Central Africa
- Session 3 - Soil fertility aspects and soil management
- Session 4 - Soil and water management
- Session 5 - Appropriate soil management for environmental protection
- Session 6 - Socio-economic aspects of soil management
- Session 7 - Role of information dissemination and environmental protection

A total of 5 lead papers, 37 technical papers and 8 posters were presented. The following recommendations were made:

- 1 - Research should be oriented to meet the practical needs of the farmers in the different agro-ecological zones.
- 2 - The link between soil scientists and scientists in other related disciplines should be encouraged.
- 3 - The relationship researchers - extension agents - farmers should be strengthened.
- 4 - Government contribution to research in national universities research institutions should be made a priority in national development.
- 5 - The role of AOCASS in information dissemination to members should be strengthened.
- 6 - The role of international donor agencies in supporting research, scientific meetings and information dissemination should be stressed.
- 7 - African scientists should look for excellence in their research.

L. Thiombiano, Ouagadougou, Burkina Faso

**AUSTRALIAN SOIL SCIENCE SOCIETY
Federal Council – Office Bearers 1994-1996**

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CANADIAN SOCIETY OF SOIL SCIENCE (CSSS)

This is the new Council of the CSSS, elected for the period 1993 - 1994:

- President: Dr.A. Fedkenheuer, Calgary, Alberta
President Elect: Dr. U.C. Gupta, Charlottetown, Prince Edward Island
Past President: Dr.K.B. MacDonald, Guelph, Ontario
Secretary: Dr.Y.P. Kalra, Edmonton, Alberta
Treasurer: A.V. Rodd, Nappan, Nova Scotia
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ASSOCIATION FRANCAISE POUR L'ETUDE DU SOL

Composition du bureau de l'A.F.E.S. à compter du 20-04-94:

Président : Jean-Claude REMY
1er Vice-Président : Marcel JAMAGNE
2e Vice-Président : Jacques DECROUX
3e Vice-Président : Christine LE SOUDER
Trésorier : Daniel TESSIER
Secrétaire Général : Micheline EIMBERCK
Vice-Secrétaire : Denis BAIZE

ATTENTION: Le siège de l'Association est transféré à l'adresse suivante:

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Avenue de la Pomme de Pin,
F-45160 ARDON
France
Tel: (33) 38 41 78 87

SOIL SCIENCE SOCIETY OF INDONESIA (SSSI)

This is the composition of the Central Committee of the Soil Science Society of Indonesia (SSSI), for the working period 1990 - 1993/1994:

President:	Prof. Dr. Lutfi Nasution
Immediate Past President:	Dr. Isa Darmawijaya
Vice President I:	Dr. Ir. Suryatna Effendi/ Dr. A. Syariffudin K*)
Vice President II:	Mr. Djamin T./Dr. Marjudi S.*)
Vice President III:	Mr. Dwijatmo
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Secretary II:	Ms. Nur Sulistiati/Rizatus Shofiyati*)
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Treasurer:	Mr. Abdoel Rochim
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Division II (Soil Fertility and Biology)	Dr. B. Radjagukguk
Division III (Soil Mineralogy, Genesis and Classification)	Dr. Didiek H. Goenadi
Division IV (Survey and Land Evaluation):	Dr. Sarwono Hardjowigeno
Division V (Soil Technology and Management)	Dr. Marjudi S.

*) in replacement of

SOIL SCIENCE SOCIETY OF IRAN (SSSI)

HISTORICAL DEVELOPMENT OF THE SSSI

The Soil Science Society of Iran was founded in the year 1972 and commenced its activities by holding two National Congresses in the years 1973 and 1975 at the Agricultural Colleges of Karadj and Shiraz, respectively. After a lull in work for nearly 15 years, it once again resumed its activities in the year 1991 and held its Third National Congress at the Karadj Agriculture College of the Tehran University, from September 6 - 7, 1992.

The Congress was well attended by renowned scientists, academicians and specialists from all over the country. On the last day of the meeting it was decided to hold the Fourth National Congress of SSSI in Isfahan, in August 1994.

FOURTH CONGRESS OF THE SSSI IN ISFAHAN, AUGUST 28 - 31, 1994

The SSSI held its 4th Congress at the Technical University of Isfahan, where more than 500 soil scientists and specialists from various universities, institutes and private organizations coming from different parts of the country attended the symposium. A total number of 17 national lead papers and 165 contributed papers in specialized categories of soil genesis and classification and land resource evaluation, soil chemistry and plant nutrition, land reclamation and drainage, soil physics, soil erosion and pollution, soil biology, mineralogy, micromorphology and soil and plant relationship were received. After close appraisal, 17 invited papers and 91 contributed papers were selected for oral presentation. Extended summaries were provided for all participants at the time of registration.

During the symposium, the 17 invited papers were presented in plenary sessions and the 91 contributed papers were presented simultaneously in 3 auditoriums.

In addition to the sightseeing tour of the beautiful and historical city of Isfahan, organized for the participants and their families, visits to the compost factory were organized, as well as field excursions to the land consolidation project of the Felavarjan Region and to aridisols with gypsic, calcic and argillic horizons around Isfahan.

The committee members of SSSI met during the Congress and some important decisions to be implemented in the future, particularly emphasizing the importance of strengthening research activities, in the areas of Land Degradation, Soil Microbiology, Soil Organic Matter and Humus and Soil Pollution, were debated and discussed and finally approved by the General Assembly.

During the General Assembly of the Congress, diverse motions were made concerning amendments of Articles of the Society and necessary changes were initiated. Also new office bearers were nominated for the time 1994-98, and the following ones were selected by ballot voting:

NEW OFFICE BEARERS ON THE SSSI

President:	Dr. Mohammad Hassan Roozitalab
Secretary:	Dr. Najaf Ali Karimian
Treasurer:	Eng. Mohammad Hassan Banaie
Committee Members:	Dr. Ahmad Jalalian Dr. Jafar Malekoti Dr. Gholam Hosein Haghnia Dr. Ahang Kousar
Reserve Members:	Dr. Mahmud Kalbasi Dr. Abas Pashaie
Audit Committee:	Dr. Ali Asghar Jafarzadeh Dr. Abolghasem Tavassoli

On the final day of the 4th National Congress it was unanimously decided to hold the 5th National Soil Science Congress in 1996 at the University of Tabriz.

Dr. M.H. Roozitalab, Iran

ITALIAN ASSOCIATION OF PEDOLOGISTS (AIP)

The Italian Association of Pedologists was founded on 4 December 1992 in Florence. The main objectives of the Association are the formation, the certification, the promotion and the protection of the pedologist. The Association aims at spreading the knowledge of pedology, and proposes itself as a reference point for the problems related to the professional and technical aspects of pedology in Italy.

The AIP publishes the Newsletter "Il Suolo".

The members of the Board of Counsellors are:

President	E. Favi
Vice President	E. Costantini
Treasurer	F. Cassi
Members	C. Calzolari
	A. Arnoldus-Huyzendveld
	G. Benciolini
	F. Guaitoli
	I. Vinci
	S. Moretti

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TUNISIA SOCIETY OF SOIL SCIENCE (T.S.S.S.)

The following officers and members of the T.S.S.S. were elected on July 7, 1994:

President:	Dr. Ir. Amor MTIMET, Dptmt. of Soil Science, Ministry of Agriculture
Vice President:	Ir. Chedly DEROUICHE
Secretary:	Ir. Belgacem JELIDI
2nd Secretary:	Ir. Mansour BRANSIA
Treasurer:	Ir. Rafla ATTIA
Honorary Members:	Dr. M. Hamza, Dr. K. Belkoja, Prof. A. M'hiri, Prof. T. Guellali, Prof. A. Daaloul, Prof. M. Ennabli, Dr. A. Ben Ayed, Dr. R. Gueddas

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UNITED KINGDOM

THE DEPARTMENT OF SOIL SCIENCE AT THE UNIVERSITY OF READING

The last twelve months have seen substantial changes in Soil Science at the University of Reading. Following the resignation of Professor Roger Swift in 1992 to take up the position of Chief, Division of Soils, CSIRO, Australia, the University appointed two new Professors to the Department of Soil Science. Professor Brian J. Alloway took up his appointment in October 1993 and Professor P.J. Gregory returned from Australia in January 1994. Professor Gregory has succeeded Dr. Stephen Nortcliff as Head of Department. The appointment of Professors Alloway and Gregory consolidates the Department's traditional strengths and adds new areas related to the management and amelioration of contaminated land.

In addition to the appointment of two new Chairs in Soil Science, the Department moves to new custom designed buildings in the summer of 1994 on the main campus of the University. The new buildings costing in excess of 3 million Pounds were funded chiefly from Government sources, with contributions from the University, industry and charitable trusts. The new buildings are equipped with research and teaching laboratories to very high standards and the main building has its own lecture and seminar rooms. This new facility provides the basis for the continuation and development of the University as a major centre for education and research in Soil Science within the United Kingdom.

The Department continues to offer undergraduate degrees in the Faculties of Science and Agriculture and Food; one year MSc degrees in Soils and Environmental Pollution, the Management of Soil Fertility and Pedology, Soil Survey and Land Evaluation; Two year MAgSc degrees in Soil Science; and research degrees for MPhil or PhD. In addition to permanent research and teaching staff, the Department has over a dozen postdoctoral research staff on a range of contracts. (See: "Courses" section in this Bulletin)

Stephen Nortcliff, U.K.

BRITISH SOCIETY OF SOIL SCIENCE

The Council of the British Society of Soil Science for 1994 is:

President:	Dr. T. Batey
Vice Presidents:	Prof. D. Greenwood Prof. P. Bullock
Hon. Secretary:	Dr. S. Nortcliff
Hon. Asst. Secretary:	Dr. M. Wood
Hon. Treasurer:	Dr. J.H. Gauld
Hon. Asst. Treasurer:	Mr. G. Hudson
Hon. Editor Journal of Soil Science:	Dr. D.A. Rose
Hon. Editor of Soil Use & Management:	Prof. J.A. Catt

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SOCIEDAD VENEZOLANA DE LA CIENCIA DEL SUELO (1955 - 1995)

La Sociedad Venezolana de la Ciencia del Suelo, cuya junta directiva publicamos en nuestro Boletín No. 85, celebra la 40o aniversario de su fundación en 1995.

Además hemos recibido esta información sobre una nueva revista científica:

VENESUELOS es una revista de carácter científico, cuyo primer número ya está en circulación. La misma es editada con el patrocinio conjunto del Instituto de Edafología de la Facultad de Agronomía de la Universidad Central de Venezuela.

VIETNAM SOIL SCIENCE SOCIETY

From the most recent issue of the Vietnam Journal of Soil Science we take the following information:

- Chairman: Dr. TRAN KHAI
Vice Chairmen: Ass.Prof.Dr. TON THAT CHIEU
Dr. NGO THE DAN
Eng. TON GIA HUYEN
Ass. Dr. LE VAN THUONG
Secretary General: Ass.Prof. Dr. TON THAT CHIEU
Vice Secretary General: Eng. DO DINH THUAN
- Heads of sections:
- Science & technology: Prof. Dr. DO ANH
 - External relations: Ass.Prof.Dr. TON THAT CHIEU
 - Financial: Ass.Prof. Dr. TRAN AN PHONG
 - Information: Prof.Dr. TRAN KONG TAU
 - Personal: Prof. Dr. LE DUY THUOC
 - Inspection board: Eng. TON GIA HUYEN

INTERNATIONAL RELATIONS RELATIONS INTERNATIONALES INTERNATIONALE BEZIEHUNGEN

GLOBAL CHANGE RESEARCH – IN PRACTICE

Standards in Soil Protection

Standards in soil protection are part of complex evaluation procedures. They fulfill diverse functions in ecological planning:

- Ecosystem research tries to generate limit values based on an ecological approach to reduce the complexity of the soil compartment. These indicators refer to soil functions and soil characteristics.
- If effects like erosion, immission of waste chemicals or soil compaction are to be evaluated, values are needed to describe and assess the development of soil qualities.
- Standards in soil protection acquire legal status when they are used as the foundations of planning. Fixing standards in law results in significant consequences, e.g. changed liability limits or a changed view of soil as a common good. The lack of evaluation procedures based on an ecological approach is a particular deficit for the decision-making process in environmental impact assessment.

From the above comments it is clear why international, but in particular national soil protection is rightly called the “stepchild of environmental policy”, because:

- 1) The modelling of the complex structure of soil is incomplete.
- 2) This fact makes the ecological foundation of soil protection standards by regionalization more difficult. The evaluation of heavy metals in soils, for example, depends on background values, which can be high in specific regions by reasons of nature. This shows how important it is to differentiate between original and man-made factors when evaluating environmental problems with high degrees of complexity - characteristically also a basic problem of climate change research.
- 3) Scientific, political and/or administrative management and evaluation of aspects relevant for soil protection is not adequately organized and institutionalized. On the one hand, the long-term reaction and evolution of soils show how necessary it is to take a cross-boundary approach when assessing soil loads, and, on the other hand, how soils can be used as indicators for the development of ecosystems.
- 4) Standards in soil protection are only convenient when multi-dimensional, i.e., if they take ecological, economical and social aspects into consideration. Such a holistic approach has been used in the Netherlands for some years.

Generally, soil protection demands evaluation procedures which combine quantitative and qualitative aspects. The concept of “soil quality goals and standards” is an approach to develop such an integrated evaluation, possibly even a “soil-sociology” from the point of view of the social sciences.

To summarize, we propose:

- (i) The definition of standards in soil protection with equivalent consideration of ecological knowledge and planning;
- (ii) Enlargement of evaluation by economical, social and legal dimensions.
- (iii) Definition of regionalized soil quality goals and standards with regard to quantitative and qualitative aspects.

- (iv) Combination of soil protection with other medial environmental problems in order to develop a basis for integrated evaluation, upon which environmental impact assessment can be founded.

From: Global Change Prisma, Dec. 1993
A. Daschkeit & W. Schröder,
Geographisches Institut der Universität Kiel

LECTURESHIPS / PROFESSORSHIPS IN SCIENCE AND SUSTAINABLE DEVELOPMENT

The Lectureship Programme was initiated in 1987 by the International Council of Scientific Unions (ICSU) and the Third World Academy of Sciences (TWAS) and was joined in 1989 by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Commonwealth Science Council (CSC). The Earth Council joined the Programme as co-sponsor in 1993. In the meantime the Programme was extended to include a Professorship Scheme to allow for repeated visits by international experts to developing countries. The two parts of this Programme are described below:

- (1) **Lectureships in Science and Sustainable Development** The objective of the Lectureship Programme is to provide those associated with scientific and other appropriate institutions in developing countries with the opportunity to establish and enhance collaboration with colleagues in all fields of science, technology and key areas of environment and development. Within this Programme, prospective hosting institutions can invite eminent experts in science, technology and sustainable development, to lecture and hold discussions in their countries.

Institutions wishing to invite a lecturer under this Programme are requested to fill out a form providing information about the subject area to be addressed and, if available, the name of person(s) who might be invited to lecture. Request forms can be obtained from the TWAS Secretariat. An indicative data base containing names and lecture titles of scientists is available for consultation.

The travel (economy fare) expenses of lecturers to host countries will be borne under the Programme, while host institutions in developing countries will be expected to cover all local expenses as well as to make local arrangements. Normally there will not be more than one lectureship visit per country per year. Experts who are planning to visit a developing country for other purposes not strictly related to the Lectureship Programme may be requested to give lectures at no financial cost to the Programme.

The deadline for submission of request forms for lectureships to the TWAS Secretariat are:

30 June for lectures to take place between January and June of the following year;

31 December for lectures to take place between July and December of the following year.

- (2) **Visiting Professorships in Science and Sustainable Development**

The objective of the Visiting Professorships Scheme is to provide institutions and research groups in developing countries, especially those that lack outside contacts, with the opportunity of establishing long-term links with world leaders in science and technology and key areas of environment and development.

Under this part of the Programme, a number of international experts will be offered visiting professorship appointments at institutions in the Third World. The appointment is normally for a period of **five years**, during which the appointed professor will be expected to visit the host institution **at least three times** for a minimum stay of one month each time.

The economy fare travel expenses of the visiting professor, and a small honorarium will be provided by the five organizations, while the host institution will be expected to cover the local expenses.

During each visit the visiting professor will be expected to interact strongly with the staff at the host institution with the aim of strengthening their existing activities and/or assisting them to establish new lines of research. The visiting professor may also be requested to deliver a series of topical lectures and seminars to research students.

Institutions in developing countries wishing to be considered for this Programme should fill in the relevant request form which they can obtain from the TWAS Secretariat at the address below. Information about the subject areas of current interest to the host scientists should be provided, and, if available, the name of person(s) who might be considered for the appointment. Only persons who have attained international recognition in their fields of science of environment and development will be considered for appointment under this scheme.

Application forms for Lectureships and Professorships in Science and Sustainable Development can be obtained from:
The Third World Academy of Sciences (TWAS)
Strada Costiera 11, P.O.Box 586, 34126 Trieste, Italy
Phone: (+39-40) 2240-387 – Telex: 460392 ICTP I
Fax: (+39-40) 224559 – E-mail: twas@ictp.trieste.it

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
Second International Symposium on Artificial Recharge of Ground Water
Orlando, Florida, July 17 - 22, 1994

An American Society of Civil Engineers' "Second International Symposium on Artificial Recharge of Ground Water" (SISAR) offered an outstanding opportunity for technology transfer for over 200 participants from 24 countries and 28 USA states meeting at Walt Disney World Swan during 17 - 22 July 1994. SISAR was a follow-up to the ASCE First International Symposium on Artificial Recharge of Ground Water, convened at Anaheim, California in 1988, the popular proceedings of which is now out of print.

An ASCE Continuing Education Course "Introduction to Artificial Recharge" was presented to 44 registrants on the Sunday preceding the symposium and was followed during the week by an interdisciplinary program of oral and poster papers by 130 international authors. Some very interesting field trips to well-type and basin-type recharge sites near Disney World were taken in mid-week of the symposium.

The symposium provided a forum for international and interdisciplinary technology transfer relating to all aspects of artificial recharge. The ASCE proceedings include papers discussing recharge by wells or spreading basins; with various qualities of potable water, surface water, and reclaimed wastewater; into consolidated and unconsolidated, confined and unconfined aquifers. Papers also discussed water quality changes occurring during recharge, soil-aquifer treatment processes, well clogging, modeling and recent innovative technical developments and applications. Special discussion issues included regulatory hydraulic, environmental, economic, and other considerations that affect development of successful recharge projects. The symposium arrived at the same conclusion as a reported survey made by the European Union of National Associations of Water Suppliers, namely that artificial recharge (1) is important, (2) is increasing, (3) is successful, and (4) is sustainable.

Persons interested in purchasing the proceedings volume should contact ASCE publications, 345 East 47th Street, New York, NY 10017.

Further information can be obtained from: A. Ivan Johnson, Chairman,
ASCE Committee on Artificial Recharge
AIJ Inc., 7474 Upham Court,
Arvada, CO 80003, USA
Tel.&Fax: (+1)303-425-5610

THE INTERNATIONAL CONSORTIUM FOR AGRICULTURAL SYSTEMS APPLICATIONS (ICASA)

On March 11, 1994, the International Consortium for Agricultural Systems Applications (ICASA) was formally established in Hawaii, USA. Officers include: Goro Uehara as president, Victor D. Phillips as vice-president and Gordon Y. Tsuji as Secretary/Treasurer. In addition, the Board of Directors of ICASA is composed of an internationally recognized group of systems scientists led by Rudy Rabbinge (Wageningen Agricultural University, The Netherlands), as chair and Joe T. Ritchie (Michigan State University, USA) as vice-chair. Members of the board include Johan Bouma (Wageningen Agricultural University, The Netherlands), J. Barry Dent (University of Edinburgh, Scotland, UK), James W. Jones (University of Florida, USA), Frits W.T. Penning de Vries (Wageningen Agricultural University, The Netherlands), Paul S. Teng (IRRI, The Philippines).

ICASA brings together for the first time systems scientists associated with both IBSNAT and SARP in a collaborative and cooperative mode. Through ICASA, we anticipate presenting a common focus and mode of operation to both international and national agricultural research centers interested in systems analysis and simulation. It will have its headquarter in Honolulu, Hawaii. The Hawaii office will be the legal entity and will serve as a facilitating body to receive and respond to requests from user groups or donor agencies.

Members will likely include, but not be limited to, systems scientists from international, regional, and national research organizations in both the public and private sectors and those participating in the SARP and IBSNAT network. ICASA is being organized as a consortium of individuals and organizations involved in or interested in systems research and applications. A multidisciplinary effort is anticipated and expected.

Products to be developed and services to be provided by the systems analyst group are anticipated to include a range of systems tools, technical support services, and training courses and programs. Financing arrangements to cover costs incurred will be made through reimbursement contracts, grants and contracts with donor agencies and client groups either through the ICASA legal entity or directly through consortium members.

TRAINING COURSE

Application of crop simulation models in the newest version of DSSATv3 and other available decision tools will be the focus of a training course being organized at the University of Florida in Gainesville this summer. The course has been conducted annually by IBSNAT collaborators since 1989 and is planned for two weeks, from August 8 to August 19. Participation will be limited to the first 20 to 25 applicants. According to our colleagues in Florida, a few more openings are still available.

Those who are interested in attending should contact:

University of Florida, International Training Division Academic Programs, IFAS,

P.O.Box 110480, Gainesville FL 32611-480;

Tel: 904-392-3166, Fax: 904-392-3165;

Internet: ITD@GNV.IFAS.UFL.EDU; Cable: CENTROP

DSSATV3.

Version 3 of DSSAT will be available for distribution after September 1, 1994. The software and reference documents in three volumes will be available for US\$495 plus airmail postage costs.

For those who already have the 10 crop model version of DSSATv2.1, it will be possible to obtain V3 for US\$ 75, plus the cost of postage and handling. Earlier versions of DSSATv2.1 with 4 or 6 crop models can be upgraded to DSSATv3 for US\$250 plus airmail postage. For information, please send your enquiries to:

2500 Dole Street, KR 22, Honolulu, HI 96822

E-mail: IBSNAT@UHUNIX.UHCC.HAWAII.EDU,

Tel: 808-956-8858, Fax: 808-956-3421

from: Consortium Network News, June 1994

**INTERNATIONAL COUNCIL FOR SCIENTIFIC AND TECHNICAL INFORMATION
CONSEIL INTERNATIONAL POUR L'INFORMATION SCIENTIFIQUE ET TECHNIQUE
(ICSTI)**

ICSTI announces "information aid" for developing countries

The International Council for Scientific and Technical Information (ICSTI) has launched a major project to improve access to scientific and technical information in developing countries. In cooperation with UNESCO and the International Telecommunication Union, the project will investigate ways of narrowing the "knowledge gap" between rich and poor countries by making use of new telecommunication systems.

The project was approved at the 1994 Extraordinary General Assembly of ICSTI held in Cambridge, UK, in July, and is one of a number of projects launched by ICSTI, which include building a pool of expertise on computer networking, and assessing the "state of the art" in information retrieval from digitized full text documents.

The General Assembly also adopted a new four-point Strategic Plan. The plan aims (i) to improve relations among the different communities involved in the chain between information generators and users; (ii) to define the future needs of users and monitor progress of efforts undertaken to meet them, (iii) to examine the impact, cost and acceptability of new standards, and legal aspects of information management such as copyright.

Kent Smith, ICSTI President, hailed the Assembly's achievements, saying "Information is vital to the world's economic and social development. This strategic plan will serve not only the interests of the Council's members but also society at large".

For further information please contact:

Marthe Orfus, Executive Secretary, ICSTI

International Council for Scientific and Technical Information

51 boulevard de Montmorency, 75016 Paris - France

Tel: +33-1-4525-6592; Fax: +33-1-4215-1262

Internet: icsti@paris7.jussieu.fr

from: ICSTI Press Release, July 1994

ORGANIC MATTER MANAGEMENT NETWORK

This Network is already in operation in Kenya and it has just started in Tanzania. Activities in Uganda and Ethiopia are still in a planning stage.

Interested scientists in the countries mentioned may contact:

Dr. R.J. Cheatle, P.O.Box 39042, Parkland PO, Nairobi, Kenya.

**APPOINTMENTS, HONOURS
NOMINATIONS, DISTINCTIONS
ERNENNUNGEN, AUSZEICHNUNGEN**

Prof.Dr. C. Fred Bentley, Professor of soil science from Edmonton, Alberta, was appointed officer of the Order of Canada in recognition of his contributions and services in the area of agriculture. This award is the highest honour an individual can receive in Canada.

Prof.Dr. Thomas Rosswall will take up a new appointment as Rector of the Swedish University of Agricultural Sciences.

Prof.Dr. R. Schoonheydt of the Centrum voor Oppervlaktechemie en Katalyse, K.U. Leuven, has been elected Secretary General of the International Association for the Study of Clays - Association Internationale pour l'étude des argiles (AIPEA). He is also president of the Organizing Committee of the International Conference "EUROCLAY '95" which will be held in Leuven, August 19 - 25, 1995.

Prof.Dr. P. Bernard Tinker has been awarded the Busk Medal by the Council of the Royal Geographical Society, for his contributions to global terrestrial research. Dr. Tinker is a member of the Scientific Committee for the IGBP since 1993, and of the Scientific Steering Committee for GCTE, where he is leader of Focus 3 research on global change impact on agriculture and forestry.

Prof.Dr. K. Vlassak, of the Faculteit Landbouwkundige en Toegepaste Biologische Wetenschappen, K.U. Leuven, received the honorary degree of Doctor of Philosophy, Plant Science, from the Maejo University, Chiang Mai, Thailand, for his contributions to Plant Science.

IN MEMORIAM

Vladimir Ignatieff

Vladimir Ignatieff, a renowned soil scientist and honorary member of the International Society of Soil Science, died on 9 September 1994 in Richmond, Quebec, Canada. He was 89 years old.

Dr. Ignatieff was a member of a very prominent Russian family of politicians and diplomats. He was born in Kiev, in the Ukraine. In 1919, his family escaped from the Crimea region and settled near Hastings in Sussex, England, where they took up dairy farming.

In 1927, Vladimir Ignatieff graduated with a B.Sc. from the University of London's Wye Agricultural College. The Ignatieff family emigrated to Canada in 1928, where Vladimir worked first on a dairy farm near Montreal. Later he became a research assistant at the first Agriculture Canada research station in Northern Alberta. In 1930 he became a graduate student in the Soils Department at the University of Alberta in Edmonton, where he earned his M.Sc. in 1932. Next, he obtained the Ph.D. at the University of Toronto, with a thesis on a soil biochemistry topic.

In 1937, Dr. Ignatieff was appointed to the academic staff of the Soils Department at the University of Alberta. But two years later the young assistant professor took leave-of-absence to go overseas with the Canadian Army.

Upon leaving the army, he was appointed the first FAO employee, originally in Washington, D.C. and then in Rome.

Vladimir Ignatieff was an outstanding scientist and promotor of the utilization of existing technical knowledge of soil management to increase sustainably the productions and profitability of farming. While at the University of Alberta, he participated in research on the renowned "Breton Plots" where very small amounts of appropriate fertilizers in combination with practical rotation of crops increased production more than fourfold while simultaneously achieving slow but very important improvements in soil quality. Based on that experience, Ignatieff, at the FAO, developed a very important, widely used bulletin "Efficient Use of Fertilizers". Due to the great demand for that publication, it was revised and expanded in several succeeding editions for worldwide use. Ignatieff served with the FAO for over two decades and concluded as head of his division.

Vladimir Ignatieff retired to a rural community near Montreal, close to where his parents had lived after coming to Canada. In recognition of his outstanding worldwide work as a soil scientist he was appointed Honorary Member of the International Society of Soil Science at its Eleventh Congress - held at the University of Alberta in Edmonton, in 1978.

C.F. Bentley, Edmonton, Canada

**MEETINGS, CONFERENCES, SYMPOSIA
REUNIONS, CONFERENCES, SYMPOSIA
TAGUNGEN, KONFERENZEN, SYMPOSIEN**

Meetings etc. marked with (*), are organized or approved by ISSS.

Les réunions, etc., marquées d'un astérisque (*) sont organisées ou autorisées par l'AISS.

Tagungen usw., versehen mit (*) werden von der IBG organisiert oder sind von dieser autorisiert.

Las reuniones, etc. marcadas con un asterisco (*) son organizadas o autorizadas por la SICS.

IMPORTANT NOTICE

ISSS, as a Scientific Union Member of the International Council of Scientific Unions (ICSU), subscribes to the principle of free movement of bona fide scientists; patronage or sponsoring will therefore automatically be withdrawn if the country of venue denies or purposely delays visa awarding to any ISSS member who wishes to participate in the meeting concerned.

1995

NATO Advanced Workshop: Drainage Development in Arid Zones - ARW, Wageningen, The Netherlands, January 9 - 12, 1995.

Information: Dr. M.G. Bos, ILRI, Staring Building, POB 45, 6700 AA Wageningen, The Netherlands.
Fax: +31-8370-17187)

2nd IHP/IAHS George Kovács Colloquium on "Subsurface Flow and Transport: The Stochastic Approach", Paris, France, January 26 - 30, 1995.

Information: UNESCO - Division of Water Sciences, 1, rue Miollis, 75732 Paris Cedex 15, France.
Tel: +33-145-684002; Fax: +33-145-675769

International Symposium of the Working Groups Remote Sensing for Soil Survey and World Soils and Terrain Digital Data Base: "Remote Sensing and GIS as tools for monitoring soils in the environment - Surveillance des Sols dans l'Environnement par Télédétection et SIG"

Ouagadougou, Burkina Faso, February 6 - 10, 1995

The symposium is organized in cooperation with the West and Central African Association of Soil Science.

Information: Dr.L. Thiombiano, Secrétaire Général

AOCASS/WCASS, 06 BP 9046 Ouagadougou 06, Burkina Faso.

Fax: 226-3104-71, Tel: 226-3192-02

International Workshop: Evaluation of Soil Organic Matter Models Using Existing Long-Term Datasets (ARW), Harpenden, Herts., U.K., March 1995.

Information: Dr. D.S. Powlson, IACR Rothamsted Experimental Station, Herts., Soil Science Dept., Harpenden, Herts.

AL5 2JQ, U.K. Fax: +44-582-76-0981.

Preparatory meeting for the World Summit for Social Development, Copenhagen, Denmark, March 11 - 12, 1995

(see entry for March 1996)

Information: Mr. Delmar Blasco, Executive Director, ICVA,

Case postale 216, 1211 Geneva 21, Switzerland;

Tel: +41-22-732-6600, Fax: +41-22-738-9904; E-mail: DIALCOM: TCN4092 and UNX024

or:

Ms. Sirpa Utriainen, Secretary General, ICSW,

Koestlergasse 1/29, 1030 Vienna, Austria;

Tel: +43-1-587-8164; Fax: +43-1-587-9951

Dahlia Greidinger International Symposium on Fertigation, Haifa, Israel, March 26 - April 2, 1995.

Information: Prof. em. Josef Hagin, Agricultural Eng., Technion - Israel Institute of Technology, Haifa 32000, Israel; Fax: 972-4-221529.

5th Conference Sinkholes, Eng. & Env. Impact Karst, Gatlinburg, TN, USA, April 2 - 5, 1995.

5th International Microirrigation Congress: Microirrigation for a Changing World, Orlando, Florida, April 2 - 6, 1995.

Information: Allen Smajstrla, Co-chair, Univ. of Florida, Agr.Eng.Dept., Gainesville, Florida 32611. Tel: +904-392-9295, Fax: +904-392-4092; BITNET AGS@IFASGNV, INTERNET AGS@AGEN.UFL.EDU

First Symposium Biological Waste Management "A Wasted Chance?", Bochum, Germany, April 4 - 6, 1995.

Information: B W M Info-Service, Dipl.Ing. Josef Barth, Am Landhagen 58, 59302 Oelde, Germany. Tel: +49-2522-811-13, Fax: +49-2522-50-90.

SPECTEL '95 International Colloquium "Spectral Properties and Remote Sensing of Soils and Rocks from the Visible to Medium Infrared Range", La Serena, Chili, April 24 - 27, 1995.

Information: ORSTOM, Casilla 53390, Santiago 1, Chili. Tel/Fax: (562)235-7008, E-mail: tony@cecux1.cec.uchile.cl.

3rd International Conference on the Biogeochemistry of Trace Elements "Contaminated Soils", Paris, France, May 15 - 19, 1995.

Information: Ministère de l'Environnement, René Prost, Conférence Internationale sur la Biogéochimie, DGAD/SRAE, 20, Avenue de Segur, 75302 Paris 07 SP, France. Tel: +33(1)4219-1757; Fax: 33(1)4219-1771

International Seminar on management and transfer of information to support agricultural development in China, Beijing, China, May 19 - 24, 1995.

Information: Mr. Yu Ge/Mr. J. Delman, CECAT, 55 Nongzhanbeilu, Chaoyang District, Beijing, P.R. China, Postcode: 100026. Tel: +861-502-6343, Fax: +861-506-3012.

3rd International Meeting on Red Mediterranean Soils, Chalkidiki, Greece, May 21 - 26, 1995.

Information: Dr. C. Kosmas, Dept. of Soils and Agric. Chemistry, Agricultural University of Athens, 75 Iera Odos, Athens 11855, Greece; Tel: +30-1-346-4221; Fax: +30-1-346-4221 or +30-1-346-0885.

International Symposium "The Science of Composting", Bologna, Italy, May 30 - June 2, 1995.

Information: Dr. Guido Del Gizzo, c/o Agrital Ricerche, Viale dell'Industria, 24, 00057 Maccarese (Italy); Tel: +39-6-667-8486/-6678357; Fax: +39-6-6678312.

International Workshop on Soil Conservation Extension: Concepts, Strategies, Implementation and Adoption, Chiangmai, Thailand, June 4 - 11, 1995.

Information: Mr. Sompong Theerawong, Organizing Committee Chairman, Deptmt. of Land Development, Paholyothin Road, Bangkok 10900, Thailand. Tel: 66-2-5611954; Fax: 66-2-5611230/5613029/5620313; Telex: 21505 IBSRAM TH.

Conference on Erosion and Land Degradation in the Mediterranean: The Impacts of Agriculture, Forestry and Tourism, Aveiro, Portugal, June 14 - 18, 1995.

Information: Organising Committee of the Conference on "Erosion and Land Degradation in the Mediterranean", c/o Celeste Coelho, Dep. Ambiente e Ordenamento, Universidade de Aveiro, P-3800 Aveiro, Portugal. Tel: +351-34-370200; Fax: +351-34-29290.

AWRA 1995 Annual Summer Symposium "Water Resources and Environmental Hazards: Emphasis on Hydrologic and Cultural Insight in the Pacific Rim", Honolulu, Hawaii, USA, June 25 - 28, 1995.

Information: A. Ivan Johnson, A. Ivan Johnson, Inc., 7474 Upham Court, Arvada, CO 80003; Tel+Fax: +1-303-425-5610

International Conference on "Organic-Mineral Interactions in Sediments and Soils", Newcastle-upon-Tyne, U.K., June 28 - 29, 1995.

Information: Dr. D. Rimmer, Dept. of Environmental Sciences, University of Newcastle, Newcastle-upon-Tyne NE1 7RU, U.K.

International Working Meeting on Archaeological Soil Micromorphology, London, Summer 1995.

Information: Dr. Richard Mcphail, Institute of Archaeology, UCL, 31-34 Gordon Square, London WC1H 0PY.

International Conference on ENvironment and INformatics "EN+IN", Budapest, Hungary, June 29 - July 1, 1995.

Information: Viktor Richter, Computer and Automation Research Institute, HAS, 1518 Budapest, P.O.B. 63, Hungary, Fax: +361-186-9378.

Malama 'Aina 95: First International Conference on Multiple Objective Decision Support Systems for Agricultural and Environmental Management: Concepts, Approaches, and Applications, Honolulu, Hawai'i, USA, July 23 - 29, 1995.

Information: Department of Agronomy and Soil Science, College of Tropical Agriculture and Human Resources, 1910 East West Road, Honolulu, Hawai'i 96822, USA.

Tel: 808-956-8708 or 7530; Fax: 808-956-6539.

XIV International Congress of the International Union for Quaternary Research, Berlin, Germany, August 3 - 10, 1995.

Information: Congress Partner GmbH, Emmastr. 220, 28213 Bremen;

Tel: +49-421-219073, Fax: +49-421-216419

International Symposium on Soil and Plant Analysis: Quality of Soil and Plant Analysis in view of Sustainable Agriculture and the Environment, Wageningen, the Netherlands, August 5 - 10, 1995

Information: IAC-Section OCC, P.O.Box 88, 6700 AB Wageningen, The Netherlands,

Tel: +31-8370-90287, Fax: +31-8370-18552

XX IUFRO (International Union of Forestry Research Organizations) World Congress, Tampere, August 6 - 12, 1995.

Information: Prof. Risto Seppälä, The Finnish Forest Research Institute, IUFRO'95 Secretariat,

Unioninkatu 40A, SF-00170 Helsinki, Finland; Tel.: +358-0-857-051; Fax: +358-0-625-308

ECGA Euroclay '95, Leuven, Belgium, August 19 - 25, 1995.

Prof. P. Grobet, Secretary Euroclay '95, Centrum voor Oppervlaktechemie en Katalyse,

K.U. Leuven, K. Mercierlaan 92, B-3001 Heverlee, Belgium.

Tel: +32-16-220931; Fax: +32-16-295126.

3rd All African Soil Science Conference, Ibadan, Nigeria, August 19 - 26, 1995

Information: Dr. Charles R. Obatolu, Secretary LOC, 3rd All African Soil Science Conference,

c/o Department of Agronomy, University of Ibadan, Ibadan, Nigeria. Fax: 022-310-491

BSSS 1995 Annual Conference, University of Reading, Autumn 1995.

Information: Martin Wood, Dept. of Soil Sciences, University of Reading,

Whiteknights, Reading RG6 2DW

International Conference: "Driven by Nature: Plant Litter Quality and Decomposition", Wye, Ashford, Kent, U.K., September 1995
Information: Georg Cadisch and Ken Giller, Wye College, University of London, Wye, Ashford, Kent, TN25 5AH, UK,
E-mail: g.cadisch@wye.lon.ac.uk, Fax: +44-233-813140, Tel: +44-233-812401.

Third International Conference on Modelling of Global Climate Change and Variability, Hamburg, Germany, September 4 - 8, 1995.
Information: Dr. Lydia Dümenil, Max-Planck-Institut fuer Meteorologie, Bundesstrasse 55, 20146 Hamburg, Germany; Tel: +49-40-41173-310; Fax: +49-40-41173-366.

International Symposium and Field Seminar on Karst Waters and Environmental Impacts, Antalya (Turkey), September 10 - 20, 1995.
Information: Prof.Dr. Gültekin Günay, Int. Res. & App. Center for Karst Water Resources (UKAM), Hacettepe University, 06532 Beytepe Ankara, Turkey;
Tel: +90-312-235-2543, Fax: +90-312-235-2862
or:
A. Ivan Johnson, A. Ivan Juhnson Inc., 7474 Upham Court, Arvada, CO 80003, USA;
Tel+Fax: +1-303-425-5610,

Global Analysis, Interpretation, and Modelling, The First GAIM Science Conference, Garmisch-Partenkirchen, Germany, September 25 - 29, 1995.
Information: IGBP Secretariat, Institut fuer Meteorologie, Freie Universität Berlin, Carl-Heinrich-Becker-Weg 6-10, 12165 Berlin, Germany

Third International Symposium on Headwater Control "Sustainable Reconstruction of Highland and Headwater Regions" (Hans Keller Memorial Symposium), Delhi and Himachal Pradesh, India, October 6 - 15, 1995.
Information: Dr. R.B. Singh, HC3 Convenor, Delhi School of Economics, Delhi - 110007, India; Fax: +91-11-725-7049.

FISOLS 95 - Fifth International Symposium On Land Subsidence, The Hague, The Netherlands, October 16 - 20, 1995.
Information: Secretariat FISOLS 95, Mr. F.H. Schroeder, c/o Netherlands Geodetic Commission, P.O. Box 5030, 2600 GA Delft, The Netherlands. Tel: +31-15-782819; Fax: +31-15-782745.

International Congress on Soils of Tropical Forest Ecosystems, Balikpapan, Kalimantan, Indonesia, October 30 - November 03, 1995.
Information: Indonesian-German Forestry Project, Faculty of Forestry/Mulawarman University, Dr. Andreas Schulte - Dr. Daddy Ruhiyat, P.O.Box 1227, Samarinda 75123, East Kalimantan/Indonesia,
Tel: +62-541-35089, Fax:+62-541-35379;

1996

1st Australasia-Pacific Conference on Contaminants and Soil Environment in the Australasia Pacific Region, Adelaide, Australia, February 1996.
Information: Dr. Ravendra Naidu, CSIRO Division of Soils, Private Mail Bag No. 2, Glen Osmond, Adelaide, South Australia 5064.

World Summit for Social Development, Copenhagen, Denmark, March 11 - 12, 1996
Information: Mr. Delmar Blasco, Executive Director, ICVA, Case postale 216, 1211 Geneva 21, Switzerland;
Tel: +41-22-732-6600, Fax: +41-22-738-9904; E-mail: DIALCOM: TCN4092 and UNX024
or:

Ms. Sirpa Utriainen, Secretary General, ICSW, Koestlergasse 1/29, 1030 Vienna, Austria;
Tel: +43-1-587-8164; Fax: +43-1-587-9951

International Conference on Environmental Pollution, Budapest, April 15 - 19, 1996.
Information: Prof. B. Nath, Chairman of the Organising Committee, ICEP Conference Office,
253 Kilburn Lane, London W10 4BQ, UK. Tel: +44-81-960-6823; Fax: +44-81-960-1597

Ten years terrestrial radioecological research following the Chernobyl accident, Vienna,
Austria, April 22 - 23, 1996.

Information: Dr. Andreas Baumgarten, Federal Research Institute of Horticulture,
Gruenbergstrasse 24, 1131 Vienna, Austria.

Sexto Congreso Nacional y Conferencia Internacional de Geología Ambiental y Ordenación del Territorio "Riesgos Naturales, Ordenación del Territorio y Medio Ambiente", Granada, 24 al 27 abril 1996

Información: VI CNGAOT. Dpto de Congresos de Viajes Sacromonte.
C/Angel Ganivet 6. 18009 Granada. Tel: 958-225598/9; Fax: 224617; Telex: 78484.

10th International Peat Congress, Bremen, Germany, 27 May - 2 June 1996.

Information: CPO Hanser Service, PO Box 12 21, 22882 Hamburg-Barsbüttel,
Tel: +49-40-670882-0; Fax: +49-40-6703283.

or:

Prof. Dr. Jens Dieter Becker-Platen, Chair of the Organizing Committee,
Deutsche Gesellschaft f. Moor- u. Torfkunde e.V., P.O.Box 51 01 53, 30631 Hannover, Germany.

10th International Working Meeting on Soil Micromorphology, Moscow, Russia, July 8-13, 1996.

Information: Dr. V.M. Sefanova, Faculty of Soil Science, Moscow State University,
119 899 Moscow, Russia. Fax: +7-095-939-0989; E-mail: fater.inbox@parti.inforum.org.su.

4th Congress of the European Society for Agronomy, Veldhoven and Wageningen, The Netherlands, July 7 - 11, 1996.

Information: ESA Fourth Congress, Kongressservice Brabant,
P.O. Box 140, NL-5500 AC Veldhoven, The Netherlands,
Fax: +31-40-545515, from October 9, 1995: +31-40-2545515.

International Symposium on Erosion and Sediment Yield: Global and Regional Perspectives, Exeter, UK, July 15 - 19, 1996.

Information: Prof. D.E. Walling or Dr. B.W. Webb, Dptmt. of Geography, University of Exeter,
Amory Building, Rennes Drive, Exeter, EX4 4RJ, UK;

Tel: +44-392-263345 or -263334, Fax: +44-392-263342, E-mail: b.w.webb@exeter.ac.uk.

28th International Geographical Congress, The Hague, The Netherlands, 4-10 August 1996.

30th International Geological Congress, Beijing China, August 4 - 14, 1996

Information: Secretariat Bureau, 30th International Geological Congress, P.O.
Box 823, Beijing 100037, P.R. China.

Second International Congress of the European Society of Soil Conservation (ESSC): Development and Implementation of Soil Conservation Strategies for Sustainable Land Use, München-Weihenstephan, Germany, September 1 - 7, 1996.

Information: Dr. Karl Auerswald, ESSC Congress, Lehrstuhl fuer Bodenkunde, TU München,
85350 Freising, Germany. Fax: +49-8161-714466.

International Symposium on Soils with Gypsum, Lleida, Catalonia, Spain, September 13 - 19, 1996.

Information: Dr. Rosa M. Poch, Secretary ISSWG, Dep. Medi Ambient i Ciències del Sòl, UdL,
Av. Rovira Roure 177, 25198 Lleida, Catalonia, Spain. Tel: +34-73-702-567; Fax: +34-73-238-264.

ICSC-2: The 2nd International Crop Science Congress, New Delhi, India, November 17 - 23, 1996.

Information: Suresh K. Sinha, Secretary General, Second International Crop Science Congress, IARI, Pusa, New Delhi-110 012, India.

1997

XVIII International Grassland Congress, Grasslands 2000, Winnipeg, Manitoba, Saskatoon, Saskatchewan, Canada, June 8 - 18, 1997.

Information: P.O.Box 4520, Station C, Calgary, Alberta, Canada T2T 5N3;

Tel: (403)244-4487, Fax: (403)244-2340

14th ISTRO Conference: Agroecological and Economical Aspects of Soil Tillage, Lublin - Pula-
wy, Poland, July 27 - August 4, 1997.

Information: ISTRO Conference 1997, Dr. Jerzy Rejman, Institute of Agrophysics,
Polish Academy of Sciences, ul. Doswiadczalna 4, 20-236 Lublin, Poland;

Tel: +48-81-45061; Fax: +48-81-45067.

**INTERNATIONAL TRAINING COURSES
COURS INTERNATIONAUX DE FORMATION
INTERNATIONALE FORTBILDUNGSKURSE**

34th International Post-Graduate Course on Land Drainage, August 14 - November 24, 1995, International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands.
Information: ILRI, Lawickse Allee 11, 6701 AN Wageningen, The Netherlands;
mailing address: ILRI, P.O.Box 45, 6700 AA Wageningen, The Netherlands,
Tel: (+31)8370-90144, Fax: (+31)8370-17187.

ITC Postgraduate Diploma and MSc Degree Courses, Enschede, The Netherlands,
ITC offers a wide range of courses on
- Applied Geomorphological and Engineering Geological Surveys
- Water Resources Surveys – Groundwater Resources Surveys
- Water Resources Surveys – Watershed Management and Conservation
- Information Management for Natural Resource Development
Information: ITC, P.O.Box 6, 7500 AA Enschede, The Netherlands,
Tel: +31-53-874-206; Fax: +31-53-874-238; Telex: 44525 itc nl.

2-week course on “Modern Techniques in the Identification of Bacteria and Filamentous Fungi”, Egham, U.K., 26 June - 7 July 1995;
and
International Course on the Identification of Fungi of Agricultural Importance, Egham, U.K.,
7 August - 15 September 1995;
Information: Miss J. Pryse (Training Officer), International Mycological Institute,
Bakeham Lane, Egham, Surrey, TW20 9TY, U.K.
Tel: +44-784-470111; Fax: +44-784-470909; E-mail: j.pryse@cabi.org

19th International Course on Nutrient Management for Sustainable Agriculture, IAC Wageningen, The Netherlands, August 27 - September 23, 1995.
Information: International Agricultural Centre,
P.O.Box 88, Lawickse Allee 11, 6700 AB Wageningen, The Netherlands;
Fax: +31-8370-18552, Tel: +31-8370-90111, Telegrams: INTAS, Telex: 45888-INTAS NL;
E-mail: IAC@IAC.AGRO NL.

Silsoe College, Bedford, England, offers a wide range of post-graduate courses and studies, e.g.: **Agribusiness Management and Technology (MSc.)**, **Agroforestry (MSc.)**, **Land Resource Management and Planning (MSc. and Postgraduate Diploma programmes)**, **Engineering for Rural Development (MSc.)**, **Agricultural Engineering (Agrochemicals Application Technology - MSc., etc.)**, **Management for Agricultural Development (MSc.)**, **Agricultural and Food Marketing (MSc. and PD)**, **Agricultural Water Management (MSc.)**, **Crop Production Technology (MSc.)**, **Information Technology (MSc.)**, etc.
Information: The Student Recruitment Executive, Silsoe College,
Silsoe, Bedford MK45 4DT, U.K.; Tel: (0525) 860428; Fax: (0525) 861527; Telex: 826383 silcam g

Cursos de Magister en Ciencias Agrícolas (Suelos y Producción Vegetal) y **Doctorado en Agro-nomía** de aproximadamente 2 y 4 años de duración en la Universidad Nacional del Sur (UNS) Bahía Blanca, Argentina. Idioma: Español. Frecuencia: permanente.
Informes: Prof.Dr. R.A. Rosell, Agronomía, UNS,
8000 BAHIA BLANCA, ARGENTINA
(Tel.: 54-91-30024/26533; Fax: 54-91-27876; Telex: 81712 DUJOR AR).

ICRAF Training Materials for Agroforestry, Nairobi, Kenya.
Information: International Council for Research in Agroforestry, P.O.Box 30677, Nairobi, Kenya
(Tel.: 254-2-521450; Fax: 521001; Telex: 22048).

External Programme, specialised courses on Managing Agricultural Development, Environmental Management in Agricultural Development, Kent, UK.

Information: The External Programme, Wye College, University of London, Ashford, Kent TN25 5AH UK (Tel.: 0233 812401; Fax: 0233 813320; Telex: 94017832 WYEGG).

Masters, Postgraduate Diploma and Graduate Certificate Courses in Soil Management and Conservation, Adelaide, Australia.

Information: The Head, Department of Soil Science, Waite Agricultural Research Institute, University of Adelaide, P.M.B. 1, Glen Osmond, South Australia 5064 (Tel.: +61 8 303 7210; Fax: +61 8 303 6511; Telex: UNIVAD AA 89141).

2-Year Master Programme in Water Resources Engineering (Options: Irrigation, Hydrology, Water quality management)

Interuniversity Programme in Water Resources Engineering (IUPWARE), Katholieke Universiteit Leuven - Vrije Universiteit Brussel, Belgium

Information: Institute for Land and Water Management, K.U. Leuven, Vital Decosterstraat 102, 3000 Leuven, Belgium.

Tel: +32-1623-1381, Fax: +32-1623-0607, E-mail: agr@cc3.kuleuven.ac.be or

Laboratory for Hydrology, V.U. Brussel, Pleinlaan 2, 1050 Brussel, Belgium; Tel: +32-2629-3021; Fax: +32-2629-3022; E-mail: hydr@vub.ac.be.

International Summer Courses on "Microcomputer Applications in Water Resources Engineering and Management", Leuven, Belgium.

Information: Mrs. Greta Camps, Course Secretary, Institute for Land and Water Management, Vital Decosterstraat 102, 3000 Leuven, Belgium.

Tel: +32-1623-1381, Fax: +32-1623-0607, E-mail: agr@cc3.kuleuven.ac.be

M.Sc. Programmes at the Department of Agricultural Engineering, University of Nairobi, Kenya, 1991/1993.

Information: University of Nairobi, Dept. of Agricultural Engineering, P.O. Box 30197, Nairobi, Kenya.

MSC Programme in Survey Integration for Resources Development

- Land Use Planning and Resources Management or

- Project Planning and Implementation or

- Rural Energy and Development

- Environmental Systems Analysis and Monitoring

Postgraduate Diploma and MSc Degree Courses on Soil Survey and Applications of Soil Information

International Institute for Aerospace Survey and Earth Sciences, Enschede, The Netherlands

Information: ITC Student Registration Office, P.O. Box 6,NL-7500 AA Enschede, The Netherlands

Tel: +31 53 874 205, FAX: 053 874 238, Telex: 44525 itc nl

4

Master of Science in Eremology (Interdisciplinary, 2-Year, Post-Graduate Programme in Desert Science), Ghent, Belgium, starting each year in October.

Information: The International Center for Eremology, Faculty of Agricultural and Applied Biological Sciences, University of Ghent, Coupure Links 653, B-9000 Gent, Belgium.

Tel.: +32-9-2646036; Fax: +32-9-2646247; Telex: 12754 rugent b

4

M.Sc. Courses in "Irrigation Engineering" and "Soil Conservation and Land Reclamation".

Information: The Course Administrator, Effective Irrigation Management Short Course, Institute of Irrigation Studies, The University, Southampton SO9 5NH, UK

(Tel.: (0703) 593728; Fax: (0703) 593017; Telex: 47661 (a/b sotonu g).

Course in "Soil Science, Plant Nutrition and Fodder Crops", Technical College of Tropical Agriculture Basel.

Information: Swiss Tropical Institute, Socinstrasse 57, 4051 Basel, Switzerland (Tel.: (061) 23 38 96); Technikum für tropische Landwirtschaft, Andreas Heusler-Strasse 41, 4052 Basel, Switzerland (Tel.: (061) 50 80 10).

Graduate Study and Training in Development, School of Development Studies, Norwich, UK. Wide range of M.A. and M.Sc. Studies, e.g. M.Sc. in Land Use Planning, etc.

Information: The School Clerk (Admissions), School of Development Studies, University of East Anglia, Norwich, NR4 7TJ, U.K.;

Tel.: (+44-603) 56161/ext. 2331; Fax: (+44-603) 505262; Telex: 975247 chacom g "Attn: DEV".

Irrigation Engineering Principles, a videotape course, Logan, Utah, USA.

Information: Utah State University Foundation, Logan, Utah, 84322-9300, U.S.A. (Tel.: (801) 750-2603; Fax: (801) 750-1248; Telex: 3789426 UTAHSTATEU).

Applied Hydraulics, a videotape course and textbook, Logan, Utah, USA.

Information: Utah State University Foundation, Logan, Utah, 84322-9300, U.S.A. (Tel.: (801) 750-2603; Fax: (801) 750-1248; Telex: 3789426 UTAHSTATEU).

Soil and Water Management Research and Training, African Academy of Sciences, Nairobi, Kenya.

Information: Head of Programmes, African Academy of Sciences, P.O. Box 14798, Nairobi, Kenya (Tel.: 802182/3, 802176; Fax: (02) 802185; Telex: 25446 AFACS KE).

M.Sc. Course in Soil Science and Water Management, Wageningen, The Netherlands.

Information: Director of Studies of MSc-Courses, P.O. Box 453, 6700 AL Wageningen, the Netherlands.

MSc Programmes: Agricultural Engineering, Animal Science and Aquaculture, Biotechnology, Crop Science, Ecological Agriculture, Geographic Information Systems, Management of Agricultural Knowledge Systems, Soil and Water, Tropical Forestry, Wageningen, The Netherlands.

Information: Wageningen Agricultural University, Dean's Office for Foreign Students, P.O. Box 453, 6700 AL Wageningen, The Netherlands (Tel.: (08370)82680; Fax: (08370)84464; Telex: 45854 LUWAG).

Master's and Advanced Course in Soil Science, Ghent, Belgium.

Information: Prof. Dr. G. Stoops, Director ITC, Geological Institute, University of Ghent, Krijgslaan 281/S8, B-9000 Ghent, Belgium.

Tel.: +32-91-64-45-61; Telex: 12754 rugent; Fax: +32-91-64-49-91;

E-mail: ADM@ITC.RUG.AC.BE.

3

Cours de 3e cycle en Protection de l'Environnement, EPFL, Lausanne, Suisse.

Information: Prof. L.Y. Maystre, Inst. de génie de l'environnement, EPFL-Ecublens, CH-1015 Lausanne, Suisse (tél: (21) 693.27.15).

Sponsored Training Courses on Use of Isotope Techniques in Soil Research and Plant Nutrition, International Atomic Energy Agency, Seibersdorf, Austria.

Information: IAEA Headquarters, Joint FAO/IAEA Division, Vienna International Center, Wagramerstr. 5, P.O. Box 100, A-1400 Vienna, Austria.

M.Sc. in Conservation of Soil Fertility, Canterbury, England.

Information: Dr. R.G. Burns, Biological Laboratory, University of Kent, Canterbury, Kent CT2 7NJ, U.K.

Post-graduate Training Courses in Soil Science and Plant Biology, Granada/ Sevilla, Spain.

Information: Dr. M.L. Garrido, Estacion Experimental del Zaidin,
Avenida de Cervantes, Apdo. 419, Granada, Spain.

Interuniversity Post-graduate Programme in Hydrology, Free University of Brussels, Belgium.

Information: Prof.Dr.Ir. A. van der Beken, Director of the Hydrology Programme,
Laboratory of Hydrology, Vrije Universiteit Brussel, Pleinlaan 2, B-1050 Brussels, Belgium.

Farming Systems Approaches to Upland Conservation and Watershed Management in the Tropics, University of Hawaii.

Information: S.A. El-Swaify, Chairman, Dept. of Agronomy and Soil Science, College of Tropical Agriculture and Human Resources, University of Hawaii, Honolulu, Hawaii 96822.

Programme for Ph.D. in Environmental Chemistry and Technology, Lublin, Poland.

Information: Prof. Lucjan Pawlowski, Dept. of Water and Wastewater Technology,
The Technical University of Lublin, 40 Nadbystrzycka Str., 20-618 Lublin, Poland.

Advances in Biological Nitrogen Fixation, Puerto Rico, USA.

Information: Dr. E.C. Schroder, Dept. of Agronomy and Soils, College of Agricultural Sciences,
University of Puerto Rico, Mayaguez, Puerto Rico 00709-5000, USA.

Post-graduate Courses in Soil Science, Univ. of Reading, Dept. of Soil Science, U.K.

Information: The Secretary, Department of Soil Science, University of Reading,
London Road, Reading RG1 5AQ, England.

Post-graduate Course in Soil Science, Maracay, Venezuela.

Information: Universidad Central de Venezuela, Facultad de Agronomia,
Comision de Estudios de Postgrado, Curso de Postgrado en Ciencia del Suelo,
Avda. Principal el Limon, Apartado Postal 4579, Maracay, Estado Aragua, Venezuela, S.A.

International Post-graduate Training Course in Eremology, (Desert Science), Ghent, Belgium.

Information: The International Center for Eremology, University of Ghent,
Coupure Links 653, B-9000 Gent, Belgium (Tel.: ++32-91-646036; Fax: ++32-91-646247).

M.Sc. Course in Resource Assessment for Development Planning, University of East Anglia, Norwich, England.

Information: Dr. David Dent, School of Environmental Sciences, University of East Anglia,
Norwich NR4 7TJ, England.

Cursos de Postgrado en Desarrollo de los Recursos de Aguas y Tierras, Merida, Venezuela.

Information: CIDIAT, Apartado 219, Merida, Venezuela.

Training Course in Soil and Plant Analysis, at the Royal Tropical Institute, Amsterdam, The Netherlands.

Information: The Course Coordinator, Soil and Plant Analysis, Royal Tropical Institute (KIT),
63 Mauritskade, 1092 AD Amsterdam, The Netherlands.

Centro Internacional de Altos Estudios Agronomicos Mediterraneo, Zaragoza, Spain.

Curso superior de diez meses sobre Ordenacion Rural en funcion del Medio Ambiente.
Informacion: Instituto Agronomico Mediterraneo de Zaragoza,
Apartado 202, 50080 Zaragoza, España.

Cours de Formation Spécialisée sur les Aménagements de Terrain, Le Havre, France.

Information: ISTOM, CHCI Quai George V, 76600 Le Havre, France.

International Course on Soil Reference Collections, ISRIC, Wageningen, The Netherlands.

Information: the Director, ISRIC, P.O. Box 353, 6700 AJ Wageningen, The Netherlands.

College of Soil Physics, Trieste, Italy.

Information: International Centre for Theoretical Physics, College on Soil Physics,
P.O. Box 586, I-34100 Trieste, Italy.

International Fertilizer Development Center, USA.

Information: International Fertilizer Development Centre,
P.O. Box 2040, Muscle Shoals, Alabama 35662, USA.

Courses in Agricultural and Rural Development by the USDA and US Universities.

Information: Ralph Otto, Acting Director, International Training Division, USDA/OICD,
Washington, D.C. 20250-4300, U.S.A.

Courses in Project Planning and Management, Bradford, England.

Information: The Director, Development and Project Planning Centre, University of Bradford,
Bradford, West Yorkshire BD7 1DP, England.

Courses in Soil and Plant Analysis, University of Reading, England.

Information: Dr. A.A. Jones, Department of Soil Science, University of Reading,
London Road, Reading, RG1 5AG, England.

Arid Lands Resource Sciences Ph.D. Program, The University of Arizona, Tucson, Arizona.

Information: Graduate College, University of Arizona,
Tucson, Arizona 85721, USA (Tel.: (602)621-3132; Fax: (602)621-7112).

School of Development Studies, University of East Anglia, Norwich, England. Different courses,
e.g.: **Agricultural and rural development policy: efficiency, equity and the environment; Vertebrate pest management and crop protection**; etc.

Information: The School Clerk (Admissions), School of Development Studies,
University of East Anglia, Norwich, NR4 7TJ, U.K.

Tel: (0603)56161; Fax: (0603)505262; Telex: 975197 ueacpc g for odg

Master's and Advanced Course in Soil Science, International Training Centre for Post-Graduate
Soil Scientists, Ghent, Belgium.

Information: Prof. Dr. G. Stoops, Director ITC, Geological Institute, University of Ghent,
Krijgslaan 281/S8, B-9000 Gent, Belgium;

Tel: +32-91-644561, Telex: 12754 RUGENT, Fax: +32-91-644991;

E-mail: ADM@ITC.RUG.AC.BE

International Postgraduate Course on Soil and Plant Analysis and Data Handling. A nine-week
course in the months of October-November, dealing with: instrumental analysis, soil analysis, plant
analysis, laboratory management and data handling.

Information: Dr. V. Houba, Wageningen Agricultural University,
P.O. Box 8005, 6700 EC Wageningen, the Netherlands. Fax: +31 8370-83766.

ITC, The International Institute for Aerospace Survey and Earth Sciences, Enschede, The
Netherlands offers post-graduate a wide range of different courses in various fields, e.g.:

- Geoinformatics
- Land Resource and Urban Sciences
- Earth Resources

Information: The International Institute for Aerospace Survey and Earth Sciences (ITC),
350 Boulevard 1945, P.O. Box 6, 7500 AA Enschede, The Netherlands
(Tel.: (31) 53 874 444; Fax: (31) 53 874 400; Telex 44525 ITC NL).

International Institute for Infrastructural, Hydraulic and Environmental Engineering (IHE),
Delft, The Netherlands, offers a wide range of MSc. programmes, diploma courses and short courses
in the fields of Water, Environment and Transport. Information on all courses available on demand.

Information: IHE, Student Affairs Office, P.O. Box 3015, 2601 DA Delft, The Netherlands
Tel: +31-15-151700 or 151715; cable: interwater, Telex: 38099 ihe nl, FAX: +31-15-122921

M.Sc. Course "Environmental Analysis and Assessment", Imperial College of Science, Technology & Medicine (Centre for Analytical Research in the Environment) Ascot, Berkshire; and Royal Holloway University of London (Department of Geology) Egham, Surrey.

Information: The Registrar (Admissions), Imperial College of Science, Technology & Medicine, London SW7 2AZ, U.K.;

or

Dr. P. Smith, Graduate Office, Royal Holloway & Bedford New College, Egham, Surrey, TW20 0EX, U.K.

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Post-graduate Courses in Soil Science, Plant Production, and Ecology. MSc and PhD Degree, Universidad de Buenos Aires, Argentina.

Information: Fax. Agronomía. UBA, Escuela para Graduados,

Av. San Martín 4453, (1417) Buenos Aires, Argentina.

Tel: +51-7577/52-1006/522-3805; Fax: (541)522-1687.

4

International Agriculture Courses at MSc. Level, Larenstein International Agricultural College, The Netherlands.

Information: Larenstein International Agricultural College,

P.O.Box 7, 7400 AA Deventer, The Netherlands.

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ICRA, Centre International pour la Recherche Agricole orientée vers le Développement – International Centre for Development Oriented Research in Agriculture

Formation post-académique pour de jeunes chercheurs agricoles des pays en voie de développement et leurs collègues des pays développés qui ont une expérience de travail dans des pays en voie de développement.

Post-academic training for young agricultural scientists from developing countries and their colleagues from developed countries who have some working experience in developing countries.

Information: The Director of ICRA, P.O.Box 88, 6700 AB Wageningen, The Netherlands.

Fax: -31-8370-27046.

4

ISSS COOPERATING JOURNALS
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1. ARID SOIL RESEARCH AND REHABILITATION

Size: Four issues per year in one volume of ca. 400 pages.

Publisher: Taylor & Francis New York

Editor-in-chief: Prof.Dr. J. Skujins, Utah State University, USA.

Full subscription rate incl. postage (1993): US\$ 99.00.

Personal subscription rate for ISSS members (1995): US\$ 74.00.

2. BIOLOGY & FERTILITY OF SOILS

Size: Eight issues per year, in two volumes of about 750 pages.

Publisher: Springer Verlag, Berlin-Heidelberg-New-York-Tokyo.

Editor-in-Chief: Prof.Dr. J.C.G. Ottow, Giessen, Germany.

Full subscription rate for the two volumes, excluding surface mailing: DM 956.00.

Personal subscription price for ISSS members for the two volumes, excluding postage and handling DM 597.60.

3. CATENA, an interdisciplinary journal of Soil Science-Hydrology-Geomorphology, focusing on Geoecology and Landscape Evolution.

1995: Volume 23-25 in 12 issues

Publisher: Elsevier Science Publishers, Amsterdam, the Netherlands

Joint editors: R.B. Bryan, Toronto, Canada, R. Herrmann, Bayreuth, Germany, P. Jungerius, Amsterdam, the Netherlands, J. Poesen, Leuven, Belgium, R. Webster, Zürich, Switzerland and D. Yaalon, Jerusalem, Israel

Full subscription rate, including postage and handling: Dfl 1047.00/US\$ 551.00

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4. GEODERMA, an International Journal of Soil Science.

1995: Volumes 63-68 in 24 issues

Publisher: Elsevier Science Publishers, Amsterdam, the Netherlands.

Editor-in-Chief: Prof.Dr. J. Bouma, Wageningen, The Netherlands, Prof.Dr. J.A. McKeague, Ottawa, Ont., Canada and Prof. D.L. Sparks, Newark, DE, USA

Full subscription rate, including postage: Dfl 2226.00/US\$ 1172.00.

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5. SOIL BIOLOGY & BIOCHEMISTRY

Size: 12 issues per year, in one volume of about 1800 pages.

Publisher: Elsevier Science Publishers, Amsterdam, the Netherlands

Editor-in-Chief: Prof.Dr. J.S. Waid, Mooloolaba, Australia.

Full subscription rate, including surface mailing: £ 590.00 (US\$ 910.00). Personal subscription price of ISSS members: £ 70.00

6. SOIL TECHNOLOGY, journal concerned with applied research and field applications on soil physics, soil mechanics, soil erosion and conservation, soil pollution, soil restoration, drainage, irrigation and land evaluation.

Size: Quarterly, 1 volume (4 issues) per year, about 400 pages.

Publisher: Elsevier Science Publishers, Amsterdam, The Netherlands

Editors-in-Chief: Dr. D. Gabriels, Prof. Dr. R. Horn, Prof.Dr. M. Kutilek, Dr. M.J.M. Römkens.

Full subscription rate 1994, incl. surface mailing: Dfl. 326.00/US\$ 176.00

Personal subscription rate for ISSS members 1994 (available from the publisher only): Dfl 116.00/US\$ 63.00 (72% discount)

7. PEDOBIOLOGIA, international journal, focusing on soil biology, especially on soil zoology and microbiology.

Size: 6 issues per year, in 1 volume with 450 pages.

Publisher: G. Fischer, Jena, Stuttgart, New York.

Editors-in-chief: Prof.Dr. M. Schaefer and Dr. J. Schauermann, Göttingen, Prof.Dr. G. Weigmann, Berlin.

Subscription rate 1993: DM 330.00, plus postage

Reduced subscription-price for personal subscribers of ISSS: DM 94.00, plus postage.



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Land Evaluation. Part I: Principles in Land Evaluation and Crop Production Calculations; Part II: Methods in Landvaluation; Part III: Crop requirements. C. Sys, E. van Ranst and J. Debaveye. Agricultural Publications No.7. General Administration for Development Cooperation (AGCD), Brussels, 1991. (I) iii + 273 p. (II) iii + 247 p. (III) ii + 139 p. Paperback.

This is a completely revised edition. It has to be considered as a practical manual on land evaluation for agricultural purposes. Besides the explanation of the principles in land evaluation, it provides the necessary guidelines for crop production calculations and for the most important practical methods in land evaluation useful to anyone engaged in assessing the suitability of land for agricultural development. It was the authors' aim to comment particularly on the soil science and the land-use aspect of land evaluation, based on the fairly stable physical resources (soil, topography and climate).

The socio-economic aspects are variable and dependent on social and political decisions. Though not dealt with in detail, they are mentioned wherever they are important for taking certain decisions.

Price: free of charge

Orders to: AGCD, Brederodestraat 6, B-1000, Bruxelles, Belgique.

The Turnover of ^{14}C Labelled Groundnut Straw, Soil Organic Matter Dynamics, and CO_2 Evolution in an Alfisol and a Vertisol of Semi-arid Tropical India. S. Singer. Hamburger Bodenkundliche Arbeiten Band 19, 1993, x + 235 p. ISSN 0724-6382. Paperback.

In the semi-arid tropics of India, Alfisols (Luvisols) and Vertisols cover extensive areas. The emphasis of this study was laid on the turnover of ^{14}C labelled groundnut residues and on the field measurements of CO_2 evolution to short-term climatic changes with different treatments.

In the laboratory, the turnover of these residues was examined under several, but constant, moisture and temperature conditions. These experiments show the potential mineralization of applied residues and soil organic matter. *Orders to:* Verein zur Förderung der Bodenkunde in Hamburg, Allende-Platz 2, D-2000 Hamburg 13, Germany.

Acceptance of Soil and Water Conservation. Strategies and Technologies. Topics in Applied Resource Management in the Tropics No 3. E. Baum, P. Wolff and M.A. Zöbisch, editors. Deutsches Institut für Tropische und Subtropische Landwirtschaft, Witzenhhausen, 1993, 458 p. ISBN 3-9801686-4-6. Paperback.

Recent research has shown that socio-economic conditions play a much more important role for the achievement of sustainability of production than had previously been anticipated. It is known that the human element is the key factor for the degree and extent of appropriate production technologies being adopted by land users. For the same reason, acceptance and adoption of soil and water conservation measures do not entirely depend on their technological appropriateness.

The contributions contained in this volume touch on general and specific issues as well as give examples of adoption and rejection of conservation techniques under different conditions and for varying reasons. They try to give answers to central questions like: what makes conservation measures acceptable or unacceptable to the land

users, or which conditions need to be fulfilled to make conservation measures acceptable? Contributions were received from five continents, which may show the current worldwide concern for this topic.

Price: DM 29.80

Orders to: DITSL, Postfach 1652, D-37206 Witzenhhausen, Germany.

Mires: Process, Exploitation and Conservation. A.L. Heathwaite and Kh. Göttlich, editors. John Wiley & Sons, Chichester, New York, 1993, x + 506 p. ISBN 0-471-93353-8. Hardback.

This volume brings together recent research into processes in mires, including their physical, chemical, hydrological and palaeoenvironmental properties. This research is examined in the context of the exploitation of the peat resource, and more recently, the attempts to conserve and regenerate the remaining mire remnants.

The book has been substantially revised by L. Heathwaite from Göttlich's original German text *Moor- und Torfkunde*, in order to incorporate the extensive mires research undertaken in the United States and Europe, and in particular Britain.

This book is the first attempt at integrating the scientific basis of mires research with the practical requirements of understanding how peat resources have been used, and how they might be protected and environmentally managed.

Price: GBP 79.95

Orders to: see below.

Soil Gas and Related Methods for Natural Resource Exploration. R.W. Klusman. John Wiley & Sons, Chichester, New York, 1993, xi + 483 p. ISBN 0-471-93892-0. Hardback.

Most of the widely used geochemical methods for natural resource exploration involve solid media. This book details how a formerly purely experimental technique relating to the study of soil gas can now be applied to the prospection of oil, gas, mineral and geothermal resources.

Contrary to popular belief that "hydrocarbon reservoirs absolutely do not leak", a large quantity of evidence has accumulated, indicating that gases can be transported from the depths of an oil and gas reservoir to the surface without significant dilution and dispersion. Soil gas exploration methods are now beginning to gain the acceptance that they deserve, and this book aims to accelerate the process.

This text offers comprehensive coverage of the applications of soil gas methods to a range of natural resources in order to emphasize the interdisciplinary methods now available. This book is divided into two, the first section dealing with applications to oil and gas, and the second with mineral and geothermal resources.

In the first section theories of vertical migration and microseepage of light hydrocarbons are critically reviewed.

Physical, chemical and biogeochemical processes, which modify the concentrations of light hydrocarbons in the soil and sediment environment, are discussed as potential complications in the interpretation of soil gas data. The direct measurement of light hydrocarbons in onshore and offshore environments for petroleum exploration is discussed. A chapter is included on the use of a variety of special statistical techniques for increased reliability in

interpretation.

The second section covers the relevant chemical and biogeochemical reactions which produce gases during the weathering of mineral deposits. The application of soil gas measurements to detect base metal, precious metal and uranium deposits are reviewed. The detection of geothermal resources using soil gases is covered in a single chapter.

Price: GBP 95

Orders to: see below.

Crop Protection and Sustainable Agriculture. Ciba Foundation Symposium 177. John Wiley & Sons, Chichester, New York, 1993, x + 285 p. ISBN 0-471-93944-7. Hardback.

One of the most important issues in the world today is how to feed ever-increasing numbers of people. This book considers the role of crop protection in achieving sustainability in agriculture, with reference to both intensive and extensive systems. In most areas of the world, the yields obtained are much lower than potential yields; much of the deficit is due to crop damage by pests or by diseases. Sustainability requires biological control in place of chemical treatments. This includes encouraging natural predators and parasites of the pest organisms, deployment of simple traps to attract specific pests, and the development of resistant crop varieties, either through conventional breeding or through biotechnology.

Ideally, the most suitable methods for a given situation will be merged in a programme of integrated pest management. This should be combined with optimal use of nutrients, water and other inputs to achieve the highest possible productivity, while maintaining sustainability to preserve natural resources for future generations. Such programmes are being developed but the knowledge and means to implement them must be transmitted worldwide.

Different ways of teaching farmers, particularly by encouraging them to experiment and learn something for themselves, are discussed. The book also considers the effects of governmental policies and the role of nongovernmental organizations in the development of sustainable agriculture.

Price: GBP 45

Orders to: see below.

Landscape Sensitivity. British Geomorphological Research Group Symposia Series. D.S.G. Thomas and R.J. Allison, editors. John Wiley & Sons, Chichester, New York, 1993, xiii + 347 p. ISBN 0-471-93636-7. Hardback.

Environmental change has been a topic of geomorphological research for many years, with its importance increasingly recognized today. The sensitivity of landscapes to environmental change is a key concern of scientists and policy makers. This book takes a broad stance in order to link individual systems and improve our understanding of the total environment.

Landscape sensitivity is viewed in terms of the response of landscapes and landforms to changes in geomorphic processes, to shifts in climatic parameters and to human disturbance. The book contains empirical studies, overviews and modelling papers, organized into three main sections. The first relates sensitivity to geomorphic processes and climate change, the second to land-use change and the third to built environments.

Price: GBP 65

Orders to: John Wiley & Sons, 605 Third Avenue, New York NY 10158-0012, U.S.A. or: John Wiley & Sons, Baffins Lane, Chichester, West Sussex PO19 1UD, England.

Agricultural Dimensions of Global Climate Change. H.M. Kaiser and T.E. Drennen, editors. St. Lucie Press, Delray Beach, 1993, ix + 311 p. ISBN 0-9634030-3-6. Hardback.

This book discusses agricultural dimensions of global climate change. Research and policy issues are covered and a multidisciplinary view of global climate change and agriculture is presented. Major sections cover the contribution of agriculture to greenhouse gas emissions (including an investigation as to whether monitoring and verification of such emissions would work) and the impact of global climate change on agriculture.

The book examines such important issues as global food availability, distributional effects between developing and developed countries, agricultural adaptation possibilities, and whether CO₂ enrichment will benefit agriculture. This publication addresses communication difficulties between researchers and policy makers and suggests solutions.

Price: USD 55 (pre-pub) plus shipping

Orders to: St. Lucie Press, 100 E. Linton Blvd., Suite 403 B, Delray Beach, FL 33483, U.S.A.

Gesteinsbildende Minerale im Dünnsschliff. 2. Auflage. H. Pichler und C. Schmitt-Riegraf. Ferdinand Enke Verlag, Stuttgart, 1993, x + 233 S. ISBN 3-432-95522-7.

Dieses knapp gefaßte und übersichtliche Lehrbuch der Gesteinsmikroskopie konzentriert sich auf die gesteinsbildenden Minerale im weitesten Sinne. Zahlreiche Tabellen fassen alle wesentlichen Daten zusammen. Die Autoren stellen die Wichtigkeit der Paragenese für das Suchen und Erkennen von Mineralien heraus. Der erste Abschnitt führt in die Grundbegriffe der Kristalloptik, der Polarisationsmikroskopie und den praktischen Umgang mit dem Mikroskop ein. Zahlreiche Dünnsschliff-Fotos und Zeichnungen bilden die vorgestellten Minerale ab.

Die 2. Auflage ist durchgehend überarbeitet, viele Abbildungen wurden ausgetauscht und ergänzt.

Preis: DM 54

Bestellungen an: Ferdinand Enke Verlag, Postfach 30 03 66, D-70443 Stuttgart, Deutschland.

Code of Good Agricultural Practice for the Protection of Soil. Ministry of Agriculture, Environmental Protection Division, London, 1993, vi + 55 p. Paperback.

Practical advice is provided for farmers and other users of the land regarding the care and protection of soils. The introduction, is concerned with the many laws which are concerned with soil protection. The situation in the UK is complicated by there being no one Act of Parliament which brings together all aspects of soil protection. The subjects covered include those legal aspects which relate to domestic waste, special (toxic) waste, sewage sludge, contaminated land, mineral working, soil stripping, contamination by radioactive substances and the protection of archaeological sites.

Part 2 is involved with the management of soil fertility and has a discussion of biological activity and the way this is affected by acidification, plant nutrient content and levels of organic matter. The physical problems of soil compaction, erosion by wind and water, and removal of soil and peat deposits for commercial gain is dealt with in Part 3. Soil contamination is dealt with in Part 4 with reference to toxic metals, oil spillages, as well as the contamination arising from atmospheric and industrial deposition. The effects on the soil from the use of animal manures, pesticides and the occasional episode of sea-water flooding are also described in straight-forward terms.

Part 5 deals with the problems encountered with the restoration of soils on land disturbed by mining, landfilling

of wastes, and other civil engineering activities. Advice is provided on soil storage, re-instatement and aftercare in the rehabilitation of sites. Appendices contain "permissible" levels of inorganic and organic contaminants currently acceptable for British soils.

Price: free of charge.

Orders to: MAFF Publications, London SE99 7TP, England. E.M.Bridges, Wageningen, Netherlands.

Agro-ecological Regions of India 1:5,000,000. J.L. Sehgal, D.K. Mandal, C. Mandal and S. Vadivelu, editors. Oxford & IBH Publishing, New Delhi, 1993, 132 p. + map. ISBN 81-204-0821-7, Paperback.

This work was undertaken to understand better the agro-ecological regions of India, on which agriculture depends. In the Indian context, the soil and climatic aspects become all the more crucial in the absence of irrigation facilities in more than three-fourth of the country. A soil resource mapping of the country was undertaken to identify and delineate different soils. This is shown on soil resource maps of different states (1:250,000) and of the country (1:1 million). The agro-ecological map was prepared by superimposing the maps of bio-climate and length of growing period on the soil-landscape map resulting in various agro-ecological regions having comparable soils, physiography, climate and length of growing period.

Price: Rs. 125. Outside India: USD 25 (postage USD 11)

Orders to: Oxford & IBH Publishing, 66 Janpath, New Delhi 110 001, India

Utilization of Soil Survey Information for Sustainable Land Use. J.M. Kimble, editor. Soil Conservation Service, 1993, v + 271 p. Paperback.

This volume contains the Proceedings of the Eighth International Soil Management Workshop held in Oregon, California and Nevada in July 1992. The meeting emphasized the use of soil survey information for interpretations, and its goal was to insure that land use planners, policy makers, and others are using this information, so that there will be productive and sustainable land use in the future. Some of the issues addressed by the participants involved many recent advances in computer technology and in the agricultural sciences, the increased emphasis on sustainable agriculture, and the relationship of these issues both to the use of soil survey information and interpretations and to the need to assure protection of the environment.

Orders to: National Leader, Soil Survey Interpretations Staff, Federal Building, Room 152, 100 Centennial Mall North, Lincoln, NE 68508-3866, U.S.A.

Water Flow in Soils. T. Miyazaki. Marcel Dekker, New York, Basel, 1993, vii + 296 p. ISBN 0-8247-8982-2. Hardbound.

This volume bridges the gap between hydrology and soil physics by examining soil water flow in laboratories and fieldwork as well as providing nonmathematical explanations - introducing phenomenal approaches with logical descriptions of water flow in soils.

Presenting easy-to-understand reasoning with concrete examples, it discusses the fundamental concept of water flow in uniform soils, in slopes, and in deep zones ... treats preferential flows of water, such as bypassing, funnel, and fingering flow ... explores the influence of temperature gradients in soils and the peculiarity of thermally induced water flow in soils ... covers the effects of microbiology on water flow in soils ... analyzes spatial variability and field heterogeneity of soil physical properties ... and more.

Price: USD 125

Orders to: see below.

Hazardous Waste Site Soil Remediation. Theory and Application of Innovative Technologies. D.J. Wilson and A.N. Clarke, editors. Marcel Dekker, New York, Basel, 1993, x + 567 p. ISBN 0-8247-9107-X. Hardbound.

This guide introduces the latest methods developed for remediating contaminated soils and aquifers, including chemical fixation/stabilization, soil vapour extraction, thermally enhanced vapour stripping, biodegradation, and air sparging - written in a style accessible to nonspecialists.

Addressing fundamental aspects of groundwater hydrology and mass transport and examining the behavior of dense nonaqueous-phase liquids, the book analyzes the difficulties associated with pump-and-treat operations ... explores the removal of volatile organics from the vadose zone through soil vapour extraction ... describes the cost-effective ex situ technique of thermal desorption of soil contaminants ... discusses enhanced biodegradation for on-site remediation of soils and groundwater ... details the relatively new processes of air sparging in the zone of saturation ... and much more.

Price: USD 165

Orders to: Marcel Dekker Inc., 270 Madison Avenue, New York, NY 10016, U.S.A. or: Marcel Dekker, AG/BS, Hutgasse 4, Postfach 812, CH-4001 Basel, Switzerland.

Solving Problems in Soil Mechanics. 2nd edition. B.H.C. Sutton. Longman Scientific and Technical, Harlow, 1993, ix + 267 p. ISBN 0-582-08971-9. Paperback.

This book provides a fully revised and updated introduction to the rapidly growing science of soil mechanics. The subject matter is presented as solutions to typical examination and assignment type questions. A full discussion of the theory behind the principles is discussed within the solutions. Additions for this second edition include: a new chapter on the technique of site investigation and testing, an introduction to Critical State theory, examples of computer programs using BASIC, and many new problems and worked examples.

Topics covered include the classification of soil, the effect of water on soil, the shear strength and consolidation properties of soil, the investigation of soil properties, the effect of soil properties on the design of foundations and earth-retaining structures and the stability of earth slopes.

Price: GBP 13.50

Orders to: see below.

Biogeography. A Study of Plants in the Ecosphere. 3rd edition. J. Tivy. Longman Scientific and Technical, Harlow, 1993, xix + 452 p. ISBN 0-582-08035-5. Paperback.

The third edition of this classic text, incorporating new data and concepts, presents a wide-ranging, broad based study of variations in form and functioning of the biosphere at regional and global scale. Divided into three parts: the biosphere, ecosystems and biotic resources, it examines the characteristics of and interaction between organic and inorganic components of the ecosphere. Part one analyses the variation in the composition and structure of the earth's biomass, and the effect of ecological variables on the distribution of organisms. Part two looks at the links between the organic and inorganic, such as forests, grasslands and deserts. The final part emphasises the impact of humans and concludes with a review of the problems of maintaining biological diversity while preventing the depletion of organic resources.

Key themes include: the integral role of humans as a dominant ecological factor; important role of the plant biomass - the primary biological product which forms the vital food link between all organisms; scope of biogeography, providing a base from which specialised studies can be developed. Assuming no previous knowledge, jargon is kept to a minimum and the author provides detailed explanations of biological and ecological processes.

Price: GBP 15.99

Orders to: Longman Scientific and Technical, Longman House, Burnt Mill, Harlow, Essex, CM20 2JE, England. In the U.S.A.: John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158, U.S.A.

Cultura do Milho. Fatores que afetam a produtividade. L.T. Büll e H. Cantarella, editores. Associação Brasileira para Pesquisa da Potassa e do Fosfato, Piracicaba, 1993, xvi + 301 p.

O Simpósio sobre Fatores que Afetam a Produtividade do Milho e do Sorgo (julho 1990) permitiu que se discutissem as causas da baixa produtividade do milho no Brasil bem como as do sorgo. O livro contém 11 contribuições dos diversos autores.

Comendado: Associação Brasileira para Pesquisa da Potassa e do Fosfato, Caixa Postal 401, 13400-970 Piracicaba-SP, Brasil.

Soil Technology. Applied Soil Science. P.A. Hazelton and A.J. Koppi, editors. Australian Society of Soil Science (NSW Branch), Sydney, and Soil Science, University of Sydney, Sydney, 1993, xi + 449p. ISBN 0-9587460-7-9. Paperback.

By the year 2000, it is estimated that the world population will increase by 50% and all but one-tenth of this increase will be in the developing countries. Therefore, it is necessary to understand clearly the effects that this increase will have on the environment. Irrespective of whether the impacts are from industrial, urban, rural, recreational or extractive pursuits, professionals working in the environmental field are being asked to include a study of the effects of a proposed activity on the soil. Accurate effective soil assessment is critical, not only for sustainable agriculture, but also for urban and industrial development. There is a need to understand the nature and behaviour of the chemical, physical and biological properties of the soil.

This course represents accumulated expertise by professionals from various fields of soil science and from different areas of employment.

Orders to: Dpt. of Conservation and Land Management, P.O. Box 573, Wollongong East NSW 2520, Australia.

Sustainability of Land Use Systems. Tropical Agroecology 7. Z. Hailu and A. Runge-Metzger. Deutsche Gesellschaft für Technische Zusammenarbeit, Eschborn, together with Verlag Josef Margraf, Weikersheim, 1993, v + 168 p. ISBN 3-8236-1219-0. Paperback.

The question of sustainable development has increasingly drawn the attention of many international development research institutions and scholars particularly concerned with the challenge imposed on prevailing production systems in the developing world. The main objective thereby is twofold: the incorporation of sustainability as an objective in the traditional set of goals of agricultural development research; and to develop and use sustainability as a measurement criterion to design and evaluate alternative systems by investigating and analyzing the reasons why existing systems are no more capable of perpetuating agricultural growth.

Price: DM 32

Orders to: Margraf Verlag, Postfach 105, D-97985 Weikersheim, Germany.

Geographic Information Systems for Environment and Development. Geoprocessing Series 22. O. Simonett. Geographisches Institut der Universität Zürich, 1993, viii + 190 p. ISBN 3-906254-22-4. Paperback.

The main objective of the research is to give a comprehensive assessment of Geographic Information Systems (GIS) applied for the establishment of sustainable development strategies in Third World countries. The central question on how the technology should be used to meet broader environmental goals has been approached at three levels: the evaluation of published background literature, the development of a conceptual GIS model for environment and development, and the assessment of case studies in Uganda and Nepal. As the underlying methodology, participatory action research principles have been applied, an approach chosen because of its potential to link theory with practice.

Price: SFR 35

Orders to: Universität Zürich-Irchel, Geographisches Institut, Winterthurerstrasse 190, CH-8057 Zürich, Switzerland.

Hillslope Materials and Processes. 2nd edition. M.J. Selby. Oxford University Press, Oxford, 1993, xv + 451 p. ISBN 0-19-874183-9 Paperback; 0-19-874165-0 Hardback.

This second edition has the same general purpose as the first one: to provide an integrated review of the basic knowledge and methods which form the foundation for advanced study and contributions to developments in the understanding of hillslopes.

Since the first edition, not only has knowledge advanced but an interdisciplinary approach to much of the research has become increasingly common and productive. These developments are reflected in this book by the threefold expansion of the bibliography and by the bringing together of the approaches and scientific knowledge from the disciplines of geology, civil engineering, hydrology, soil science, ecology, and geomorphology to produce a comprehensive text which makes possible an integrated understanding of hillslopes. Some subjects are more extensively considered, such as the nature of chemical bonding, the properties of mineral particles and fabrics of weak rock, rheology of rock and soil, hillslope hydrology, hillslope stratigraphy, and landslide hazard vegetation.

Price: GBP 22.50 (paperback); GBP 48 (hardback).

Orders to: Oxford University Press, Walton Street, Oxford OX2 6DP, England.

The Role of Plant Nutrients for Sustainable Food Crop Production in Sub-Saharan Africa. H. van Reuler and W.H. Prins, editors. Dutch Association of Fertilizer Producers, Leidschendam, 1993, x + 232 p. ISBN 90-801673-1-2. Paperback.

It is well-known that food crop production has to be increased in Sub-Saharan Africa. Many people are concerned about the impact of the modern agricultural production techniques that will be needed to achieve such an increase. One particular concern is in respect of threats to the environment. Some consider fertilizer use to be one of the major causes of agriculture's environmental problems.

To give an objective assessment of the role of plant nutrients for sustainable food crop production in Sub-Saharan Africa, a number of scientists was invited to review the subject from different angles. The book reports

the findings of the scientists. Part 1 provides general information, Part 2 contains two case studies at country level, for Malawi and Ethiopia. The contents of the book give opportunity for policy makers to decide on a course of action to increase food production in a sustainable fashion.

Price: USD 30 or NLG 55 (students: USD 25 or NLG 46)
Orders to: VKP, P.O.Box 443, 2260 AK Leidschendam, The Netherlands.

Soil Resource Map of India. National Bureau of Soil Survey & Land Use Planning, Nagpur.

Soils form a valuable natural resource of any nation as they provide basic needs for our existence. Due to ever increasing population pressure and misuse of this basic resource, the soils are in a continuous process of degradation. In order to prepare a charter of soil resource, mapping based on soilscape relationship becomes essential. Soil maps show a comprehensive account of soils giving their potential and problems. These maps are not only useful for rationalising land use, but also form a base for delineating agro-ecological zones so essential for maintaining eco-balance and for transfer of agro-technology.

Since some years, soil resource mapping of different states of India was undertaken on 1:250,000 scale, and published at 1:500,000. To date soil resource maps of several states have already been prepared and printed. Soil maps of other states are in the pipeline.

Soil Resource Map of India - West Bengal. National Bureau of Soil Survey & Land Use Planning, Nagpur. 4 sheets + executive summary, 40 p. ISBN 81-85460-12-4.

This is the first map in the series at 1:500,000. It shows 115 mapping units, at the level of association of soil families with phases. The area of each mapping unit has been calculated and is given in the legend. The legend also gives information on several parameters of soils useful for plant growth in a manner easily understood by the extension staff and other use agencies. Classification in Soil Taxonomy terms are also given for national and international understanding.

Price: India: Rs 400; *Elsewhere:* USD 75.

Orders to: see below.

Soil Resource Map of India - Pondicherry and Karaiikal. National Bureau of Soil Survey & Land Use Planning, Nagpur. 7 sheets + executive summary, 24 p. ISBN 81-85460-05-1.

This is the first in the series of 1:100,000 maps. The set of seven maps and executive summary contains soil maps showing 13 and 8 mapping units respectively, at the level of associations of soil series; and soil suitability maps for a number of rainfed crops and irrigated crops.

Price: India: Rs 50 per sheet; *Elsewhere:* USD 75 for complete set.

Orders to: The Documentation Officer, NBSS & LUP, Amravati Road, Nagpur 440 010, India.

Agro-Ecosystem Modelling. Special issue of Modeling of Geo-Biosphere Processes, Vol.2 No 1-4. 350 p.

This volume contains 24 selected papers of the International Congress on Agro-Ecosystem Modelling held in Braunschweig in October 1992.

Price: Vol. 2: DM 198; USD 132 (institutional rate)

Orders to: in USA/Canada: Catena Verlag, P.O.Box 1897, Lawrence, KS 66044-8897, U.S.A.; *Elsewhere:* Catena Verlag, Brockenblick 8, D-38162 Cremlingen 4, Germany.

Sustainable Agriculture and the Environment in the Humid Tropics. National Research Council, National Academy Press, Washington, 1993, xv + 702 p. ISBN 0-309-04749-8. Hardback.

Rain forests are rapidly being cleared in the humid tropics to keep pace with food demands, economic needs, and population growth. At the same time, important natural resources are being eroded or lost due to unsound practices. This book provides a critically needed direction for developing strategies that both mitigate land degradation, deforestation, and biological resource losses and help the economic status of tropical countries. It includes a practical discussion of 12 major land use options for boosting food production and enhancing local economies while protecting the natural resource base, recommendations for developing technologies needed for sustainable agriculture, and a strategy for changing policies that erode natural resources and biodiversity. The second part of this voluminous publication presents country profiles of Brazil, Indonesia, Ivory Coast, Malaysia, Mexico, the Philippines and Zaire. An appendix gives information on emission of greenhouse gases from tropical deforestation and subsequent uses of the land.

Price: USD 49.95

Orders to: National Academy Press, 2101 Constitution Avenue, NW Box 285, Washington, DC 20055, U.S.A.

Introduction to Mineral Sciences. A. Putnis, Cambridge University Press, Cambridge, 1992, xx + 457 p. ISBN 0-521-42947-1. Paperback.

The subject of mineralogy is moving away from the traditional systematic treatment of mineral groups toward the study of the behaviour of minerals in relation to geological processes. A knowledge of how minerals respond to a changing geological environment is fundamental to our understanding of many dynamic earth processes.

By adopting a materials science approach, the book explains the principles underlying the modern study of minerals, discussing the behaviour of crystalline materials with changes in temperature, pressure and chemical environment. The concepts required to understand mineral behaviour are often complex, but are presented here in simple, non-mathematical terms for undergraduate mineralogy students.

After introductory chapters describing the principles of diffraction, imaging and the spectroscopic methods used to study minerals, the structure and behaviour of the main groups of rock-forming minerals are covered, and the role of defects in the deformation and transformation of a mineral are explained. The energy changes and the rate of transformation processes are introduced using a descriptive approach rather than attempting a complete and rigorous treatment of the thermodynamics and kinetics.

Orders to: Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, U.K.

Australian Laboratory Handbook of Soil and Water Chemical Methods. G.E. Rayment and F.R. Higginson. Inkata Press, Melbourne, Oxford, 1992, xvii + 330 p. ISBN 0-909605-68-8. Hardback.

The chemical analysis of soils and water is affected by the choice and application of analytical methods, by the quality of field sampling, and by the pre-treatment and preservation of samples. The time taken to complete the analysis may be a further variable.

This Handbook is designed to minimise the effect of these variables and promote standardisation of soil and water analysis throughout Australia. It has been prepared with the practising chemist or analyst in mind. The ready-to-use methods are described in sufficient detail for the

book to be used as an operational laboratory methods manual.

Soil and water chemical methods include sampling and sample preparation, and measuring electrical conductivity and pH. Soil analysis includes: chloride, carbon, nitrogen, phosphorus, sulfur, gypsum, micronutrients, iron, aluminium, silicon, potassium and carbonates, as well as saturation extracts, ion exchange properties and lime requirements. Water analysis includes: chloride, fluoride, nitrogen, phosphorus, silica, sulfate, micronutrients and soluble bases, as well as sodium absorption and other derived properties.

This is the third volume in a series of three handbooks; the others are: R.C. McDonald et al., *Australian Soil and Land Survey Field Handbook* (Inkata Press, 1984); and R.H. Gunn et al., *Australian Soil and Land Survey Handbook: Guidelines for Conducting Surveys* (Inkata Press, 1988).

Price: AUD 74.95

Orders to: Butterworth/Heinemann, 271-273 Lane Cove Road, North Ryde, NSW 2113, Australia.

Cultivating Knowledge. W. de Boef, K. Amanor and K. Wellard, with A. Bebbington. Intermediate Technology Publications, 1993, xvi + 206 p. ISBN 1-85339-204-9. Paperback.

The international debate on biodiversity has resulted in renewed interest in the role of farmers and local communities in the management of natural resources and crop genetic diversity. In recent years it has become apparent that the local crop diversity in the South is threatened by the promotion of modern varieties. This book reflects new approaches and concepts in the field of conservation and the development of local crops.

Case studies from Africa, Latin America and Asia address these issues from different angles, examining the significance of local knowledge, and documenting new approaches and methodologies. The book looks at the policy issues raised by the expansion of agribusiness, and the need to consider the interests of small-scale farmers.

Price: paperback: GBP 8.95; USD 17.50. hardback: GBP 22.50; USD 42.95.

Orders to: IT Publications, 103-105 Southampton Row, London WC1B 4HH, U.K.

Manual of Soil Laboratory Testing. Vol. 2: Permeability, shear strength and compressibility tests. 2nd edition. K.H. Head. Pentech Press, London, 1994, xi + 440 p. ISBN 0-7273-1319-3. Hardback.

This revised edition takes into account the changes and additions to BS 1377 in the 1990 revision of that Standard, and subsequent amendments. Reference is also made to some of the latest ASTM standards.

A new section on Calibration, complementary to that in Volume 1 (second edition) has been added, taking into account the requirements on NAMAS for calibration of laboratory test instruments and reference standards.

This volume covers standard laboratory tests for the measurement of soil permeability, GBR value, shear strength (total stress and fully-drained) and consolidation characteristics. Some miscellaneous tests that are becoming increasingly significant have been added to this revised edition, as well as the ring shear test and an expanded treatment of consolidation tests on peat.

Price: GBP 55.

Orders to: John Wiley & Sons, 605 Third Avenue, New York NY 10158-0012, U.S.A. or: John Wiley & Sons, Baffins Lane, Chichester, West Sussex PO19 1UD, England.

Groundwater Flow in Saturated and Unsaturated soil. H. Zaradny; edited by R.B. Zeidler. A.A. Balkema, Rotterdam, Brookfield, 1993, xiii + 279 p. ISBN 90-5410-100-8. Hardback.

Groundwater flow in phenomena are analyzed in broad quantitative terms. Using relationships of soil physics, meteorology, agrohydrology and kindred fields the author shows solutions to the problem of groundwater flow in three-phase soil media. An important advantage of the theories elaborated here consists in treatment of the external forcing along with the capacity of the system to transport water.

After introductory concepts, data and quantities, such as e.g. hydraulic conductivity, basic equations of groundwater motion in soil media are derived. The Richards equation is shown to apply to both saturated and unsaturated media, anisotropic as well as inhomogeneous. The pertinent elastic properties of the soil-water medium are also discussed. The linkage between the Richards, Laplace, Boussinesq and Fokker-Planck equations is illustrated for different regimes of saturation, isotropy and homogeneity.

One chapter presents crucial numerical methods required in solution of the parabolic and elliptic equations of groundwater flow. The last six chapters contain examples of solutions, from one-dimensional intake by plant root systems, through drainage problems and infiltration from channels to stratified soil, up to unsteady seepage in complex dykes and dams, and interception of water in a small catchment area.

Price: NLG 165, USD 95, GBP 61.

Orders to: see below.

History of Soil Science. From its Inception to the Present. I.A. Krupenikov. A.A. Balkema, Rotterdam, Brookfield, 1993, x + 350 p. ISBN 90-6191-939-8. Hardback.

This is a comprehensive book devoted to the history of soil science, from the earliest times to the present. The author examines the development of man's knowledge regarding soils during the era of ancient civilizations of Greece and Rome with developed irrigation, in the feudal period in the Orient, in Western Europe, and in Russia. He traces the history of ideas about soil in 19th century Europe, the founding of modern genetic soil science by V.V. Dokuchaev, and its further development. He also reviews the roles played by Volney, Ramann, and Hilgard in the making of this new science, the great development of soil science in Russia, and the modern developments in soil research in the USA, Western Europe and Japan. The book identifies the main trends in the history of soil science and designates appropriate historical periods.

Price: NLG 165

Orders to: see below.

Soft Soil Properties and Testing Methods. Geotechnika 7. L.S. Amaryan. A.A. Balkema, Rotterdam, Brookfield, 1993, x + 180 p. ISBN 90-5410-134-2. Hardback.

The book deals with soft soils embodying different kinds of organomineral dispersed systems of low lithification. They incorporate both peat and peat-type soils, sapropel deposits and marine mud. This genetic-lithologic and structural-mechanical group of organomineral soils is characterized by the presence in the solid phase of hydrophilic components, a high degree of saturation and compressibility, the presence of strong interparticle bonds, low density and low bearing capacity.

The primary goal of this book has been formulated as an elaboration of a methodological and technical background for universal exploration of structural-mechanical and hydrophysical properties and composition of soft

soils, together with establishment of theoretical fundamentals and practical recommendations for prediction of the behaviour of such soils under loading, at dewatering, and due to other effects.

The solution of this task has been possible because of the author's experience in the derivation and extensive practical implementation of improved methods aimed at investigating the properties of soft organomineral soils, along with elaboration of special techniques for computation of the stress-strain conditions under varying load.

Price: NLG 125, USD 70, GBP 46.

Orders to: A.A. Balkema Publishers, P.O.Box 1675, NL-3000 BR Rotterdam, The Netherlands; *or:* A.A. Balkema Publishers, Old Post Road, Brookfield, VT 05036, U.S.A.

Umweltbeobachtung durch Fernerkundung. R. Theilen-Willige, Ferdinand Enke Verlag, Stuttgart, 1993, 120 S. ISBN 3-432-25181-5. Kartoniert.

Flugzeug- und Satellitenaufnahmen stellen heute unverzichtbare Hilfsmittel der Umweltbeobachtung dar. Sie tragen zur systematischen Bestandsaufnahme wichtiger Umweltparameter, wie z.B. des Klimas, der Vegetation oder des Oberflächenwassers bei. Ihre Große Bedeutung liegt in der kontinuierlichen Überwachung großer Gebiete, so daß Veränderungen von Umweltbedingungen schnell erkennbar werden. Dieses Buch bietet einen Überblick über die Möglichkeiten der Fernerkundung bei der Umweltbeobachtung und bei der Erkennung von Umweltproblemen sowie über die Verwertbarkeit von Fernerkundungsdaten bei der Umweltplanung. Es ist für Personen mit geowissenschaftlichen Vorkenntnissen geeignet, z.B. für Studenten an Fachhochschulen und Universitäten in umweltbezogenen Studiengängen wie z.B. Geologie, Bodenkunde, Geoökologie, Landschaftspflege etc. Der verständliche Stil ermöglicht auch Nicht-Fachleuten einen Einstieg in diese Materie. Dies ist wichtig, da in vielen umweltbezogenen Behörden und anderen Institutionen, die diese Möglichkeiten der Fernerkundung nutzen können, eine relativ „einfache“ Informationsübersicht fehlt.

Preis: DM 78

Bestellungen an: F. Enke Verlag, Postfach 30 03 66, D-70443 Stuttgart, Germany

Sustainable Food Production in Sub-Saharan Africa.

1. IITA's Contributions. International Institute of Tropical Agriculture, Ibadan, 1992, vii + 195 p. ISBN 978-131-086-3. Paperback.

This publication commemorates the 25th anniversary of IITA's founding. It includes the Institute's contributions to sustaining food production in sub-Saharan Africa. This record of the contributions consists of five chapters. The first one describes the events that led to the Institute's establishment, and the evolution of its mandate. Chapter 2 summarizes what has been learned so far about farming systems in sub-Saharan Africa and about their generally fragile resource base. Chapters 3 and 4 document the considerable work done toward fulfilment of the mandate's other aspect - that dealing with tropical crops. Chapter 5 gathers up various threads running through the description of IITA's contributions in preceding chapters and weaves them into a broad framework for future research, focusing on the major agroecosystems of sub-Saharan Africa. One topic which is dealt with throughout the publication is the institute's collaboration with and efforts to support national agricultural research institutions.

Orders to: see below.

Sustainable Food Production in Sub-Saharan Africa.

2. Constraints and Opportunities. International Institute of

Tropical Agriculture, Ibadan, 1993, iv + 108 p. ISBN 978-131-096-0. Paperback.

This volume brings together the invited papers presented at a symposium on "Sustainable Food Production in Sub-Saharan Africa" held at Ibadan in December 1992, along with a summary of four presentations by IITA scientists. The papers in this volume are meant to provide an informed perspective on sustainable food production, as well as the stimulus for a sharper focus on priorities for research and for policies that facilitate sustainable development in sub-Saharan Africa.

Orders to: IITA, P.M.B. 5320, Ibadan, Nigeria.

Good Laboratory Practice Standards. W.Y. Garner, M.S. Barge and J.P. Ussary, editors. American Chemical Society, Washington, 1992, xix + 571 p. ISBN 0-8412-2192-8. Hardback.

The 33 chapters in this book were written by experienced quality assurance professionals and field and laboratory researchers who provide concrete ideas for establishing a compliance program and refining the compliance process. Representing industry, field and laboratory research, and government agencies, the authors outline approaches that have resulted in successful compliance and describe methods for avoiding some of the common mistakes. In addition, appendices contain the full text of the Good Laboratory Practice Standards, standard forms for submitting data to the Environmental Protection Agency (EPA), a question-and-answer section, and the EPA's recently enacted penalty policy. The full perspective of practical approaches to regulatory compliance makes this book a reference manual for Quality Assurance professionals, researchers, and managers alike.

Orders to: American Chemical Society, Distribution Office, Department 225, 1155 16th Street, NW, Washington DC 20036, U.S.A.

A Reference Slide Collection for Soil Micromorphology. M.L. Thompson, A.R. Mermut, W.D. Nettleton, L.D. Norton, and S. Pawluk. Soil Science Society of America, Madison, 1993, 135 p. + 115 slides. Paperback.

This slide set is designed for those individuals who want to learn more about the organization of soil components at the microscopic scale. The collection features four categories: biological features, coatings, microstructure and porosity, and related distribution patterns. Each group comprises a class of micromorphological features that is important to soil behaviour, management, or genetic interpretations. The documentation that accompanies each slide provides useful information about the soil in which the feature occurs.

Price: USD 50

Orders to: SSSA Headquarters Office, Book Order Dept., 677 South Segoe Road, Madison WI 53711, U.S.A.

Mycorrhizae, Beneficial or Parasymbiont: Its relation to crop decline in shifting cultivation. Ecoscript 54. B. Baars. Foundation for Ecodevelopment, Amsterdam, 1993, vi + 50 p. ISBN 90-71111-58-X. Paperback.

A decrease in nutrient availability is the reason for fallow and shifting cultivation in tropical rainforest. If these systems are not properly managed then the only alternative is to resort to external inputs to maintain cropping potential on the same plot of land. Decreased cropping potential is generally attributed to decreased fertility, weed infestation, lowered pH and organic matter content. On some soils either one or a combination of these aspects may be the reason for crop decline. On tropical rainforest soils however none of these likely agronomical causes rang true and the question of crop decline follow-

ing their cutting has remained open. The aim of this study is to establish a definite connection between crop decline in cultivated tropical rainforest soils after the initial three years of cropping on one hand and mycorrhizae forming fungi on the other.

Since a large part of future expansion of agricultural land will be at the expense of tropical rainforests, the focal point of this study is directed to the consequences of disturbance on the mycorrhizae population, and its relation to crop decline which gives cause for shifting cultivation.

Price: NLG 10

Orders to: Foundation for Ecodevelopment, P.O.Box 26047, 1002 GA Amsterdam, the Netherlands.

Chemical Time Bombs. G.R.B. ter Meulen, W.M. Stigliani, W. Salomons, E.M. Bridges and A.C. Imeson, editors. Foundation for Ecodevelopment, Hoofddorp, 1993, xi + 279 p. ISBN 90-71111-62-8. Paperback.

These proceedings report on delayed effects of chemicals stored in soils and sediments, reflecting the result of the "European State-of-the-Art Conference on Chemical Time Bombs" held in the Netherlands in September 1992. The conference surveyed the results of literature studies and workshops carried out within the Chemical Time Bombs (CTB) project since 1990, combined with other relevant studies.

The program included: an introduction to the concept and project; presentations on binding properties of soils; examples of different release mechanisms of chemicals from soils and sediments; tools to forecast chemical time bombs and implications for standard-setting and land management; definition and discussion of a framework for a research program. These subjects are discussed in 25 papers, with theme introductions and discussion results prepared by the first editor.

Price: NLG 35 (+ NLG 10 for postage)

Orders to: Foundation for Ecodevelopment, P.O.Box 36010, 1020 MA Amsterdam, the Netherlands.

Physical Resource Inventory of the Communal Lands of Zimbabwe. An Overview. NRI Bulletin 60. I.P. Anderson, P.J. Brinn, M. Moyo and B. Nyamwanza. National Resources Institute, Chatham, 1993, viii + 186 p + 4 maps. ISBN 0-85954-340-4. Paperback.

This overview of the physical resources of the Communal Lands of Zimbabwe is based on a compilation and condensation of the results of reconnaissance soil surveys undertaken between 1985 and 1991. The area surveyed and mapped at 1:500 000 scale comprises some 163,500 km² or 42% of Zimbabwe. Fifty land units, identified by interpretation of aerial photography and defined on a broad geological and landform bases, are used as the framework for describing and mapping the Communal Lands (CLs). Following an introduction to the physical environment encompassed by the CLs, each unit is described according to land characteristics and resources relevant to an assessment of potential for agricultural improvement.

Price: GBP 20

Orders to: Natural Resources Institute, Central Avenue, Chatham Maritime, Kent ME4 4TB, United Kingdom.

Soil Management and Conservation in the Tropics. L.A. Manrique. Manrique International Agrotech, Honolulu, 1993, xvi + 215 p.

Small farmers living in the tropics comprise a large sector of the world population. They operate in relatively stable subsistence agricultural systems using traditional technologies designed to achieve sustained crop produc-

tion at very low yields and with minimum land degradation. However, there is a growing awareness that sustainability of subsistence agriculture in the tropics is steadily deteriorating as a result of rapid growing population and over-exploitation of the land. Given the various limitations affecting tropical agriculture, few soil management and conservation options remain. This book attempts to explore potential avenues for developing strategies to maintain sustainability of tropical agriculture. To maintain sustainability, however, significant improvements in crop production must come from improved soil management practices focusing on soil and water conservation, improved crop management, and the use of cropping systems designed to reduce soil erosion and maintain soil productivity.

Price: USD 66 plus handling charges.

Orders to: Manrique International Agrotech, P.O.Box 61145, Honolulu, HI 96839, U.S.A.

Agroclimatology of West Africa: Niger. 2nd edition. Information Bulletin No.5. M.V.K. Sivakumar, A. Maidoukia and R. Stern. International Crops Research Institute for Semi-Arid Tropics, Patancheru, 1993, v + 108 p. ISBN 92-9066-238-7. Paperback.

In Niger, where rainfed agriculture is the main source of livelihood for the people, agricultural productivity is affected by climatic variability, in particular rainfall. In this study, data from 1961-90 for 42 stations in Niger are used to describe the temporal variability of rainfall at different scales: annual, monthly, decadal, and daily. Decadal rainfall totals were analyzed for the probability of receiving rainfall of different threshold values and maps showing the patterns of rainfall probabilities for selected periods during the rainy season are presented. An analysis of the onset of rains and the probabilities for growing season lengths of different durations for variable onset of rains is presented. Daily rainfall data were analyzed for probabilities of different durations of dry spells and maps showing regional patterns of dry spells in Niger are also presented. Maximum and minimum temperature data were used to describe the variations in available soil-moisture storage and water availability periods for different locations. Applications of the analysis of climatic data for crop planning are described.

Price: LDC: USD 5.80; HDC: USD 17.40; India: Rs 174.00

Orders to: ICRISAT, Patancheru, Andhra Pradesh 502 324, India.

Environmental Change and Human Health. Ciba Foundation Symposium 175. John Wiley & Sons, Chichester, New York, 1993, viii + 274 p. ISBN 0-471-93842-4. Hardback.

Many aspects of the global environment are changing now, and will continue to change in the future. There has been much recent interest in the likelihood of systematic changes in weather patterns, with their consequent effects on sea-levels, but some aspects of environmental change, such as pollution, have been a subject of research for many years. Any environmental change can ultimately affect human life, and the object of this Ciba Foundation-EERO symposium was to discuss those aspects of environmental change which might have direct or indirect effects on human health.

Summaries of foreseeable environmental changes, including those to climate, sea-level and chemical pollution, are presented. The implications of these changes for human health are then examined in detail. The issues discussed include pollution, human nutrition and population growth, genetic disease, radiation-induced disease, respi-

ratory disease and exotic tropical diseases, particularly those transmitted by insects. The effects of deforestation, urbanization and water developments such as irrigation and damming are considered. Problems of global epidemiology are also discussed, as are the special problems facing developing countries.

Price: GBP 45; USD 82.50

Orders to: see below.

Computer Simulation in Physical Geography. 2nd edition. M.J. Kirkby, P.S. Naden, T.P. Burt and D.P. Butcher. John Wiley & Sons, Chichester, New York, 1993, ix + 180 p. + disk. ISBN 0-471-93546-8. Paperback.

Simulation modelling has grown in importance in geographical teaching and project work ever since microcomputers have become widely available. By developing a broad range of usable programs in an environmental context, this edition of the book may be used both as a physical geography textbook and as a pathway to learning standard programming, since substantial sections of the book are devoted to the design, formulation and best use of programs.

The book opens with an introduction to the subject, followed by a series of chapters each of which is devoted to a different type of model, including black box models, process models, mass and energy balance models, and stochastic models. The second half of the book contains methods for model or program formulation and various means of verifying and calibrating models against field data. The choice of an appropriate model for a given situation is considered, together with the building of rationally based computer simulations from geographical assumptions. Example programs are drawn from ecology, hydrology, meteorology and hillslope and fluvial geomorphology. All programs are contained on a supplementary disk in Microsoft QuickBASIC.

Price: GBP 24.95, USD 39.95

Orders to: see below.

Soil Microscopy and Micromorphology. E.A. FitzPatrick. John Wiley & Sons, Chichester, New York, 1993, xi + 304 p. ISBN 0-471-93859-9. Hardback.

This book offers a comprehensive coverage of soil micromorphology with the emphasis on soil thin sections. It also outlines how transmission and scanning electron microscopy, X-ray microprobes, as well as microbiology and other procedures may be used to obtain full insight into the composition, genesis and behaviour of soils.

Applications are wide-ranging, incorporating analysis of the soil fabric, the structure and porosity of soils, mineralogy and weathering, microenvironments in soils, root-soil interactions, soil-organism interactions, and also the investigation of other properties of practical significance, particularly structure deterioration. This volume is also of relevance to the study of soil landscapes as well as to archaeological investigations into the human history of the environment.

The aim is to encourage as many people as possible to use microscopic techniques, particularly those who ordinarily might be intimidated by the terminology. A distinctive feature of the book is the lack of jargon - adherence to only accepted, and necessary, mineralogical principles and terms is maintained throughout. The book contains many, well selected, black and white photographs of micromorphological features.

Price: GBP 69.95, USD 111.95

Orders to: John Wiley & Sons, 605 Third Avenue, New York NY 10158-0012, U.S.A. or: John Wiley & Sons, Baffins Lane, Chichester, West Sussex PO19 1UD, England.

Basic Concepts of Soil Science. A.K. Kolay. Wiley Eastern Limited, New Delhi, 1993, x + 237 p. ISBN 81-224-0490-1. Paperback.

The book has been designed to cover the core courses in soil science of all Indian Agricultural Universities. The first chapter provides a brief account of earth which includes its crust and formation of India. The second and third chapters discuss the soil forming rocks and minerals with details of all Indian states and important aspects to soil genesis. Physical properties of soil are discussed in the fifth chapter. Important aspects of soil water, fundamental aspects of soil erosion and its control have also been explained in detail. The book further elaborates, chemical properties, biological properties, classification of soil, microbes and their effects, partial sterilisation of soils; soil organic matter and carbon nitrogen ratio. The systems of soil classification and survey are dealt with in chapter nine. The most important aspect about soils of all Indian states are discussed in chapter ten and the last chapter is devoted to mineral nutrition of plants.

Orders to: Wiley Eastern Limited, 4835/24 Ansari Road, Daryaganj, New Delhi-110002, India.

Assessing Surprises and Nonlinearities in Greenhouse Warming. J. Darmstadter and M.A. Toman, editors. Resources for the Future, Washington, 1993, viii + 157 p. ISBN 0-915707-71-3. Paperback.

In March 1992, an interdisciplinary workshop was centred on the following goals: (1) to examine the existing state of knowledge regarding surprises and nonlinearities in natural and socioeconomic systems confronted with climatic change; (2) to promote interdisciplinary exchange of information regarding these issues; (3) to distill insights that could be communicated to a wider audience; and (4) to draw conclusions about productive directions for further research on climate change.

The papers review a wide range of topics, including the following: (1) How continued greenhouse gas emissions may affect climatic conditions? (2) How climate change may affect agriculture, the archetypal managed ecosystem, and less managed ecosystems? (3) How various shifts in the natural environment from climate change may affect human well-being, with particular concern about damages that may vary nonlinearly with climate change? (4) How improved information about climate change and its consequences may have value in guiding decision making?

Price: USD 25 (+ USD 3 for postage/handling)

Orders to: Resources for the Future, Customer Service, P.O.Box 4852, Hampden Station, Baltimore, MD 21211-2190, U.S.A.

Incorporating Models of Spatial Variation in Sampling Strategies for Soil. D. Brus. Doctoral Thesis, Wageningen Agricultural University, Staring Centre-DLO, Wageningen, 1993, xi + 209 p. ISBN 90-5485-183-X. Paperback.

The efficiency of soil sampling strategies can be increased by incorporating a spatial variation model. The model can be used in the random selection of sample points i.e. in the sampling design, or in spatial estimation (prediction). In the first approach inference is based on a sampling design, in the second on a probabilistic model. The advantages and disadvantages of these two approaches, referred to as the design-based and model-based approach, are dealt with from a theoretical and a practical point of view. Estimation by random sampling stratified by soil map unit, and kriging are taken as examples of the two approaches in several case studies.

In the model-based approach the quality of the estimation

tes depends on the quality of the model. To avoid this, a new approach for spatial estimation is proposed, the model-assisted approach, making use of non-ergodic variograms. This approach incorporates the sampling error of the non-ergodic variogram in the kriging error, making the estimation variance estimates always valid. A set of new methods is presented for unbiased and robust estimation of the non-ergodic variogram and its sampling error.

Many factors determine the efficiency of an approach that incorporates spatial variation models, making the decision process rather complicated. A simple decision-tree is presented with seven questions related to the aim of the survey, the constraints, and prior information.

Price: NLG 25

Orders to: Staring Centre-DLO, Dept. WIO, P.O.Box 125, 6700 AC Wageningen, The Netherlands.

From the Ground Up. Rethinking Industrial Agriculture. P. Goering, H. Norberg-Hodge, J. Page. Zed Books, London, in association with International Society for Ecology and Culture, Bristol, Berkeley, 1993. viii + 120 p. ISBN 1-85649-224-9 (Paperback), 1-85649-223-0 (Hardback).

Modern agriculture is in crisis. In our obsession with "efficiency" and short-term profit we are losing any real connection with the natural world. As a result, the dream of global abundance promised by the introduction of chemical fertilizers, pesticides and hybrid seeds is becoming a nightmare of health risks, degraded land and ailing communities.

The book critiques chemical-based, capital- and energy-intensive agriculture. It points out that its seemingly diverse problems are not isolated "side-effects" amenable to technical fixes, but have common roots in an industrial world-view that promotes a dangerous level of specialization, standardization and centralization. What is needed, the authors argue, is a more ecological way of understanding nature and organizing human activities. They urge to look at the agricultural practices of traditional societies, which represent the only models of sustainable agriculture that exist.

Price: GBP 10.95, USD 17.50 (Paperback); GBP 29.95, USD 49.95 (Hardback).

Orders to: Zed Books, 7 Cynthia Street, London N1 9JF, England.

Annotated Bibliography: Gender and Irrigation and Soil and Water Conservation. B. Verkuijsse, E.H. Jordans, J.F. Webbink, M.Z. Zwarteveen, B.C.M. van Koppen. Wageningen Agricultural University, Wageningen, 1992, v + 204 p. ISBN 90-6754-216-4. Paperback.

This bibliography contains over 400 references to work undertaken since 1975. Entries on irrigation highlight the role of women in farmer-managed irrigated agriculture and the impacts of irrigation projects for women. Entries on soil and water conservation focus on the effects of land degradation for women, the impacts of technical interventions on them, and the experience of women's involvement in the implementation of projects.

Orders to: Ms. Dineke Wemmen, Dept. of Irrigation and Soil and Water Conservation, Wageningen Agricultural University, Nieuwe Kanaal 11, 6709 PA Wageningen, the Netherlands.

Ecologically Sensitive Sites in Africa. Compiled by the World Conservation Monitoring Centre for the World Bank. The World Bank, Washington, 1993, 6 volumes. Paperback.

During the last two decades, there has been growing

evidence that environmental degradation in its many forms constitutes a threat of growing significance to economic development. In addition, the rapid evolution of the environmental agenda has led to an increased understanding of the interdependence among economic activities and their environmental consequences, both within and between countries. The economic and physical interdependence between nations is illustrated by the emergence of new kinds of environmental problems, such as the deterioration of the ozone layer, the greenhouse effect, tropical deforestation, and the transboundary movement of hazardous wastes.

This publication is made in response to requests from task managers in Africa who wanted to know the location and properties of the ecologically sensitive sites in Africa to which they could refer while implementing Bank projects in the region. It is also made to assist task managers to comply with the policy on "Wildlands: their protection and management in economic development".

The six volumes concern the following countries: **Volume I - Occidental and Central Africa:** Benin, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea, Togo; **Volume II - Eastern Africa:** Ethiopia, Kenya, Somalia, Sudan, Tanzania, Uganda; **Volume III - South-Central Africa and Indian Ocean:** Angola, Burundi, Comoros, Djibouti, Madagascar, Mauritius, Rwanda, Seychelles, Zaire; **Volume IV - West Africa:** Ghana, Guinea-Bissau, Liberia, Nigeria, São Tomé e Príncipe, Sierra Leone; **Volume V - Sahel:** Burkina Faso, Cape Verde, Chad, Gambia, Mali, Mauritania, Niger, Senegal; **Volume VI - Southern Africa:** Botswana, Lesotho, Malawi, Mozambique, Swaziland, Zambia, Zimbabwe.

Orders to: World Bank Headquarters, 1818 H Street, N.W., Washington, DC 20433, USA.

Integrated Soil and Sediment Research: a Basis for Proper Protection. Soil and Environment 1. H.J.P. Eijssackers and T. Hamers. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xxiv + 763 p. ISBN 0-7923-2321-1. Hardback.

Increasing awareness of the irreversible and long-lasting impacts of deterioration and pollution of soils and sediments has had an important influence on environmental policies and research during the last decade. The complexity of the soil and sediment system and its processes cannot be tackled properly unless scientists from different disciplines work together. With this in mind, a number of multidisciplinary soil research programmes have been started in various European countries. They involve different disciplinary approaches and they aim at different fields of application: agriculture, land use, town and country planning, drinking water supply, and nature management. The results that are now appearing need to be integrated in a scientifically sound and useful way. The first European Conference on Integrated Research for Soil and Sediment Protection and Remediation was intended to foster this. This volume contains the edited and selected proceedings of this conference and is complemented by a subject index.

Price: NLG 395, USD 236, GBP 160

Orders to: In U.S.A. and Canada: Kluwer Academic Publishers, 101 Philip Drive, Norwell, MA 02061, U.S.A. Elsewhere: Kluwer Academic Publ. Group, P.O. Box 322, 3300 AH Dordrecht, The Netherlands.

Cadmium Mobility and Accumulation in Soils of the European Communities. D. Fraters and A.U.C.J. van Beurden. National Institute of Public Health and Environmental Protection, Bilthoven, 1993, xii + 65 p. Report No.

481505005. Paperback.

In this overview of the effects of the cadmium pollution on agricultural soils in the European Community, both the cadmium loads on arable land and grassland and the soil sensitivity to cadmium accumulation have been estimated. The effects that the spatial variation of the cadmium loads have on soils different in binding capacity for cadmium are mapped. Effects are expressed either as calculated cadmium concentration of the soil solution compared with a target value for groundwater or as an accumulation rate of cadmium in the topsoil compared with the present-day cadmium content. The cadmium in the soil solution is liable to leaching from the topsoil. Whether or not this eluting cadmium threatens the groundwater depends on many factors, like net precipitation and characteristics of the soil layers below the topsoil.

Calculations show that for about 15% of the agricultural land the cadmium concentration in the soil solution of the topsoil are around or above the Dutch target value, and that for 36-47% of the land calculated accumulation rates are more than 10% in 100 years, compared with the current cadmium content.

Orders to: RIVM, P.O.Box 1, 3720 BA Bilthoven, the Netherlands.

Exchange Processes at the Land Surface for a Range of Space and Time Scales. IAHS Publication 212. H.-J. Bolle, R.A. Feddes and J.D. Kalma, editors. International Association of Hydrological Sciences, Wallingford, 1993, xi + 626 p. ISBN 0-947571-53-1. Paperback.

The papers in this volume were presented at a Symposium which was held during the joint meeting of the International Association of Meteorology and Atmospheric Physics and the International Association of Hydrological Sciences in Japan in July 1993. It was organized in the realization that large Global Change Programmes, such as the Core Project of the International Geosphere-Biosphere Programme on "Biospheric Aspects of the Hydrological Cycles", and projects such as the joint H-1-1/IAHS International Committee on Soil-Atmosphere-Vegetation Relations "Review of the scientific aspects of the interface processes of water transport through the atmosphere-vegetation-soil system at elementary plot, catchment and large grid-size scales" in the International Hydrological Programme of Unesco, need close interdisciplinary and broad international cooperation to lead to the better understanding of these processes and the syntheses of scientific investigations which are ongoing in many parts of the world.

Price: USD 80 (including surface mail)

Orders to: see below.

Tracers in Hydrology. IAHS Publication 215. N.E. Peters, E. Hoehn, Ch. Leibundgut, N. Tase and D.E. Walling, editors. International Association of Hydrological Sciences, Wallingford, 1993, x + 350 p. ISBN 0-947571-68-X. Paperback.

This book is the proceedings of the International Symposium H2 held during the joint meeting of the International Association of Meteorology and Atmospheric Physics and the International Association of Hydrological Sciences at Yokohama, Japan, in July 1993. The objective of the Symposium was to provide a forum for discussions on the use of tracers to improve understanding of hydrological processes, with emphasis on issues of scale, for both time and space. Consequently, papers varied in subject from investigations of chemical signatures (sources) of atmospheric deposition to residence times and transport in groundwater. One exception is a keynote paper

which provides an overview of the involvement of the IAEA in environmental isotope applications in hydrology.

The remaining 37 papers and five poster descriptions focus on studies of hydrological processes in which tracers were used. The papers are grouped in five topics: Watershed processes, Groundwater, Surface water, Groundwater and surface water interactions, and Sediment.

Price: USD 60 (including surface mail)

Orders to: see below.

Hydrology of Warm Humid Regions. IAHS Publication 216. J.S. Gladwell, editor. International Association of Hydrological Sciences, Wallingford, 1993, ix + 510 p. ISBN 0-947571-73-6. Paperback.

The warm humid regions of the world are regions of high population density. It has been forecasted that by the year 2000 at least one-third of the world's population will inhabit these regions. It is therefore important that water resources managers have the hydrological understanding and appropriate methods to cope with the water-related activities that will accompany the inevitable socio-economic and technical changes in these regions. One problem that cannot be overlooked is the susceptibility of the world's climate to improper forest management in the humid tropics.

This book comprises 45 papers presented at IAHS symposium H3 held at Yokohama, Japan in July 1993. The aim of the symposium was to focus on the research and practice of hydrology in the humid tropics and other warm humid regions of the world. The papers are arranged in four sections: Hydrology and man's influence; Special problems of tropical islands; Urban problems in the tropics; Groundwater in the tropics.

Price: USD 75 (including surface mail)

Orders to: see below.

Sediment Problems: Strategies for Monitoring, Prediction and Control. IAHS Publication 217. R.E. Hadley and Takahisa Mizuyama, editors. International Association of Hydrological Sciences, Wallingford, 1993, viii + 284 p. ISBN 0-947571-78-7. Paperback.

This book comprises the proceedings of the International Symposium H4 held during the joint meeting of the International Association of Meteorology and Atmospheric Physics and the International Association of Hydrological Sciences at Yokohama, Japan, in July 1993. The papers are divided into six general groups: Erosion and sediment yield; Landslides and pyroclastic flows; characteristics and controls; Deposition processes in reservoirs; Modelling and monitoring of sedimentation and erosion processes; Soil erosion, sediment losses, and drainage basin characteristics; Monitoring processes of erosion and sediment transport.

The papers represent problems in arid, semiarid, and humid regions and offer a broad perspective on contemporary studies of erosion and sediment yield.

Price: USD 60 (including surface mail)

Orders to: IAHS Press, Institute of Hydrology, Wallingford, Oxfordshire, OX10 8BB, U.K.

Sorption and Degradation of Pesticides and Organic Chemicals in Soil. SSSA Publication No.32. D.M. Linn, T.H. Carski, M.L. Brusseau and F.-H. Chang, editors. Soil Science Society of America and American Society of Agronomy, Madison, 1993, xix + 260 p. ISBN 0-89118-803-7. Paperback.

Few, if any, processes that occur in soil are isolated from the effect of their surrounding environment. The de-

gradation of manmade or naturally occurring organic compounds is no exception. Over the past several decades considerable time and energy has been spent on defining the conditions that influence the breakdown of organic compounds in soil.

This volume examines the state-of-the-art information regarding the relationships between sorption and degradation of anthropogenic compounds in soils. This information is critical to the development of models predicting the fate of organic chemicals in soils. The chapters that follow attempt to bring together current thinking regarding the issues and constraints involved in coupling the processes of sorption and degradation.

Price: USD 30 (advance payment and 10% per book for postage is required).

Orders to: SSSA, ASA Headquarters Office, Book Order Dept., 677 South Segoe Road, Madison, WI 53711-1086, U.S.A.

Soil Series Criteria and Norms. NBSS Publication 36. J. Sehgal. National Bureau of Soil Survey & Land Use Planning, Nagpur, 1992, x + 40 p. ISBN 81-85460-14-0. Paperback.

This publication is an attempt to outline the basic concepts and principles of soil series, review criteria used by different schools and to fix standard norms and criteria for establishing soil series so that the same can be adopted and used by different organizations involved in soil survey and mapping programmes. The publication gives background, concept and criteria of soil series. It deals with the characteristics considered basic for soil series and elucidates procedure for establishing soil series. It is hoped the information will be of great use to the Soil Survey Staff for establishing soil series. It is hoped that the information will be of great use to the Soil Survey Staff for establishing soil series which can stand at their own.

Price: Rs. 15 (+ postage); USD 3 (including airmail)

Orders to: see below.

Red and Lateritic Soils of India. NBSS Publication 37. J. Sehgal, V.A.K. Sarma, R.K. Batta, K.S. Gajbiye, S.R. Nagabhushna and K.R. Venugopal, editors. National Bureau of Soil Survey & Land Use Planning, Nagpur, 1993, xv + 356 p. + map. ISBN 81-85460-17-5. Paperback.

This publication contains information on the extent, distribution, morphological characteristics, physical and chemical properties, problems and potential of red and laterite soils of India and their management for sustainable agricultural production. These soils are very extensive in the country and of great importance for agricultural production. The publication contains the papers presented at a national workshop, which objective was to discuss and bring out the information on red and lateritic soils of the country.

Price: Rs. 150 (+ postage); USD 16 (including airmail)

Orders to: Director, NBSS & LUP, Amravati Road, Nagpur 440 010, India.

Agricultural Chemicals and Chemical Mutagens. C.L. Sanoria. Banaras Hindu University, 1993, xviii + 509 p. Hardback.

Agricultural chemicals and chemical mutagens are of global importance because of their specific advantages, and of great concern because of the likely risks of environmental pollution endangering human life. Molecular structure determines the biological activity of a chemical, and is used as a basis in the nomenclature of individual chemicals and also in the classification of group of chemicals. Therefore, structural study of agricultural chemicals

and chemical mutagens, is of fundamental importance in many disciplines of agriculture and biology. The author made an attempt to include as many chemicals as possible in this volume. The agricultural chemicals discussed are: Insecticides (360); Fungicides (670); Herbicides (270); Plant growth regulators (110); Miscellaneous agricultural chemicals (400). The chemical mutagens (310) constitute the sixth part of the book.

These chemicals follow a presentation into suitable chemical (sub)classes, chemical nomenclature and structural formula. As far as possible their abbreviations, common names, commercial names and trade numbers are also provided.

Price: Rs 600, USD 70 (airmail)

Orders to: Mr. R.K. Sanoria, New D-1 Tulsidas Colony, Banaras Hindu University, Varanasi-221005, India.

Reference Soils of South-western Australia. W.M. McArthur. Australian Society of Soil Science (W.A. Branch), 1991, x + 265 p. + 10 maps. ISBN 0-7309-3978-2. Paperback.

This book provides detailed descriptions of the soils, landforms and native vegetation at 130 representative sites throughout south-western Australia. It gives a detailed regional overview of the soils of this part of Australia, and provides a benchmark for estimating future change. Detailed soil physical and chemical analyses are complemented with an integration of the considerable body of information that already exists on WA's soils. It also provides an example on which similar projects, elsewhere in Australia, and possibly outside this continent, could be based.

Discussion of the relationships between soils, landscapes, native vegetation and land degradation, and references to many previous soil studies, makes this a reference for land managers, scientists, planners and students.

Price: AUD 20 + postage.

Orders to: Mr. R. Jeffery, Hon. Treasurer ASSSI (WA Branch), Chemistry Centre (WA), 125 Hay Street, East Perth, Western Australia 6004, Australia.

Potassium in Ecosystems. International Potash Institute, Basel, 1992, 457 p. Paperback.

This book contains all papers, poster presentations with reports of the session coordinators, presented at the 23rd colloquium of the International Potash Institute held at Prague in October 1992. The papers on biogeochemical fluxes of cations in agro- and forest-systems are divided into 4 sections: (1) K in the pedosphere; (2) K in the hydrosphere; (3) K in the food chain; and (4) K requirements in different land use systems. The posters were split into the following sections: Derivation of K-fertilizer recommendations, and Ecological aspects of potassium use.

Price: USD 20, SFr 28 (plus postal charges)

Orders to: International Potash Institute, P.O.Box 1609, CH-4001 Basel, Switzerland.

Análisis de Suelos y Plantas Tropicales. T.T. Cochrane y R.G. Barber. Centro de Investigación Agrícola Tropical y Misión Británica en Agrícola Tropical, Santa Cruz, 1993, ix + 226 p.

El propósito de este manual es el de presentar métodos de análisis de suelos y de plantas al corriente que han sido verdaderamente probados en el Laboratorio de Suelos del CIAT como referencia de metodologías aptas no solamente para Bolivia sino para otros países.

En lo posible, los métodos químicos presentados son compatibles con los métodos elaborados por ISRIC. Los métodos físicos están basados mayormente en las meto-

dologías elaboradas por el American Society of Agronomy. En cuanto al análisis foliar los métodos presentados dependen mayormente en la calcificación de las muestras foliares debido a las dificultades en obtener ácidos en Bolivia. Sin embargo, estos métodos dan buenos resultados y son aptos para el análisis de cantidades bastante grandes de muestras foliares en forma rutinaria.

Este manual también proporciona una guía para la comprobación estadística de los métodos en cuanto a su precisión y a su reproductibilidad. Se utiliza la terminología estándar internacional de unidades, aunque las formas antiguas que todavía se usan comúnmente se presentan en paréntesis. En la sección que trata del análisis físico de suelo, están incluidos formularios para cada metodología que pueden ser ampliados y fotocopiados para su uso en el laboratorio.

Precio: USD 25

Orden a: CIAT, Casilla 247, Santa Cruz, Bolivia.

Inland Valleys in West Africa: An Agro-Ecological Characterization of Rice-Growing Environments.

ILRI Publication 52. P.N. Windmeijer and W. Andriess (editors). International Institute for Land Reclamation and Improvement, Wageningen, 1993, ix + 149 p. + 2 maps. ISBN 90-70754-320. Hardback.

The main objective of the Wetland Utilization Research Project was to develop the inland valley bottoms in the West African landscape for wetland rice cultivation. The first phase of this project consisted of an inventory of existing information in order to identify the extent and categories of wetlands, including the valley bottoms, and to assess their capabilities and constraints for rice-based smallholder farming systems.

This book describes the various environmental characteristics that determine the rice-growing environments in West Africa. Based on ecological, agronomic, and socio-economic data from secondary sources, this involves a description and grouping, in general, for the whole inventory area. Wherever additional data were available, more detailed descriptions of the inland valleys are given.

Price: NLG 50, USD 29

Orders to: ILRI, P.O.Box 45, 6700 AA Wageningen, The Netherlands.

Volcanic Ash Soils. Genesis, Properties and Utilization.

Developments in Soil Science 21. S. Shoji, M. Nanzyo and R.A. Dahlgren. Elsevier, Amsterdam, New York, 1993, xxiv + 288 p. ISBN 0-444-89799-2. Hardback.

Volcanic eruptions are generally viewed as agents of destruction, yet they provide the parent materials from which some of the most productive soils in the world are formed. The high productivity results from a combination of unique physical, chemical and mineralogical properties. The importance and uniqueness of volcanic ash soils are exemplified by the recent establishment of the Andisol soil order in Soil Taxonomy. This book provides a synthesis of all aspects of volcanic ash soils. It contains coverage of important topics including terminology, morphology, genesis, classification, mineralogy, chemistry, physical properties, productivity and utilization. Twelve colour plates provide a valuable visual-aid and complement the text description of the world-wide distribution for volcanic ash soils.

Price: NLG 290, USD 165.75

Orders to: in the USA and Canada: Elsevier Science Publishing Co. Inc., P.O.Box 882, Madison Square Station, New York NY 10159, USA; *Elsewhere:* Elsevier Science Publishers, P.O.Box 211, 1000 AE Amsterdam, the Netherlands.

The Nature of the Environment.

3rd edition. A. Goudie. Blackwell Publishers, Oxford, Cambridge, 1993, xiii + 397 p. ISBN 0-631-18632-8. Paperback.

This book is an examination of the natural environment of the earth. Covering all scales from the global to the local, the author integrates the study of landforms, climate, the movement of water, soils, plants and animals in order to impart an understanding of the processes currently acting on our landscape and environment and their history. Considerable stress is placed throughout the book on the human impact on environmental change.

The main new feature of this edition are twenty-two "windows", each of which describes either a key process (such as desertification, the carbon cycle and sea-level rise) or an illustrative case study. It also includes a section of colour plates, and a completely updated guide to further reading.

Price: GBP 14.99

Orders to: in the U.S.A.: Blackwell Scientific Publications Inc., 3 Cambridge Center, Cambridge, MA 02142, U.S.A. *Elsewhere:* Marston Book Services Ltd., P.O. Box 87, Oxford OX2 0DT, England.

FAO Publications

World Soil Resources. An explanatory note on the FAO World Soil Resources Map at 1:25,000,000 scale.

World Soil Resources Reports 66 Rev.1. Food and Agriculture Organization, Rome, 1993, vii + 64 p. + map. ISBN 92-5-103394-3. Paperback.

It is fortunate that the FAO-Unesco Soil Map of the World produced in the 1970s has provided an acceptable inventory of the nature and distribution of soils throughout the world. Its production also encouraged soil scientists to improve our knowledge of soils, to the extent that a revision of the original map and reports is justified. A revised legend has already been developed and is being used in the initial stages of updating the digitized soil map of the world in the FAO geographical information system (GIS).

The World Soil Resources Map presented here also forms part of the GIS and can be overlaid on equivalent small-scale maps to allow interpretations of the relationships between soil conditions and other features, such as world climate, present land use and global soil degradation. Equally important is that the knowledge of the distribution and variability of soil conditions should become more familiar to other scientists, decision-makers and all those members of the public who are concerned with environmental issues and development. This revised edition takes into account the suggestions for improvements received on the original publication.

Computerized Systems of Land Resources Appraisal for Agricultural Development.

World Soil Resources Reports 72. T.R.E. Chidley, J. Elgy and J. Antoine. Food and Agriculture Organization, Rome, 1993, x + 245 p. ISBN 92-5-103404-4. Paperback.

This publication has been prepared as a response to the increasing worldwide demand for adequate information on computerized systems for land resources appraisal. Such information has become indispensable at the planning state as well as during the implementation of projects and programmes on land and environmental resources planning, development and conservation at different scales.

This document describes modern computer-based technologies used in land resources appraisal for the purpose of improved management of land resources and environmental conservation. It describes land use require-

ments and related applications and the resources needed to develop the applications, including databases, models, computer hard- and software and human resources. It can serve as a guide for people designing and implementing projects and programmes of land resources appraisal that involve computers, remote sensing and geographic information systems.

This report is not intended to be all-inclusive. Reference to the bibliography and other relevant specialized texts should be made whenever supplementary information is required. With the knowledge gained from reviewing or consulting this report, the reader should feel confident to assess computerized land resources methods, tools and applications in relation to the issues of planning rational land resources use for sustainable agricultural development.

FESLM: an International Framework for Evaluating Sustainable Land Management. World Soil Resources Reports 73. A.J. Smyth and J. Dumanski. Food and Agriculture Organization, Rome, 1993, vii + 74 p. ISBN 92-5-103419-2. Paperback.

The Framework is designed as a structured, logical pathway for making decisions on whether or not a carefully defined form of land management is likely to prove sustainable in a defined situation over a defined period of time. The logical pathway approach was selected because our knowledge of sustainability will always be imperfect. This approach assists us in making decisions that can be substantiated without having to wait for all the final data.

CLIMWAT for CROPWAT. FAO Irrigation and Drainage Paper 49. M. Smith. Food and Agriculture Organization, Rome, 1993, iii + 113 p. + 5 disks (3=AB", 1.44 Mb). ISBN 92-5-103416-8. Paperback.

CLIMWAT is a climatic database to be used in combination with the program CROPWAT and allows the ready calculation of crop water requirements, irrigation supply and irrigation scheduling for various crops for a range of climatological stations worldwide. The database comprises data from 3262 meteorological stations from 144 countries on five continents and is contained on five diskettes divided by continent and arranged by country, with a number of auxiliary programs to facilitate the selection of stations.

The manual explains the use of the database with the CROPWAT program and the various procedures to set up the system and to address the selected climatic stations. Examples are presented to show how the climate files are addressed and used for planning and management of irrigated and rainfed agriculture.

Field Measurement of Soil Erosion and Runoff. FAO Soils Bulletin 68. N.W. Hudson. Food and Agriculture Organization, Rome, 1993, xiv + 139 p. ISBN 92-5-103406-0. Paperback.

This bulletin reviews simple methods for estimating soil erosion and runoff, with the emphasis on techniques that could be used by project workers in the field rather than professional researchers. The seven chapters deal with: experimental design, stressing that even the simplest trials should be carefully designed, and pointing out errors to be avoided; reconnaissance methods for a first approximation of soil loss; field runoff plots - their design, construction and operation; estimates of flow in streams, rivers or canals; sediment transport - suspended load, bedload, total load; rainfall simulators - their applications, design and operation; estimating runoff from empirical equations and soil loss from simple models.

Global and National Soil and Terrain Digital Databases (SOTER). Procedures Manual. World Soil Resources Reports 74. 1993, viii + 122 p. ISBN 92-5-103429-X. Paperback.

This publication describes the procedures for using the global and national soils and terrain digital databases (SOTER) to produce digitized map units and their attribute data. It explains how to delineate areas with a specific set of soil and terrain characteristics and how to construct an attribute database related to the mapping units. SOTER is a land resource database with specific information on landform, terrain and soil components that can be complemented by data on land-related characteristics such as land use, natural vegetation and climate. The main function of the SOTER approach is to store data at national and global scales in an easily accessible format for improved thematic mapping and monitoring of changes of soil and terrain resources useful to scientists, planners, decision-makers and policy-makers.

This publication was also issued under the same title by ISRIC, Wageningen, the Netherlands. A Spanish version is also available from ISRIC (P.O.Box 353, 6700 AJ Wageningen, the Netherlands).

Agro-Ecological Zoning in Asia. World Soil Resources Reports 75. Food and Agriculture Organization, Rome, 1994, iii + 259 p. ISBN 92-5-103457-5. Paperback.

The document presents the results of the Asia Regional Workshop on Agro-Ecological Zones (AEZ) Methodology and Applications. The workshop reviewed advances made in this field both within and outside Asia. These advances include: Geographic Information Systems (GIS) linkage, multiple cropping, livestock and fuelwood productivity, options for the optimization of land use to match prevailing agro-ecological conditions, specific patterns of input availability and demand for agricultural products. This review process has left no doubt that AEZ/GIS, properly implemented and maintained, provides a powerful set of tools to support planners, analysts and practitioners at the national, subnational and local levels in their decisions and actions concerning the sustainable use of land.

International Rice Commission Newsletter. Special issue vol. 39. Food and Agriculture Organization, Rome, 1994, iv + 286 p. ISSN 0538-9550. Paperback.

This volume includes the Proceedings of the 17th Session of the International Rice Commission, held in February 1990 in Brazil. Special attention was given to four major topics: (1) The apparent yield plateau reached when the original semi-dwarf high-yielding rice varieties are used; (2) Environmental issues such as the greenhouse effect, the destruction of the ozone layer as well as of tropical forests and wildlife, and mangrove forest exploitation as well as the concern of diseases spread by snails and mosquitoes; (3) development of sustainable rice production systems, both those based on high-input, high-yield irrigated farming and those based on low-input, low return rainfed production farming; and (4) review of the implication of what appears to be declining investment in irrigation, fertilizer production and rice farming systems research, which does not match with population-driven demand projections for the crop.

Guidelines for Land-Use Planning. FAO Development Series 1. Food and Agriculture Organization of the United Nations, Rome, 1993, xv + 96 p. ISBN 92-5-103282-3. Paperback.

Land-use planning is sometimes misunderstood as being a process where planners tell people what to do. In

this publication, land-use planning means the systematic assessment of physical, social and economic factors in such a way as to encourage and assist land users in selecting options that increase their productivity, are sustainable and meet the needs of society.

Directives pour la Planification de l'Utilisation des Terres. Collection FAO Développement 1. Organisation des Nations Unies pour l'Alimentation et l'Agriculture, Rome, 1993, xv + 96 p. ISBN 92-5-203282-7. Cartonné.

L'on voit parfois à tort dans la planification de l'utilisation des terres un moyen pour les planificateurs de dire aux gens ce qu'il faut faire. Dans cette publication, elle est entendue comme une évaluation systématique des facteurs physiques, sociaux et économiques à prendre en considération dans le but d'aider et d'encourager ceux qui utilisent la terre à sélectionner des options qui soient de nature à accroître leur prospérité, qui soient durables et qui correspondent aux besoins de la société.

Orders to: FAO Publications Sales, Via delle Terme de Caracalla, 00100 Rome, Italy.

Agroforestry in the Pacific Islands: Systems for Sustainability. W.C. Clarke and R.R. Thaman, editors. United Nations University Press, Tokyo, 1993, x + 297 p. ISBN 92-808-0824-9. Paperback.

The replacement of forest with human domesticates figures as one of the most ancient relationships between humanity and the environment. What is new is the rate and scale at which forests are being cleared to make way for agriculture. With the possibility looming of a total loss of tropical forests, there is now a lively interest in making the place where farming and forests meet more harmonious.

Agroforestry - which, simply expressed, might be understood to refer to farming with trees rather than without - represents a powerful harmonizer between the two competitors. This book describes the diverse traditional agroforestry systems that have evolved over thousands of years in the Pacific Islands. Based on extensive field observations and a wide range of published sources, this study of the agroforestry systems and their hundreds of component trees - including detailed data on 100 of the most useful trees in the Pacific - of Polynesia, Micronesia, and Melanesia shows how these systems and their component trees have contributed environmental stability and profound utilitarian value to Pacific Island societies for millennia and thus argues convincingly for the wisdom of protecting and using the existing systems and trees in current forestry, agricultural, and agroforestry development projects, rather than replacing them with introduced systems and plants or allowing them to deteriorate because of commercial pressures or ignorance.

Price: USD 35 (LDC USD 17.50)

Orders to: United Nations University Press, 53-70, Jingu-mae 5-chome, Shibuya-ku, Tokyo 150, Japan.

Soil Monitoring - Early Detection and Surveying of Soil Contamination and Degradation. R. Schulin, A. Desaulles, R. Webster and B. von Steiger, editors. Birkhäuser, Basel, Boston, 1993, ix + 362 p. ISBN 3-7643-2956-4 (Swiss edition) 0-8176-2956-4 (US edition). Hardbound.

Soil pollution is posing increasing hazards to environmental quality, human health, and economic welfare. As a prerequisite for effective protection and remediation measures, the identification and monitoring of soil pollution has become increasingly important.

This book focuses on soil contaminants that threaten the long-term soil fertility and related functions of the soil on a regional scale. The pollutants of most concern were

the heavy metals and persistent organic contaminants. Controlling these involves taking into account the unique nature of the pedosphere. The book assesses the current knowledge and problems being tackled to protect the soil and emphasizes the use of mass balances in soil monitoring. Consequently the connections of soil protection with ecological cycling of elements, air and water pollution are covered as well. Soil monitoring combines science and technology. This book provides a wide coverage of the field, with each topic covered by a specialist.

A synthesis is given which identifies gaps in knowledge and reviews the objectives of soil monitoring. It was found that the primary objective of soil monitoring is to provide sound and relevant information on which political decisions, which may be far reaching, can be based for managing and protecting our environment.

Consequently, this book will provide up-to-date information to ecological scientists and environmental agencies working on soil protection and on related topics as environmental cycling, air and water pollution.

Price: DEM 112, ATS 873.60, CHF 98, GBP 43

Orders to: Birkhäuser Verlag AG, P.O.Box 133, CH-4010 Basel, Switzerland; in Canada and the USA: Birkhäuser, 44 Hartz Way, Secaucus, NJ 07096-2491, U.S.A.

Geographical Information Handling - Research and Applications. P.M. Mather, editor. John Wiley, Chichester, New York, 1993, xi + 343 p. ISBN 0-471-94060-7. Hardbound.

This book presents the results of the ESRC/NERC Joint Programme on Geographical Information Handling. It provides a summary of the state-of-the-art in GIS research, as well as examples of applications of GIS in economic, social and environmental areas.

The contents fall into three sections: Basic Research; Environmental Applications of GIS; and Economic and Planning Applications of GIS. Research issues include computer architectures, generalization effects, error diffusion, data structures, database design, GPS, and the human-computer interface. Case studies show how information on land cover/land use change, ecological and hydrological modelling, and geomorphological analysis of digital elevation models can be used within an environmental GIS, while economic and planning applications include aspects of natural hazard assessment, rural planning, property management, regional planning, and local authority use of GIS.

Price: GBP 35, USD 56

Orders to: see below.

Fire in the Environment. The Ecological, Atmospheric, and Climatic Importance of Vegetation Fires. Environmental Sciences Research Report 13. P.J. Crutzen and J.G. Goldammer, editors. John Wiley, Chichester, New York, 1993, xv + 400 p. ISBN 0-471-93604-9. Hardbound.

Concentrations of several trace gases in the Earth's atmosphere that are important for climate and atmospheric chemistry are strongly increasing due to various human activities. Recently, more emphasis has been given to the effects of tropical deforestation and other vegetation fires on atmospheric CO₂ concentrations. There are also significant emissions of trace gases, such as CO₂, NO_x, CH₄, and nonmethane hydrocarbons, to the atmosphere. Some of these trace gases are photochemically or climatically active and serve as catalysts and precursors in photochemical smog formation. Prehistorical and historical fire data reveal that natural and anthropogenic vegetation fires are not a new phenomenon. Fires have contributed significantly to the process of shaping

and maintaining valuable forest and savanna ecosystems. Traditional use of fire is essential for maintaining the productivity of agricultural lands and is still practised by rural populations. Forestry in many parts of the world has integrated the use of prescribed fire in forest ecosystem management.

Modern fire regimes, e.g. in the tropics and elsewhere are undergoing major changes. Forest and savanna ecosystems are increasingly utilized by rapidly growing populations in the developing world. Humans also interfere in the remote northern boreal and circumpolar vegetation and largely affect natural fire regimes.

This publication is the report of a Dalhem Workshop which aimed at examining the role and impact of natural and anthropogenic fires on ecosystems, the atmosphere, and climate.

Price: GBP 80, USD 128

Orders to: see below.

Radioecology after Chernobyl. - Biogeochemical Pathways of Artificial Radionuclides. SCOPE 50. F. Warner and R.M. Harrison. John Wiley, Chichester, New York, 1993, xxxii + 367 p. ISBN 0-471-93168-3. Hardbound.

This volume presents the consensus among leading members of the international scientific community concerning the most significant sources and environmental pathways of man-made radionuclides, at a level comprehensible to the scientist without specialized knowledge of the field.

The magnitude and importance of radionuclide releases from the nuclear fuel cycle, from accidents (e.g. Windscale, Chernobyl and Kyshtym) and other sources are put into perspective, and the effects of radioactivity from such sources upon non-human biota are assessed. Knowledge of environmental processes and geochemical cycling, which may be gained from the use of radionuclides as tracers, is discussed.

The findings of the book are based on the research efforts of many scientists, from some fourteen nations, following a series of workshops held in various European countries over a three-year period.

Price: GBP 75, USD 120

Orders to: John Wiley & Sons, 605 Third Avenue, New York NY 10158-0012, U.S.A. or: John Wiley & Sons, Baffins Lane, Chichester, West Sussex PO19 1UD, England.

Dryland Farming in Africa. J.R.J. Rowland, editor. Technical Centre for Agricultural and Rural Co-operation, Wageningen, with Macmillan Press, London, xii + 336 p. ISBN 0-333-47654-9. Paperback.

Crop production in the drought-prone tropics has been relatively neglected by research and development workers, largely due to its poor potential for commercial exploitation. Despite this, a considerable amount of information is available on this subject, but there have been few attempts to draw it together and to relate it to the needs of subsistence and small farmers and to the particular set of constraints under which they labour. This work is an attempt to examine the components of dryland farming in such a context, not simply in order to supply "solutions", but to help agricultural and development workers understand the issues involved, and therefore to work out with farmers themselves possible ways ahead.

The increasing frequency and severity of famine in dry regions, especially of Africa, do not result simply from drought, neither can they be prevented solely by agricultural means. But they remind us of the long-term neglect of farming, particularly in semi-arid areas, and should

serve to stimulate our desire to understand dryland farming systems better.

This book is written for practising agriculturalists and students, but it will also be of relevance to those working in or studying development, geography, natural resources and rural sociology in drier areas. Although based mainly on examples and experience from Africa, it draws out principles which can be applied elsewhere.

Price: GBP 19.99

Orders to: Macmillan Education Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, England. For ACP countries: free of charge at: CTA, P.O.Box 380, 6700 AJ Wageningen, the Netherlands.

Predicting N Fertilizer Needs for Corn in Humid Regions. B.R. Bock and K.R. Kelley, editors. National Fertilizer and Environmental Research Center, Muscle Shoals, 1992, v + 127 p. ISBN 0-87077-077-1. Paperback.

Matching N fertilizer rate to crop need on a site-specific basis is one of the most critical requirements for minimizing loss of agricultural N into ground and surface waters. A symposium was held at the annual Soil Science Society of America meeting (Denver, 1991) to provide an up-to-date assessment of traditional and new approaches for predicting N fertilizer needs for corn in humid regions. The proceedings are published to assist agricultural scientists, policy makers, regulators, and farm advisors dealing with water quality and farm profitability aspects of N management.

The relevance of the proceedings to public concerns and mandates is discussed in chapter 1. Subsequent chapters review underlying principles in predicting N needs and summarize advances in the Northeast, Mid-Atlantic, and Midwest regions of the United States. These chapters include the latest information on the pre-sidedress soil nitrate test, chlorophyll meter test, and other diagnostic tests.

Price: USD 20 (in the U.S.A.); USD 30 (Outside the U.S.A.)

Orders to: NFERC Bookstore, P.O.Box 1010, Muscle Shoals, AL 35660, U.S.A.

Technologies for Sustainable Agriculture in the Tropics. ASA Special Publication No. 56. J. Ragland and R. Lal, editors. American Society of Agronomy, Madison, 1993, xix + 313 p. ISBN 0-89118-118-0. Paperback.

Land and its associated natural resources provide for our basic needs and forms as the source of most of the world's accumulated wealth. Today, sustainability of agriculture is of concern to people throughout the world. Nowhere is the sustainability issue of greater concern than in the tropics. It is in the tropics where population, a fragile environment, and the need for foreign currency put a strong demand on the remaining natural resources.

This publication explores the assessment of many international tropical experts. It is divided into seven sections: basic concepts, technological options, agroforestry and nutrient cycling, vegetative hedges for erosion management, computer models, socio-economic considerations, and case studies from sub-Saharan Africa. This book serves as a reference for those individuals that want to develop and promote the technologies that will help sustain a valuable resource: the Tropics.

Price: USD 30 (+ 10% per book for postage on orders outside the USA). Advance payment required.

Orders to: SSSA Headquarters Office, Book Order Dept., 677 South Segoe Road, Madison WI 53711, U.S.A.

Drylands. Environmental Management and Development. P. Beaumont. Routledge, London, New York,

1993, xix + 536 p. ISBN 0-415-09663-4. Paperback.

Drylands or arid zones, which cover over half of the world's area, have witnessed rapid development, exploitation and change with the discovery of mineral reserves, urbanization and population growth. Environmental management in these areas is critical to the conservation and sustainable use of the resources.

This publication offers a systematic study of the physical nature of drylands and the history of human response to and uses of these harsh landscapes. Detailed case studies, including urban as well as pastoral drylands from California to Central Asia, the Middle East, the Sahara and Australia, contrast different management approaches and problems. The future of drylands is discussed at some length. The book closes with an extensive listing of references.

Price: GBP 17.99

Orders to: Routledge, 11 New Fetter Lane, London EC4P 4EE, England; or: Routledge, 29 West 35th Street, New York, NY 10001, U.S.A.

Salt Affected Soils and Crop Production: A Modern Synthesis. P. Lal, B.R. Chhipa and Arvind Kumar, editors. Agro Botanical Publishers, Bikaner, 1993, viii + 375 p. ISBN 81-85031-61-4. Hardbound.

Salt affected soils are unequivocally amongst the most precarious barrier in plant production under natural and cultivated environments. Scientific endeavours to face the challenge of Malthusian's doctrine have been experiencing set backs, vis-a-vis advancing untiringly in the sub-optimal and marginal environments of salt affected soils. The previous decade was particularly peculiar and special in the sense that the knowledge generated in the area of adaptation towards salinity has been multifaceted. The organisms under study included prokaryotic bacteria, algae, perennial plants of natural environment and also important food crops. Understanding about mechanism of salt tolerance increased considerably, particularly at cellular and molecular level.

The book aspires to present the state-of-art in almost all important aspects of plant growth in a saline environment. It gives a wide coverage of information on nature, management of salt affected soils, irrigation water, physiology, biochemistry, biotechnology, crop plants, grasses and forage crops, medicinal plants and micro-organisms.

Price: INR 500; USD 120

Orders to: Agro Botanical Publishers, 4E 176 J.N. Vyas Nagar, Bikaner 334 003, India.

Le Carbone 13 dans la Matière Organique des Sols. Cahiers Orstom, Série Pédologie, Vol. XXVI, N° 4-1991. ORSTOM, Bondy, 1993, 87 p. ISSN 0029-7259.

La pédologie est passée de l'observation des faits et de l'inventaire des objets à l'étude des systèmes et des processus. La première phase de cette évolution dans les recherches a été marquée par la caractérisation des phénomènes minéraux (géochimie, minéralogie et cristallogénie) et, à cet effet, on a cherché progressivement l'appui des méthodes physiques adaptées: diffraction des rayons X, spectroscopie infrarouge, microanalyse par microsonde...

Mais le sol est aussi un milieu vivant et dans tous les cas un système organominéral. C'est ce qui est à l'origine de l'accent mis depuis quelques années sur la caractérisation des constituants organiques et sur l'étude de leur rôle dans la dynamique des sols et des écosystèmes; d'où la nécessité de faire appel, là aussi, à des techniques physiques appropriées et en particulier à l'utilisation, grâce à l'introduction de la spectrométrie de masse, des mesures

de ^{13}C .

Ce numéro de Pédologie donne un aperçu des possibilités d'utilisation du ^{13}C pour étudier la dynamique des matières organiques du sol, ou pour suivre l'évolution du couvert végétal.

Commandes à: Editions de l'ORSTOM, 70 route d'Aulnay, F-93143 Bondy Cedex, France.

Soil Resilience and Sustainable Land Use. D.J. Greenland, and I. Szabolcs, editors. CAB International, Wallingford, 1994, xiv + 561 p. ISBN 0-85198-871-7. Hardback.

Soil resilience embraces many aspects, but may be defined as "the soil's ability to recover after disturbance". It is central to any concept of sustainable land use in both developed and less developed countries in times of continued increases in population. These issues form the focus of this book which presents papers presented at the International Symposium and Workshop on Soil Resilience and Sustainable Land Use, which was organized by the Hungarian Academy of Sciences, CAB International and the ISSS, from 28 September to 2 October, 1992.

The book is divided into six parts: sustainable agriculture and soil resilience; the extent of soil degradation; avoiding and combating soil degradation; soil organisms and soil resilience; methodologies for the study of soil resilience and sustainable land use; and promoting soil resilience for sustainable land use.

Price: GBP 60, USD 99.50

Orders to: CAB International, Wallingford, Oxon OX10 8DE, U.K.

Soil Resilience and Sustainable Land Use. Poster Presentations. I. Szabolcs, editor. Agrokémia és Talajtan, Tom.42, No 1-2, 1993, 219 p. Paperback.

This volume includes 30 poster communication presented at the symposium mentioned above.

Orders to: Agrokémia és Talajtan, RISSAC, Herman Ottó út 15, 1022 Budapest II, Hungary.

Operational Methods to Characterize Soil Behavior in Space and Time. Special issue of Geoderma, Vol.60 Nos. 1/4. R.J. Wagenet and J. Bouma, editors. Elsevier, Amsterdam, New York, 1993, viii + 382p. ISSN 0016-7061. Paperback.

This issue contains papers presented at a Conference of the Working Group on Moisture Variability in Space and Time of the ISSS, held in Ithaca in July 1992.

Developments in these fields at the local farm and field level are quite pronounced, which may result from the ever more pressing need to balance production requirements with environmental consequences at farm level. Modern computer-guided systems were discussed which allow soil-specific application of fertilizers and biocides. The necessary survey and sampling procedures received considerable attention, demonstrating that statistical interpolation procedures, such as various forms of kriging, have found their place in soil inventory programs. Emphasis is placed on assessments in terms of probabilities of exceedance rather than in terms of average concentrations or contents. Some papers discussed the effects of tillage-induced variability in time. Different techniques for monitoring soil hydraulic characteristics and for measuring hydraulic parameters were tested and reviewed. A clear need was expressed for more and better field monitoring data, particularly with regard to the properties of different types of soil structure resulting from various alternative forms of soil management.

Orders to: see below.

Pedometrics-92: Developments in Spatial Statistics for Soil Science. Special issue of *Geoderma*, Vol.62 Nos. 1/3, J.J. de Gruyter, R. Webster and D.E. Myers, editors. Elsevier, Amsterdam, New York, 1994, xii + 326 p. ISSN 0016-7061. Paperback.

Pedometrics, according to the first paper by R. Webster, is essentially the application of probability and statistics to soil, has its origins in agronomy in the early part of this century. For several decades it was a tool for designing experiments and for creating and analyzing classifications, and for exploring multivariate relations. The 1970s brought a reappraisal, leading to changes of classifying strategy from hierarchical to non-hierarchical and to a new appreciation of the nature of soil variation itself. Pedometricians began to treat soil properties as spatially correlated random processes and to tap the richness of geostatistics for analysis and prediction.

Image-analyzing computers have brought new opportunities for analyzing soil structure, especially that of the pores, their sizes, shapes, and topology. There is still a need to relate the directly observed porous structure to *hydraulic and mechanical behaviour of soil*. Fractals may have a role. To a more limited degree pedometrics has helped in elucidating pedogenesis by quantifying relations between individual soil properties and controlling factors. Solving the full system of multivariate equations needed to describe the products of soil genesis in individual regions, let alone globally, remains one of the biggest challenges for pedometricians.

The present volume of *Geoderma* brings together twenty reviewed papers presented at Pedometrics-92. *Orders to:* in the USA and Canada: Elsevier Science Publishing Co. Inc., P.O.Box 882, Madison Square Station, New York NY 10159, USA; *Elsewhere:* Elsevier Science Publishers, P.O.Box 211, 1000 AE Amsterdam, the Netherlands.

Zur Bewertung von Bodenverbesserungsmitteln durch Bestimmung von Zersetzungsgrad und Rotte der organischen Substanz. Geologisches Jahrbuch, Reihe F, Heft 24. J. Schwaar, H. Jacob und H. Hufnagel. Bundesanstalt für Geowissenschaften und Rohstoffe, mit Geologische Landesämter in der Bundesrepublik Deutschland, Hannover, 1990, 160 S. ISSN 0341-6445.

Die Bewertung von Bodenverbesserungsmitteln durch Bestimmung von Zersetzungsgrad und Rotte der organischen Substanz ist grundsätzlich möglich. Nur gestalten sich die Aussagen schwieriger als erwartet. Eine Charakterisierung aller Substrate ist nicht mit einem einzigen Parameter möglich. Dazu bedarf es mindestens ihrer drei. Unbedingt erforderlich sind auch Keimversuche.

Torfe und Torfkultursubstrate sind mit Rinden- und Müllkomposten nicht direkt vergleichbar, denn eine geringe Zersetzung hat eine hohe biologische Wertigkeit zur Folge. Bei den Rinden- und Müllkomposten trifft in den meisten Fällen das Gegenteil zu: je geringer die Zersetzung, desto geringer die biologische Wertigkeit.

Der Remissionsgrad ist ein hinreichend brauchbarer Parameter, solange die Aschengehalte gering bleiben; dies trifft für Torfkultursubstrate zu, für die Rindenkomposte nicht immer. Für die Müllkomposte ist er deshalb nicht anwendbar. Da er methodisch keinen großen Aufwand erfordert, führt er zu raschen Ergebnissen. Von dem mikrophotometrischen Parameter ist die Reflexion weitgehend unbrauchbar, während die Fluoreszenz gute Ergebnisse liefert. Die Mikro-Remission ist ebenfalls einsetzbar, nur ist zu bedenken, daß die Bestimmung dieser Parameter methodisch aufwendig ist. Die Anschaffungskosten der notwendigen Geräte sind relativ hoch.

Eine zentrale Bedeutung hat der Keimtest, der etwas

über die tatsächliche biologische Wertigkeit aussagt. Denn dem Pflanzenwachstum hinderliche Schadstoffe werden mit der Bestimmung der Zersetzung nicht erfaßt. Ergänzende Aussagen kann die Leitfähigkeit geben. Die Untersuchungen zeigen auch, daß die „Quetschmethode“ als Schnellverfahren zur Charakterisierung des Zersetzungsgrades von Torfen und Torfkultursubstraten brauchbar ist. Das gleiche gilt für fluoreszenzmikroskopische Photographien. Die Heterogenität der Kultursubstrate ist dafür verantwortlich, daß mindestens drei Parameter so wie ein Keimtest und - zumindest bei Siedlungsabfallkomposten - Schwermetallanalysen zur ausreichenden Charakterisierung notwendig sind.

Bestellungen an: Siehe unten.

Das Niedersächsische Bodeninformationssystem NIBIS. Wissenschaftliche Berichte zum Niedersächsischen Bodeninformationssystem (NIBIS) (1. Folge). Geologisches Jahrbuch, Reihe F, Heft 27. B. Schwerdtfeger. Redaktion. Bundesanstalt für Geowissenschaften und Rohstoffe, mit Geologische Landesämter in der Bundesrepublik Deutschland, Hannover, 1993, 256 S. + 3 Karten. ISSN 0341-6445.

Im Jahre 1985 wurde das Niedersächsischen Landesamt für Bodenforschung mit dem Aufbau eines Bodeninformationssystems für das Land Niedersachsen (NIBIS) beauftragt. Auf Tagungen und in mehreren Veröffentlichungen wurden bereits Prinzipien und Arbeitsansätze des NIBIS vorgestellt. Sie haben bundesweit Interesse gefunden. In der Folgezeit häuften sich die Anfragen und Wünsche nach einer detaillierten Darstellung des Aufbaus und der Funktionsweise von NIBIS. Mit diesem Band will nun die Arbeitsgruppe, die mit der Konzeption und Umsetzung des Programmes befaßt ist, beginnen, ihre Arbeiten darzustellen. Dies wird auf zweierlei Weise erfolgen: 1. Es werden in der Reihe F (Bodenkunde) des *Geologischen Jahrbuches*, mit diesem Band beginnend, in loser Folge „Wissenschaftliche Berichte zum NIBIS“ erscheinen, die sich mit den Konzeptionen und wissenschaftlichen Ansätzen für einzelne Arbeitsschritte beschäftigen und 2. werden „Technische Berichte zum NIBIS“ in einer speziellen Reihe erscheinen, in denen Datenschlüssel, Übersetzungsanweisungen, Programmbeschreibungen und andere „technische“ Informationen dargestellt werden. Ziel ist, mit dieser Veröffentlichung dem breiten Interesse am Einsatz moderner rechnergestützter Verfahrensweisen in der Bodenkunde Rechnung zu tragen und Anregungen zu geben. In diese Publikation wird dargelegt wie mit NIBIS der Aufbau der Datenbasis, die Bereitstellung von Auswertungsmethoden und die Nutzung erfolgt.

Bestellungen an: Siehe unten.

Dokumentation zur Methodenbank des Fachinformationssystems Bodenkunde. 5. überarbeitete Auflage. Technische Berichte zum NIBIS, Heft 3. U. Müller, C. Degen und C. Jüring. Niedersächsischen Landesamt für Bodenforschung, Hannover, 1992.

Wirksame Bodenschutzmaßnahmen erfordern eine geeignete Datenbasis mit Angaben über Verbreitung und Eigenschaften der Böden. Im Niedersächsischen Landesamt für Bodenforschung werden diese Daten im Fachinformationssystem Bodenkunde (FIS BODEN) des Niedersächsischen Bodeninformationssystems (NIBIS) digital gehalten. Es enthält Datenbanken für Punktdaten (Profilatenbank, Labordatenbank) und für Flächendaten. Die effektive Nutzung der Datenbasis für thematische Auswertungen erfordert die Konzipierung und den Aufbau einer Methodenbank als Bestandteil des FIS BODEN.

Die dargestellten Methoden beruhen auf der Grundlage

empirisch ermittelt und in Verknüpfungsregeln oder Formeln beschriebener Zusammenhänge, wobei keine exakte Beschreibung der ablaufenden Prozesse stattfindet. Durch die geringere Anforderung an die Datenbereitstellung, liegt der Einsatzbereich auch im Maßstabbereich 1:25000 und größer.

Eine Simulation von Prozessen erfordert die Anwendung von numerischen Simulationsmodellen. Hierbei wird der ablaufende Prozeß durch mathematische Lösungen in hoher räumlicher und zeitlicher Auflösung simuliert. Diese hohe Auflösung erfordert deshalb auch die Bereitstellung von Eingangsdaten in hoher räumlicher Dichte. Da in der Regel diese Informationsdichte für numerische Lösungen nicht vorliegt, kann durch räumliche Parametrisierungsverfahren (Boden, Klima, Nutzung) versucht werden, die benötigten Daten bereitzustellen. Durch diese Anforderungen an die räumliche Auflösung liegt der Einsatz von numerischen Simulationsmodellen auf größeren Maßstabsebenen.

Neben den Anforderungen der Methoden an die Datendichte sind die Qualitätsansprüche an die zur Verfügung zu stellenden Eingangsdaten unterschiedlich. Während empirische Methoden auf einfachere Eingangsdaten und abgeleitete Kennwerte zurückgreifen können, erfordern numerische Lösungen. Die Anforderung an die Eingangsdaten werden mit zunehmender Komplexität der zu beschreibenden Prozesse höher. Durch Anwendung von Parametrisierungsverfahren können z.B. pF- und Ku-Kurven aus einfach zu ermittelnden Eingangsdaten abgeleitet und für Modelle bereitgestellt werden.

Bestellungen an: E. Schweizerbart'sche Verlagsbuchhandlung, Johannesstrasse 3 A, D-7000 Stuttgart 1, Germany.

Soils in Archaeology. Landscape Evolution and Human Occupation. B.T. Holliday, editor. Smithsonian Institution Press, Washington and London, 1993, xiii + 254 p. ISBN 1-56098-308-6. Paperback.

Focusing on the archaeological applications of soil geomorphology and soil chemistry, the case histories and reviews presented here combine a wide range of disciplines, including archaeology, physical geography, Quaternary geology, and pedology. The book also includes a glossary of selected soil science terms. The papers presented here are the proceedings of a symposium held in Phoenix in April 1988.

The papers discuss the use of soils for reconstructing past landscapes and landscape evolution, for use in estimating the age of surfaces and depositional episodes, and for providing physical and chemical indicators of human occupation. The first four chapters focus on soil geomorphology in archaeology; specifically they deal with soils for reconstructing landscapes and site settings and the use of soils as age indicators. The second group of four essays deals with the archaeological significance of particular attributes of soils and includes both soil geomorphology and soil chemistry.

Price: USD 16.95; GBP 13.25

Orders to: Smithsonian Institution Press, 470 L'Enfant Plaza, Suite 7100, Washington, DC 20560, U.S.A.

IGBP in Action: Work Plan 1994-1998. Global Change Report No. 28. IGBP, Stockholm, 1994, 151 p. ISSN 0284-8015. Paperback.

This report provides an overview of the research to be carried out by the International Geosphere-Biosphere Programme: A Study of Global Change over the next five years. It provides researchers and the wider community with an up-to-date synthesis of what IGBP is doing, why it is important, and the scientific products that it expects

to achieve. It takes account of a wide input, being based on the active involvement in planning and project development of all programme participants, through workshops, scientific meetings and other discussions at the national and international level.

Orders to: IGBP Secretariat, Royal Swedish Academy of Sciences, Box 50005, S-10405 Stockholm, Sweden.

Humic, Fulvic and Microbial Balance: Organic Soil Conditioning. W.R. Jackson. Jackson Research Center, Evergreen, 1993, xxv + 958 p. ISBN 0-9635741-0-8. Hardback.

This is an agricultural text and reference book with a total of 958 pages in which the author sees the need to provide a condensed one-page table of contents before the reader comes to the eight-page list of contents! The book ends with 22 pages of glossary and 89 pages of references amounting to some 1,500 articles, books and proceedings. Several chapters in the book are supported by articles reprinted from reputable sources such as Soil Science and Soil Science Society of America Journal.

The contents of the book begin with a discussion of organic matter, humification and energy transformations. Next, humic acid, fulvic acid, water and the types of chemical linkage occurring are presented as the basic materials and system of construction of the organic materials found in soils. This is followed by an account of the familiar nitrogen cycle, the role of the clay-humus complex, and growth factors including the importance of mycorrhiza.

The author then turns his attention to the application of his ideas. Chapters evaluate the role of organic matter as a "conditioner" and the importance of plant and microbial growth stimulants. Further practical applications of the role of the microbial population of soils, are seen in the breakdown of pesticides and herbicides as well as other alien organic substances such as oils and wastewaters. An over-optimistic reliance on the capability of soil humus is reflected in the treatment of the way soils can deal with toxic metals and radionuclides. Finally, the author turns to what he feels the individual should do to help conserve organic matter and with it our precious natural asset of the soil.

From the Foreword, and some of the views expressed, William R Jackson (whose previous publications are not in the field of soil science) appears to be a convert and disciple of the organic school of agriculture. Unlike some proponents of organic farming methods, he has adopted a scientific approach and clearly has a message of which all students of soil and environmental science should be aware.

It may be an "American" style of presentation, but at times the reader feels that the author resorts to the level of a school book compared with that expected of an in-depth university text. As the readership of this book obviously would be at a university level of education, the encyclopaedic nature of the book will be welcomed, especially by students who may be expected to write essays or present seminars on the topic of organic matter.

Price: USD 149.00 (postage and packing USD 15.00).

Orders to: Jackson Research Center, 822, Shady Glen, Martinez, CA 94553-4010, USA.

E.M. Bridges, Wageningen, The Netherlands

Sistema de Informações Geográficas Aplicações na Agricultura (Agricultural Applications of Geographical Information System). E.D. Assad and E.E. Sano. Ministério da Agricultura, do Abastecimento e da Reforma Agrária, Empresa Brasileira de Pesquisa Agropecuária, y Centro de Pesquisa Agropecuária dos Cerrados, Brasília,

1993, 274 p. Paperback. (In Portuguese).

The index of population growth, especially in developing countries, has increased considerably after World War II. High energy cost, degradation of soil and inaccessibility to technology have been pointed out as the main causes for decline of per capita food production in the last decades. Creating conditions for attending the minimum human nutritional requirements is the great challenge of the end of this century.

Agricultural research plays an important role, especially in the boundary areas of agricultural expansion like the Brazilian Cerrados. It forms a major and important option for the development of a sustainable agricultural system, in order to supply sufficient food for Brazil and to gear surpluses for export.

Recognizing one of the primordial elements in research of natural resources for the development of the Cerrados, the EMBRAPA-CPAC created a Laboratory of Environmental Biophysics with the aim to develop and/or adapt methodologies for applications of remote sensing techniques and geographical information systems for agricultural use.

This book presents the most important results obtained during the last years by a multidisciplinary team of this laboratory. It can be used as a source of information for professionals or as a textbook.

Orders to: EMBRAPA/SPI, Caixa Postal 040315, 70770-901 Brasília, DF, Brazil.

Proceedings of Symposium Plant Nutrition Effects on Production and Quality of Tobacco. G. Dev, M.S. Chari and B.V. Ramakrishna, editors. Potash and Phosphate Institute of Canada (India prog.), Haryana, 1993, 194 p. Paperback.

Among commercial crops, tobacco occupies an important position. India occupies the third place in production and the seventh place in export of tobacco. Among various types of tobacco, Flue-Cured Virginia (fcv) occupies a prominent place. It is an export-oriented type and 90% of foreign exchange earnings come from this type of tobacco. Notwithstanding its third place in fcv production area, the productivity in India is very low compared to other fcv producing countries. To achieve maximum yields and attain desired marketing characteristics, the tobacco plant requires a balanced and continuous supply of all the essential plant nutrients.

These proceedings includes 15 lead papers presented at the Symposium held in Rajahmundry (AP), India. The papers review the work on the effect of essential nutrients on production and quality of all types of tobacco grown in India. One of the papers covers fertiliser practices for tobacco in Europe and another one deals with potassium sulphate effects on production and quality of tobacco.

Orders to: Potash & Phosphate Institute of Canada, India Programme, Sector 19, Dundahera, Gurgaon-122 001, Haryana, India.

Geopotential and Ecology - Analysis of a Desert Region. Catena Supplement 26. B. Meissner and P. Wycisk, editors. Catena Verlag, Cremlingen, 1993, 208 p. + 6 maps. ISBN 3-923381-35-2. Hardback.

The southern part of the Western Desert of Egypt occupies the centre of the largest hyperarid area of the earth. Between 1981 and 1987, a study was made of sedimentary basins, groundwater regimes, mineral resources, climatic development, plant ecology, development of soils and their suitability for agriculture.

The Cartography Unit was concerned with the development of new types of maps based on remote sensing data. The digital satellite image mosaic based on Landsat

MSS data made it possible to produce supplementary medium and small scale maps of selected topics.

When the project completed its first phase in Egypt in 1987, transferring its activities to Sudan and Somalia, the idea was born to present the collected multidisciplinary results in one thematic map work related to the geopotential and ecology of the region.

The map series of six "Geopotential and Ecological Maps of the Western Desert of Egypt" documents the present situation of this arid area for the first time on a 1:1.000.000 scale by the following thematic maps: Topography, Lithology, Hydrogeology, Soil Association, Land Suitability (for irrigated agriculture), and Vegetation.

Background information for these maps and related contributions supplement the environmental information. The interdisciplinary approach covers aspects of remote sensing data in cartography, landscape evolution and paleoclimate, sedimentary basin studies soil associations and land suitability, landscape ecology and phytomass production. The content of these maps also provides an appropriate database for a future environmental Geographical Information System (GIS).

Price: DM 132.30, USD 88.20

Orders to: Catena Verlag, Brockenblick 8, D-38162 Cremlingen 4, Germany; or: Catena Verlag, PO Box 1897, Lawrence, KS 66044-8897, U.S.A.

Grünlandlehre. Uni-Taschenbücher 1770. W. Opitz von Boberfeld. Verlag Eugen Ulmer, Stuttgart, 1994, 336 S. ISBN 3-8252-1770-1.

Die Bewirtschaftung von Grünland, der meist kulturbedingten Vegetation, zielt bei Erhaltung bzw. Stabilisierung der Selbstregulation des gesamten Systems Boden, Narbe, Tier auf die Erzeugung von Futter ab, das nach zeitlichem Anfall und Beschaffenheit den Bedürfnissen der Tiere weitgehend entspricht. Dieser Vorgabe haben Landbewirtschaftung und Landschaftspflege gleichermaßen Rechnung zu tragen. Folglich erfordern Eingriffe in das Agrarökosystem Grünland eine Beschäftigung mit den Besonderheiten von Standort, Pflanzenbestand und Weidetier. Da die Futterakzeptanz nachhaltig durch die qualitative Beschaffenheit des Aufwuchses geprägt wird, steht dieses Merkmal einschließlich der Bewertungsproblematik ganz im Zentrum des vorliegenden Werkes. Vor diesem Hintergrund werden selbst die Besonderheiten des Graslandes wärmerer Klimate, des Wasser- und Landschaftsschutzes behandelt.

Preis: DM 36.80

Bestellungen an: Verlag Eugen Ulmer, Postfach 700561, D-70754 Stuttgart, Deutschland.

Modelling Surface Runoff and Soil Erosion in Catchments using Geographical Information Systems. Netherlands Geographical Studies 157. A.P.J. de Roo. Doctoral Thesis, University of Utrecht. Royal Dutch Geographical Society, Utrecht, 1993, 295 p. ISBN 90-6809-167-0. Paperback.

Soil erosion and surface runoff are serious problems in the hill country of South Limburg (The Netherlands), because of the unique combination of susceptible loess soils, sloping land, intensive agriculture, human settlement and ecologically important areas. In order to understand how to reduce the magnitude of these problems quantitative models of runoff and erosion, which were used to evaluate alternative strategies for improved land management, were applied, modified and tested in this study. Three research projects were designed to provide information on the hydrological response of rural catchments, to provide information on possible erosion control measures and to provide data for the validation of

the soil erosion models. In 1987, a study of surface runoff and soil erosion measurements and model simulations started in the Catsop catchment (46 ha). In 1988, a modelling study was started in the Etzenrade catchment (225 ha). To test the models under different conditions, a study was started in 1989 in the Yendacott catchment (147 ha), north of Exeter (U.K.). In these three catchments surface runoff and soil erosion were measured and simulated.

Price: NLG 36, including postage (all orders must be prepaid, payable to NGS)

Orders to: The Royal Dutch Geographical Society KNAG, P.O.Box 80123, 3508 TC Utrecht, the Netherlands.

Subsistence and Survival in the Sahel. Netherlands Geographical Studies 168. E.J.A. Harts-Broekhuis and A.A. de Jong. Royal Dutch Geographical Society, Utrecht, 1993, 455 p. ISBN 90-6809-181-6. Paperback.

The objective of this study was to gain insight into the socio-economic and geographical structures of the town of Mopti, Mali, and its surrounding areas, the changes which have recently taken place in these structures, and the ensuing town-hinterland relations. The study consists of four parts. Part I presents the research framework by discussing the literature about economic stagnation and ecological degradation in Africa and the Sahel in particular, and introduces the research area. Part II focuses on the rural producers and their responses to deteriorating circumstances and external interventions. Part III considers the town of Mopti and the town-hinterland relations, while Part IV discusses the issue of regional development, which purpose is to review the effects of the analyzed rural and urban processes of change on the region's development.

Price: NLG 49.50, including postage (all orders must be prepaid, payable to NGS)

Orders to: The Royal Dutch Geographical Society KNAG, P.O.Box 80123, 3508 TC Utrecht, the Netherlands.

Saturated Flow and Soil Structure. Springer Series in Physical Environment 14. H. Diestel. Springer Verlag, Heidelberg, New York, 1993, ix + 235 p. ISBN 3-540-55791-1 (German edition) 0-387-55791-1 (US edition). Hardcover.

The hydrodynamic laws for the flow of water through those soil voids, the properties of which are determined by the size distribution and the deposition pattern of the mineral particles, no longer apply to already very small interaggregate voids arising from processes of soil structure formation. The significance of differences in soil structure in the field and in structural fluctuations with time for the movement of water can, however, only be quantified if knowledge about the effect of the morphology of inter-aggregate voids on the flow processes is available.

Impermeable inclusions in the soil can have an effect on the degree to which and on the sequence in which various soil regions are included in the flow processes, and on the length of the flow paths down to a given level as well as on the distribution of flow velocities.

In order to quantify such influences on the flow processes arising from soil structure at water saturation, percolation experiments were conducted in soil columns containing artificial voids or impermeable inclusions. Infiltration experiments in the field served the purpose of a first examination of the transferability of the obtained results and of the applicability of the methods of investigation to field conditions. The subject of this work is of interest to soil scientists and hydrologists working in soil

and water pollution.

Price: DM 148; ATS 1.154,40; CHF 148.

Orders to: see below.

Contaminants in Terrestrial Environments. Springer Series in Physical Environment 13. O. Fränze. Springer-Verlag, Heidelberg, New York, 1993, xvi + 439 p. ISBN 3-540-55277-4 (German edition) 0-387-55277-4 (US edition). Hardcover.

The book aims at a novel coherent understanding of chemical impact on the lower atmosphere and characteristic types of terrestrial ecosystems. To this end comprehensive flux-analytical and hierarchical modelling approaches were developed, which include a thorough consideration of the specific physical and geographic boundary conditions of the processes involved. The first part is devoted to fundamentals of environmental chemistry and ecology, while the second deals with the complex atmospheric pathways of anthropogenic chemicals. In the last part, the manifold interactions of these compounds or their metabolites with the soil-vegetation complex of ecosystems are described. Chapters on pollutant impact on materials and a review of chemical fate modelling are included.

Price: DM 228; ATS 1778,40; CHF 226.

Orders to: see below.

Water Flow and Solute Transport in Soils. Advanced Series in Agricultural Sciences 20. D. Russo and G. Dagan, editors. Springer-Verlag, Heidelberg, New York, 1993, xxii + 306 p. ISBN 3-540-56216-8 (German edition) 0-387-56216-8 (US edition). Hardcover.

This book reflects the main trends of contemporary research in the field of water flow and solute transports in soils, as well as its applications. The contributions fall into three main areas: (1) the stochastic modeling of solute transport through heterogeneous soil in the upper layer of the unsaturated zone; (2) the more traditional scope of analysis of flow through homogeneous or layered formations; (3) applications, for example, new devices for field measurements, calculation of solute movement through a soil cover, and the use of geo-statistical methods to quantify solute concentrations in spatially variable soils.

Price: DM 198; ATS 1544,40; CHF 198.

Orders to: Springer-Verlag, Tiergartenstrasse 17, D-69121 Heidelberg, or: Springer-Verlag, 175 Fifth Avenue, New York, NY 10010, U.S.A.

Water in our Common Future. Committee on Water Research, COWAR. J. Jordaan, E.J. Plate, E. Prins and J. Veltrop. Unesco, Paris, 1993, iv + 90 p. Paperback.

On the basis of inputs from all international associations working in the field of water and represented by COWAR, an editorial board has prepared a report in which the issues associated with sustainable water resources development are identified and discussed. COWAR's mandate, which was drawn up by the International Council of Scientific Unions (ICSU), representing the science oriented associations, and the Union of International Technical Associations (UITA/UATI), representing the engineering societies, aims at bridging the gaps between different sectors of water research, as well as between water research and water engineering. The COWAR report reflects this purpose in the approach taken, which has been: (1) To define the present water resource development situation, (2) To identify the consequences of sustainable development on water resources development, (3) To derive research needs resulting from the concept of the sustainable development of water resource, and (4) To summarize the role that international associations can play in transferring know-

ledge and engineering expertise in the field of water resources development.

Price: free of charge

Requests to: The Director, Division of Water Sciences, Unesco, 1 rue Miollis, F-75732 Paris Cedex 15, France.

The Fate of Mercury in Soil. Soil and Groundwater Research Report IV. K. Schlüter. Commission of the European Communities, 1993, iii + 75 p. ISBN 92-826-5322-6. Paperback.

The results of early research into the causes of mercury contamination of fish, pointed to the soil system as a significant and sometimes even dominant source of mercury supply to lakes and watercourses. Subsequently several investigations have been performed concerning the fate of mercury in soil. Today, several of these first ideas on the behaviour of mercury in soil have to be revised and new hypotheses have been suggested.

The present review deals with the turnover and translocation of natural soil mercury and mercury which has been deposited from the atmosphere. Direct anthropogenic mercury inputs have only been considered in the order of magnitudes which are used in agricultural and forest systems. The fate of mercury in heavily contaminated soils, as in case of some industrial or mining areas, may be different, as other biological, physical and chemical mechanisms and reactions may be dominant.

Price: ECU 9

Orders to: Office for Official Publications of the European Communities, L-2985 Luxembourg.

Laboratory Methods of Soil and Plant Analysis: A Working Manual. J.R. Okalebo, K.W. Gathua and P.L. Woome. Tropical Soil Biology and Fertility Programme, Nairobi, 1993, 88 p. ISBN 9966-9892-1-8. Paperback, spiral binding.

This compilation of analytical methods is intended for use in the laboratory. It results from the scientific collaboration between the Tropical Soil Biology and Fertility Programme and the National Agricultural Research Centre of the Kenya Agricultural Research Institute. The methods were selected on the basis of their accuracy, reproducibility, time efficiency and cost and are intended for use by laboratory technologists, students and research scientists in developing nations. Whenever possible, the use of sophisticated instrumentation has been avoided in favour of colorimetric or titrimetric approaches. The contents of this manual include laboratory basics of quality control and sample preparation; analysis of soil physical properties such as soil texture, bulk density and water holding capacity; soil and plant analytical procedures for nitrogen, phosphorus, nutrient cations and extractable acidity; measurement and fractionation of soil organic carbon; a section on interpretation of experimental results and several useful appendices.

Orders to: TSBF Programme, c/o Unesco-Rosta, P.O. Box 30592, Nairobi, Kenya.

Etude d'Objets Complexes Sol/Plante à Différents Niveaux d'Organisation, de la Parcelle au Paysage. Sols 19. Thèse de Doctorat. Chao Yongchalemai. Institut National Agronomique, Paris-Grignon, 1993, 232 p. ISBN 2-903643-20-3.

La prise de décision au niveau régional nécessite qu'on puisse disposer d'informations pédologiques au même titre que la topographie, l'occupation du sol, etc.. Le concept de pédo-paysage permet d'associer les études de télédétection et les mesures de terrain concernant la couverture pédologique.

Cette étude porte: (1) sur la caractérisation d'un mo-

dèle physique d'évolution de la surface des sols; (2) sur l'utilisation d'une méthode statistique (DIMITRI) pour élaborer la carte de synthèse à partir de l'interprétation visuelle des images satellitaires; et (3) sur l'analyse structurale des images au moyen d'une nouvelle méthode (OASIS).

Cette étude montre que les données de télédétection une fois calées par des données radiométriques et enrichies par des observations et mesures de terrain, peuvent grandement contribuer à l'élaboration de documents pédologiques régionaux susceptibles de constituer un niveau d'information dans les Systèmes d'Information Géographique.

Prix: FFR 149,60

Commandes à: INA-Paris-Grignon, Science des Sols et Hydrologie, F-78850 Grignon, France.

World Overview of Conservation Approaches and Technologies. Workshop Proceedings. Group for Development and Environment, Berne, 1994, x + 40 p. Paperback.

The participants to this second international WOCAT workshop were asked to contribute to the development of the WOCAT methodology, co-ordination and networking. A review of the comprehensive questionnaire prepared by the core WOCAT team and submitted to the participants for testing resulted in a re-orientation of the approach. It was decided to split the project according to its three major outputs and to prepare separate methodologies for each of these. Expected WOCAT outputs are: 1) A handbook on adaptable conservation technologies and techniques; 2) An overview report of successful approaches in sustainable management; and 3) A world map on achievements in soil and water conservation.

Orders to: Group for Development and Environment, Berne University, Hallerstrasse 12, CH-3012 Berne, Switzerland.

Einführung in die Bodenkunde. 3. Auflage. Pareys Studentexte 58. E. Schlichting. Verlag Paul Parey, Hamburg, 1993, 131 S. ISBN 3-490-20115-9. Kartiert.

Mit der Bedeutung von Umweltproblemen ist der Bedarf an naturwissenschaftlich begründeter, zugleich aber allgemein verständlicher Information über bodenkundliche Sachverhalte gestiegen.

Dieses Buch macht dem Naturfreund verständlich, daß nicht nur „die oberen 30 cm, von denen wir leben“, die Pflanzen versorgen, dem Planer, daß Bodenzerstörung durch Landverbrauch nicht nur Verlust an Grünflächen bedeutet, und dem Bodennutzer, daß seine Eingriffe längerfristig und großräumig wirken als meist angenommen. Ihnen allen aber wird veranschaulicht, daß sich in Bau und Verhalten wesentlich unterscheiden. Darum werden im Hauptteil des Buches Entstehung, Eigenschaften und Nutzung von Böden typischer Landschaften Mitteleuropas eingehend behandelt. Daraus werden allgemeine Schlüsse auf das Wesen von Böden als Umwandlungsformen von Gesteinen, als erdgeschichtliche Urkunde, als Landschaftselemente sowie als Pflanzenstandorte und Filterkörper gezogen, die von speziellem Interesse sein dürften. So wird die Einsicht vermittelt, daß die Bodenkunde als ökologische Geowissenschaft gleichermaßen von hohem intellektuellem Reiz wie von großer praktischer Bedeutung ist.

Preis: DM 34; ATS 265; CHF 34,20.

Bestellungen an: Paul Parey Verlag, Postfach 10 63 04, D-20043 Hamburg.

Monitoring and Evaluating Agricultural Research. A Sourcebook. D. Horton, P. Ballantyne, W. Peterson, B.

Uribe, D. Gapasin and K. Sheridan. CAB International, Wallingford, in association with International Service for National Agricultural Research, The Hague, 1993, xvi + 219 p. ISBN 0-85198-860-1. Paperback.

This book provides a synthesis of literature and experience that introduces monitoring and evaluation principles, processes and methods, presents examples of monitoring and evaluation, and identifies useful sources of expertise and information. Applications to agricultural research from both industrialized and developing countries are presented. The book will be a useful guide and reference for agricultural research managers, as well as development workers and trainers involved in agricultural research management.

Price: GBP 17.95; USD 34 (Americas only)

Orders to: CAB International, Wallingford, Oxon OX10 8DE, U.K. or: ISNAR, P.O. Box 93375, 2509 AJ The Hague, The Netherlands.

La Selva. Ecology and Natural History of a Neotropical Rain Forest. L.A. McDade, K.S. Bawa, H.A. Hespenheide, and G.S. Hartshorn, editors. The University of Chicago Press, Chicago, London, x + 486 p. ISBN 0-226-03952-8 (paper) 0-226-03950-1 (cloth).

La Selva, a nature reserve and field station in Costa Rica, has been a major focus of research on rain forest ecology, flora, and fauna for over thirty years. This volume provides a review of this research, covering La Selva's climate, soils, and physical setting, its plant and animal life, and agricultural development and land use in nearby areas.

Part 1 summarizes research on the physical setting and environment of the rain forest, as well as the history of the research station and focuses on climate, geomorphology, aquatic systems, soils, nutrient acquisition, and cycles of energy. Part 2 synthesizes what is known about the plant community: vegetation types, plant diversity, plant demography, spatial patterns of trees, impact of treefall gaps on forest structure and dynamics, plant physiological ecology, and plant reproductive systems. Part 3 covers the animal community, while Part 4 addresses interactions between plants and animals, focusing on herbivory and frugivory. Part 5 considers the impact of land use and agricultural development on La Selva and other areas of Costa Rica: land colonization and conservation, subsistence and commercial agricultural development, and forest industry.

Orders to: The University of Chicago Press, 5801 S. Ellis Avenue, Chicago, IL 60637, U.S.A.

Grassland Invertebrates. J.P. Curry. Chapman & Hall, London, New York, 1994, viii + 437 p. ISBN 0-412-16520-1. Hardcover.

Grasslands comprise more than a quarter of the Earth's land surface. In addition to supporting a wide range of vertebrates such as domestic livestock and a variety of game species, grassland is the natural habitat for a wide range of invertebrate species, and this book considers those which occur in grassland and their impact on soil fertility and herbage growth. It describes grassland as a habitat for invertebrates, the groups which occur there and their abundance. The opening chapter considers the major grassland types and discusses the features which influence the distribution and abundance of the invertebrates which inhabit them. Next the major taxonomic groups are reviewed, with a brief account of their biology and ecology and of their ecosystem role. Some general features of grassland invertebrate communities are then described and the factors which influence the population densities of their constituent species are considered. Partic-

ular attention is given to the ways in which populations are influenced by management practices. The final and largest chapter deals with the various ways in which invertebrates influence important grassland processes through ingestion of organic matter, interaction with microorganisms, soil working and feeding on plant tissue. The control of injurious species is considered, with particular emphasis on the potential for achieving this through manipulating grassland management practices.

Price: GBP 50

Orders to: see below.

Clay Mineralogy: Spectroscopic and Chemical Determinative Methods. M.J. Wilson, editor. Chapman & Hall, London, New York, 1994, xi + 367 p. ISBN 0-412-53380-4. Hardcover.

This volume reviews in the form of monographs by expert contributors the application of chemical and spectroscopic methods to the characterization of clay minerals and materials in a way which requires little prior knowledge other than an understanding of what clay minerals are. Infrared, Mossbauer, electron paramagnetic and nuclear magnetic resonance, X-ray photo-electron and X-ray fluorescence spectroscopies are discussed in detail and useful information on standard chemical techniques, especially as applied to poorly ordered materials, is also included.

Price: GBP 79.

Orders to: Chapman & Hall, 2-6 Boundary Row, London SE1 8HN, U.K. or: Chapman & Hall Inc., One Penn Plaza, 41st Floor, New York, NY 10119, U.S.A.

SOILIMS - Laboratory Information Management System for Soil and Plant Laboratories. Manual and Tutor. J. Brunt and L.P. van Reeuwijk. International Soil Reference and Information Centre, Wageningen, the Netherlands, 1994, 85 p. + 2 diskettes. ISBN 90-6672-055-7. Ringbound.

Today, many laboratories are faced with two main pressures: an increasing work-load at a time of budget restriction and the need to comply with official guidelines to ensure product quality (i.e. Good Laboratory Practice or ISO 9000 standards). Both pressures can be countered by the same policy: improvement of performance through better management and efficiency. This applies to the organization of the laboratory as a whole as well as to the organization of the information (registration, work-load, planning, data, etc.).

Efficiency is closely related to the quality of the output. Poor data can be very costly for both the user and the producer. With high quality data, fewer analyses need to be repeated and users of the data will be more satisfied. Therefore, quality assurance and quality control are of paramount importance in laboratory work. Introduction of measures to improve performance involves higher demands on administration and stricter data management.

To meet these demands a LIMS (Laboratory Information Management System) can be a great help. The essential element of a LIMS is a database in which laboratory data are organized logically for rapid storage and retrieval. In principle, a LIMS plans, guides and records the passage of a sample through the laboratory, from its registration, through the programme of analyses, along the quality control (approval or rejection) of data before the presentation and/or filing of the analytical results.

To improve the performance of small to medium-sized soil, plant and water laboratories, ISRIC has developed a low-budget tailor-made LIMS. To ensure acceptance the LIMS is of a user-friendly design so that technicians with little computer experience can use it after only a brief

training. FAO expressed its interest by co-sponsoring this project.

In addition to the full-fledged system, a DEMO version is available which consists of the complete programme but has a limited capacity of 100 samples. This version can be used to get acquainted with SOILIMS and is suitable for instruction and training of laboratory personnel and students in LIMS features. Minimum required hardware: IBM PC (or compatible) 386 SX with 4 Mb RAM. Price of DEMO version: USD 55.

Orders to: ISRIC, P.O. Box 353, 6700 AJ Wageningen, the Netherlands.

Sustainable Agriculture in Egypt. M.A. Faris and M.H. Khan. Lynne Rienner Publishers, Boulder, London, 1993, ix + 273 p. ISBN 1-55587-370-7. Cloth.

Egypt's agricultural development has been constrained by, among other factors, the need to conserve scarce natural resources, the pressures of rapid urbanization, the onslaught of the desert, and, not least important, technological limitations and restrictive economic structures. This book addresses the issues crucial to achieving and maintaining sustainable agriculture in Egypt. It presents edited versions of 21 papers presented and discussed at an international conference held in Alexandria in May 1992, organized in six parts: 1) Major issues for a sustainable agriculture, 2) Environmental aspects, 3) Development of natural and human resources, 4) Adaptation of technology, 5) Economic aspects, and 6) Cultural, social and political aspects.

Price: GBP 34.50

Orders to: Lynne Rienner Publishers, Inc., 1800 30th Street, Boulder, CO 80301, U.S.A. or: Lynne Rienner Publishers, Inc., 3 Henrietta Street, Covent Garden, London, WC2E 8LU, U.K.

Handbook of Plant and Crop Stress. M. Pessarakli, editor. Marcel Dekker, New York, Basel, 1994, xiv + 697 p. ISBN 0-8247-8987-3. Hardcover.

Since the beginning of the century, scientists have observed that plant growth and crop yields decrease under salinity, drought, and other environmental stress conditions. Reduction in plant growth has been reported as a result of modification in the physiological process and environmental conditions that control growth. The mechanisms by which environmental stresses affect plant metabolism, thereby reducing growth and development, are still not completely understood. The change in nutrient uptake and metabolism induced by environmental stresses is commonly accepted among scientists as one of the most important factors responsible for abnormal plant metabolism, reduced growth, and decreased crop yield. Minimizing the effects of salt, drought, or any other environmental stress on plant growth and crop yield is vital. Thus, a greater understanding of environmental stress problems is essential to agricultural scientists.

While there are many reference books about soil salinity, sodicity, and environmental stresses, these exist in relative isolation, each one covering only one specific topic. This handbook is a comprehensive reference that addresses all the factors and their interrelationships related to plant and crop stress. Part I, on soils, addresses soil salinity and sodicity problems, as well as the effects of soil salinity and sodicity on crop growth. Part II discusses plants and crops with different degrees of salt tolerance. Plant and crop responses to salt, drought, and other stresses are presented in Part III, where each chapter covers specific responses of plants and crops under stress conditions. Molecular biology and microbiological aspects of plant responses under salt, drought, and other

stress conditions are discussed in Part IV. Empirical investigations on the different degrees of tolerance of specific plants and crops grown under salt, drought, and other stress conditions are presented in Part V, while Part VI offers future promises for plants and crops for cultivation under stressful conditions. Part VII presents information on using saline water and effluent as sources of irrigation water in arid and semi-arid areas. The important subject of the beneficial aspects of stress, which has received little attention, is presented in Part VIII.

This book is intended to serve as a resource for soil scientists, plant physiologists, agronomists, environmental scientists, and biochemists, as well as educators and students in agricultural disciplines.

Price: USD 150

Orders to: see below.

Remediation of Hazardous Waste Contaminated Soils. D.L. Wise and D.J. Trantolo, editors. Marcel Dekker, New York, Basel, 1994, 952 p. ISBN 0-8247-9160-6. Hardcover.

This book offers a thorough treatment of the remediation of soils contaminated by hazardous wastes and the scientific and engineering issues that must be addressed in creating practical solutions for their reclamation. Presenting traditional physical and chemical methods as well as current and emerging biological methods, it discusses state-of-the-art techniques of site monitoring and assessment; demonstrates a wide range of technical approaches that can be used in remediation; elucidates hydrocarbon remediation; illustrates actual, in-field remediation processes highlighting bioremediation; furnishes innovative process modeling studies. Chapters are organized by issues, case studies, traditional methods, and new technologies to facilitate cross-referencing of topics.

Price: USD 195

Orders to: Marcel Dekker Inc., P.O. Box 5005, Monticello, NY 12701-5185, U.S.A. or: Marcel Dekker, Postfach 812, CH-4001 Basel, Switzerland.

Carbon Fixation through Forestation Activities. IBN Research Report 93/4. G.J. Nabuurs and G.M.J. Mohren. Institute for Forestry and Nature Research, Wageningen, in association with Forests Absorbing Carbondioxide Emission (FACE) Foundation, Arnhem, 1993, 205 p. ISSN 0928-6896. Paperback.

This report presents the results of a study on the carbon storing capacity of 16 global forest types in the tropics and temperate regions of Europe and North America. In most of the cases, three productivity levels were distinguished for each forest type. Productivity is described according to the mean annual volume increment at the end of a rotation. The forest types have been chosen according to criteria of expected high carbon sequestering capacity and probability of establishment.

Orders to: IBN-DLO, P.O. Box 23, 6700 AA Wageningen, The Netherlands.

Irrigated Forage Production. Developments in Crop Science 24. A. Dovrat. Elsevier, Amsterdam, New York, 1993, xiii + 257 p. ISBN 0-444-88300-2. Hardbound.

This volume discusses the possible improvement of forage production for livestock in areas with limited irrigation water and, sometimes, land. It is written in two parts; the first provides some basic elements of forest yield formation; the second gives details of five crops plus pasture selected because of their wide distribution or recommendations for use. The book mainly deals with crop agronomy, such as soil management, crop selection, input scheduling, and forage quality; as well as examining

the physical processes, such as climate factors, crop-water functions, low water quality, and irrigation methods.

Price: NLG 295, USD 168.50

Orders to: see below.

Agriculture and the Environment. C.A. Edwards, M.K. Wali, D.J. Horn and F. Miller, editors. Elsevier, Amsterdam, New York, 1993, xxv + 326 p. ISBN 0-444-89800-X. Hardbound.

Until the 1980s, global increases in food production exceeded the concomitant growth of human populations. However, progressively agriculture is becoming unable to meet the worldwide per capita needs for food. Unless there is major international cooperation in addressing the problems associated with population control, it is predicted that the global human population will reach more than 14 billion by the year 2050, with provision of adequate food, fuel and space for such an increased population unachievable.

These problems are accentuated by factors such as worldwide reductions in soil fertility, the accelerating degradation of land that is suitable for food production through soil erosion, the worldwide trend for migration of human populations from rural habitats to cities and extremely rapid rates of global deforestation. Possible solutions to global sustainability in agriculture and natural resources must involve an integration of ecological, sociological, cultural, and economic considerations, as well as mandated international and national policies. This publication outlines these problems and attempts to seek solutions. It includes the papers presented at an International Conference held in November 1991. The book is a reprint from *Agriculture, Ecosystems and Environment*, vol.46, nos 1-4 (1993).

Price: NLG 320

Orders to: in the USA and Canada: Elsevier Science Publishing Co. Inc., P.O.Box 945, Madison Square Station, New York, NY 10160-0757, USA; Elsewhere: Elsevier Science Publishers, P.O.Box 211, 1000 AE Amsterdam, the Netherlands.

Practical Handbook for Wetland Identification and Delineation. J.G. Lyon. Lewis Publishers, Boca Raton, London, 1993, xii + 157 p. ISBN 0-87371-590-X. Hardbound.

Identification and delineation of wetlands have become increasingly important topics as wetland laws are applied in new manners and enforcement by government regulatory agencies has increased. This book defines wetlands, describes their functions, and presents a variety of methods used to assess the extent of wetlands. It offers solutions to real-world problems and covers important subjects such as methods for identifying and delineating wetland boundaries, evaluating wetlands using aerial photography, indicators of hydrological, chemical, and biological processes, soil surveys, and plant measurements. It also discusses methodological approaches to optimizing wetland delineation and permitting.

Price: GBP 48

Orders to: see below.

Description and Sampling of Contaminated Soils: A Field Guide. 2nd edition. J.R. Boulding. Lewis Publishers, Boca Raton, London, 1994, xv + 218 p. ISBN 1-56670-050-7. Hardback.

Awareness of the hidden problems of polluted land has come to the fore through activities of governmental and non-governmental agencies concerned with public health. Significant areas of the earth's surface are contaminated

with noxious substances and in many places this is severe enough to be regarded as pollution and soil cleaning is necessary.

This book attempts to address the problem of how to identify polluted soils and lists the equipment necessary for field investigations. It draws heavily upon the Revised US Soil Survey Manual for methods of soil description and upon the ASTM standards and EPA methods of evaluation and operation. Detailed advice is given on sampling, but little attention is given to the patterns required for statistical verification of samples. Several checklists are provided and advice is given concerning the analyses required from the laboratory to provide the chemical and physical data needed for an assessment to be made. Strangely, no listings of the critical levels at which contaminants become pollutants are given. It is difficult to see exactly at which group of people this book is aimed as its contents are dealt with more extensively in other publications. Soil scientists will find much familiar material, but the check lists and lists of possible analytical tests may be useful. Non-pedological field staff will find the material extracted from the US Soil Survey Manual a good introduction to soil morphology. Numerous references are given, predominantly to articles and documents published in the USA.

E.M. Bridges, Wageningen, The Netherlands.

Price: GBP 41.

Orders to: see below.

Soil Biology: Effects on Soil Quality. Advances in Soil Science. J.L. Hatfield and B.A. Stewart, editors. Lewis Publishers, Boca Raton, London, 1994, vi + 169 p. ISBN 0-87371-927-1. Hardbound.

This volume is a result of the 1991 workshop on Long-Term Soil Management, which goal was to discuss the current issues in soil biology in context to soil quality and develop a linkage among disciplines in the pursuit of a more complete understanding of the soil system.

The publication is a state-of-the-art review focusing on the linkage between biological processes that occur in the soil and their impact on soil quality. Topics considered include the microbial ecology of conservation management systems, dynamic processes of vesicular-arbuscular Mycorrhizae, earthworms and soil fauna, microbial processes in the soil, and the degradation of pesticides through microbial processes.

Price: GBP 61

Orders to: see below.

Landscape Ecology and Agroecosystems. R.G.H. Bunce, L. Ryszkowski and M.G. Paoletti. Lewis Publishers, Boca Raton, London, 1993, xiv + 241 p. ISBN 0-87371-918-2. Hardbound.

Agroecosystem structure and functioning are closely related and affect the landscape. Landscape characteristics also affect the mechanisms and flows in agricultural fields and frequently even affect crop yields. This book attempts to focus on the different perspectives of analyzing rural landscapes at different scales, functions, and structures. Topics covered include the role of natural vegetation in biological diversity, the importance of landscape ecology, landscape ecological patterns and agricultural transport, ecological aspects of agricultural production, weed management in agroecosystems, reforestation, and birds in agroecosystems. The book provides 20 contributions presented at the International Symposium on Agroecology and Conservation Issues in Tropical and Temperate Regions held at Padova in 1990, and will benefit anyone interested in landscape ecology, agroecology, sustainable agriculture, soil conservation and man-

agement, soil and crop science, entomology, and weed science.

Price: GBP 64

Orders to: Times Mirror International Publishers, Lynton House, 7-12 Tavistock Square, London WC1H 9LB, England.

Proceedings of the International Workshop on Classification and Management of Arid-Desert Soils. (2 volumes) Academia Sinica, China Science and Technology Press, Beijing, 1993, 460 p. ISBN 7-5046-1147-6. Paperback.

The 14th International Congress of Soil Science held in Japan, 1990, made a decision to hold an international workshop on the classification and management of arid soils. The 97 papers presented at this workshop, held in August 1993, were edited and are published in the present book. In these papers, soil classification of arid soils, soil improvement and land utilisation are discussed. These reflect progress on different aspects in these fields.

Orders to: Institute of Soil Science, Academia Sinica, P.O.Box 821, Nanjing, China.

Organisation et Fonctionnement des Altérites et des Sols. J.-M. Wackerman, éditeur. ORSTOM, Paris, 1992, 334 p. ISBN 2-7099-1072-1. Cartonné.

Ce livre reprend les communications présentées lors du Séminaire ORSTOM tenu à Bondy en février 1990. Ces communications sont classées en cinq thèmes: Distinction des traits pédologiques et des traits sédimentaires (4 comm.); Relations sol-modèle-milieu géochimiques-cartographie (7 comm.); Du paysage au minéral, et retour (10 comm.); Des éléments en traces aux concentrations supergènes (11 comm.); Valorisation des matériaux latéritiques (4 comm.).

Prix: FF 120

Commandes à: voir ci-dessous.

Mélanges offerts à Stéphane Hénin. Sol-Agronomie-Environnement. ORSTOM, Paris, 1993, 189 p. ISBN 2-7099-1141-8. Cartonné.

Cet ouvrage a été publié suite au jubilé scientifique de S. Hénin à l'occasion de 60 années consacrées à la recherche dans le domaine des sols, de l'agronomie et de l'environnement. Il comprend 12 communications présentées lors de ce jubilé, dont une par le jubilaire.

Prix: FF 100

Commandes à: voir ci-dessous.

Etude Quantitative des Relations Constituants Minéralogiques - Réflectance Diffuse des Latosols Brésiliens. J. da Silva Madeira Netto. ORSTOM, Paris, 1993, ix + 236 p. ISBN 2-7099-1142-6. Cartonné.

L'objectif central de cette thèse est de déterminer la composition minéralogique des sols à partir de leurs caractéristiques de réflectance diffuse et d'envisager des applications possibles avec les données satellitaires. La première partie concerne l'étude des relations quantitatives entre les constituants minéralogiques et la réflectance diffuse d'un nombre limité d'échantillons (56) que l'on considère comme représentatifs de la variabilité minéralogique des latosols brésiliens. Elle comporte six chapitres correspondant en fait à autant d'étapes pour arriver à une modélisation de ces relations. La deuxième partie est consacrée à l'application des modèles à une image TM (Thematic Mapper) de la région de Brasília.

Prix: FF 140

Commandes à: Editions de l'ORSTOM, 72 route d'Aulnay, 93143 Bondy, France.

Tropical Forestry Handbook. L. Pancel. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Eschborn, 1993, xxxvii + 1738 p. ISBN 3-540-56420-9. Hardcover.

The tropical forests are irreplaceable - yet they are disappearing at an alarming pace. Despite the information available to us today, efforts to save or even reforest this natural resource face many obstacles and difficulties. One of these may even be lack of up-to-date information and coordination. Now there is one major source covering all aspects necessary for managing tropical forest resources. Leading specialists take a look at the whole picture: biology, climatology, forestry, geology, genetics, and other relevant fields. They examine just how an ecologically sound use and management of the tropical forests might be possible. Twenty-eight chapters presents exact methods and comparative data as well as concepts and ideas. The vast experience gathered in tropical forestry is presented in a concentrated form, showing just which strategies have been most successful so far.

Price: DM 698

Orders to: Springer-Verlag, Postfach 31 13 40, D-10643 Berlin, Germany.

Local Level Institutional Development for Sustainable Land Use. Bulletin 331. R.J. Bakema, editor. Royal Tropical Institute, Amsterdam, 1994, 63 p. ISBN 90-6832-814-X. Paperback.

Sustainable environmental management depends strongly on development of adequate mechanisms for organizing, decision making and implementation at relatively local levels. Three examples related to local institutions - from community forestry, village land management, and range management - are given in this Bulletin. Case studies from Lesotho, the Sahel, and Mali are presented.

Price: NLG 15

Orders to: see below.

Land Tenure and Sustainable Land Use. Bulletin 332. R.J. Bakema, editor. Royal Tropical Institute, Amsterdam, 1994, 46 p. ISBN 90-6832-815-8. Paperback.

Property rights to land are often perceived as the key to environmental management. This Bulletin deals with the complex topic of land tenure, regulation by the state, and the relationship to sustainable land use. Includes an interesting case study from Cameroon, where economic trends plus modern legislation led to the collapse of traditional protection, resulting in an uncontrollable situation in the forest; plus articles covering the need to harmonize traditional and modern laws, and the attempts to do this in Mali since 1991.

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Jachères Améliorées. Bulletin 333. H. Hoefsloot, F. van der Pol and L. Roeleveld. Royal Tropical Institute, Amsterdam, 1993, 86 p. ISBN 90-6832-820-4. Cartonné.

Au cours des 50 dernières années, l'exploitation des ressources naturelles dans la zone ouest-africaine est devenue de plus en plus intensive. En raison de la croissance démographique, l'espace agricole s'est à la fois étendu et densifié. L'introduction des cultures de rente, accompagnée de la culture attelée, a également conduit à augmenter l'utilisation de l'espace consacré à la production agricole. Les périodes de jachère, qui servaient autrefois à restaurer la restauration de la fertilité du sol, ont ainsi diminué de façon considérable, et les périodes de cultures se sont prolongées, engendrant une rupture de l'équilibre des systèmes de culture itinérantes.

La jachère améliorée constitue une des innovations qui pourraient contribuer à l'intensification de l'agriculture. Elle a les mêmes fonctions que la jachère naturelle, mais il s'agit d'une parcelle ensemencée et cultivée. Cette publication présente l'état actuel des recherches sur ce thème.

Prix: NLG 15

Commandes à: Royal Tropical Institute, Publ. Dept, Mauritskade 63, 1092 AD Amsterdam, the Netherlands.

Paleoweathering Bibliography. M. Thiry, compiler. International Geological Correlation Program (IGCP), Fontainebleau, 1993, 81 p. Paperback.

This publication gathers more than 500 references on paleoweathering and is published within the framework of IGCP project 317: Paleoweathering Records and Paleosurfaces. The references can be found by alphabetic entry, or using an index with key-words. Scientists are requested to provide new entries.

Orders to: IGCP 317, c/o M. Thiry or J.M. Schmitt, C.I.G. Ecole des Mines de Paris, 35 rue Saint-Honoré, 77305 Fontainebleau Cedex, France.

A Global Warming Forum: Scientific, Economic and Legal Overview. R.A. Geyer. CRC Press, Boca Raton, London, 1993, xxv + 638 p. ISBN 0-8493-4419-0. Hardbound.

This publication provides an integrated, thematic approach to major critical aspects of the problems presented by global warming. Scientific issues; economics; natural resource management concerns; and legal, educational, and policy considerations are discussed within the context of arriving at solutions to global warming problems. Data and information are derived from diverse geographic locations, especially in the case history chapters requiring the application of integrated interdisciplinary methods.

The book is divided in five sections: (1) Role of geophysical and geoenvironmental methods to solve problems related to global climatic change; (2) Role of oceanographic and geochemical methods to provide evidence for global climatic change; (3) Global assessment of greenhouse gas production including need for additional information; (4) Natural resource management needed to provide long term global energy and agricultural uses; and (5) Legal, policy, and educational considerations required to properly evaluate global warming proposals.

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Orders to: see below

Computer Simulation Analysis of Biological and Agricultural Systems. B.K. Huang. CRC Press, Boca Raton, London, 1994, vii + 862 p. ISBN 0-8493-4869-2. Hardbound.

This volume covers the methods and application of the principles that are essential to system analysis, design, and synthesis, with emphasis on the quantitative dynamic relations between elements and system response. It focuses on the integration of mathematical models and dynamic simulation. Analytical treatment of physical and biological systems and functional analysis of system components will be studied to bridge the gap between theories and applications. Methods of computer-aided design and analysis of engineering and science problems are discussed to provide the techniques of computer application. The volume provides (1) a step-by-step method that will result in a concise, interesting, and effective systems analysis; (2) guidelines for the development of dynamic models, in connection with each of the steps, to ensure effective application of the proper techniques and methodologies; (3) insights for developing systems models and

communications with a computer; (4) techniques for increasing the effective use of computers; and (5) practice exercises to make the reader familiar with simulation analysis with a wise selection and use of computer hardware and software. It has chapters on soil-water environment systems, on plant systems, and on soil-plant environment systems.

Price: GBP 110

Orders to: see below.

Experimental Research Design and Analysis. A.R. Hoshmand. CRC Press, Boca Raton, London, 1994, vii + 408 p. ISBN 0-8493-8635-7. Hardbound.

The book offers a rational approach to the quantitative methods of agricultural experiments. In its presentation of the most commonly used experimental designs, this text/reference discusses the logical reasons for selecting a particular design and shows how experimental results can be analyzed and interpreted. Real-world examples from different areas of agriculture are featured throughout the book to illustrate how practical issues of design and analysis are handled.

Price: GBP 48.

Orders to: see below.

Boron and its Role in Crop Production. U.C. Gupta, editor. CRC Press, Boca Raton, London, 1993, x + 237 p. ISBN 0-8493-6582-1. Hardbound.

The book summarizes the current knowledge of the following topics: chemistry of boron, extraction of available boron from various soils, methods of determining boron in soils and plants the role of boron in the physiology of plants and seed production, the technology and application of boron fertilizers for crops, response to boron of various crops, boron deficiency and toxicity in various plant species, and the boron distribution among plant parts. Modeling of boron adsorption and desorption to provide a description of chemical systems in soils is explained. The models of detoxifying boron where boron toxicity is encountered from using irrigation water high in boron has been described.

The contributions by authors from different geographical areas have helped to provide a broader perspective of the subject matter.

Price: GBP 99.50

Orders to: Times Mirror International Publishers, Lynton House, 7-12 Tavistock Square, London WC1H 9LB, England.

Soil Science. Methods and Applications. D.L. Rowell. Longman, Harlow, 1994, x + 350 p. ISBN 0-582-08784-8. Paperback.

This publication is an introduction to the measurement of soil properties and the use of data. Clear criteria underlie the selection of methods: they are generally accepted by soil scientists as the basic tools of the trade, which can be understood without advanced scientific knowledge and carried out without access to sophisticated analytical equipment. Key features include: the scientific background to each method; a step by step description of the method; examples of all calculations used to obtain results; agricultural and environmental examples to illustrate the applications of the data; ideas for projects; computer assisted modelling of soil processes; further calculations with answers.

Coverage includes: soil profile and field methods; mineral particles; the soil framework; alive and dead organic materials; soil structure and particle arrangement; water in soil; air in soil; particle surfaces and solutions, soil acidity, availability of plant nutrients; phosphorous

and sulphur; nitrogen; potassium soil fertility; rainfall and evapotranspiration; salinity and sodicity; pesticides and metals.

Price: GBP 19.99

Orders to: Longman Scientific & Technical, Longman House, Burnt Mill, Harlow, Essex CM20 2JE, England.

The Literature of Soil Science. *Literature of the Agricultural Sciences Series.* P. McDonald, editor. Cornell University Press, Ithaca and London, 1994, 449 p. ISBN 0-8014-2921-8. Hardback.

Being the first in-depth treatment of the soil science literature, this book should arouse considerable interest. Produced as a part of a series on the literature of agricultural sciences, one of the project's aims was to prepare a core list of soil monographs (on CD-ROM) for academic institutions and research stations as a guide for their holdings. It was achieved on the basis of an examination of databases, citation analysis and reviewer questionnaires, and is discussed in several chapters by the editor. The sections include lists of core soil monographs, historical soil monographs, soil journals, soil maps, reference sources, and a bibliometric analysis of soil science from three abstracting databases. The remaining chapters were prepared by 12 other authors and essentially cover three topics: historical aspects of soil science and its literature before 1950, current information and reviews of soil science societies, soil information systems, soil maps, and soil science in the tropics, and a reexamination of a 1988 bibliometric analysis on tropical soil science.

The ranked core list of some 930 post-1950 monographs, into four categories, for developed and developing countries, and the top twenty list is a major feat and contribution, but the core list could have been printed in a more reader friendly way. The treatment of Third World literature is skewed towards the humid tropics. The editor apparently realized this too late to include also a review on the literature of acidic soils. Several of the chapters would have benefited from stricter editing; there are unnecessary technical and printing errors and some incomplete references. In spite of the broad approach and comprehensiveness, omissions include some major publications in German and some classical Russian books, which were translated after 1950. This is a book for every library with soil science holdings. Rating it on a scale 1 (best) to 4, the rating would be between 2 and 3 depending on the topics of your interest.

Price: USD 71.50

Orders to: Cornell University Press, Sage House, 512 E. State Street, Ithaca, NY 14850, U.S.A.

Fertilizer Consumption and Environment Report. International Fertilizer Industry Association, Paris, 1993, 41 p. Paperback.

This publication provides the fertilizer situation worldwide and per (part of) continent in 1992/93 and the outlook for 1993/94. It includes country reports for 39 countries, both developed and developing. In conclusion, an environmental report is given on the environmental developments in West Europe, the United States, Australia and at the FAO.

Orders to: IFA, 28, rue Marbeuf, 75008 Paris, France.

Second International Conference on River Flood Hydraulics. W.R. White and J. Watts, editors. John Wiley, Chichester, New York, 1994, 450 p. ISBN 0-471-95019-X. Cloth.

River flood plains are an important part of the earth's surface. They form the natural route for transport of water and sediments to the seas and in their natural state may

have ecological diversity. Human use of this land for communication, industry, agriculture and settlement poses many challenges for those responsible for the sustainable management of river basins. Many engineers and other professionals concerned with the diverse aspects of flooding in rivers came together for this conference.

Papers cover original research and practical experience in flood analysis, prediction and forecasting, computational modelling, experimental measurements, sediment movement and river morphology. There are also contributions on the environmental aspects of river management and the particular challenge of flood management in the Indian sub-continent.

Price: GBP 60, USD 96.

Orders to: see below.

Beyond the Biomass. K. Ritz, J. Dighton and K.E. Giller, editors. John Wiley, Chichester, New York, and the British Society of Soil Science, Reading, 1994, xiv + 275 p. ISBN 0-471-950-963. Hardcover.

The chapters in this book are based on the oral presentations made by researchers at an international symposium held at the Wye College in March 1993. The objective of this symposium was to provide a forum for the reporting and discussion of contemporary ideas on characterising complex microbial communities, the functional analysis of such communities and their interactions with other components of the biota, especially in relation to nutrient cycling. The contributions range from overviews of the biomass concept itself, through specific techniques being developed at the forefront of research, to more philosophical pieces. The final chapter attempts to summarise the main themes which emerged during the formal and informal discussion sessions.

Price: GBP 75

Orders to: see below.

Desertification: Exploding the Myth. D.S.G. Thomas and N.J. Middleton. John Wiley, Chichester, New York, 1994, xiii + 194 p. ISBN 0-471-94815-2. Hardback.

The authors examine the origin of the "desertification myth", how it spawned multi-million dollar research initiatives and became regarded as a leading environmental issue. With the aid of recent research findings, including the use of evidence from geographic information systems, they demonstrate that this much vaunted problem is very much smaller and less locally significant than previously accepted, and that the "global process of desertification" as an environmental problem is simply chimerical. The book explores the political and institutional factors that created the myth, sustained it and now protect it against scientific criticism.

Price: GBP 32.50

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The Quiet Revolutionaries. A look at the campaign by agricultural scientists to fight hunger. World Bank Development Essays 2. D. Wigg. The World Bank, Washington, 1993, iv + 47 p. ISBN 0-8213-2531-0. Paperback. Also available in Spanish.

Agricultural scientists were at the centre of the "green revolution" which yielded record-breaking harvests of wheat and rice. But because of population growth, global warming, and the rapid evolution of pests and diseases that attack plants, the war against hunger has to be fought over and over again. This essay tells the dramatic story of how scientists stay one step ahead in this struggle to feed

the world's hungry.
Price: USD 6.95
Orders to: see below.

Revitalizing Agricultural Research in the Sahel. World Bank Discussion Papers 211. J. Weijenberg, J. Dioné, M. Fuchs-Carsch, A. Kéré and J. Lefort. The World Bank, Washington, 1993, xvii + 89 p. ISBN 0-8213-2598-1. Paperback.

The problem which this framework for action (FFA) seeks to address is the slow rate of technology generation of the agricultural research system in the Sahel. To overcome this problem, the FFA proposes to strengthen the national agricultural research systems in the region through a three-pronged effort: (1) Institutional reforms of the national agricultural research systems to evolve an "enabling" environment for creativity, innovation and improved performance; (2) New modes of regional cooperation based on the principles of comparative advantage and the relative strengths of national agricultural research systems; and (3) A series of cross-cutting actions to support the revitalized national and regional efforts.

It is expected that a more demand-driven national/regional research agenda and more vibrant linkages between scientists and clients will lead to faster rates of technology generation, as was demonstrated by the success of cotton research in the Sahel.

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Raising the Productivity of Women Farmers in Sub-Saharan Africa. World Bank Discussion Papers 230. K.A. Saito. The World Bank, Washington, 1994, xii + 110 p. ISBN 0-8213-2749-6. Paperback.

As this report shows, women are so important to African agriculture that initiatives to raise the sector's productivity cannot afford to ignore them. Most farmers in Africa are women, and they produce more than three-quarters of the region's basic foodstuffs. Yet the economic, social and cultural environment in which they work, rear their children and manage their households is frequently unsupportive. In particular, women's access to agricultural inputs and support services has not improved commensurate with their role as farmers, resulting in considerable loss in agricultural activity and output - more than 20 percent according to the Kenyan analysis. The recommendations of this report are consistent with well-established tenets of agricultural development. Land and labour productivity, cost-effective extension advice, appropriate technologies and viable financial services are all important for effective agricultural development strategies have not adequately focused on the clients. And, in Sub-Saharan Africa at least, the clients are increasingly women.

Price: USD 8.95
Orders to: see below.

Agricultural Extension in Africa. World Bank Discussion Papers 231. A. Bagchee. The World Bank, Washington, 1994, x + 91 p. ISBN 0-8213-2756-9. Paperback.

Bank-assisted agricultural extension projects are being implemented in some thirty countries in Sub-Saharan Africa. This volume presents the main issues discussed at two workshops held in 1993 in Accra (for anglophone countries) and Abidjan (for francophone countries), along with their policy implications. The main issues discussed were: management of extension, technology, training, and extension for special categories of farmers.

Price: USD 7.95
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Getting Ready for the Twenty-First Century. World Bank Technical Paper 217. C.H. Antholt. The World Bank, Washington, 1993, vii + 46 p. ISBN 0-8213-2510-8. Paperback.

This paper reviews the performance of agricultural research and extension in Asia. Given the increasing pressures for performance and technological innovation at the farm level, a faster-moving, more interdependent world, and a time when governments increasingly are strapped for resources, institutional modernization needs to begin now to deal with the issues of relevance, responsiveness and cost-effectiveness of research and extension.

Price: USD 6.95
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Conserving Soil Moisture and Fertility in the Warm Seasonally Dry Tropics. World Bank Technical Paper 221. J.P. Srivastava, P.M. Tamboli, J.C. English, R. Lal and B.A. Stewart. The World Bank, Washington, 1993, x + 81 p. ISBN 0-8213-2617-1. Paperback.

The paper briefly describes the ecoregion, identifies the main constraints, and offers a series of technological options for sustainable development through the conservation of soil moisture, the prevention and control of soil erosion, and the improvement of soil fertility. The paper is designed to serve as a guide for policymakers, project managers, and agriculture operations staff in evaluating options and designing programs for the warm seasonally dry tropics. References have been provided for those requiring additional background material or more technical information.

Price: USD 7.95
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Land Resource Management in Machakos District, Kenya, 1930-1990. World Bank Environment Paper 5. J. English, M. Tiffen and M. Mortimore. The World Bank, Washington, 1993, xi + 82 p. ISBN 0-8213-2734-8. Paperback.

The report analyses the changes which have taken place in the land resources, agricultural systems, and social structures of the district over the last sixty years. Despite the fact that there was considerable social turbulence in the period prior to independence, the people of the district have managed, building on good market access and periodic government support, to make substantial changes in their agricultural systems and bring about a dramatic increase in the productivity of their land resources.

Price: USD 7.95
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Economic and Institutional Analyses of Soil Conservation Projects in Central America and the Caribbean. World Bank Environment Paper 8. E. Lutz, S. Pagiola and C. Reiche, editors. The World Bank, Washington, 1993, x + 207 p. ISBN 0-8213-2741-0. Paperback.

The work presented in this report was motivated by an interest in understanding the extent of soil degradation in Central America and the Caribbean, in knowing how farmers are in general responding to it, and in examining the possibilities that exist to help farmers better respond to the challenges they face. The authors have used a cost-benefit perspective to analyze which practices, under which circumstances, may be beneficial for the farmer to adopt.

It was found that although social and other factors also play a role, the expected economic payoff for adopting a practice, to the extent that it is known in an uncertain environment, is a key determinant for farmers' adoption de-

cisions. Another important result of the studies is that the economics of adopting certain practices depends very much on site-specific circumstances. Further, the productivity effect for the same practice under the same conditions depends crucially not on the amount of soil lost, but on the soil that remains.

Price: USD 11.95

Orders to: The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A. *or:* The World Bank, 66 avenue d'Iéna, 75116 Paris, France.

South-East Asia's Environmental Future. The Search for Sustainability. H. Brookfield and Y. Byron, editors. United Nations University Press, Tokyo, and Oxford University Press, Kuala Lumpur, 1993, xxi + 422 p. ISBN 967-65-3025-5. Hardback.

South-East Asia's economic success since the 1950s has placed very heavy demands on its natural resources and on the capacity of its environment to sustain continued development. By the end of the 1980s, there was growing concern that present forms of development are unsustainable. A conference held at Yogyakarta in 1991 brought together regional and foreign experts to discuss these issues. This book is based on that conference. It analyses the driving forces of change, climatic uncertainties and a number of major issues such as deforestation, sustainability of food production, the deteriorating urban and marine environments, and the institutional problems lying in the way of better environmental management. The book presents a great deal of new information, and offers forthright discussion of a dangerous situation. In conclusion, it is argued that a basic change in the approach to development is necessary if current growth is not to rob the next generation of many of the resources which they will require.

Price: GBP 30

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Science for Agriculture. A Long-Term Perspective. W. E. Huffman and R.E. Evenson. Iowa State University Press, Ames, 1993, xv + 268 p. ISBN 0-8138-1359-X. Cloth.

This study is primarily a long-term perspective on a science system for agriculture in the United States. The authors piece together a story covering considerably more than a century. The primary objectives of the book are to (1) describe the evolution and development of the U.S. agricultural research system, (2) report some of its major long-term accomplishments or economic impacts, and (3) suggest some lessons or directions for future organization and funding of science for American agriculture. The 9 chapters of the book concern the following issues: the evolution of the U.S. system; the development of a system of agricultural sciences; the agricultural scientist; resources and their allocation; agricultural research in the private sector; research contributions to agricultural productivity; economics and politics of funding; and lessons for the future.

Price: USD 44.95

Orders to: Iowa State University Press, 2121 S. State Avenue, Ames, Iowa 50010, U.S.A.

Surveys, Plans and People: a review of land resource information and its use in developing countries. Environmental Planning Issues 2. B. Dalal-Clayton and D.

Dent. International Institute for Environment and Development, London, 1993, vi + 148 p. Paperback.

This overview considers the key issues concerning resource assessment and land use planning in relation to the needs of decision-makers and planners, and provides lessons from a historical perspective on the evolution of procedures. The main approaches to natural resource survey, their limitations and effectiveness are reviewed. Methods of land evaluation and land use planning are described and the logic, assumptions and success of these methods assessed. The opportunities for improvement offered by participatory approaches are considered, and examples provided of initiatives which show potential for scaling-up to link bottom-up and top-down planning. The needs of developing countries for information on natural resources are discussed along with the problems they face in securing and making use of such information and in integrating it into planning and decision-making.

Price: GBP 8.

Orders to: IIED, 3 Endsleigh Street, London WC1H 0DD, England.

Conference of the Society for Environmental Toxicology and Chemistry. Special Issue of Land Degradation and Rehabilitation, Vol.4 No.4, 1993, G.P. Hekstra, E. Ivanova and J.H. Weverling, guest editors. 246 p. Paperback.

Land degradation, caused by water and wind erosion, as well as agricultural practices, like deforestation and overgrazing, create visible environmental problems. Since the occurrence of "dust bowl" in the United States, these man-induced environmental problems have attracted much public attention and generated policy measures. Other, almost concealed types of land degradation associated with the insidious and pervasive accumulation of persistent chemicals in sediments and soils have received less attention.

This volume is a collection of 29 papers, presented during the session on Chemical Time Bombs (CTBs) and soil and sediment pollution at the June 1992 conference of the Society for Environmental Toxicology and Chemistry at Potsdam in Germany. The basic concept of a CTB is a time-delayed and non-linear response of soils, sediments and groundwaters to stored pollutants under changing conditions of climate and land-use. The papers are essentially grouped according to the session themes: (a) land-use related CTBs; (b) sediment pollution, as a potential CTB; (c) sediment, sludge and water related CTBs; and (d) soil pollution in general. The emphasis in the discussions is on the sinks and sources of the pollutants and the non-linear processes of storage, demobilization and transformation in soils, sediments and groundwater by physical, chemical and biological processes. Four lines for further, international co-operation were recognized during the conference: (a) a catchment area approach; (b) co-operation across catchment boundaries for similar problems, like landfills and atmospheric inputs; (c) handling of soil and terrain data in a GIS, and assessment of soil and sediment vulnerability to specific pollution scenarios; and (d) development of a common analytical methodology. A logical sequence is to proceed from mapping, evaluation and risk-assessment to early warning systems and proposals for remedial action.

Niels H. Batjes, Wageningen

Orders to: John Wiley & Sons, Baffins Lane, Chichester, West Sussex PO19 1UD, England; *or:* John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, U.S.A.

Dictionary of Soil Fertility, Fertilisers and Integrated Nutrient Management. H.L.S. Tandon. Fertiliser Development and Consultation Organisation, New Delhi. ix + 131 p. ISBN 81-85116-33-4. Hardback.

This volume primarily focuses on the terms, topics and aspects of direct importance to present day agriculture. It covers not only fertilisers but all sources of plant nutrients (mineral, organic, bio). It also covers all plant nutrients (macro and micro) and provides a broad-based, interdisciplinary coverage dealing with environmental aspects as well. Actual examples are mostly cited after explaining a term, and in many cases, terms or processes are explained with the help of diagrams.

Price: Rs 200 in India; USD 60 outside India.

Orders to: FDCO, 204-204A Bhanot Corner, 1-2 Pamposh Enclave, New Delhi-110048, India.

Hydrological, Chemical and Biological Processes of Transformation and Transport of Contaminants in Aquatic Environments. IAHS Publication 219. N.E. Peters, R.J. Allan and V.V. Tsirkunov, editors. International Association of Hydrological Sciences, Wallingford, 1994. x + 458 p. ISBN 0-947571-88-4. Paperback.

This book contains papers of a symposium that was convened in Rostov-on-Don, May 1993, to evaluate research in this area and foster communication among scientists. Emphasis was placed on modelling the fate and transformation of contaminants associated with both field and laboratory studies, and alternate data analysis techniques and water quality assessments.

This volume contains 48 papers which have been organized into four main sections: the Overview contains a paper focused on global and national monitoring; a section entitled Fate and Transformation of Contaminants, which contains 13 papers primarily on pesticides, metals, and toxic organic contaminants; a section entitled Hydrochemical Modelling, which contains 18 papers on nutrients, organic contaminants, metals, and radioactive contaminants; and a section entitled Additional Techniques and Water Quality Assessments, which contains 16 papers on mass-balance studies for various contaminants, sampling design, effects of changing land use, experimental ecosystems, remote sensing, and tracer techniques.

Price: USD 75

Orders to: see below

Macroscale Modelling of the Hydrosphere. IAHS Publication 214. W.B. Wilkinson, editor. International Association of Hydrological Sciences, Wallingford, 1993. viii + 193 p. ISBN 0-947571-63-9. Paperback.

This volume includes the proceedings of an international symposium held at Yokohama in July 1993 during the joint scientific meeting of the International Association of Meteorology and Atmospheric Physics and the International Association of Hydrological Sciences. A keynote paper introduces this volume, and the other papers are divided into three topics: Hydrological models (7 papers), Land surface representation and sensitivity in GCMs (5 papers), and Integrating hydrology and meteorology: data and models (5 papers). This is a newly emerging area of science and there are many scientific and technical problems to be overcome before full integration of atmospheric and hydrological models can be achieved at a macroscale. The papers in this book are stepping stones towards this goal.

Price: USD 50

Orders to: IAHS Press, Institute of Hydrology, Wallingford, Oxfordshire OX10 8BB, U.K.

Global Climate Change: The Ecological Consequences. F.I. Woodward, editor. Academic Press, London, San Diego, 1992. xiii + 337 p. ISBN 0-12-762560-7. Paperback.

The concepts and concerns regarding the global effects of a continued increase in the atmospheric concentrations of greenhouse gases have enjoyed a high visibility in newspapers and scientific journals. These concerns are now being translated into big-science projects. These international projects aim to understand better the processes of climate and ecosystem changes and impacts, and are being designed under the aegis of the World Climate Research Programme and the International Geosphere Biosphere Programme. Biological and climatic systems are intertwined in processes leading to impacts and feedbacks and so it has emerged that climatologists, atmospheric scientists, terrestrial and marine ecologists must collaborate in research programmes, else the bases of their future projections are incomplete. This special volume of *Advances in Ecological Research* brings together eight chapters which propose and demonstrate the two major components of current climate change research, future predictions and the interdisciplinary approach.

Price: GBP 24.50

Orders to: Academic Press Ltd., 24-28 Oval Road, London NW1 7DX, U.K. or: Academic Press, Inc., 1250 Sixth Avenue, San Diego, CA 92101-4311, U.S.A.

Prescribed Burning for Brushland Management. The South Texas example. C.J. Scifres and W.T. Hamilton. Texas A&M University Press, College Station, 1993. xvii + 246 p. ISBN 0-89096-512-9. Paperback.

This manual provides information on the uses of fire for managing thorn woodlands in South Texas and northern Mexico. South Texas represents the northern portion of a unique biotic province - the Tamaulipan thorn woodland. This vegetation, a transitional type linking desert scrub to subtropical vegetation to the south and east, is analogous to vegetation existing in South America, Africa, and Australia. It is safely assumed that results from experiences with prescribed burning can be extrapolated to these vegetation types.

The volume first describes the ecological setting in South Texas. The authors then present the benchmark principles related to fire behaviour and mode of action, in order to understand vegetation responses to burning and in order to predict these responses. Finally, methods of fire application and control are discussed. Actual results from prescribed burning are explained in terms of vegetation, livestock, and wildlife responses.

Price: USD 19.50

Orders to: Texas A&M University Press, Drawer C, College Station, TX 77843-4354, U.S.A.

Soil Science: An Introduction. G.W. Leeper and N.C. Uren. Melbourne University Press, Carlton, 1993. xi + 300 p. ISBN 0-522-84464-2. Paperback.

Many people need a better understanding of the formation, classification, properties and fertility of soils - specifically Australian soils. Soil science, once restricted to schools of agricultural science and horticulture, now reaches out to secondary and tertiary students of ecology, geography and environmental science, to people concerned with natural resource management, to farmers - even to the home gardener.

This comprehensive, interesting and readable book was first published in 1948. Professor Leeper's book became, in the course of four editions, the bible in its field. The present revision includes substantive work on the theoretical underpinnings of major soil properties, con-

version to standardized units, new and revised illustrations and tables. It now better encompasses the whole of Australia.

Price: AUD 29.95

Orders to: Melbourne University Press, P.O.Box 278, Carlton Sth, VIC 3053, Australia. In USA: International Specialized Book Services, 5904 N.E. Hassalo St., Portland, OR 97213-3644, U.S.A. In Europe and UK: UCL Press Ltd, University College London, Gower Street, London WC1E 6BT, England.

Systèmes Agraires, Systèmes de Production. Vocabulaire Français-Anglais. L. de Bonneval. Institut National de la Recherche Agronomique, Versailles, 1993, 285 p. ISBN 2-7370-0443-1. Cartonné.

Il n'existait pas jusqu'ici de vocabulaire bilingue consacré au domaine de la recherche sur les systèmes de production (cultures, élevage notamment) et le développement agricole. Cette publication vient combler cette lacune. Conçu comme un outil pratique de traduction destiné plus particulièrement aux chercheurs, étudiants, professionnels du développement et traducteurs-interprètes qui s'intéressent à une approche systémique de l'activité agricole, cet ouvrage, qui contient quelque 2 000 termes principaux, vise un double objectif: (1) éclairer l'utilisateur sur le sens d'une série de concepts qui ont cours, en France et hors de France; et (2) faciliter le travail des francophones qui ont à rédiger des textes en anglais dans un domaine où se croisent des disciplines aussi diverses que l'agronomie, l'économie, la sociologie, la géographie, etc. Au-delà de la simple traduction, le lecteur trouvera des conseils et des explications sur le choix et l'utilisation de certains termes.

En fin d'ouvrage, un index alphabétique codé de tous les termes anglais contenus dans le texte permet à un anglophone d'utiliser aisément ce vocabulaire.

Price: FFR 220

Commandes à: INRA, Service des Publications, Route de St-Cyr, F-78026 Versailles Cedex, France.

Desertification and its control in the Thar, Sahara and Sahel Regions. A.K. Sen and Amal Kar, editors. Scientific Publishers, Jodhpur, 1993, xvi + 478 p. ISBN 81-7233-044-8. Hardback.

The present volume is the outcome of and based on the proceedings of a workshop on "Tackling soil erosion, drought, desertification and related problems" held at CAZRI, Jodhpur during March, 1989.

The workshop was attended by scientists from six African countries and India. The desertification, drought and soil erosion problems of Thar (India), Sahara and Sahel are dealt with in details. The book outlines the problems of desertification and suggests measures to combat these. The theme papers were presented by the Indian scientists whereas the African counterparts dealt with their main problems through country reports.

Price: INR 475; USD 47.50

Orders to: see below.

Advances in Arid Zone. Volume 1. I.C. Gupta, editor. Scientific Publishers, Jodhpur, 1992, iv + 207 p. ISBN 81-7233-025-1. Hardback.

Efforts of soil scientists, agronomists, plant breeders, plant physiologists and agricultural engineers have been afoot to diagnose and rectify the limps and shrinks of the arid lands all over the world. The accurate and precise identification of the problems facing the arid zones is very important because the right and useful treatment accruing practical results depends on that. The present new serial publication is an attempt to evaluate the present knowled-

ge on the management of "Arid Zones" with respect to agriculture. It is hoped that bringing information together in different volumes will not only contribute to the advancement of knowledge but also help to solve the food problem of the world through better management of arid lands under desertification.

Price: INR 350; USD 35

Orders to: see below.

Rehabilitation of degraded arid ecosystem. A.S. Kolar kar, D.C. Joshi and K.D. Sharma, editors. Scientific Publishers, Jodhpur, 1992, viii + 204 p. ISBN 81-7233-035-9. Hardback.

Man-Resource-Technology and Development syndrome occupies a central position in the management of arid lands. Over-exploitation of the natural resources due to growing demands, have accelerated the degradation of the fragile arid ecosystem. The book deals with the concept of ecosystem, characteristics of climate, landforms, soil, vegetation and water resource of arid region and types and processes of degradation. This is followed with the appropriate technologies suitable for rehabilitation of such degraded ecosystem. Regional approach involving agriculture, horticulture, silviculture, pasture development and animal resource have been discussed.

The compendium is an outcome of the Unesco's Regional Training Course "Rehabilitation of degraded arid ecosystem" held in 1990 at Central Arid Zone Research Institute (ICAR) Jodhpur, India.

Price: INR 325; USD 32.50

Orders to: see below.

Sustainable Development of the Indian Arid Zone. A research perspective. R.P. Singh and Surendra Singh. Scientific Publishers, Jodhpur, 1994, xvii + 335 p. ISBN 81-7233-069-3. Hardback.

Indian arid zone, like other arid areas of the world, is beset with varied and complex problems, ecological and environmental degradation being the most predominant. However, the sheer "vastness" in terms of land area, human and livestock population explosion on one hand and "diversity" with regard to physical environmental and biological resources on the other, put a distinctive stamp on the Indian arid ecosystems as something different from others. Thus, the sustainable development of the Indian arid zone is a challenging task. A research perspective is a pre-requisite to sustainable development.

This book gives a perspective of the present status of natural resources in terms of their physical potentials and limitations and offer management strategies for sustainable development of the fragile arid ecosystems.

The contents of this book include eight sections covering thirty nine chapters on various facets of the Indian arid zone, written by leading experts in the fields of their specialization.

Price: INR 600; USD 60

Orders to: Scientific Publishers, P.O. Box 91, Jodhpur 342 001, India.

Soil Erosion as a Consequence of Forest Fires. M. Sala and J.L. Rubio, editors. Geofoma Ediciones, Logroño, 1994, 275 p. ISBN 84-87779-14-X. Paperback.

Over the last decades wildland forest fires have intensified in most Mediterranean countries. As a result of concern for their effects on soil properties, infiltration, runoff, soil degradation and soil erosion, an International Conference was organized by the European Society for Soil Conservation in Barcelona and Valencia in September 1991. Selected papers of this Conference have been gathered in this volume including: general aspects of the

role of the impact of the fire on surficial materials, vegetation and its relationship with erosion, short and long term effects of fire on soil properties and alterations in surface runoff. A summary of the general discussion and conclusions of the conference are also included.

Orders to: Geoforma Ediciones, Apartado de Correos 1293, 26080 Logroño, Spain.

Hydrological Basis of Ecologically Sound Management of Soil and Groundwater. H.P. Nachtnebel, K. Kovar and Z. Zuidema, editors. International Hydrological Programme, Unesco, Paris, 1993, 71 p. Paperback.

The preservation of wetlands and habitats interrelated with the quantity and quality of underground water has been considered an important objective in several countries. A symposium has been organized in Vienna, August 1991, to support this objective by trying to achieve the following tasks: (1) to bring together leading scientists, engineers and officials of environmental agencies to present the state-of-the-art methodologies for ecologically sound management of soil and groundwater; (2) to describe realistic scenarios, mathematical models and other techniques for analyzing and predicting not only the movement and fate of constituents in the saturated and unsaturated zone but also the response of the ecosystems to these hydrological impacts; (3) to improve the knowledge of the relationships between the hydrological changes in the soil and groundwater system and the effects of the ecosystems. In addition, to strengthen the collaboration between hydrologists and ecologists.

Orders to: The Director, Division of Water Sciences, Unesco, 1, rue Miollis, 75732 Paris Cedex 15, France.

Land Clearing and Reclamation of Ultisols and Oxisols. Soil Management CRSP Bulletin 94-01. K. Cassel and J.C. Alegre. Soil Management Collaborative Research Support Program, Raleigh, 1994, 42 p. Paperback.

Producing adequate food supplies and meeting the other basic needs of growing populations are difficult tasks on the finite soil resources of the humid tropics. All too often, inappropriate land-clearing methods and subsequent management practices degrade these soils, rendering them unproductive. The lands are then abandoned, and more rain forests must be cut. Soil management technologies capable of sustaining production are the key to stopping this environmentally destructive and economically unproductive pattern.

To help develop such technologies, the Soil Management CRSP program undertook studies on the effects of land-clearing methods on some soils in Peru and Indonesia. The collaborators also evaluated methods for reclaiming degraded soils. This report summarizes the findings of these studies.

Orders to: Soil Management CRSP, North Carolina State University, Raleigh, NC 27695-7113, U.S.A.

Factors of Soil Formation: A Fiftieth Anniversary Retrospective. SSSA Special Publication No 33. R. Amundson, J. Harden and M. Singer, editors. Soil Science Society of America, Madison, 1994, xvii + 160 p. ISBN 0-89118-804-5. Paperback.

The book *Factors of Soil Formation: A System of Quantitative Pedology* by Hans Jenny, published in 1941 represented a quantum leap forward in understanding the impacts of parent material, climate, topography, vegetative cover, and time on soil character. Even after more than 50 years, Hans Jenny's theory of soil formation remains the foundation of modern thought regarding soil genesis. The present volume includes the papers presented at a special symposium commemorating the 50th anniversary

of *Factors of Soil Formation*.

The papers in this publication represent the views of a multidisciplinary group of authors as to how this book has influenced scientific thought and research in their respective fields. A special tribute to Professor Jenny, who died in January 1992, is also included.

Price: USD 24 (advance payment and 10% per book for postage is required).

Orders to: see below.

Whole Regolith Pedology. SSSA Special Publication No 34. D.L. Cremeens, R.B. Brown and J.H. Huddleston, editors. Soil Science Society of America, Madison, 1994, xvii + 136 p. ISBN 0-89118-805-3. Paperback.

Regolith materials are normally considered by soil scientists to be the rocks and minerals underlying the solum. Pedologists have concentrated their soil genesis and classification studies on the soil profile and largely ignored the regolith. Other soil scientists have not studied the regolith because these materials are thought to have limited impacts on most soil properties and plant growth.

Site-specific engineering and environmental problems have necessitated a better understanding of earth surface materials at depths exceeding the traditional limits of soil survey investigations. Regolith materials at these depths are of great importance to water quality and other environmental issues. Based on the need for information, pedologists have initiated studies that deal with regolith materials in association with the solum.

The present volume reviews the concepts in the characterization, delineation, and management of regolith materials. Its goal is to present this work as a foundation and as a guide for further research into the nature of earth surface materials.

Price: USD 24 (advance payment and 10% per book for postage is required).

Orders to: see below.

Defining Soil Quality for a Sustainable Environment. SSSA Special Publication No 35. J.W. Doran, D.C. Coleman, D.F. Bezdicek and B.A. Stewart, editors. Soil Science Society of America, Madison, 1994, xxiii + 244 p. ISBN 0-89118-807-X. Paperback.

The concept of soil quality will not be in the mainstream of soil or environmental science programs until there is a wide acceptance of the definition for the term and quantitative indicators of soil quality are developed. Air and water quality are well-recognized concepts that already have established standards. Continued research and education is necessary before soil quality becomes an important natural resource issue.

This volume contains the papers on soil quality presented at a recent annual meeting symposium. Emphasis has been placed on defining soil quality, identifying soil quality indices, and assessing the biological importance of soil quality. This publication serves as a first step in educating scientists about the concepts and significance of soil quality.

Price: USD 30 (advance payment and 10% per book for postage is required).

Orders to: SSSA Headquarters Office, Book Order Dept., 677 South Segoe Road, Madison WI 53711, U.S.A.

Heavy Metals in Soils. 2nd edition. B.J. Alloway. Blackie Academic & Professional, London, New York, 1994, ca. 352 p. ISBN 0-7514-0198-6. Hardcover.

Heavy metals in soils continue to receive increasing attention due to the growing scientific and public awareness of environmental issues and the development of analytical techniques to measure their concentrations accurately.

Building on the success and acclaim of the first edition, this book continues to provide an up-to-date, balanced and comprehensive review of the subject. This volume is for research chemists, geochemists, soil scientists, agricultural chemists and environmental scientists.

Price: GBP 69.

Orders to: Chapman & Hall, 2-6 Boundary Row, London SE1 8HN, U.K. or: Chapman & Hall Inc., One Penn Plaza, 41st Floor, New York, NY 10119, U.S.A.

Aspects de l'Aménagement Intégré des Ressources Naturelles au Sahel. Tropical Resource Management Paper No.2. Université Agronomique, Wageningen, 1992, 104 p.

Les trois articles de cette publication se sont inspirés des nouvelles expériences et idées accompagnant l'évolution des programmes de foresterie dans les pays Sahéliens vers une approche plus intégrée, multi-sectorielle, recherchant la participation active des paysans et des organisations villageoises.

Le premier article est une discussion sur les problèmes fondamentaux que soulève l'application des techniques agroforestières dans la zone semi-aride, pour une meilleure intégration de la foresterie et de l'agriculture. Le deuxième article décrit des expériences réalisées quant à l'élaboration d'un plan d'aménagement et de gestion du terroir villageois au Burkina Faso. Le troisième article présente des idées et des expériences dans le domaine du sylvo-pastoralisme, c'est à dire de l'intégration de la foresterie et de l'élevage. Toutes ces contributions sont tout autant des pièces de réflexion sur les possibilités d'application d'une nouvelle approche, qu'une présentation des expériences vécues par des experts qui ont travaillé eux-mêmes sur le terrain pendant une longue période.

Commandes à: Université Agronomique de Wageningen, Département de l'Aménagement de la Nature, B.P. 8080, 6700 DD, Wageningen.

Biodiversity and Pest Management in Agroecosystems. M.A. Altieri. The Haworth Press, New York, London, 1994, xvii + 185 p. ISBN 1-56022-037-6. Hardback.

Many modern agroecosystems are unstable as a consequence of constant human intervention in crop systems which ignore ecological principles. The present volume explores entomological aspects of agriculture and analyzes the ecological basis for the maintenance of biodiversity in agriculture. The author assembles all the current available information on the subject of agricultural diversity for pest suppression.

The author describes the theory and practice of enhancing biological pest control in agricultural systems by managing vegetational diversity in the forms of multiple cropping, cover cropping, rotations, and other spatial and temporal designs. This book stresses the importance of assessing each situation separately and developing long-term vegetation management strategies with regard to socioeconomic and cultural factors. It focuses on the ways in which biodiversity can contribute to the design of pest-stable agroecosystems. The author includes studies on intercropping, cover cropping, weed management, and crop-field border vegetation manipulation.

Price: USD 39.95

Orders to: The Haworth Press, 10 Alice Street, Binghamton, NY 13904-1580, U.S.A.

Management of Water Use in Agriculture. Advanced Series in Agricultural Sciences 22. K.K. Tanji and B. Yaron, editors. Springer-Verlag, Berlin, New York, 1994, xix + 320 p. ISBN 3-540-57309-7 (German edition) 0-387-57309-7 (US edition). Hardback.

As the world population increases, there is increasing competition for water quantity as well as quality. Provided here is an up-to-date perspective on Available Water Resources (Part I), Water Conservation and Technology in Agricultural Systems (Part II), Problem Water Uses and Treatment (Part III), and Management and Policy Evaluation (Part IV).

The book is an invaluable source of information for water resource planners, managers and policy makers, researchers and students, and irrigationists.

Price: DEM 228; ATS 1778.40; CHF 224.

Orders to: Springer-Verlag, Tiergartenstrasse 17, D-69121 Heidelberg, or: Springer-Verlag, 175 Fifth Avenue, New York, NY 10010, U.S.A.

Rainfed Lowland Rice in Cambodia: a Baseline Survey. IRRI Research Paper Series 152. R.P. Lando and S. Mak. International Rice Research Institute, Manila, 1994, 20 p. Paperback.

Rainfed lowland rice (RLR) is planted in 88% of Cambodia's cultivated rice land. Data for the baseline survey of RLR production in Cambodia were drawn from interviews with 45 RLR farmers. This report describes (1) The place of RLR in Cambodian rice culture; (2) farmers' family composition, farm assets, access to labour, and income sources; (3) factors influencing farmers' crop management and varietal choices, including size of landholding, field levels and related soil and water problems, farmers' classification of rice by maturity, and local varietal preferences based on cooking and eating quality and agronomic performance; and (4) RLR crop management and cropping operations from nursery establishment to harvest and storage.

Constraints to intensifying RLR cultivation in Cambodia are discussed and conclusions and research recommendations are presented.

Orders to: see below.

Deepwater Rice in Cambodia: a Baseline Survey. IRRI Research Paper Series 153. R.P. Lando and S. Mak. International Rice Research Institute, Manila, 1994, 29 p. Paperback.

The importance of deepwater rice (DWR) production in Cambodia is demonstrated by data gathered from contrasting sites. In Takeo Province, 55% of the land available for cultivating rice is flooded by the Tonle Bassac River. In Prey Veng Province, DWR farmers depend almost completely on cultivating fields flooded by a Mekong River tributary. The data gathered reveal differences in historical experiences, settlement patterns, demography and income sources, field hydrology, challenges in reestablishing DWR cultivation, land allocations, agricultural strategies, and importance placed on DWR culture. Varietal factors and DWR cropping operations are discussed. Research recommendations are offered based on farmers' opinions of the future of DWR production in Cambodia.

Orders to: see below.

Cambodian Farmers' Decisionmaking in the Choice of Traditional Rainfed Lowland Rice Varieties. IRRI Research Paper Series 154. R.P. Lando and S. Mak. International Rice Research Institute, Manila, 1994, 17 p. Paperback.

Many factors influence Cambodian farmers of rainfed lowland rice (RLR) in choosing which traditional varieties they will cultivate. Data collected through interviews with farmers in three provinces and through crop cuts taken in their fields during the 1989-90 and 1990-91 wet-season rice harvests helped to identify these factors and clarified their relative influences on the farmers' choices.

The factors highlighted are field elevation, varietal maturity, eating quality, and yield potential. Cambodian cultural practices - particularly order of sowing, density of transplanting, and application of fertilizer - also are examined. Composite reasons for farmers' use of varieties are discussed by varietal maturity. Constraints and requirements for farmers' preferred RLR varieties are compared to stated breeding objectives of national breeding and varietal improvement programs.

Orders to: see below.

Nodulation and Nitrogen Fixation in Rice. Potentials and Prospects. G.S. Khush and J. Bennett, editors. International Rice Research Institute, Manila, 1992, vii + 136 p. ISBN 971-22-0035-3. Paperback.

Global food security depends on reaching ever higher levels of sustainable grain production. If cereal plants were able to utilize atmospheric N_2 as their primary source of nitrogen nutrition, serious economic and ecological problems associated with the use of inorganic and organic fertilizers could be mitigated. Research on biological N_2 fixation, particularly the Rhizobium-legumes symbiosis, and on plant molecular genetics have progressed to the point where it is now realistic to design research strategies aimed at developing N_2 -fixing capacity in cereals.

Rice is particularly well-suited to serve as a model cereal for such investigations. Most of the biotechnology tools needed have been or are being developed for rice. IRRI has an ongoing research program on biological N_2 fixation and has significant germplasm and field research facilities. Scientists throughout the world have relevant materials and know-how.

Price: HDC USD 11.50; LDC USD 3 (plus postage)

Orders to: IRRI, P.O. Box 933, Manila 1099, Philippines.

Pollution in Livestock Production Systems. I. Ap Dewi, R.F.E. Axford, I. Fayed M. Marai and H. Omed, editors. CAB International, Wallingford, 1994, xv + 463 p. ISBN 0-85198-857-1. Hardback.

Intensive livestock production is a significant contributor to environmental pollution through slurry, silage liquor and odours, as well as less directly through fertilizers used to support intensive grazing and through chemicals passed into the human food chain. Yet the interaction between pollution and livestock production is more complex, for pollution from sources such as contaminated animal feed, airborne particles, radiation and infectious microorganisms also affects production. This book examines in 23 chapters various aspects of these relationships. Four main topics are considered: the impact of pollution arising from livestock enterprises; the environmental effects of pollution as well as in related disciplines such as agricultural engineering and pollution control.

Price: GBP 55 (USD 99.50 Americas only).

Orders to: CAB International, Wallingford, Oxon OX10 8DE, United Kingdom or: CAB International, 843 North Park Avenue, Tucson, AZ 85719, U.S.A.

A Methodology for the Assessment of Surface Resistance and Soil Water Storage Variability at Mesoscale Based on Remote Sensing Measurements. Rapport 38. Wageningen Agricultural University, Department of Water Resources, 1993, 71 p. Paperback.

A new remote sensing algorithm has been tested with Normalized Difference Vegetation Index, surface albedo and surface temperature data obtained during the Thematic Mapper Simulator flight in the HAPEX-EFEDA field experiment (Hydrological and Atmospheric Pilot Experiment-Echival Field Experiment in a Desertification threatened Area). Its high spatial resolution allowed for a com-

parison of its results with soil moisture obtained from the moisture monitoring network. The microwave backscatter coefficient derived from AIRSAR data provided a possibility to compare the evaporation and topsoil moisture content. Having the surface energy balance instantaneously quantified in a distributed manner, it was finally possible (i) to inversely derive the surface resistance to evaporation from the latent heat flux and (ii) to study the (non-linear) relationship between surface resistance and soil water content at mesoscale for the Mediterranean climate present in Spain.

Price: NLG 33.00.

Orders to: Wageningen Agricultural University, Department of Water Resources, Nieuwe Kanaal 11, 6709 PA Wageningen, the Netherlands.

Ice on the Equator: Quaternary Geology of Mount Kenya. W.C. Mahaney. Wm Caxton Press, Sister Bay, 1990, xvi + 397 p. ISBN 0-940473-19-4. Cloth.

Based on fifteen years of research, this volume documents the Quaternary record on Mount Kenya including the geological background, environmental setting, use of multiple relative and absolute age-dating methods, glacial chronology, paleosol genesis, glacial geology, paleoclimatology, paleoecology, prehistoric and historic environmental impact, correlation with other tropical alpine areas, and with the deep-sea record. A comprehensive discussion of the glacial chronology and new advances in the use of paleomagnetism and amino acid racemization for relative-age determination form an important part of the volume. The geochemistry of stratigraphically important paleosols on Mount Kenya provides new and detailed information on paleoclimatic reconstruction. New methods for distinguishing tills from lahars are also discussed.

Price: USD 65; CAD 75.

Orders to: Wm Caxton Ltd., Publisher, 12037 Hwy 42, Ellison Bay, WI 54210, U.S.A.

Isotopic Studies of Azolla and Nitrogen Fertilization of Rice. Developments in Plant and Soil Sciences 51. K.S. Kumarasinghe and D.L. Eskew, editors. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xi + 145 p. ISBN 0-7923-2274-6. Hardback.

Nitrogen is the most limiting element for crop production. Traditionally, expensive commercial fertilizers are used to correct soil N deficiencies. Indeed, 50% of the increase in rice yields after World War II can be attributed to increased fertilizer N use. Although an increased rate of fertilizer N application has been advocated to meet the growing demand for food, it is unrealistic to advise the farmers to apply fertilizers they can hardly afford, and whose prices are likely to escalate in the years ahead. In addition, when they are not applied judiciously there are problems of environment pollution as plants are capable of taking up only a relatively small portion of the applied nitrogen, a substantial amount being lost through various chemical and biological processes. The exploitation of cheaper alternatives or supplements to fertilizers have therefore gained much interest in recent years.

Our increased interest in biological nitrogen fixation as a supplement or alternative to nitrogen fertilizers led to the convening of a consultants meeting on "The role of isotopes in studies on nitrogen fixation and nitrogen cycling by blue-green algae and the Azolla-Anabaena azollae association", in Vienna in October 1982. The consultants group recommended that the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture embark on a Co-ordinated Research Programme in this field and that initial emphasis should be placed on Azolla-Anabaena

symbiosis. As a result, a Co-ordinated Research Programme was initiated in 1984 which was concluded in 1989. The results and conclusions reported here are those that were generated during the five years of its operation.
Price: DFL 125; USD 73; GBP 51.
Orders to: see below.

New Horizons in Nitrogen Fixation. Current Plant Science and Biotechnology in Agriculture 17. R. Palacios, J. Mora and W.E. Newton, editors. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xvi + 788 p. ISBN 0-7923-2207-X. Hardback.

To understand a process as complex as nitrogen fixation and to be in a position to manipulate it for the benefit of mankind, researchers are now working at the frontiers of science in many different areas: protein structure and function; catalytic mechanisms; electron-transfer processes; regulatory circuits and environmental sensing; metabolic integration; chemical communication between organisms; differentiation; genome structure and function; microbial ecology; plant physiology; plant molecular biology; and agronomy. This volume represents a testimony to the advances in nitrogen-fixation research that have been made and the contribution of these efforts to the solution of many other varied scientific problems. Limiting steps for future advances are analyzed and new horizons in nitrogen-fixation research are proposed.

Price: DFL 325; USD 189.50; GBP 134.
Orders to: In U.S.A. and Canada: Kluwer Academic Publishers, 101 Philip Drive, Norwell, MA 02061, U.S.A. Elsewhere: Kluwer Academic Publ. Group, P.O. Box 322, 3300 AH Dordrecht, The Netherlands.

Tropical Forests, People and Food. Man and the Biosphere Series 13. C.M. Hladik, A. Hladik, O.F. Linares, H. Pagezy, A. Sempé and M. Hadley, editors. UNESCO, Paris, together with Parthenon Publishing, Carnforth, 1993, xxiv + 852 p. ISBN 92-3-102879-0 (Unesco) 1-85070-380-9 (Parthenon). Hardbound.

For as long as they have inhabited tropical forests, people have used, managed and transformed natural resources in their quest for food. The future of tropical forests and their human inhabitants will continue to depend on the ways - wise or otherwise - in which food is procured and produced.

In this book, scientists from disciplines spanning the natural and social sciences have focused on the biocultural interactions between tropical forest food resources and the communities they sustain. The volume's 74 chapters are organized into six major sections dealing with evolution and history of tropical forests in relation to food availability; food production and nutritional value of wild and semi-cultivated species; adaptive aspects of food consumption and energy expenditure; feeding strategies in relation to environmental variation; cultural factors in food choices; and management alternatives for the rational use of tropical forests in years to come. Each section begins with a background chapter that provides key references and attempts to integrate the individual chapters in terms of overall themes and salient problems.

The book's interdisciplinary approach makes it a valuable source of ideas and data upon which natural and social scientists can draw for discussion and analysis. It will also assist managers, planners, development agencies and concerned individuals in making the right decisions about the future of tropical forests and the people who live in them.

Price: GBP 58.
Orders to: The Parthenon Publishing Group Ltd., Casterton Hall, Carnforth, Lancs LA6 2LA, England.

World Map of Present-Day Landscapes. E.V. Milanova and A.V. Kushlin, editors. United Nations Environment Programme, Nairobi, with Moscow State University, Moscow, 1993.

In October 1990, the United Nations Environment Programme (UNEP) and the Centre for International Projects (CIP) of the USSR State Committee for Environmental Protection signed a Memorandum of Understanding implementing a project to assess and map the present status of the world's landscapes. Following this decision, and in accordance with the recommendations of the Third Technical Advisory Group Meeting on Desertification Assessment and Mapping, Moscow State University was entrusted with the task of compiling a world map of present-day landscapes at the scale of 1:15,000,000.

The map has been published in four sheets with an explanatory booklet including the measure and tendencies of human-induced landscape transformation at the global level. The authors tried to correlate the legend of the map with those used for the World Atlas of Desertification as well as the Global Assessment of Soil Degradation.

The explanatory booklet is a useful guide for science, education as well as for those compiling regional maps, databases and Geographical Information Systems (GIS) on the present status, use and trends of landscape development.

The first section overviews general objectives of the global assessment and mapping of present-day landscapes, the practical value of the map and its possible applications. In the second section, a closer look is taken at the base map characteristics and information sources used to compile the map. The third section provides a detailed explanation of the principal terms and concepts employed in the map, while the fourth section explains how to read and understand the map and its legend. The explanatory booklet also contains short guidelines for application of the map for practical purposes and for interpretation of remote-sensing data.

The characterization and degree of landscape transformation and formation of derivative (secondary) landscapes caused by anthropogenic effects or by climate change are also described.

Price: USD 100
Orders to: Department of World Physical Geography and Geoecology, Faculty of Geography, Moscow State University, Moscow 119899, Russia.

Inventory of New Zealand Soil Sites of International, National and Regional Importance. Part 2: North Island and northern offshore islands. New Zealand Society of Soil Science Occasional Publication 2. J. Arand, L. Basher, R. Wardle and K. Wardle. New Zealand Society of Soil Science, Lincoln, 1993, v + 131 p. Paperback.

This publication is the first listing of significant soil sites in northern New Zealand. The listing of significant soil sites in southern New Zealand was published in 1991. Both inventories mainly comprise sites which have formal protection for scenic, biotic or scientific reasons or have been proposed for protection, but also include a smaller number of sites that have no formal protection. The latter category will expand in later editions of the inventories as sites are drawn to the attention of the New Zealand Society of Soil Science. Although primarily of interest to New Zealand, the kind of information provided may help soil scientists in other countries to develop criteria for safeguarding soil sites.

Orders to: Dr. Les Basher, Landcare Research New Zealand Ltd., PO Box 69, Lincoln, Canterbury, New Zealand.

Memorias del XI Congreso Latinoamericano y II Congreso Cubano de la Ciencia del Suelo. R. Villegas y D. Ponce de León, editores. Instituto Nacional de Investigaciones de la Caña de Azúcar, La Habana, 1993, 1540 p. en V Volúmenes.

La celebración del XI Congreso Latinoamericano de la Ciencia del Suelo en Marzo de 1990 en La Habana, Cuba, constituyó un gran impulso para el desarrollo de las investigaciones relacionadas con este valioso recurso mediante el intercambio de criterios, experiencias e información actualizada con especialistas de numerosos países de Ibero-América y otras partes del mundo, con lo que se cumplió uno de los principales objetivos del Forum. Este evento fortaleció a la Sociedad Cubana de la Ciencia del suelo que celebró simultánea su II Congreso.

Fueron presentados 280 trabajos en Posters, Conferencias y Simposios de autores provenientes de: Argentina, Austria, Bolivia, Brasil, Colombia, Costa Rica, Cuba, España, Francia, Holanda, Hungría, México, Nicaragua, Perú, URSS y Venezuela.

En estas Memorias se agrupan los trabajos completos y resúmenes ampliados que fueron recibidos por el Comité Organizador. Volumen I: Química, física y biología de suelos; Vol.2: Génesis, clasificación y cartografía de suelos; Recursos hídricos en la producción de las plantas: interacción entre agua y suministro de nutrientes; Vol.3: Evaluación de la fertilidad de los suelos y uso de los fertilizantes en los cultivos principales; Vol.4: Erosión, conservación, mejoramiento y técnicas de manejo de suelos; Vol.5: Conferencias y simposios.

Orden: INICA, Ave Van Troi # 17203, 19210 Boyeros, La Habana, Cuba.

Biological Basis of Sustainable Animal Production.

Special issue of the Netherlands Journal of Agricultural Science 42/1. Royal Netherlands Society for Agricultural Science, Wageningen, 1994, 87 p.

This issue offers a selection of papers from Dutch authors presented at a Symposium in April 1993 on the occasion of the 75th anniversary of Wageningen Agricultural University. All papers deal with recent, and in most cases on-going, research. These papers, as well as the other symposium presentations and discussions confirm the general concern about the sustainability problems we face now in animal production. They should be regarded as key issues in present and future research agendas of animal sciences institutes. True sustainability, however, is not a technological matter only. It is a socio-economic, political, and ultimately also an ethical issue.

Orders to: Netherlands Journal of Agricultural Science, Administrative Centre, PO Box 79, NL-6700 AB Wageningen, the Netherlands.

Africa and Global Change. Global Change Rapport No.29. IGBP, Stockholm, 1994, 65 p. ISSN 0284-8015. Paperback.

START (Global Change System for Analysis, Research and Training) is the acronym for a system of interconnected regional research networks being developed by the International Geosphere-Biosphere Programme (IGBP) in cooperation with many other bodies. START is the scientific community's response to the need for regional research with a global scientific perspective and the development of competence and consensus on scientific issues world-wide. The purpose of a system of networked regional research centres and sites is to promote research on the regional origins and impacts of global environmental changes and to enhance indigenous scientific capacity to engage in focused research on critical regional

environmental issues of global importance.

START will be a world-encompassing system of Regional Research Networks (RRNs), each of which includes at least one Regional Research Centre (RRC) and a number of Regional Research Sites. Each of the RRCs serves as the information centre for the RRN, with additional coordination functions both within and between the regions. A major function of the RRC is to provide a multidisciplinary setting within which results from various disciplines can be synthesised into a framework that is policy relevant. Within START, 13 distinctive biogeographic regions have been identified and only together can they provide a complete representation of environmental changes in a global context. Priority has been given to developments of RRNs/RRCs in regions covering primarily developing countries.

A series of regional workshops was organised to ensure that regional priorities and perspectives have appropriate influence on the development of the international programme and to address how further regional collaboration can be promoted. The present report contains the reports of the working groups in which research priorities in Africa are discussed and defined, and general recommendations.

L'Afrique et le Changement Global. Global Change Rapport No.29. IGBP, Stockholm, 1994, 65 p. ISSN 0284-8015. Paperback.

START (Global Change System for Analysis, Research and Training) est l'acronyme d'un système de réseaux régionaux de recherche interconnectés, développé par le Programme International Géosphère-Biosphère (IGBP) en coopération avec un plusieurs autres instances. START constitue la réponse de la communauté scientifique aux besoins de recherche régionale, se plaçant dans une perspective scientifique globale et de développement à l'échelle mondiale de compétences et de consensus sur les problèmes scientifiques à résoudre. L'objectif d'un tel système de centres et de sites régionaux de recherche interdépendants consiste à promouvoir la recherche basée sur les origines régionales et les effets liés aux changements environnementaux généraux. Ce système cherche également à aider les organisations scientifiques locales à focaliser leurs recherches sur des aspects critiques de l'environnement régional d'importance globale.

START représentera un système mondial de Réseaux Régionaux de Recherche (RRR), chacun comprenant au moins un Centre Régional de Recherche (CRR) et un certain nombre de Sites Régionaux de Recherche. Chaque CRR sert de centre d'informations pour le RRR, avec des fonctions de coordination supplémentaires dans et entre les régions. Une des fonctions principales du CRR consiste à établir un cadre multidisciplinaire, où les résultats de disciplines traitant des phénomènes peuvent être synthétisées dans un cadre politiquement pertinent. Au sein de START, 13 régions biogéographiques distinctes ont été identifiées et c'est ensemble seulement qu'elles peuvent représenter la diversité des changements environnementaux dans un contexte global. Une étape prioritaire concerne la mise en place des RRR/CRR dans les régions de pays en développement.

Une série d'ateliers régionaux a été mise en place par l'IGBP pour s'assurer que les priorités et perspectives régionales influencent correctement le développement du programme international et pour renforcer la collaboration régionale. Ce rapport contient les compte-rendus des groupes de travaux dans lesquels les priorités de recherche pour l'Afrique ont été discutées et définies, et leurs recommandations générales.

Orders to/Commandes à: IGBP Secretariat, Royal Swedish Academy of Sciences, Box 50005, S-10405 Stock-

holm, Sweden.

New Frontiers in Rice Research. K. Muralidharan and E.A. Siddiq, editors. Directorate of Rice Research, Hyderabad, 1993, viii + 400 p. ISBN 81-7232-002-7. Hardbound.

This book includes the proceedings of an International Symposium held in November 1990 in India. The main focus of this symposium was to look ahead and examine the scope offered by recent advances in genetics, biotechnology, space technology, information technology and public policy formulation in enhancing the productivity, profitability and stability of rice farming system in an ecologically and economically sustainable basis.

Besides the 3 papers of the inaugural session, the book is divided in 7 sections: 25 years of rice research: a balance sheet (7 papers); Breeding, agronomic and physiological approaches to enhance and stabilise crop production (8 papers); Cellular and molecular approaches to crop improvement (13 papers); New trends in disease and pest management (7 papers); Space, communication and computer technologies for rice research (4 papers); New trends in nutrient management (4 papers) and Sustainability of rice farming systems (8 papers).

Orders to: The Project Director, Directorate of Rice Research, Hyderabad 500 030 A.P., India.

New publications in the series ODI Irrigation Management Network.

Multifunction Irrigation Organisations: Advantage or handicap. Network Paper 28. P. Shah and M.K. Shah. Overseas Development Institute, London, 1994, 11 p.

This paper describes the experiences of an NGO in supporting the formation of lift irrigation cooperatives and their performance as multifunction organisations. It also examines the conditions under which Irrigation Organisations are likely to become multifunction. It then discusses the mechanisms which facilitate the functioning of irrigation organisations and multifunction organisations.

Grameen Krishi Foundation. A multifunction organisation. Network Paper 29. E. Mallorie. Overseas Development Institute, London, 1994, 15 p.

This paper briefly describes the background of ground-water irrigation in Bangladesh and the activities of the Grameen Bank. It then examines the operational experience of the foundation and explains how it has evolved into a multifunction organisation. Finally its future prospects are reviewed and consideration given as to what extent its experience is typical or replicatable.

Design for Water User Associations: Organisational characteristics. Network Paper 30. M.M. Cernea and R. Meinzen-Dick. Overseas Development Institute, London, 1994, 17 p.

This paper analyses how Bank-financed irrigation projects deal with the basic organisational characteristics of water use associations in their design and approach.

News from the Field: Balochistan, Pakistan; Nigeria and Western Thar Desert, India. Network Paper 31. Overseas Development Institute, London, 1994, 27 p.

Prospects for Multifunction Organisations to Improve Irrigated Agriculture. Network Paper 32. Overseas Development Institute, London, 1994, 28 p.

Orders to: ODI, Regent's College, Inner Circle, Regent's Park, London NW1 4NS, U.K.

Management of Productivity Constrained U.P. Soils. N.K. Mehrotra and V.K. Garg, editors. Lucknow Chapter, Indian Society of Soil Science, Lucknow, 1993, vi + 135

p. Paperback.

This volume includes the papers of a one-day seminar held in Lucknow in October 1992. The publication covers the following broad aspects: Use of remote sensing to delineate waste lands in Uttar Pradesh (U.P.). Nutritional constraints in the management of problem soils of U.P.; Specific techniques suggested for the management of eroded and salt-affected soils; Use of mycorrhiza in acquisition of nutrients in soils; A major thrust on reclamation of water logged, calcareous and "diara" lands of U.P.

Price: INR 100 (plus postage).

Orders to: Dr. V.K. Garg, Soil Testing Lab, N.B.R.I., Lucknow 226 001, India.

Tropical Forests, Integrated Conservation Strategies and the Concept of Critical Mass. MAB Digest 15. I. Muul. Unesco, Paris, 1993, 84 p. Paperback.

This digest sets out a strategy for the conservation (i.e. wise use) of tropical forests based on economic diversification and on making full use of the range of products and resources that tropical forests can provide. The primary audience is those who seek to promote the improved use of tropical forests in ways that combine economic and ecological sustainability.

Orders to: see below

La Jachère en Afrique Tropicale. Dossier MAB 16. C. Floret, R. Pontanier et G. Serpantié. Unesco, Paris, 1993, 86 p.

Dans ce numéro, les auteurs ont tenté de faire le point sur l'état des connaissances sur la jachère en Afrique tropicale et de dégager les grandes lignes et les principales hypothèses de travail d'un programme coopératif de recherche et de développement sur la pratique de la jachère et sur ses implications sur les plans écologiques et agronomiques.

Commandes à: Unesco, 7 place de Fontenoy, F-75352 Paris 07 SP, France.

Physical Principles of Flow in Unsaturated Porous Media. Oxford Monographs on Geology and Geophysics 26. C.M. Case. Oxford University Press, Oxford, New York, 1994, xiii + 372 p. ISBN 0-19-504622-6. Cloth.

The material presented in this volume is aimed at dealing primarily with the theoretical underpinnings of the study of flow in unsaturated porous media and extending the understanding of these in a number of respects. The fundamental point of view taken is that phenomena at a given level are explained by considering phenomena at a more microscopic level. Phenomena are discussed at a number of levels with generally an attempt to relate happenings at the macroscopic (Darcy's law, say) level to causes at the microscopic (pore/capillary) level.

The example porous medium considered throughout is soil in the vadose zone. The transport of liquids containing impurities as well as gases is considered, and a unified view of these flows, as well as the possible movement of the porous medium itself, is presented.

Price: GBP 60.

Orders to: see below.

Environmental Chemistry of Soils. M.B. McBride. Oxford University Press, Oxford, New York, 1994, ix + 406 p. ISBN 0-19-507011-9. Hardback.

This book is an attempt to describe soil chemistry within the bounds of established chemical principles. It avoids as much as possible the more empirical descriptions and models, instead stressing concepts that build from our present knowledge of inorganic, organic, and physical chemistry as well as surface science. It is hoped that a

consistent, and not too complex, conceptual framework has been constructed that will help to explain the many seemingly disparate facts and observations that constitute the chemical behaviour of soils. The emphasis is on environmental as opposed to agricultural topics, compared with most texts in soil chemistry, recognizing that a major challenge of the future is to protect the soil ecosystem from the pollutants of an industrial society.

Price: GBP 35.

Orders to: Oxford University Press, Walton Street, Oxford OX2 6DP, England; *or:* Oxford University Press, 200 Madison Avenue, New York, NY 10016, U.S.A.

World Resources 1994-1995. People and Environment. The World Resources Institute, Washington, with Oxford University Press, Oxford, 1994, xii + 400 p. ISBN 0-19-521044-1. Paperback. (Also available on disk).

This volume has a special focus on people and the environment, in support of the 1994 United Nations International Conference on Population and Development. Part I consists of three special chapters that highlight natural resource consumption trends and their environmental consequences; the complex interactions among population growth, environmental degradation, and other factors; and the special and indeed essential role of women in sustainable development. Part II provides an overview of the environmental and natural resource issues faced by the world's two most populous nations, China and India as they develop. Part III reports on basic conditions and trends, key issues, major problems and efforts to resolve them, and recent developments in each of the major resource to atmosphere and climate. Supporting data, as well as the core data tables from the World Resources Database, are found in Part IV.

Orders to: World Resources Institute, 1709 New York Ave, N.W., Washington, DC 20006, U.S.A. *or:* Oxford University Press (see above).

Recent volumes in the series Advances in Agronomy. Academic Press, London.

Volume 49, 1993, 315 p. ISBN 0-12-000749-5.

Areas covered include phosphogypsum in agriculture, nutrient cycling and soil fertility in the grazed pasture ecosystem, the current use of computer assisted tomography (CAT) in studying water movement around plant roots as well as future applications of CAT in agronomy, and electrical conductivity methods for measuring and mapping soil salinity.

Price: GBP 61.

Volume 50, 1993, 277 p. ISBN 0-12-000750-9.

Areas covered include a thorough treatment of redox chemistry in soils, advances in agronomic improvement in oilseed brassicas, population groupings of soybean bradyrhizobia, crop responses to chloride, and plant nutrient sulphur in the tropics and subtropics.

Price: GBP 62.

Volume 51, 1994, c.212 p. ISBN 0-12-000751-7.

This volume features articles on: Gypsum and acid soils; Conservation tillage; Transposable elements in maize; Concepts and directions in arthropod pest management; and Accumulation of cadmium in crop plants and its consequences to human health.

Price: GBP 54 (tentative)

Volume 52, 1994, c.263 p. ISBN 0-12-000752-5.

This volume features articles on: Poultry waste management; Rainwater utilization efficiency in rainfed lowland rice; Wetland soils of the prairie potholes; Soil potassium quantity-intensity relationships; and Morphological and physiological traits associated with wheat yield increases in mediterranean environments.

Price: GBP 61 (tentative)

Orders to: Academic Press, 24-28 Oval Road, London NW1 7DX, U.K. *or:* Academic Press, Inc., 1250 Sixth Avenue, San Diego, CA 92101-4311, U.S.A.

Quantitative Methods in Soil Mineralogy. SSSA Miscellaneous Publication. J.E. Amonette and L.W. Zelazny, editors. Soil Science Society of America, Madison, 1994, xxi + 462 p. ISBN 0-89118-806-1. Paperback.

This publication contains the papers presented at a symposium held in 1990. It provides the reader an understanding of current and emerging analytical techniques and how they are best applied to the quantitative characterization of soil minerals. Application of these analytical techniques is expected to help solve problems in such diverse areas as environmental soil chemistry, soil genesis and classification, soil fertility, civil engineering, agricultural engineering, soil physics, and hydrology. The advantages, limitations, and future development of the techniques are critically assessed, and specific examples of the application of the techniques to soils are presented.

Price: USD 39.

Orders to: SSSA Headquarters Office, Book Order Dept., 677 South Segoe Road, Madison WI 53711, U.S.A.

New Journals/Nouveaux Périodiques/Neue Zeitschriften

Soil Use and Management is now published by CAB International. It still is owned by the British Society of Soil Science.

Orders to: CAB International, Wallingford, Oxon OX10 DE, U.K.

Soil Technology, a Cooperating Journal of the ISSS is now published by Elsevier.

Orders to: in the USA and Canada: Elsevier Journal Information Center, P.O.Box 945, Madison Square Station, New York, NY 10159-0945, USA; *Elsewhere:* Elsevier Science, Order Dept., P.O.Box 181, 1000 AD Amsterdam, the Netherlands.

Ecotoxicology. Quarterly published by Chapman & Hall, London, 1992. D.B. Peakall and L. Shugart, editors. ISSN 0963-9292.

This international journal is devoted to the publication of fundamental research on the effects of toxic chemicals on populations, communities and terrestrial, freshwater and marine ecosystems. It aims to elucidate mechanisms and processes whereby chemicals exert their effects on ecosystems and the impact caused at the population or community level. The journal is not biased with respect to taxon or biome, and it welcomes papers that indicate possible new approaches to regulation and control of toxic chemicals and those aiding in formulating ways of conserving threatened species are particularly welcome. Studies on individuals should demonstrate linkage to population effects in clear and quantitative ways. Laboratory studies must show a clear linkage to specific field situations. The journal includes not only original research papers but also technical notes and review articles.

Subscription Price: EC: GBP 98, USA/Canada: USD 181, ROW: GBP 107. Personal subscription: EC: GBP 37, USA/Canada: USD 68, ROW: GBP 37.

Orders to: Chapman & Hall, 2-6 Boundary Row, London SE1 8HN, U.K. *In USA and Canada:* Chapman & Hall, 29 West 35th Street, New York, NY 10001-2291, U.S.A.

Journal of Agromedicine. Interface of Human Health

and Agriculture. Quarterly published by Haworth Medical Press, Binghamton, 1994. S.H. Schuman, editor. ISSN 1059-924X.

This journal wants to fill the gap between journals already devoted to the health and agricultural sciences. It will focus on the health effects of agricultural operations on workers, consumers, and the environment. Articles will aid readers in better understanding how agricultural sciences and health sciences can work together to promote health in those who produce food and fiber and those who consume products of agriculture, forestry, and aquaculture.

Topics of special interest will be the morbidity and mortality of agricultural and associated industrial workers, food quality and safety, frontiers of nutrition, biotechnology and cancer prevention, cultural diversity and international cooperation in food production in a global economy, environmental issues pertaining to agricultural production, and teamwork between consumers, producers, regulatory agencies, researchers, and health professionals.

Subscription Price: Libraries: USD 36; Institutions: USD 32; Individuals: USD 28.

Orders to: The Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580, U.S.A.

CD-ROM for Development. Published bi-annually by the American Association for the Advancement of Science, Washington, 1993.

The first volume of this newsletter of the Sub-Saharan Africa Program of the AAAS was published in early 1993. The publication is intended for librarians and documentalists, researchers, and administrators interested in how information technologies can serve research needs. This newsletter will contain information on new products (both hardware and databases), troubleshooting or "technical tips", and recent publications.

Subscription Price: free of charge.

Orders to: AAAS Sub-Saharan Africa Program, 1333 H Street NW, Washington, DC 20005, U.S.A.

CIAT on-line. Published by Centro Internacional de Agricultura Tropical, Cali, 1993.

This new publication is to serve as an advanced information summary of the activities of the CIAT, and will consist of short news briefs. Each item will be only a few paragraphs, in a format that is easy to "lift" for publications in other media. The first issue appeared in May 1993.

Orders to: CIAT, Apartado Aereo 6713, Cali, Colombia.

Geotechnical Testing Journal. Published quarterly by ASTM, Philadelphia. H.J. Pincus, technical editor.

For years this journal has been known internationally as a preferred vehicle for authors to publish their latest work on soil and rock testing. Now it has expanded its scope, including papers in these geotechnical fields: marine sediments; ground water investigations; contaminated soil testing and stabilization; waste management related to soil and rock engineering; and soil as a medium for plant growth.

Orders to: ASTM, 1916 Race Street, Philadelphia, PA 19103-1187, U.S.A.

Global Change Biology. Published bimonthly by Blackwell Scientific Publications, Oxford, January 1995. S. Long, editor-in-chief.

This journal aims to promote the understanding of both the impact of global change on biological systems and the interactive feedbacks between biological systems and earth, physical and chemical systems in change. It will fo-

cus on the impact of all aspects of environmental change affecting all or large portions of the globe. Topics of current concern include predicted climate change, rising tropospheric CO₂ and O₃ concentrations, and loss of biodiversity. In addition to original research articles, short communications, reviews, opinions and technical papers, the journal will include a news section and a forum for debate on the growing number of contentious issues in global change.

Orders to: Blackwell Scientific Publications, attn. Anna Rivers, Osney Mead, Oxford OX2 0EL, U.K.

Soil Science Alert. Quarterly published by Elsevier Science, Amsterdam, 1994. ISSN 1380-7838.

This journal contains abstracts of articles recently or shortly to be published in 6 Elsevier journals dealing with soils: Applied Soil Ecology, Catena, Geoderma, Soil Biology and Geochemistry, Soil Technology and Soil & Tillage Research.

Subscription Price: free of charge

Orders to: Elsevier Science B.V., attn. R. Hayward, PO Box 181, 1000 AD Amsterdam, the Netherlands.

SOFERNET Newsletter. Published by the Regional Coordination Unit of Soils & Fertilizers Network, 1994.

This newsletter reports on meetings held or to be held on subjects in the fields of soils and fertilizers. It also gives some information about important publications on those subjects.

Requests to: The Soil and Fertilizers Network (SOFERNET), c/o Soil Research Institute, Academy Post Office, Kwadaso-Kumasi, Kumasi, Ghana.

Applied Soil Ecology. Quarterly published by Elsevier Science Publishers, Amsterdam, 1994. Editors-in-chief: C.A. Edwards (for the Americas) and L. Brussaard (for the rest of the world). ISSN 0929-1393.

This new journal addresses the role of soil organisms and their interactions in relation to: agricultural productivity, nutrient cycling and other soil processes, the maintenance of soil structure and fertility, the impact of human activities and xenobiotics on soil ecosystems and biotechnological control of soil-inhabiting pests, diseases and weeds. Such issues are the basis of sustainable agricultural and forestry systems and the long-term conservation of soils in both the temperate and tropical regions.

The disciplines covered include the following, and preference will be given to articles which are interdisciplinary and integrate two or more of these disciplines: Soil microbiology and microbial ecology; Soil invertebrate zoology and ecology; Root and rhizosphere ecology; Soil science; Soil biotechnology; Ecotoxicology; Nematology; Entomology; Plant pathology; Agronomy and sustainable agriculture; Nutrient cycling; and Ecosystem modelling and food webs.

Subscription price: NLG 368; USD 204.50

Orders to: In the U.S.A. and Canada: Elsevier Science Publishers, P.O.Box 945, Madison Square Station, New York, NY 10160-0757, USA; Elsewhere: Elsevier Science Publishers, P.O.Box 181, 1000 AD Amsterdam, the Netherlands.

Of Soils and Seeds. Issued by the Center for PVO/University Collaboration in Development, Cullowhee, 1993. (Also in French).

This is the newsletter of the On-Farm Productivity Enhancement Program (OFPEP). This program is designed to assist farmers at the local level in Senegal, The Gambia and Uganda in seed and soil practices that will increase

productivity at the farm level. The newsletter will be updating the activities of the program, providing information on soils and seeds, and providing a form for OFPEP partners.

Subscription price: free of charge

Requests to: Center for PVO/University Collaboration in Development, Bird Building, Western Carolina University, Cullowhee, NC 28723-9056, U.S.A.

The International Journal of Sustainable Development and World Ecology. Quarterly published by Parthenon Publishing, Carnforth, Pearl River, 1994. J.N.R. Jeffers, editor-in-chief. ISSN 1350-4509.

This new journal provides a forum for the report and discussion of issues and ideas surrounding the important concept of sustainable development. By linking sustainable development to world ecology, the journal publishes original research papers, articles and reviews that deal with all aspects of sustainable development, aiming at a balanced discussion, including the economic viewpoint. Contributions related to major environmental issues such as biodiversity, global climatic warming, resource management and wildlife conservation, especially those which deal with Third World ecosystems and developing countries, will be especially featured.

Subscription price: GBP 35 or USD 58 (individual); GBP 75 or USD 120 (institutions).

Orders to: The Parthenon Publishing Group Ltd., Casterton Hall, Carnforth, Lancs LA6 2LA, England; or: The Parthenon Publishing Group Inc., One Blue Hill Plaza, PO Box 1564, Pearl River, NY 10965, U.S.A.

ASB-Newsletter. Published by ICRAF, Nairobi, 1994.

ICRAF has recently launched the first issue of its ASB-Newsletter. ASB is the acronym for "Alternatives to Slash-and-Burn". ASB is a worldwide research and development project to reduce tropical deforestation and promote rehabilitation of deforested land by providing farmers who practise unsustainable slash-and-burn agriculture with alternative ways of using the land. This, in turn, will improve the livelihood of farming families living at the margins of tropical forests. It will also preserve biodiversity and limit the emission of greenhouse gases that contribute to global warming. ASB research is highly participatory; a joint technology-policy approach is used to seek alternatives.

The ASB Newsletter will be a forum for partners in the consortium to communicate with each other, and to spread information about ASB activities around the world to others who share concerns about unsustainable slash-and-burn agriculture, and to those who are also working on finding alternatives.

Requests for subscription to: ICRAF, attn. Dale Bandy, Coordinator ASB Update, PO Box 30677, Nairobi, Kenya.

Forage Cell Wall Structure and Digestibility. H.G. Jung, D.R. Buxton, R.D. Hatfield and J. Ralph, editors. American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, Madison, 1993. xxv + 794 p. ISBN 0-89118-115-6. Hard cover.

An increase in the efficient use of plant resources is critical if we are to meet tomorrow's food and fiber needs. To help meet this goal, the use of forages as a food resource in livestock production will need to be enhanced. However, there is a critical lack of information on the chemistry of the cell walls of forage plants and especially how this chemistry relates to digestibility and absorption and how the digestibility can be improved through plant breeding.

This book presents the findings of a conference that brought together more than 160 researchers from around the world who specialize in disciplines ranging from plant cell wall chemistry to digestibility. The primary objective of the conference was to offer state-of-the-art information on forage cell wall structure and digestibility.

The authors review the various aspects of forage cell wall structure and digestibility and provide not only the latest information, but also a vision of future opportunities for research. Several authors accepted the challenge to develop conceptual models related to wall structure and development, and wall degradation in the rumen. The opinions, conclusions, and hypotheses from all of the researchers are compiled in this book.

Price: USD 42

Orders to: see below.

Soil Specific Crop Management A Workshop on Research and Development Issues. P.C. Robert, R.H. Rust and W.E. Larson, editors. American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, Madison, 1993. xi + 395 p. ISBN 0-89118-116-4. Paperback.

Historic agronomic practices have been developed with the farm or field as the area of management. The advent of soil conservation began to focus soil management on topographic and soil-specific features. Even so agronomic practices and recommendations have largely been made on a field basis rather than on soil specific properties that might influence tillage, seeding, fertilizing and weed control practices. The near completion of detailed soil surveys in the U.S.A., particularly in the intensive agricultural areas, has provided a database of great magnitude. The advent of computer processed spatial data together with geostatistical analysis enables the display of those soil, hydrologic, and micro-climate features relevant to agronomic practices. With the further development of positioning systems suitable to on-site applications, the capability now exists, or can be feasibly developed to deliver real-time, real-space changes in almost any agronomic procedures.

This Soil Specific Crop Management workshop, held in April 1992 in Minneapolis, consisted of invited papers on the topics of soil resources variability, managing variability, engineering technology, profitability, environment, and technology transfer. They were followed by several invited presentations detailing current research and development in each of the six areas.

Price: USD 20

Orders to: see below.

Soil Color. SSSA Special Publication Number 31, J.M. Bigham and E.J. Ciolkosz, editors. Soil Science Society of America, Madison, 1993. xii + 159 p. ISBN 0-89118-802-9. Paperback.

It is thought of by the U.S. Soil Survey Staff (1981) to be one of the most useful tools in identifying soils. It can be a soil's sediment's, or rock's most significant morphological characteristic. "It" is soil colour. And it plays a major role in soil classification. Even in the age of advanced instrumentation, colour remains a very important soil characteristic.

Often the first property recorded in a detailed description, soil colour is thought of as an afterthought in many soil science textbooks. This oversight reflects the reality that soil colour remains a mystery to most earth scientists. This is due to the fact that soil colour is a complex discipline that cuts across the fields of physiology, psychology, physics, chemistry, and mineralogy. The perception also exists that soil colour cannot be measured with any

great degree of precision. Despite these uncertainties, pedologists and geologists recorded and correlated colours and colour patterns for many years. The present publication, dedicated to Prof. Udo Schwertmann, provides a concise description of the role of a number of components (organic matter, iron oxides, hydrological conditions, etc.) in determining the colour of a soil.

Price: USD 25

Orders to: SSSA Headquarters Office, Book Order Dept., 677 South Segoe Road, Madison WI 53711, U.S.A.

Working with Farmers for Better Land Husbandry. N. Hudson and R.J. Cheate, editors. Intermediate Technology Publications, 1993, viii + 272 p. ISBN 1-85339-122-0 (Paperback), 1-85339-160-3 (Hardback).

Many people in Africa face enormous problems as they struggle to feed themselves, and to generate sufficient cash income to meet the most basic needs. Their difficulties escalate as increasing populations are forced to farm marginal land which is vulnerable to degradation. At best the overall results are static crop yields and widespread poverty. Famine, refugee problems and abandoned lands are common symptoms of our failure to practice good land husbandry, and to manage our affairs to assure a decent livelihood for the majority of rural people.

This book reports on seeds of hope and lessons for the future, first setting the scene with an outline of current approaches to soil and water management in different countries and aid agencies. Then follows discussion of social, cultural and economic issues and the mechanics of participatory working. The case studies that follow are in three groups. There are examples of the opportunities and benefits of improved farming methods; case studies where an important part of the experience is stimulating community developments; and case studies with more emphasis on the methods and techniques used to promote better land husbandry. There are suggestions on vanguard research to develop methods for effective conservation farming, as well as ways to provide training and experience in the new ideas for fieldworkers, to help carry those new ideas forward.

Price: GBP 9.95 (paperback), GBP 29.95 (hardback).

Orders to: Intermediate Technology Publications Ltd., 103-105 Southampton Row, London WC1B 4HH, U.K.

Farm Land Erosion in Temperate Plains Environment and Hills. S. Wicherek, editor. Proceedings of the International Symposium on Farm Land Erosion, Paris, Saint-Cloud, France, 25-29 May 1992. Elsevier Science Publishers, Amsterdam, New York, 1993, xiv + 584 p. ISBN 0-444-81466-3. Hardbound.

During the last twenty years, mutations within agricultural systems in Europe have brought on a spectacular worsening of soil erosion and degradation. This volume, contributed to by scientists from 25 countries, discusses how this risk can be evaluated, and which solutions should be adopted without radically disturbing the socio-economic orientation of major agricultural regions. It is an excellent starting point for the development of new research themes, and will be of great value to soil and environmental scientists, and to all those involved in land irrigation and drainage.

Price: USD 242.75; NLG 425

Orders to: see below

Statistical Analysis of Regional Yield Trials: AMMI Analysis of Factorial Designs. H.G. Gauch Jr., editor. Elsevier Science Publishers, Amsterdam, New York, 1992, x + 278 p. ISBN 0-444-89240-0. Hardbound.

During the last few years, many journal articles have

shown the usefulness of the Additive Main Effects and Multiplicative Interaction (AMMI) model for analyzing regional yield trials. AMMI helps agronomists and breeders in several ways: to understand or model complex data sets, especially the interactions; to estimate yields more accurately, even with less data; to make better selections; and to design more efficient yield-trial experiments.

This book is the first systematic treatment of these topics, collecting concepts from the scattered literature and also presenting many new results. Although agricultural applications are emphasized here, AMMI is applicable to two-way data tables containing one kind of data, either replicated or not, so AMMI appears in many areas of science and technology.

The volume's first seven chapters review the agricultural and statistical principles and the final chapter indicates the difference that AMMI can make for agricultural research and world food supplies. This book will be of great value to agricultural scientists throughout the world, enabling them to learn more from their data and thereby make greater progress.

Price: USD 175; NLG 280

Orders to: in the USA and Canada: Elsevier Science Publishing Co. Inc., P.O.Box 882, Madison Square Station, New York NY 10159, USA; *Elsewhere:* Elsevier Science Publishers, P.O.Box 211, 1000 AE Amsterdam, the Netherlands.

The Stability of Minerals. The Mineralogical Society Series 3. G.D. Price and N.L. Ross, editors. Chapman & Hall, London, New York, 1992, xi + 368 p. ISBN 0-412-44150-0. Hardbound.

This book addresses the fundamental factors that underlie our understanding of all aspects of mineral behaviour and crystal chemistry. In particular it highlights the factors that determine the stability of minerals and related systems, including the quantum mechanical and atomic basis of structural stability, the thermodynamic and thermochemical properties of minerals and mineral assemblages and the chemical and physical limits of mineral stability.

This publication is particularly timely, since major advances in the understanding of many aspects of the complex behaviour of solids (such as the origin of incommensurate phases) have recently occurred. In addition, the subject is also benefitting from advances in supercomputing, which have enabled solid-state chemists and physicists to apply their understanding of bonding to model complex silicates. The book introduces and puts into context these new and exciting developments by adopting a tutorial approach.

Although focusing on mineralogical problems, this book should be of interest to material scientists, solid-state chemists and condensed matter physicists. It is hoped that this book will also appeal to senior undergraduate students as well as those involved in research.

Price: GBP 75

Orders to: see below.

Landscape Ecology of a Stressed Environment. IALE Studies in Landscape Ecology 1. C.C. Vos and P. Opdam, editors. Chapman & Hall, London, New York, 1993, xv + 310 p. ISBN 0-412-44820-3. Hardbound.

The Netherlands landscape is an example of environments which are managed for high rates of production and other human uses. A knowledge of the ecological processes resulting from such intense utilitarian management is vital to a fuller understanding of the stresses imposed by us on these environmental systems. The new data and emerging principles of landscape ecology, as developed

in this volume, apply to a variety of other managed landscapes worldwide where landscape processes have been substantially modified by management for overproduction and overuse.

As world leaders in this subject, the authors and contributors have produced a ground-breaking study of what is known about the distortion of landscape processes and losses of natural diversity and environmental quality due to high population density and intensive land use. The value of this book will increase as the question of sustainability becomes better defined and environmental protection measures are implemented further.

Price: GBP 45

Orders to: see below.

Hey's Mineral Index. Mineral Species, Varieties and Synonyms. Third edition. A.M. Clark. Chapman & Hall, London, New York, 1993, xii + 852 p. ISBN 0-412-39950-4. Hardbound.

This book provides an up-to-date alphabetical list of the names of all known mineral species and important varieties - details of the mineral's chemical composition and unit cell are provided. Also included, where known, are the type locality for each named mineral and details of important changes in the chemical formulation of each species.

This is the third edition of the book popularly known as Hey's Index. The major departure in this new edition is that the information is provided alphabetically. A finding index for recognized mineral species, based on their chemical composition, is also included.

Price: GBP 50

Orders to: see below.

Statistical Methods in Agriculture and Experimental Biology. Second edition. R. Mead, R.N. Curnow and A.M. Hasted. Chapman & Hall, London, New York, 1993, xi + 415 p. ISBN 0-412-35480-2 (Paperback), 0-412-35470-5 (Hardbound).

This is an introductory text for scientists working in agriculture and experimental biology. It is appropriate for use as a textbook for undergraduate or postgraduate students of these subjects and includes all the basic statistical methods which are appropriate to their work. The book also includes material on more advanced topics not usually discussed in an introductory text including multiple regression, incomplete block experimental design, confounded and split-plot experimental designs, non-linear and log-linear models, and repeated measurements. The authors believe that research scientists should be aware of the potential benefits of these more advanced methods in their work.

The second edition includes new material on the effective use of computers for statistical analysis, and shows how information is provided by general linear model procedures in computer packages. There is a new chapter on the analysis of multiple and repeated measurements.

The book lays particular emphasis on the assumptions implicit in statistical methods and includes a chapter devoted solely to this important aspect. It also emphasizes the importance of designing experiments properly, particularly in using small, natural blocks and factorial treatment structure, and of using available resources efficiently and extracting all information from the data. Throughout the book the authors concentrate on the understanding needed for using statistical methods and for using statistical computer packages. The methods and the interpretation of results are illustrated by carefully described worked examples, and further data sets are provided as exercises for the reader.

Price: GBP 19.95 (Paperback), GBP 40 (Hardbound).

Orders to: Chapman & Hall, 2-6 Boundary Row, London SE1 8HN, England; or: Chapman & Hall, 29 West 35th Street, New York, NY 10001-2291, U.S.A.

The World's Savannas: Economic Driving Forces, Ecological Constraints and Policy Options for Sustainable Land Use. M.D. Young and O.T. Solbrig, editors. UNESCO, Paris, together with Parthenon Publishing, Carnforth, 1993, xx + 350 p. ISBN 92-3-102750-6 (Unesco) 1-85070-417-1 (Parthenon). Hardbound.

In this book, natural and social scientists have co-operated in examining savanna land use within a policy perspective. The aim is to assess the ecological, social and economic constraints to savanna development, and to identify the nature of policy changes necessary to enhance prospects for economic growth and development throughout the savanna regions. The emphasis is on the development of policy recommendations at a national and international level.

Fifteen chapters are grouped into six sections dealing with: economic and ecological driving forces affecting tropical savannas; policy principles - ecological constraints, land tenure for pastoral communities and in private and mixed-property regimes, national and international influences that drive savanna land use; common-property grazing systems (Barabaig, Maasai); dual common-property and private-property grazing systems (Botswana, India, South Africa, Zimbabwe); private-property grazing systems (Australia, Brazil, Venezuela); and providing an environmentally sustainable, economically profitable and socially equitable future for the world's savannas.

The book will be of interest to scientists concerned with the ecology and peoples of tropical savannas, and to those who shape, move and implement policies which affect land use and resource management in savanna regions.

Price: GBP 38

Orders to: The Parthenon Publishing Group Ltd., Casterton Hall, Carnforth, Lancs LA6 2LA, England.

Cropping Systems in Intensive Agriculture. D. Djumalieva and A. Vassilev, editors. MD Publications, New Delhi, 1993, ix + 214 p. ISBN 81-85880-07-7. Hardbound.

The aim of the book is to show the road of intensification in agriculture by introducing modern intensive crop rotations densified with homogeneous cultures at a higher level of intensification with pre-cultures and with second cultures, in accordance with the ecological conditions. The complicated phytosanitary conditions which occur when the crop rotation is intensified with homogeneous cultures are examined and modern solutions for overcoming the self-unbearing of the main cereals are also given. On the basis of the ecological differences in the frame of the separate productive units, the problems of dividing into districts are examined. The book finishes with working out the various types of crop rotations corresponding to the requirements of an ecological zone.

Price: Rs 275 (in India); US\$ 27.50

Orders to: Prints India, Prints House, 11 Darya Ganj, New Delhi 110002, India.

Agrochemicals Desk Reference. Environmental Data. J.H. Montgomery, Lewis Publishers, Boca Raton, London, 1993, 672 p. ISBN 0-87371-738-4.

This is a comprehensive volume that features environmental and physical/chemical data on 200 compounds, including pesticides, herbicides, and fungicides. Data pre-

sented includes the soil/sediment partition coefficient for predicting the compound transport rate in groundwater, the octanol/water partition coefficient for determining the compound's hydrophobicity and estimating bioaccumulation potential in aquatic biota, and Henry's Law Constants for determining the relative volatility of a substance. The book also provides data on hydrolysis and photolysis half-lives, toxicity data, formulations, and uses. A thorough discussion of transformation products and degradative, biological, and abiotic processes in soil, plants, and groundwater is presented as well.

Price: GBP 72

Orders to: see below.

Soil Fertility Evaluation and Control. C.A. Black, Lewis Publishers, Boca Raton, London, 1993, xiii + 746 p. ISBN 0-87371-834-8. Hardbound.

This publication describes the theoretical background for practical applications of scientific work on the subject. The book emphasizes the use of response curves as the basic biological standard for both evaluation and control, and it discusses soil testing and plant analysis as secondary standards. The principal applications covered include fertilizer requirements, fertilizer evaluation, residual effects, fertilizer placement, liming, and economics of fertilization. Environmental aspects of plant nutrients and soil nutrient supplies as they pertain to crop production are also addressed.

Most of the information in this book is drawn from recent world literature, which makes it a timely reference for soil scientists, agronomists, agriculturalists, foresters, and others interested in the evaluation and control of soil fertility.

Price: GBP 48

Orders to: see below.

Fundamentals of Environmental Chemistry. S.E. Manahan. Lewis Publishers, Boca Raton, London, 1993, xv + 844 p. ISBN 0-87371-587-X. Hardbound.

This publication has been written to meet two objectives: 1) to provide those who need it with a rudimentary knowledge of chemistry and 2) to present this knowledge within a framework of environmental science; specifically, environmental chemistry. Without being overly simplistic or misleading, it seeks to present chemical principles in ways so that even a reader with a minimal background in, or no particular aptitude for science and mathematics can master the material in it and apply it to a trade, profession, or course of study. All chapters have a summary, consisting of a text with blanks, to be filled in by the reader. The correct answers are provided too.

This general reference and textbook for a broad spectrum of applications will also appeal to soil scientists.

Price: GBP 24.95

Orders to: Mosby-Year Book Europe, 22-24 Torrington Place, London WC1E 7HJ, U.K.; or: Lewis Publishers Inc., 2000 Corporate Blvd, N.W., Boca Raton, FL 33431, U.S.A.

Ecosystem Rehabilitation. M.K. Wali, editor. SPB Academic Publishing, The Hague, 1992, Vol.1: Policy Issues, xii + 230 p., ISBN 90-5103-070-3. Vol.2: Ecosystem Analysis and Synthesis, viii + 388 p. ISBN 90-5103-071-1. Paperback.

Vast areas of land throughout the world lie waste, rendered unproductive by a myriad of human activities. By reliable estimates, lands degraded now exceed 2,000 million hectares, with 5-7 million hectares lost every year. And whatever we do on the land and discharge into the atmosphere, ultimately finds its way into the streams and ri-

vers, lakes and oceans making them unproductive and unsightly as well. Thus, we have not only degraded the environment and its aesthetic beauty, but have also impoverished biotic diversity, human sustenance, health and support systems, thereby threatening the basic quality of life. The rehabilitation of these ecosystems, the significant preamble to sustainable development, is the subject matter of this book.

Volume 1 discusses the economic, social, cultural, policy and legal, and other general aspects of rehabilitation in an ecological framework. It suggests both new lines of research and legislative needs that must be addressed.

Volume 2 presents specific case studies of agroecosystems, grasslands, forests, wetland and aquatic systems from diverse regions of the world. Rehabilitation strategies, based on ecosystem analysis and synthesis, are discussed.

The chapters provide in-depth analyses and should be particularly valuable to environmental scientists and senior students in such disciplines as ecology, economics, geology, natural resources, soil science, and social sciences, and in environmental law and policy studies.

Price: Vol. 1: NLG 75, USD 42.50; Vol. 2: NLG 125, USD 72.50

Orders to: SPB Academic Publishing, P.O. Box 97747, 2509 GC The Hague, The Netherlands.

Geochemistry, Groundwater and Pollution. C.A.J. Appelo, D. Postma. A.A. Balkema, Rotterdam, Brookfield, 1993, xvi + 536 p. ISBN 90-5410-106-7 (paperback) 90-5410-105-9 (hardbound).

Groundwater geochemistry is an interdisciplinary science that relates the quality of ground water to various processes and reactions in the subsurface environment. Pollution and increased exploitation of groundwater resources have demanded for an improved understanding of the concentration limits and variations of solute ions and chemicals.

This book offers a quantitative approach to the study of groundwater quality and the interactions between water, minerals, gases and pollutants. The basic geochemical notions are presented and applied in textbook style. Geochemical modelling and mass transport in aquifers are discussed, together with algorithms that couple multicomponent solute transport and chemical reactions. The applicability of the developed concepts is demonstrated with detailed examples throughout the book, and the discussed computer codes are available on disk.

Price: NLG 80 (paperback), NLG 150 (hardbound)

Orders to: A.A. Balkema, P.O. Box 1675, 3000 BR Rotterdam, The Netherlands; or: A.A. Balkema Publishers, OldPost Road, Brookfield, VT 05036, U.S.A.

2nd International Intensive Course on Soil Micromorphology. Wageningen, 1992. M.J. Vepraskas, editor. Vol.1: Introduction to Soil Micromorphology; Vol.2: Applications to Soil Micromorphology.

This syllabus was written to provide the students of the micromorphology course a brief survey of the subject. It is a review of the field and not a testament to a particular philosophy. Attempts were made to note different techniques and descriptive systems whenever possible. The bulk of the information presented comes from published sources that should be available to any student having access to a university library. The publications were made for the course participants, but a few copies are available for interested micromorphologists.

Requests to: Dr. M.J. Kooistra, SC-DLO, P.O.Box 125, 6700 AC Wageningen, the Netherlands.

Past and Present Soil Erosion. Archaeological and Geographical Perspectives. Oxbow Monograph 22. M. Bell and J. Boardman, editors. Oxbow Books, Oxford, 1992, vii + 250 p. ISBN 0-946897-46-8. Paperback.

These proceedings of a meeting held at the Institute of Archaeology in London in May 1991. There are four sections in the book: Field Studies in Lowland Britain, Field Studies in Continental North West Europe, Mediterranean Erosion, and Analytical Techniques and Modelling.

The subject of soil erosion is of concern to soil scientists, archaeologists and geomorphologists alike, and the first chapters describe the present and past evidence for erosion in the British landscape. Archaeological, soil and geomorphological evidence are brought together using examples from the South Downs, Bedfordshire, the West Midlands, Wessex and Devon. Two papers comprise the studies from continental Europe: these consider soil erosion from the last glaciation until the present day, with the most extensive erosion beginning in the Roman period and continuing throughout the Middle Ages. A current phase of intense erosion results from mechanisation and the changed farming practices of the last half of the twentieth century. Examples of erosion and colluviation are drawn from the Paris basin, Brittany and the Massif Central.

The history of erosion in the Mediterranean countries parallels the history of human society. Contributors drew their examples of erosion caused by past civilizations from Greece, Cyprus and Italy. In the final section devoted to analytical techniques, the examination of dry valleys in Kent provides evidence of both erosion and landscape stability, and another study utilises the techniques of soil micromorphology to demonstrate ancient soil erosion. Techniques using radionuclides from weapon testing fallout and nuclear accidents have helped to date modern erosional episodes. Conceptual modelling of erosion and the impact of actual erosion on archaeological sites in semi-arid regions are themes which conclude this comprehensive range of papers.

This monograph, and the later one from the same publisher on alluvial archaeology, make an interesting pair: erosion being the origin of the sediments which have infilled the valleys and helped to preserve archaeological remains and artifacts on floodplains.

Price: GBP 28, USD 56

Orders to: See below.

E.M. Bridges, Wageningen, The Netherlands

Alluvial Archaeology in Britain. Oxbow Monograph 27. S. Needham and M.G. Macklin, editors. Oxbow Books, Oxford, 1992, xiv + 277 p. ISBN 0-946897-52-2. Paperback.

In many parts of the world, alluvial plains are some of the most intensively occupied areas of the land surface. However, in Britain, these lands traditionally have been used only for pastures because they may become inundated during occasional floods. The floodwaters brought annual increments of sediment which safely concealed and preserved many items of archaeological merit. Until the last decade, these remnants of the past lay undetected, but demand for gravel resulted in archaeological investigations taking place in alluvial areas before the destructive removal of the gravel occurred.

This monograph deals mainly with alluvia of the Holocene. The book begins with accounts of methods of prospecting for and dating archaeological evidence in alluvia. It continues with evidence of soil micromorphological studies, the significance of molluscan fauna, what pollen analysis can tell, and the nature of sedimentation. Other studies describe buried sites below the alluvia of rivers in

the Midlands, and finally those of the Thames valley in London.

The subject of alluvial archaeology brings together many different aspects of environmental science and the various articles make fascinating reading for soil scientists and especially those interested in the interaction of human beings and the land.

Price: GBP 35, USD 58

Orders to: Oxbow Books, Park End Place, Oxford OX1 1HN, England; or: The David Brown Book Company, P.O. Box 5605, Bloomington, IN 47407, U.S.A.

E.M. Bridges, Wageningen, The Netherlands

Systems Approaches for Agricultural Development. Systems Approaches for Sustainable Agricultural Development 2. F. Penning de Vries, P. Teng and K. Metselaar, editors. Kluwer Academic Publishers, Dordrecht, in cooperation with the International Rice Research Institute, Manila, 1993, xii + 542 p. ISBN 0-7923-1880-3. Hardbound.

Agriculture is changing rapidly all over the world. Intensification, diversification, optimizing scarce resources, integrated pest management, sustainability and climate change are key issues for agricultural institutes. The best solutions will be found by integrating disciplines. Organized thinking about future farming requires forecasting of the implications of alternative ways to farm and to develop agriculture. Systems thinking and systems simulation are indispensable tools for such integration and extrapolation.

About 150 scientists and senior research leaders from all over the world participated in the symposium "Systems Approaches for Agricultural Development" to discuss these issues. The symposium reviewed the status of systems research and modelling in agriculture, with special reference to evaluating their efficacy and efficiency for achieving research goals, and to their application in developing countries, promoted international cooperation in modelling, and increased awareness of systems research and simulation. This book comprises the papers on the technical subjects. Well informed authors describe and illustrate how systems research was used to improve agricultural production systems of all continents and in diverse environments.

Price: NLG 375, USD 255, GBP 133.

Orders to: see below.

Genetic Aspects of Plant Mineral Nutrition. Developments in Plant and Soil Sciences 50. P.J. Randall, E. Delhaize, R.A. Richards and R. Munns, editors. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xi + 414 p. ISBN 0-

7923-2118-9. Hardbound.

The adaptation of desirable agricultural plants to infertile and problem soils is an increasingly important strategy for improving food supplies in many parts of the world. The plant breeding approach complements, and in some cases may replace, agronomic practices such as the use of fertilizers and soil amendments to provide solutions which are economically and environmentally sustainable.

The Symposium at which the papers in this volume were presented drew together workers in plant breeding, plant nutrition, physiology, biochemistry and molecular biology to discuss research on gene systems which affect the mineral nutrition of plants. Papers describe successes in plant breeding for problem soils as well as advances in understanding of mechanisms at the whole plant and cellular levels. Papers in the "molecular" area point the way to the contribution which the new biology will make to

this field in the future.

The reviews and research papers are grouped under five topics: better plants for acid soils; salinity tolerance; efficiency of uptake and use of macronutrients; efficiency for iron and micronutrients; tolerance of heavy metals and boron.

Price: NLG 325, USD 195.50, GBP 131.50

Orders to: see below.

Food From Dry Lands, An Integrated Approach to Planning of Agricultural Development. Systems Approaches for Sustainable Agricultural Development I. Th. Alberda, H. van Keulen, N.G. Seligman and C.T. de Wit, editors. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xiii + 211 p. ISBN 0-7923-1877-3. Hardbound.

The book centers around an analysis of the options for the agronomic development of semiarid regions with winter rains (i.e. Mediterranean regions). Data obtained in the northern Negev desert in Israel serve as a starting point. On the basis of these data crop and sheep husbandry systems were designed and integrated into agro-pastoral systems in which small-grain crops act as a buffer for feed production. These systems served as a basis for rational planning of regional agricultural development under alternative development objectives. In analyzing the possibilities a three-step approach was developed: first the feasibility and robustness of selected innovative techniques at the farm level were investigated in relation to variability in weather and prices, then a matrix of production techniques for a region was formulated in terms of their physical inputs and outputs, and finally this matrix was embedded into a dynamic multiple-goal linear programming model. In comparing the results for different goals, the consequences for goal achievement and desired production techniques can be made explicit, and in this way the book can be a guide for actual development planning in semiarid regions.

Price: NLG 180, USD 123, GBP 64

Orders to: see below.

Climate under Cover: Digital Dynamic Simulation in Plant Bio-Engineering. T. Takakura. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xii + 155 p. ISBN 0-7923-2104-9 (Hardbound).

This book discusses why the air space between the soil surface and any form of cover is the key to the classification of cover systems, from mulching to greenhouses. The environments created by different covers are regulated by the same processes. The emphasis is on the link between quantitative phenomena and qualitative analyses. CSMP simulation is used to describe the non-linear and non-steady state processes, and sample programmes are provided.

The book begins with a review of covering methods to protect crops from unfavourable growing conditions, with special reference to plastics. System dynamics, simulation languages, digital simulation by CSMP, model structure and representation with examples for heat flow and temperature regimes in the soil are presented. Also discussed are simulation programmes for the heat balance of bare ground; solar radiation environment; temperature environment under cover; the CO₂ environment in a soil layer and in a plastic house; water and water vapour environments. The penultimate chapter discusses control functions, system responses, PID control, temperature control logic and feedback versus feedforward controls. Plant response to the environment, and its simulation, are another important topic. Each chapter ends with problems whereby the reader can assess if he has mastered the subjects.

The book is written for computer simulation classes at graduate level and for established natural scientists. It requires a background in differential equations, numerical analysis and FORTRAN. The simulation programmes can be purchased from the author using the "order form" which is enclosed in the book. The processor Micro-CSMP with a FORTRAN compiler is needed to run the models and must be obtained from the manufacturers.

Price: NLG 135; USD 84; GBP 56

Orders to: In U.S.A. and Canada: Kluwer Academic Publishers, 101 Philip Drive, Norwell, MA 02061, U.S.A. Elsewhere: Kluwer Academic Publ. Group, P.O. Box 322, 3300 AH Dordrecht, The Netherlands.

N.H. Batjes, Wageningen, The Netherlands

Quaternary Earth System Changes. A special issue of *Global and Planetary Change*, Vol. 7, No.1-3, May 1993. Elsevier, Amsterdam, New York, 1993, ix + 251 p. ISSN 0921-8181. Paperback.

This volume is based on the latest "global" meeting organized by INQUA to expand our knowledge of the changes occurring in the Earth System during the Quaternary and to promote the role of INQUA in the IGBP Program.

Four aspects of the Earth system are considered: 1) the terrestrial and vegetation changes during the glacial-nonglacial climatic cycle; 2) the fluid envelopes: air-mass and energy exchanges, the global water cycle, and their effect on sea level or monsoon circulation; 3) progress made possible in the understanding of the systems by long records from ice cores and boreholes, and records of physical parameters as geomagnetic moment and temperature; and 4) rapid changes at the time scale of a few thousand years or less.

This volume demonstrates that Earth Science research is progressing towards a better understanding of connections between all parts of the global system.

Orders to: in the USA and Canada: Elsevier Science Publishing Co. Inc., Journal Information Center, 655 Avenue of the Americas, New York NY 10010, USA; Elsewhere: Elsevier Science Publishers, Journal Department, P.O.Box 211, 1000 AE Amsterdam, the Netherlands.

Proceedings of the Eighth International Congress on Soilless Culture. International Society for Soilless Culture. Wageningen, 1992, 527 p. ISBN 90-70976-06-04. Hardbound.

This volume provides the 36 lectures presented at the Congress held in Hunter's Rest, South Africa, in October 1992. These lectures were about recent developments with soilless culture (hydroponics): substrates, nutrition, diseases, environmental aspects, and many other subjects. About one fourth is on nutrient solutions, one fourth on substrates and one third on technical matters.

Price: NLG 150, inclusive package and airmail postage.

Orders to: Secretariat of ISOSC, P.O.Box 52, 6700 AB Wageningen, the Netherlands.

International Glossary of Hydrology. 2nd edition. English/French/Russian/Spanish. Unesco, Paris, in cooperation with the World Meteorological Organization, Geneva, 1992, xxiv + 413 p. ISBN 92-3-002745-6. Paperback.

This is the second revised edition of the book first published in 1974. The main emphasis is still on surface-water and groundwater hydrology but new scientific developments such as the greater use of remote sensing are taken into account. This edition contains approximately 1800 terms of which some 400 are new. The terms are based, whenever feasible, on internationally-accepted definitions contained in existing publications, particularly

those of Unesco, WMO and ISO (International Organization for Standardization), as well as definitions from other glossaries and dictionaries. The glossary is divided into three main parts: 1) equivalent terms in English, French, Russian and Spanish, with their definitions; 2) alphabetical indexes in the same four languages; and 3) the Universal Decimal Classification (UDC) for hydrology.

Price: FRF 200, SFR 62, USD 62

Orders to: in the USA and Canada: American Meteorological Society, Attn.: WMO Publication Center, 45 Beacon Street, Boston, MA 02108, USA. *Elsewhere:* Unesco Publishing, Sales Division, 7 place de Fontenoy, 75732 Paris 07 P, France or: WMO, P.O.Box 2300, CH-1211 Geneva 2, Switzerland.

Hydrological, chemical and biological processes of contaminant transformation and transport in river and lake systems. G. Jolikai. Unesco, Paris, 1992, iii + 147 p. Paperback.

This report adopts a practical control- and management-oriented systems analysis approach presenting mathematical and computational tools to support decision-making in managing the aquatic environment. Basic formulae for transport and transformation processes are derived on the basis of conservation of mass and continuity considerations. Multiparameter stream water quality models are examined in the light of the capabilities of some of the early model systems, thus presenting some of the most widely used methods of describing the details of the oxygen household processes, including nitrification, photosynthesis, benthic oxygen demand, etc. Modelling of stream transport processes with special regard to dispersion and mixing is presented in detail. The section on hydrological

processes deals essentially with the non-point source pollution problem. Processes of land-runoff generation are discussed along with their role in the fate of the contaminants. The quantification possibilities of run-off induced pollution loads are examined, with an overall review of the processes involved. Conclusions on the possibilities and limitations of quantifying (modelling) pollutant transport and transformation processes are presented

Price: free of charge

Requests to: The Director, Division of Water Sciences, Unesco, 1, rue Miollis, 75732 Paris Cedex 15, France.

Global and National Soils and Terrain Digital Databases (SOTER). Procedures Manual. V.W.P. van Engelen and Wen Ting-tiang, editors. UNEP/ISSS/ISRIC/FAO Publication, 1993, 125 p. ISBN 90-6672-051-4. Paperback.

This publication explains the methodology used in the compilation of a World Soils and Terrain Digital Database at a scale of 1:1 million (SOTER). The SOTER project is an initiative of the International Society of Soil Science. Financially supported by the United Nations Environment Programme (UNEP), it is executed by the International Soil Reference and Information Centre (ISRIC). The current version of the Procedures Manual is a joint effort by staff of the Food and Agriculture Organization of the United Nations (FAO) and ISRIC.

The first Part describes the project and contains the methodology used. Chapter 1 presents the historical development of SOTER and its background. Chapter 2 explains the mapping approach and database construction. SOTER is composed of sets of files for use in a Relational DataBase Management System and Geographic Information System. Chapter 3 explains which criteria are used to identify SOTER units: areas of land with a distinctive, and often repetitive, pattern of landform, lithology, surfa-

ce form, slope and soil. Chapter 4 contains the database structure and Chapter 5 additional SOTER conventions. Chapter 6 describes in detail and defines codes for all 110 terrain and soil attributes of a SOTER unit that can be accommodated in the database. In the second Part of the Manual less permanent land characteristics like land use and vegetation are defined and coded. Part three presents additional information that is required for any proper use and interpretation of the SOTER database including source material documentation, laboratory references and climate data.

It is believed that the present publication will be of interest to global and national surveys of soil and other natural resources wishing to make use of modern information technology. The Manual will make an adequate and timely interpretation of these natural resources possible.

Price: NLG 50, including surface mail postage.

Orders to: ISRIC, P.O. Box 353, 6700 AJ Wageningen, the Netherlands.

Agro-pesticides. Properties and Functions in Integrated Crop Protection. J.H. Oudejans. Economic and Social Commission for Asia and the Pacific, Bangkok, 1991, ix + 329 p. ISBN 974-88754-8-2. Paperback.

This is a completely revised new edition of the first training manual. Its different title reflects changing emphasis and lessons learned, for example, that the efficient application of pesticides should not be the only concern.

This publication provides practical and comprehensive information to teachers and students of crop production and crop protection sciences as well as to scientists and staff of agricultural services and pesticide distribution companies.

Requests to: FADINAP/ARSAP, Agriculture and Rural Development Division, ESCAP, United Nations Building, Rajdamnern Avenue, Bangkok 10200, Thailand.

Environmental Geochemistry. B. Hitchon and R. Fuge, editors. Special issue of Applied Geochemistry, Pergamon Press, Oxford, New York, January 1993, vi + 299 p. ISSN 0883-2927. Paperback.

This volume contains selected papers from the 2nd International Symposium on Environmental Geochemistry held in Sweden in September 1991. The papers are arranged in the six following themes: 1) Anthropogenic effects, 2) Geochemical methods and models, 3) Elemental translocation, 4) Environmental geochemistry and health, 5) Groundwater contamination, and 6) Geochemistry and hazardous waste.

Orders to: Pergamon Press, Headington Hill Hall, Oxford OX3 0BW, U.K.

Aluminium-Dynamik und Protonenpufferung in ungestörten Proben versauerter Waldböden. E. Fuchs. Hamburger Bodenkundliche Arbeiten Band 18, 1992, viii + 219 p. ISSN 0724-6382. Paperback. (in German).

This study examines the response of acidified forest soils to differently strong H^+ loads in the aluminium buffer range by means of naturally stratified soil samples. Of special interest is the rate of H^+ buffering in the macropore volume together with the quantity of aluminium released. Another aspect is which forms of aluminium bonds occur in soil solution and which impacts they have on the aluminium dynamics within the profile. The significance of the distribution of species in interpreting potential aluminium toxicity is discussed. The decisive role of the soil structure in H^+ buffering, aluminium release, and in species distribution is highlighted.

Four soils were examined: Podzol from glacial sand, spodic dystic Cambisol from glacial boulder sand over-

lying boulder clay, dystric Cambisol from sandy loess, and stagnic dystric Cambisol from boulder clay.
Orders to: Verein zur Förderung der Bodenkunde in Hamburg, Allende-Platz 2, D-2000 Hamburg 13, Germany.

The state of the environment in Europe: the scientists take stock of the situation. Council of Europe, Strasbourg, in cooperation with Cariplo Foundation for Scientific Research, Milan, 1993, 336 p. Paperback.

This volume presents the papers given at the International Conference on "The state of the environment in Europe: the scientists take stock of the situation". The 62 papers are arranged in 3 themes: 1) State of the environment in certain countries, 2) Biodiversity, Wild Life, and 3) Pollution, urbanisation, management, etc.

Orders to: The Council of Europe, B.P. 431 R6, F-67006 Strasbourg Cedex, France.

FAO Publications

Status of Cadmium, Lead, Cobalt and Selenium in Soils and Plants of Thirty Countries. FAO Soils Bulletin 65. M. Sillanp and H. Jansson. FAO, Rome, 1992, xii + 195 p. ISBN 92-5-103238-6. Paperback.

There are a number of micro- and macro-elements whose importance has been increasing remarkably during the past years due to their environmentally harmful effects. Among these are cadmium and lead, the two heavy metals which have attained great prominence in various parts of the world. Cobalt and selenium are two micronutrients essential for animals, and of which deficiencies are suspected in several areas of the world, while diseases due to toxic intakes of selenium have been reported from many locations. However, knowledge of the occurrence of these elements is fragmentary and based mainly on scattered case studies, and it was obvious that more systematic information was needed on the status of these elements on a worldwide basis in order to identify areas and conditions where problems could be expected and more detailed research required.

Soil and plant sample material was collected in 30 countries worldwide; the analytical results are strictly comparable because all work was done in one laboratory, with uniform analytical methods.

Agro-ecological Assessments for National Planning: the Example of Kenya. FAO Soils Bulletin 67. FAO, Rome, in cooperation with International Institute for Applied Systems Analysis, 1992, x + 154 p. ISBN 92-5-103263-7. Paperback.

This volume presents the results of the methodological developments and the resource data base compiled for the first detailed country study, undertaken by FAO regular programme and in collaboration with IIASA and the Government of Kenya.

Ninth Meeting of the East and Southern African Subcommittee for Soil Correlation and Land Evaluation. World Soil Resources Reports 70. FAO, Rome, 1992, iii + 120 p. Paperback.

This volume includes the 10 technical papers presented at this meeting, held in Malawi in November-December 1991.

Dixième Réunion du Sous-Comité Ouest et Centre Africain de Corrélation des Sols pour la Mise en Valeur des

Terres. Rapport sur les Ressources en Sols du Monde 69. FAO, Rome, 1992, iv + 142 p. ISBN 92-5-203192-8.

Paperback.

Cette réunion s'est tenue en Côte d'Ivoire en novembre 1990, sur le thème suivant: Aménagement des sols pour l'Amélioration de la Productivité agricole: Contraintes et Solutions. Le présent ouvrage comprend les compte-rendus de cette réunion: les 9 communications qui y ont été présentées, un compte-rendu de la visite de terrain, et un résumé des discussions.

Orders to/Commandes à: FAO Publications Sales, Via delle Terme di Caracalla, 00100 Rome, Italy.

Impact Assessment & Sustainable Resource Management. Themes in Resource Management 6. L. Graham Smith. Longman Scientific & Technical, Harlow, 1993, xvi + 210 p. ISBN 0-582-04653-X. Paperback.

Present practices in resource management and environmental planning appear unable to help in preventing environmental disasters. Too often, impact assessment has been viewed as a hurdle in the path of resource development, or as a means by which development proposals can be justified and environmental objections appeased. If major improvements are to be realized then a more integrated approach to resource management is needed.

This book places impact assessment in the broader context of environmental planning, developing a much-needed integrative approach. The topics covered include: decision making and dispute resolution; the role of environmental law; public policy, administration and public participation; the nature of planning; impact assessment methodology; the application of impact assessment to frontier development; liner facilities and waste management.

Price: GBP 13.99

Orders to: Longman Scientific & Technical, Longman House, Burnt Mill, Harlow, Essex CM20 2JE, England.

Climatological data of stations in the Netherlands. Publication 150-27. Royal Netherlands Meteorological Institute (KNMI), De Bilt, 1992, xxviii + 159 p. ISBN 90-369-2013-2. Paperback.

In view of a diversity of studies, especially those related to climatic change, up to date normal and extreme values of climate are needed. The present publication includes these of fifteen principal climatic stations in The Netherlands for the period 1961-1990. Data are also available on diskette.

Price: NFL 102 (with disk: NFL 361,50) incl. mailing

Orders to: KNMI Bibliotheek, P.O.Box 201, 3730 AE De Bilt, the Netherlands.

Water Harvesting. A Guide for Planners and Project Managers. Technical paper Series 30. IRC International Water and Sanitation Centre, The Hague, 1992, x + 106 p. ISBN 90-6687-020-6. Paperback.

This document describes key issues to take into consideration when planning water harvesting systems and shows the main features of the Arid and Semi Arid Lands environment including landscape profiles. It provides a description of the main water harvesting systems which are grouped under the following headings: Rooftop harvesting, Surface harvesting, Underground harvesting, Run-off farming.

The book particularly emphasizes the aspects related to community involvement, which is shown to be crucial to the development of sustainable systems. Techniques and systems need to be selected together with the community and due attention is needed to ensure that they match the skills of the people, so that systems can be maintained and extended when project interventions are no longer taking place. It also summarizes financial and economic issues

related to rainwater harvesting and potential financing arrangements.

Price: NFL 52, USD 29, including packing and surface mail

Orders to: IRC, P.O.Box 93190, 2509 AD The Hague, the Netherlands.

Forest Gradients in West Africa. A spatial gradient analysis. R.S.A.R. van Rompaey. Doctoral Thesis, Wageningen Agricultural University, 1993, xxii + 142 p. ISBN 90-5485-120-1. Paperback.

Forest gradients were studied at two levels of scale in West Africa, west of the Dahomey interval. At a regional scale, the forest gradient in SE Liberia and SW Cte d'Ivoire was analyzed using forest inventory data from the pre-logging era. In total 22 000 ha of forest were fully inventoried. 53 large tree species were used for ordination. Spatial gradient analysis was applied to the forest ordination scores and a gradient map was produced with isoscore lines. This forest gradient was related to climate, relief and lithology.

At a local scale, forest gradients were studied along three catenas in Ta National Park, SW Cte d'Ivoire. The sample plots of 22 to 25 ha were subdivided in contour sample plots, covering 2 ha each, using digital terrain models. The ordination of the trees above 70 cm diameter in these subplots allowed to conclude that the slope gradients are sliding gradients superimposed on the regional gradient and that moisture conditions are likely to control these gradients.

Forest management should take into account these forest gradients in forest inventory and adapt silvicultural methods and species choice to the position on the gradient. Conservation of biodiversity is needed over the entire gradient and a "Green Sickle" is proposed to link National Parks and Forest Reserves from the savanna down to the Atlantic coast.

Orders to: Dr.ir. van Rompaey, Graan voor Visch 18301, 2131 GM Hoofddorp, the Netherlands.

Land Use Zones and Land Use Patterns in the Atlantic Zone of Costa Rica. J. Huising. Doctoral Thesis, Wageningen Agricultural University, 1993, xviii + 222 p. ISBN 90-5485-106-6. Paperback.

This thesis describes an approach to land use inventory at the sub-regional scale in an area in the Atlantic Zone of Costa Rica. The concept of "land use zones" (LUZ) plays a central role in the definition of an observational methodology as well for structuring dynamics in land use. Land use is described in terms of the land use pattern (LUP). The LUP denotes the farming systems and land utilization types occurring within a land use zone.

This thesis formulates a methodology for the inventory of land use and land use change that is object-oriented and data-driven. "Object-oriented" means that land use is expressed in terms of a collection of objects (land use zones) with specific geometric and thematic characteristics. A classification system is developed so that each class contains land use zones with a characteristic thematic description, geometry, aggregation structure and dynamics. The handling of such complex object information requires that emphasis is put on the definition of a data model.

For inventory purposes satellite imagery and aerial photos are used. The use of these materials involves pattern recognition. The "data-driven" approach in this case means that the classes to describe land use are not a-priori but inductive, i.e. they result from the inventory process. The data-driven approach is a strategy to gain insight in the sub-regional land use expressed in the land use patterns. The complex land use inventory process in unra-

velled into a number of sequentially ordered processing steps.

Orders to: Dept. of Land Surveying, Photogrammetry and Remote Sensing, Wageningen Agricultural University, P.O.Box 339, 6700 AH Wageningen, the Netherlands.

The Vegetation of Ultramafic (Serpentine) Soils. A.J.M. Baker, J. Proctor and R.D. Reeves, editors. Intercept, Andover, 1992, xx + 509 p. ISBN 0-946707-62-6. Hardback.

Ultramafic soils have a world-wide but scattered distribution. Their vegetation is often distinctive in physiognomy and includes unusual species and races. This volume shows that ultramafic vegetation ranges from being scarcely distinctive (Ireland) to being a vast biological museum which includes unique physiognomic types and hundreds of endemic species (New Caledonia). It includes 36 papers presented at the first international meeting devoted specifically to ultramafics and their vegetation, which was held in June 1991.

Price: GBP 47.50 (+ GBP 4.15 for surface postage)

Orders to: in USA and Canada: Lavoisier Publishing Inc., Springer Verlag Service Center, P.O.Box 19386, Newark NJ 07195-9386, U.S.A. Elsewhere: Intercept Ltd., P.O.Box 716, Andover, Hants, SP10 1YG, United Kingdom.

Applications of Isotopes and Radiation in Conservation of the Environment. International Atomic Energy Agency, Vienna, 1992, xiii + 697 p. ISBN 92-0-000492-X. Paperback.

This book is the proceedings of a symposium held in Karlsruhe in March 1992. The objective of the symposium was to review present knowledge of the applications of radiation, radioisotopes and nuclear methods of analysis in the monitoring and control of environmental pollution and in reducing emissions of environmentally toxic substances. Isotopes and radiation have many characteristics which enable them to make unique contributions to the better understanding of environmental processes, as well as to directly protect the environment from the impact of toxic substance. It is these kinds of applications which form the focus of this volume.

Price: ASH 1900

Orders to: IAEA, P.O.Box 100, A-1400 Vienna, Austria.

Laterite Soils. Technical Monograph No.1. T. Varghese and G. Byju. State Committee on Science, Technology and Environment, Thiruvananthapuram, 1993, xvi + 116 p. Hardbound.

This publication presents an overview of many aspects of laterites. Chapters are on the concept of laterite; its occurrence in the world; morphological, chemical and physical characteristics; factors influencing its formation; the process of lateritization; the classification; management of laterites and associated soils for agricultural production. A useful glossary and some colour photographs complement this publication.

Requests to: Dr. T. Varghese, College of Agriculture, Vellayani 695 522, Kerala State, India.

Agricultural Development in the Western Desert of Egypt. Advances in Soil and Water Research No.11-12. A. Monem Balba. Prof. Balba Group for Soil and Water Research, Alexandria, 1991-1992, 183 p. ISSN 1110-4017. Paperback.

The Western Desert of Egypt covers about 86% of the total land area of the country. This vast area can be divided into four regions: the coastal region, the fringe of the Western Desert region, the New Valley, and the Siwah

Oasis. Each of these regions is discussed in the present publication with regard to possible development of agriculture. Much attention is given to the availability of suitable groundwater.

Orders to: Prof. Dr. A.M. Balba Group for Soil and Water Research, College of Agriculture, University of Alexandria, Alexandria, Egypt.

Environmental Microbiology. R. Mitchell, editor. John Wiley & Sons, New York, Chichester, 1992, xii + 411 p. ISBN 0-471-50647-8. Hardback.

In the past decade, the field of environmental microbiology has made significant progress in the struggle against environmental contamination. During this period, molecular genetics has become a valuable source of new techniques for the detection of microorganisms, the degradation of hazardous chemicals, and as a means of safely controlling agricultural pests.

This volume offers an examination of the role of microbiological processes related to environmental deterioration. Emphasizing new approaches, this book investigates the complex microbial processes involved in both the contamination of water, soil, the atmosphere, and the stratosphere, and pollution control. The topics addressed are: Effects of acid deposition on microbial processes in waters; *microbial transport of toxic metals*; transport of pathogens through soils and aquifers; Microbial processes in coastal pollution; Bioremediation of organic contaminants in the subsurface; Microbial control of plant disease; Composting in the context of municipal solid waste management.

Price: USD 96

Orders to: see below.

Fundamentals of Soil Behavior. 2nd edition. J.K. Mitchell, John Wiley & Sons, New York, Chichester, 1993, xiii + 437 p. ISBN 0-471-85640-1. Hardback.

The purpose of this second edition remains the same as that of the first edition: the development of an understanding of the factors determining and controlling the engineering properties of soils, with emphasis on the why aspect of soil behavior. Added to this is the extremely important considerations of the potential for changes in these properties with time and with changed environmental conditions. In the same basic structure, each chapter has been revised and rewritten. Major revisions and additions include expanded coverage of residual and tropical soils; more attention to effective stresses in partly saturated soils; Soil structure: its stability and relationships to properties; Treatment of direct and coupled hydraulic, chemical, thermal, and electrical flows through soils and their importance; Volume change behavior; and Deformation and strength behavior.

Price: GBP 58

Orders to: see below.

Soil Science Analysis. A guide to current use. D. Baize. John Wiley & Sons, Chichester, New York, 1993, xiv + 192 p. ISBN 0-471-93469-0. Hardback.

Offering succinct appraisals of current analytical methods in soil science, and guidance in interpretation of results, the aim of this book is to enable the selection of appropriate soil analyses from which maximum information can be obtained.

Topics covered specialise in pedology, and include the analysis of coarse fragments, residual water content, organic carbon and organic matter, loss on ignition, particle size, use of "granulometric skeletons", calcium carbonate content, pH, cation exchange capacity and iron, aluminium and manganese content. The second half of the book

contains chapters on total chemical analyses, X-ray diffraction, porosity and bulk density, characteristic water contents, structural stability and percolation tests, and concludes with soils which present particular problems such as peats, silty soils, volcanic ash soils and soils rich in dolomitic material.

Translated from the original French, the contents have been updated and amended to be of interest to an English-speaking audience.

Price: GBP 39.95

Orders to: John Wiley & Sons, 605 Third Avenue, New York NY 10158-0012, U.S.A. or: John Wiley & Sons, Baffins Lane, Chichester, West Sussex PO19 1UD, England.

Expert systems in Environmental Planning. J.R. Wright, L.L. Wiggins, R.K. Jain and T.J. Kim, editors. Springer-Verlag, Berlin, New York, 1993, xxi + 311 p. ISBN 3-540-56063-7 (German edition) 0-384-56063-7 (US edition). Hardbound.

This book introduces expert systems for problem solving in environmental planning. It describes the way in which heuristic knowledge and rules of thumb of expert planners can be represented through computer programs. The book presents practical applications of expert systems for solving many important environmental planning problems, such as land use and resource management, GIS and spatial modelling, environmental impact assessment, hazardous waste site investigation, and noise control. Also discussed are methods for creating and testing expert systems designed specifically for environmental applications.

Price: DM 118

Orders to: Springer-Verlag, Postfach 105280, W-6900 Heidelberg 1, Germany; or: Springer-Verlag, 175 Fifth Avenue, New York, NY 10010, U.S.A.

Green Globe Yearbook 1993. H.O. Bergesen and G. Parmann, editors. The Fridtjof Nansen Institute, Norway, 1993, 271 p. ISBN 0-19-823323-X. Hardbound.

The main objective of this Yearbook is to demonstrate how far the international community has come in solving specific environment and development problems, what the main obstacles are to effective international solutions, and what needs to be done to overcome such barriers. It focuses on the achievements and shortcomings of international co-operation, enabling the reader to distinguish clearly between the rhetoric and reality of environmental politics at the world level.

The book consists of two parts: analysis and reference. The 1993 edition covers the international dimensions of marine pollution, biological diversity, sustainable forestry, and the relationship of international business to sustainable development, as well as exploring the role of non-governmental organizations, GATT, and the World Bank in environmental issues.

The reference section contains systematically listed key data concerning the most important international agreements on environment and development, and inter- and non-governmental organizations with activities in this area.

The combination of independent, high quality analysis and a useful reference section makes this book unique in the dissemination of environmental information.

Price: GBP 30

Orders to: see below.

The Preparation of Thin Sections of Rocks, Minerals, and Ceramics. Microscopy Handbooks 24. D.W. Humphries Royal Microscopical Society, Oxford, with Oxford

University Press, Oxford, 1992, vii + 83 p. ISBN 0-19-856431-7. Paperback.

The microscope is a familiar tool in the biological and medical sciences and its application to the study of plant and animal tissues is well known. That it can be applied to the study of rocks, minerals, and ceramics may come as a surprise to many people, including experienced microscopists. The principal requirement is that a section or slice, thin enough to be transparent to transmitted light, can be prepared.

This is a practical guide to the preparation of thin sections of rocks, minerals, and ceramics. All that are needed are some simple equipment, a modicum of manual dexterity, a certain amount of "elbow grease", and a measure of patience. Above all, thin sections can be made without expensive machinery, although a brief account of mechanical aids is included here. Methods of making polished sections for reflected light microscopy, staining sections, making peels, and extracting heavy mineral suites from sands are covered in later chapters.

Price: GBP 11.95

Orders to: Oxford University Press Distribution Service, Saxon Way West, Corby, Northants NN18 9ES, England.

Who will Save the Forests? Knowledge, Power and Environmental Destruction. T. Banuri and F. Apffel Marglin, editors. United Nations University, World Institute for Development Economics Research, Helsinki, in cooperation with Zed Books, London, Atlantic Highlands, 1993, vii + 195 p. ISBN 1-85649-160-9 (Paperback) 1-85649-159-5 (Hardback).

This book examines conflicts over the management of forest resources in various parts of the world. It illustrates how the inter-relationships between people and their environment differ depending on the knowledge systems of their respective societies. The authors show how Western scientific knowledge has been used to marginalize the knowledge and practice of age-old rural communities despite the fact that it is these societies that have managed the environment in sustainable fashion down the centuries.

This argument about the importance of competing systems of knowledge points the way to a profound critique of modernization. It also implies that the only truly sustainable development strategy is one that restores the autonomy of local arrangements based on alternative conceptions of reality.

This book should command the attention of all those - both scholars and practitioners - who understand the importance of social context and the scale of the crisis which contemporary development approaches have caused in both human and environmental terms.

Price: GBP 11.95, USD 17.50 (paperback) GBP 32.95, USD 55 (hardback)

Orders to: see below.

The Struggle for Land and the Fate of the Forests. M. Colchester and L. Lohmann, editors. World Rainforest Movement, Penang, with The Ecologist, Newton, and Zed Books, London, Atlantic Highlands, 1993, xi + 389 p. ISBN 1-85649-140-4 (Paperback) 1-85649-139-0 (Hardback).

The tropical forests are vanishing faster than ever. It is often told at conferences that deforestation is caused by "poverty", "over-population" and "under-development". The solutions are therefore obvious - fewer people and more development. This book challenges these assumptions. Deforestation is an expression of structural inequalities within tropical countries and in their relations with the industrial North. Throwing aid money into the deve-

lopment pot will only accelerate forest loss if these structural issues are not simultaneously addressed.

Based on six country studies from Latin America, Asia and Africa to illustrate the complexity of the problem and the diversity of situations that exist, this book shows how land concentration, land speculation and landlessness are the main causes of improvident land use. Poor people, denied land and livelihood, are being forced into the forests in ever increasing numbers for sheer survival, often encouraged by government and development agency funding. Meanwhile the lands they have been forced to abandon are turned over to agribusiness producing cash crops for export.

Agrarian reform must be moved to the top of the global agenda. Without land and food security, rural communities will become increasingly destabilised and impoverished, and vulnerable ecosystems will be destroyed.

Price: GBP 12.95, USD 17.50 (paperback) GBP 32.95, USD 49.95 (hardback)

Orders to: ZED Books, 57 Caledonian Road, London N1 9BU, U.K. or: Zed Books, 165 First Avenue, Atlantic Highlands, NJ 07716, U.S.A.

Remote Sensing for Hazard Monitoring and Disaster Assessment: Marine and Coastal Applications in the Mediterranean Region. Current Topics in Remote Sensing 2. E.C. Barrett, K.A. Brown and A. Micallef, editors. Gordon and Breach Science Publishers, Philadelphia, Reading, 1991, xii + 240 p. ISBN 2-88124-809-8. Hardbound.

Concern for environmental hazards, plus the real or potential disasters they may prompt, is growing fast as populations and living standards rise. Fortunately, at the same time both the science and technology of space-based mapping and monitoring of our terrestrial environment are maturing fast.

This book explores the principles and practices of environmental remote sensing, especially the techniques available for data processing, interpretation and analysis. The applicability of remotely sensed data to marine and coastal hazard monitoring and disaster assessment is described and discussed with special reference to problems endemic to the Mediterranean region, including earthquakes, vulcanicity, soil erosion and degradation, vegetation and crop damage, severe weather phenomena, marine conditions, and air and water pollution.

This book will be of interest to graduate students, scientists and technical officers involved in environmental protection and management, and to national and international relief agencies, both in the Mediterranean region itself and elsewhere.

Price: USD 90, GBP 50, ECU 69

Orders to: STBS Ltd, P.O. Box 90, Reading, Berkshire RG1 8JL, U.K. or: STBS Ltd, P.O. Box 786, Cooper Station, New York, NY 10276, USA.

Soil Natural and Anthropogenic Overmoistening (Degradation, Land Use, Conservation). F.R. Zaidelman. Gidrometeoizdat, Saint Petersburg, 1992, 288 p. (in Russian with English summaries)

In the monograph the effects of natural and anthropogenic overmoistening and its consequences on soil forming processes and soil properties are characterized in conditions of different climatic and water regimes in different soil ecological regions.

As a result of field researches and experiment modelling it has been established that the gley formation in soils with stagnant-percolative water regime, spread almost in all climatic zones of the Earth, is found to be the main factor of degradation and development of acid soils with

light eluvial horizons. Many soil forming processes, such as podzolization, solodization, formation of podbel, padly podzols, pseudogleys, pseudopodzolization, ferrolise, etc. were thought to be independent processes of degradation. However they are proved to be none other than one of the forms of gleyization due to stagnant-percolative water regime of soils developed on acid, neutral or leached rocks. Great attention is paid to the problem of soil degradation control.

The book consists of nine chapters with references and subject index and represents first-hand and original monograph on the subject. It contains a short summary in English, but its full-text English publication could promote its world-wide utilization.

Requests to: Prof. F.R. Zaidelman, Lomonosov University, Moscow 119899, Russia.

I. Szabolcs, Budapest, Hungary

LORE. Capturing Traditional Environmental Knowledge. M. Johnson, editor. Dene Cultural Institute, with International Development Research Centre, Ottawa, 1992, x + 190 p. ISBN 0-88936-644-6. Paperback.

Can Western science gain from an understanding of indigenous traditional knowledge? How should this knowledge be gathered? How can it make a difference in managing our natural resources?

This book breaks new ground by presenting alternative approaches to these critical global concerns. It is a record of a unique event that was held in July 1990. Aboriginal and nonaboriginal researchers were brought together at Fort Good Hope in Canada's Northwest Territories to discuss a pressing issue of common concern: the preservation of traditional environmental knowledge. The book furthers the concept that traditional environmental knowledge is science.

Price: USD 14.95

Orders to: IDRC, 250 Alvert Street, P.O.Box 8500, Ottawa, Ontario, CANADA K1G 3H9.

Quaternary Environments. M.A.J. Williams, D.L. Dunckerley, P. De Deckker, A.P. Kershaw and T. Stokes. Edward Arnold, London, New York, 1993, xix + 329 p. ISBN 0-7131-6590-1. Paperback.

The last two million years of geological time - the Quaternary period - are the subject of this new synthesis. This book examines the global environmental fluctuations of the period, analyses important evidence used in reconstructing Quaternary environments and considers the response of living organisms - including prehistoric human societies - to past environmental change.

This book's focus is on the interactions between the geological, biological and hydrological processes that have given rise to the present-day distribution of geomorphic, biogeographic and climatic regions throughout the world. The geographical coverage is global, with examples drawn from every continent, including Antarctica, and the time span of the book includes relevant events during the Tertiary which set the scene for the Quaternary glaciations and associated changes in climate, vegetation and prehistoric development. The authors also explore the effects of accelerating human impact on the environment and consider how far the evidence of the Quaternary may be useful in predicting future environmental change.

Price: GBP 16.95

Orders to: Edward Arnold, Holder & Stoughton Publishers, Mill Road, Dunton Green, Sevenoaks, Kent TN13 2YA, U.K.

Regards sur le Sol. A. Ruellan et M. Dosso. Foucher, Paris, 1993, 192 p. ISBN 2-216-00416-2.

L'exploration de la couverture superficielle des continents ne fait que commencer: depuis une cinquantaine d'années environ, on découvre petit à petit un milieu organisé, qui possède une véritable anatomie, et qui se transforme continuellement.

Ce manuel de morphologie des sols propose la découverte de cette anatomie: par une approche morphologique, d'observation directe, ce livre donne voir, travers la diversité des formes et des couleurs observées, la structuration de ce milieu, depuis l'échelle du minéral jusqu'à celle du paysage. Donnant à voir, ce livre apprend aussi à regarder et comprendre. La démarche proposée s'appuie sur les acquis scientifiques de ces dernières années, particulièrement importantes pour l'histoire de la science du sol (Pédologie). Sur ces bases, on indique comment raisonner les observations faites, en termes d'interprétations sur la genèse des sols, sur leur évolution et ... en définitive, sur leur fertilité.

Ce livre s'adresse à toute personne devant ou désirant découvrir, connaître, voire mieux utiliser ce milieu sol, support de vie sur la planète Terre. Le premier auteur est président du Comité pour l'Enseignement de la Pédologie, l'un des comités permanents de l'AISS.

Prix: FF 160

Commandes à: Editions Foucher, 31 rue de Fleurus, 75278 Paris Cedex 6, France.

Influences on the Efficiency of Irrigation Water Use. W. Wolters. Ph.D. thesis, Technical University Delft, and ILRI Publication 51. International Institute for Land Reclamation and Improvement (ILRI), Wageningen, xx + 150 p. ISBN 90-70754-282. Hardbound.

Irrigated agriculture is by far the greatest user of water on earth. The limits to the availability of water and land for irrigated agriculture necessitate the careful use of these resources. Nevertheless, an increased efficiency in the use of irrigation water can have negative as well as positive effects.

The aims of this study have been 1) to present data on actual irrigation efficiencies worldwide; 2) to illustrate how these data can be used in the design and management of irrigation systems; and 3) to show when improvements are useful or not. The study therefore evaluates relationships between measured irrigation efficiencies and characteristics of the environment, of the infrastructure of irrigation systems, and of their operation.

Price: NLG 44

Orders to: ILRI, P.O. Box 45, 6700 AA Wageningen, the Netherlands.

Physical Geography. An Introduction to Earth Environments. M. Bradshaw and R. Weaver. Mosby, St. Louis, London, 1993, xv + 640 p. ISBN 0-8016-0298-X. Hardbound.

This text is designed for introductory physical geography courses; it aims to provide an understanding of Earth's physical environments. Five main themes are developed throughout the book: Earth Environments; Oneness of Earth's Environments; Changing Earth Environments; The Impacts of Human Interventions; and The Physical Environment is Studied by Scientific Methodology.

The text is organized in five main parts, of which Part 1 provides an introduction to Physical Geography, its ideas and subject matter, and its methodology and tools. Part 2 focuses on the study of meteorology and climatology, while Part 3 is a study of the ways in which internal earth processes produce the continents, ocean basins, and mountain ranges. Part 4 completes the study of landforms by considering those that are formed by atmospheric and marine processes acting on the continental surfaces. Part 5

concludes the study of physical geography by a consideration of ecosystems and soils. This well-produced book has 654 illustrations, many in colour.

Price: GBP 24.95

Orders to: Mosby-Year Book Europe, 22-24 Torrington Place, London WC1E 7HJ, U.K. or: Mosby-Year Book, Inc., 11830 Westline Industrial Drive, St. Louis, MO 63146, U.S.A.

Soil Survey Laboratory Methods Manual. Soil Survey Investigations Report No. 42, Version 2.0. Soil Survey Laboratory Staff. National Soil Survey Center, Lincoln, 1992, xi + 400 p. Paperback.

The methods described in this manual are those used by the laboratory at the National Soil Survey Center (NSSC). They are documented by method codes and linked with analytical results that are stored in the NSSC laboratory database.

The methods in current use at this laboratory are described in enough detail that they can be performed in many laboratories without reference to other sources. An introduction to each group of related methods describes common characteristics. However, some repetition is included in order to make the method descriptions complete in themselves and to minimize reference to other parts of the manual. The appendix describes the operation of the instruments that are used in the laboratory procedures. *Requests to:* Dr. Ellis Knox, National Soil Survey Center, Room 152, 100 Centennial Mall N., Lincoln, NE 68508-3866, U.S.A.

Studies on the Utilization and Conservation of Soil in the Eastern Amazon Region. Deutsche Gesellschaft für Technische Zusammenarbeit, Eschborn, 1991, ix + 281 p. (+ 1 map). Paperback.

In this publication, the research developed on the study of the management of organic matter is emphasized, although some studies and experiments included were initiated on the importance of organic matter in the sustainability of the fertility level of soils of the Eastern Amazon Region. The first section of the book contains descriptions of the natural and socio-economic conditions of the Eastern Amazon Region, focusing on the small farmer as the principal beneficiary of the project's activities. In the second section, methodological questions on the monitoring of organic matter in the soil are first discussed, and the initial points of a qualitative description of these are presented. Studies on the nutrient cycle of organic matter in primary and secondary forests and on its decomposition follow. Understanding these natural mechanisms, the resulting adaptation of the system to the specific conditions of the Amazon, is fundamental for the development of new technologies.

Price: DM 20

Orders to: GTZ, Postfach 51 80, W-6236 Eschborn 1, Germany

New Challenge for Soil Research in Developing Countries: a Holistic Approach. ENSA Rennes, 1992, 22 p.

This paper is the result of a discussion of a group of soil scientists from EC-countries and Developing Countries, held in Rennes in March 1992, based on a document prepared prior to the meeting by a smaller group of EC-soil scientists.

Since in many areas land degradation is rapidly reaching an irreversible state, a different way to act is to do the right thing now. This is because soil research involves a long time span and, in order to prevent soil research being too late where famine, underdevelopment and natural catastrophes initiate events, it is necessary for soil re-

search to pay close attention to the following points: 1) The need to make the most of scientific knowledge and indigenous empirical know-how; 2) The need to know priorities for whom, why and where the research has to be done; 3) The urgent need to obtain sound and significant results; 4) The need for continuity in soil research, both in developed and developing countries; 5) The need for soil research to result in sustainable use of land; 6) The need to involve local partners in soil research; and 7) The need to use a holistic approach.

Requests to: Prof. Dr. C. Cheverry, Chaire de Science du Sol, ENSA, 65 rue de St. Brieuc, 35042 Rennes, France.

Rice, Weeds and Shifting Cultivation in a Tropical Rain Forest. A Study of Vegetation Dynamics. A. de Rouw. Doctoral thesis, Wageningen Agricultural University, 1991, xxiii + 291 p. Paperback.

The study deals with the rain forest area in south-west Cte d'Ivoire (Ta National Park). Descriptions are given of the area's history, agricultural practices, geology, geomorphology, soils, flora and vegetation. The shifting cultivation system based on upland rice was studied as it is practiced without land shortage and under constraints. Possible adaptations of the system to the increasing population pressure have been tested on the fields of local farmers. Special attention was paid to the dynamics of the weed population and to the competition between rice and weeds. The classifications of primary forest, secondary forest and field vegetations are based on their complete floristic composition and was carried out by tabular comparison of plot-data.

Orders to: Anneke de Rouw, 74 rue d'Alsia, 75014 Paris, France.

Un Sistema de Información de Suelos y Tierras para la Zona Atlántica de Costa Rica. W.G. Wielemaker y A.W. Vogel (editores). Universidad Agrícola de Wageningen, Holanda, en colaboración con el Centro Agronómico Tropical de Investigación y Enseñanza, Turrialba, y el Ministerio de Agricultura y Ganadería de Costa Rica, 1993, viii + 146 p. (+ 1 mapa).

SIESTA es un sistema de información geográfica para la evaluación de los suelos y tierras de la Zona Atlántica Nor-Este de Costa Rica. El mapeo, la recolección y el análisis de los datos fueron ejecutados entre 1986 y 1990 en el contexto de un programa de cooperación entre el Centro Agronómico Tropical de Investigación y Enseñanza, el Ministerio de Agricultura y Ganadería en Costa Rica y la Universidad Agrícola de Wageningen, Holanda.

El sistema, en conjunto con su informe permite producir mapas de suelo taxonómicos, fisiográficos, de fertilidad o de limitantes principales para la producción, de cualquier región dentro de la zona abarcada, a cualquier escala, y demanda del usuario. La escala del mapa es de reconocimiento, pero las unidades de terreno son tan detalladas como las fases de los series de suelo.

El informe en español describe el proceso de recolección y procesamiento de la información e indica que tipo de productos se pueden adquirir y de que manera. Los anexos proporcionan los detalles completos de la información. El mapa en blanco y negro presenta todas las unidades cartográficas a escala 1:150,000.

Información a: see below.

The SIESTA Geographic Database. Instruction for its use and maintenance. W.K. Krabbe. Wageningen Agricultural University, The Netherlands, with Centro Agronómico Tropical de Investigación y Enseñanza, Turrialba, and Ministerio de Agricultura y Ganadería de Costa Rica, 1993, iii + 100 p. Paperback.

This paper is meant to be a guideline for the use and maintenance of the SIESTA geographic database which was developed during the period 1987-1992. It is assumed that users of this manual are acquainted with ARC/INFO. They should also be familiar with the principles of siesta as presented in the above mentioned volume. The manual gives an outline of the potentialities of the SIESTA database in the ARC/INFO environment. More detailed instruction on data presentation and database manipulation can be derived from various programs enumerated in the annex.

Information to: Dr. W.G. Wielemaker, Dept. of Soil Science & Geology, Wageningen Agricultural University, P.O. Box 37, 6700 AA Wageningen, the Netherlands

Introducing Ley Farming to the Mediterranean Basin.

S. Christiansen, L. Materon, M. Falcinelli and P. Cocks, editors. International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, 1993, ix + 299 p. ISBN 92-9127-004-0. Paperback.

This volume is the proceedings of an International Workshop held in June 1989 in Italy. The papers presented at this workshop are arranged in 4 parts: 1) Ley farming around the region; 2) Ley farming in progress; 3) Annual legumes research and genetic resources conservation; and 4) New structures for more efficient work. A poster presentation is included in part 5, followed by the discussions and recommendations of the workshop.

Orders to: ICARDA, P.O. Box 5466, Aleppo, Syria.

The Science of Global Change: the Impact of Human Activities on the Environment.

ACS Symposium Series 483. D.A. Dunnette and R.J. O'Brien, editors. The American Chemical Society, 1992, xi + 498 p. ISBN 0-8412-2197-9. Hardbound.

The objective of this volume was to bring together researchers who could address the major worldwide environmental problems, which contain some element of chemistry. Although chemists like to view chemistry as the central discipline and chemistry plays an essential role in most of this book's chapters, many of the authors are not chemists. Biology, geophysics, and other disciplines are prominent. *Biogeochemistry* is becoming a catchword for the 1990s. Environmental problems can never again be considered separately from one another. While enough of the natural world remains for study, scientists must develop an understanding of its internal interconnected workings. The authors describe important elements of these inner workings.

Price: USD 99.95

Orders to: American Chemical Society, Distribution Office, Department 225, 1155 16th Street NW, Washington, DC 20036, U.S.A.

Proceedings of the Third International Workshop on Phosphorus in Sediments.

Developments in Hydrobiology 84. P.C.M. Boers, Th.E. Capenberg and W. van Raaphorst, editors. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xviii + 376 p. ISBN 0-7923-2126-X. Hardbound.

This Workshop was organized to assess the status of knowledge on the behaviour of phosphorus in sediments and to define gaps and reassess research strategies, particularly with respect to prevalent methodology and future approach; and to define gaps and reassess research strategies for water management measures in aquatic ecosystems, especially in relation to the release of phosphorus from the sediments and its impact on the functioning of the whole system.

Keynote lectures and discussions are divided into the following topics: 1) Chemical transformations of phosphorus in sediments, particularly with respect to exchange processes and permanent fixation; 2) The role of microorganisms in sediment phosphorus dynamics in relation to mobilization and fixation of phosphorus; 3) Sediment-water dynamics with special attention to functional models describing fluxes of phosphorus across the sediment-water interface; and 4) Water management measures focused on the regulation of the release of phosphorus from the sediment, in relation to the functioning and restoration of the whole ecosystem.

Price: NLG 325; GBP 127.50; USD 195

Orders to: see below.

Nutrient Dynamics and Retention in Land/Water Ecotones of Lowland, Temperate Lakes and Rivers.

Developments in Hydrobiology 82. A. Hillbricht-Ilkowska and E. Pieczyńska, editors. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xiv + 361 p. ISBN 0-7923-2124-3. Hardbound.

Ecotones, or boundary zones between land and inland waters (such as lakes, streams and rivers), are the principal routes for transport of organic matter and nutrients across landscapes via physical and biological vectors. The ecotone is the place of cumulation and transformation of in situ production as well as of allochthonous material from adjacent aquatic and terrestrial systems. The ecotone functions as an important barrier or filter for principal nutrients, such as phosphorus and nitrogen, responsible for the eutrophication and degradation of surface waters. Intensive forest cutting, agriculture, pollution and bank regulation, urbanization and hydrotechnical constructions seriously endanger the ecotone systems and damage their protective function. It is vital to develop a scientific understanding of the behaviour of phosphorus and nitrogen in these transition-boundary habitats. Such an understanding is important for the rational protection, management and restoration of ecotones connected with lakes and rivers. The importance of nutrient cycling and retention is discussed from the point of view of ecotone function, management and reconstruction in order to sustain its protective role for water bodies. Various types of land/water transitory zones are discussed: wetlands, lake littoral systems, riparian zones of rivers, streams and brooks, the contact zones between groundwater and surface waters of lakes and rivers, air-water interfaces, and patch/ecotone structures in watersheds.

Price: NLG 300; USD 182; GBP 122.

Orders to: see below.

East Africa's Grasses and Fodders: Their Ecology and Husbandry.

Task for Vegetation Science 29. J.G. Boonman. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xvii + 343 p. ISBN 0-7923-1867-6. Hardbound.

This book presents a comprehensive review of the achievements in farming and research in both wet and dryland is given, related to the grasslands of Eastern Africa, extending from Malawi to Eritrea. Discussed are i.a.: Sown grasses, within the time-proven system of mixed-farming based on crop-grass rotations, and fodders, e.g. Elephant grass, dryland-Sorghum, lucerne, Leucaena, tropical legumes and hay. The main objectives of the book are to illustrate the value of East African grasses and fodders for livestock, soil fertility maintenance, and environmental protection. Topics discussed include animal manure versus fertilizer; zero versus direct grazing; fodder crops (annual and perennial) versus grass conservation; seed production and plant breeding. The main species in cultivation are described in detail. The book is based on

more than 1000 references to English and French articles produced in the region over many decades.

Price: NLG 375; USD 236; GBP 149.50

Orders to: see below.

The Role of Trees in Sustainable Agriculture. Forestry Sciences 43. J. Allnutt (compiler), R.T. Prinsley (editor). Kluwer Academic Publishers, Dordrecht, Boston, 1993, vii + 186 p. ISBN 0-7923-2030-1. Hardbound.

Agroforestry - the incorporation of woody species into farming systems - has the potential to increase the sustainability of agriculture. Agroforestry can simultaneously improve agricultural productivity, diversify and increase farm income, conserve land, maintain biodiversity and contribute to the national timber supply. The role of agroforestry in performing these functions is examined in a series of reviews of research on the following subjects: salinity control; provision of shelter and erosion protection; management of native vegetation; timber production; fodder production; and minor forest products. The book provides information concerning planted trees within all of these categories and includes special review of the management of native vegetation on farms. The papers also examine research needs where appropriate. The book is oriented towards Australian agriculture and forestry and summarises Australian agroforestry research including also relevant international research.

Price: NLG 125, USD 84, GBP 50

Orders to: In U.S.A. and Canada: Kluwer Academic Publishers, 101 Philip Drive, Norwell, MA 02061, U.S.A. Elsewhere: Kluwer Academic Publ. Group, P.O. Box 322, 3300 AH Dordrecht, The Netherlands.

Central Africa. Global Climate Change and Development. Biodiversity Support Program, Washington, 1993. Vol.1: Technical Report: xv + 344 p. Paperback. Vol.2: Overview: xii + 108 p. Paperback. (+ 2 maps).

This study was designed as a first step in understanding the complex dynamics of the causes and effects of global climate change in Central Africa. The study provides an initial baseline of information to guide future collaboration with, and support to, African colleagues working on this important issue.

The objectives of the study were: 1) to assess the present understanding of current and potential CO₂ emissions from deforestation in Central Africa, and assess methods for improving this understanding; 2) to determine the socio-economic factors driving human activities in the forests and the options for reducing CO₂ emissions from these activities; and 3) to assess the potential impacts of these activities and of global climate change on the region.

The 2nd volume "Overview" reviews the main finding of the Technical Report.

Orders to: Biodiversity Support Program/Africa, c/o World Wildlife Fund, 1250 24th Street, N.W., Washington, D.C. 20037, U.S.A.

Guide pour la Mise en Place de l'Assurance Qualité dans un Laboratoire d'Hydrologie. Association des Directeurs et des Cadres Scientifiques des Laboratoires Agréés pour le Contrôle Sanitaire des Eaux. Technique et Documentation - Lavoisier, Paris, New York, 1993, xi + 173 p. ISBN 2-85206-879-6. Paperback.

Cet ouvrage a été conçu par des analystes qui sont chaque jour confrontés à la crainte du résultat erroné qui engendrerait des répercussions pouvant s'avérer graves pour la santé.

Afin de réduire au minimum ce risque d'erreur et d'approcher le point zéro défaut, les laboratoires agréés se

sont engagés dans la mise en place d'une politique de qualité. Devant l'ampleur de ce travail et la solitude des responsables de laboratoire vis à vis de ces exigences, la nécessité de concevoir un guide pratique s'est imposée.

Ce recueil tente de décrire le fonctionnement d'un laboratoire d'Hydrologie dont l'objectif est la Qualité totale. L'organisation d'un tel laboratoire a été réfléchie dans le contexte d'un environnement idéal (sans contraintes de délais, de coûts,...).

Ce document est un outil de travail destiné à aider l'analyste dans la mise en place de procédures d'assurance qualité adaptées aux circonstances locales. La qualité étant un domaine de préoccupation commun à diverses branches d'activités, de nombreux sujets abordés dans cet ouvrage peuvent présenter un intérêt en dehors même de l'Hydrologie.

Price: FF 249

Commandes à: Lavoisier, 14 rue de Provigny, F-94236 Cachan Cedex, France.

Principles of Soil Chemistry. Books in Soils, Plants, and the Environment. 2nd edition. K.H. Tan. Marcel Dekker, New York, Basel, 1993, xv + 362 p. ISBN 0-8247-8989-X. Hardbound.

Fully revised and updated, this text discusses chemistry in relation to soil and plant growth, comparing the chemical reactions in soil solutions and plant cells and offering essential details on soil formation. The book - written in easy-to-understand terms - emphasizes the importance of organic and inorganic soil constituents in soil chemistry and methods for identifying them.

This second edition features new chapters on the following subjects: Soil composition and soil solution; Soil organic components and their origin and behavior in soils; and Soil minerals and soil clays. Additionally, this text provides expanded coverage of adsorption in soils, cation exchange capacity, aluminum chemistry and its effects on soil acidity, and much more.

Price: USD 65 (+ USD 1.50 for postage and handling); GBP 46.45

Orders to: see below.

Maximizing Crop Yields. Books in Soils, Plants, and the Environment. N.K. Fageria. Marcel Dekker, New York, Basel, 1992, xi + 274 p. ISBN 0-8247-8642-4. Hardbound.

This book provides an extensive coverage of crop production concepts in a single source - detailing the physiological, agronomical, and environmental factors needed to maintain or increase the productivity and sustainability of agricultural systems.

Exploring the basic principles of crop production systems, it discusses soil and plant aspects of crop production. The book presents practical experimental results, considers agronomical, physiological, and environmental effects on plant growth and yield, describes how climatic, soil and plant factors and their interactions vary from region to region, crop to crop, cultivar to cultivar, and according to the socio-economic conditions of the farmer, offers a global perspective using international examples, research, and literature.

Price: USD 99.75 (U.S. and Canada); USD 114.50 (elsewhere). (+ USD 1.50 for postage and handling)

Orders to: Marcel Dekker Inc., Cimarron Road, P.O. Box 5005, Monticello, NY 12701-5185, U.S.A. or: Marcel Dekker, AG/IBS, Hutgasse 4, Postfach 8 12, CH-4001 Basel, Switzerland.

Living Soils: Sustainable Alternatives to Chemical Fertilizers. H. McGuinness. Consumers Union, Yonkers,

1993, 411 p.

This work is an attempt to put together an overview of the limitations and problems with chemical fertilizers and how sustainable, alternative, soil-fertility practices are being developed and made to work. The book is divided into three parts. The first section reviews the social and environmental problems associated with chemical fertilizers. The second section describes in some scientific detail what it is about soils that actually makes them productive. It discusses also how the use of chemical fertilizers may be destructive to the soil ecosystem and, at times, may even be addictive. The final section presents a series of case studies worldwide where alternative methods for maintaining soil fertility have been successfully employed. In these examples, the need for chemical fertilizers has been reduced or eliminated.

Requests to: Consumer Policy Institute, Consumers Union, 101 Truman Avenue, Yonkers, NY 10703-1057, U.S.A.

Mountain Environments. A.J. Gerrard. Belhaven Press, London, 1990, vii + 317 p. ISBN 1-85293-049-7. Hardbound.

The emphasis in this book is on mountain geomorphology although ecological, climatological, hydrological and volcanic processes are integrated into the text. The author's aim is to present a framework in which mountains as special environments can be studied and to show how, no matter what their location or origin, all mountain regions share common characteristics and undergo similar processes.

A general introduction to mountain types and processes is followed by accounts of mountain ecosystems and the operation of geomorphological processes such as weathering, slope processes, hydrology and glaciation. Volcanoes are examined as a special class of mountain. The book concludes by examining specific applied problems found in mountains such as snow avalanches, landslides, floods and debris torrents and specific highway engineering aspects. The final chapter provides a balanced assessment of current problems in mountains, identifies major gaps in knowledge and suggests several lines for future research.

Price: GBP 42.50

Orders to: Belhaven Press, 25 Floral Street, Covent Garden, London WC2E 9DS, England.

Iron Chelation in Plants and Soil Microorganisms. L.L. Barton and B.C. Hemming, editors. Academic Press, San Diego, London, 1993, xv + 490 p. ISBN 0-12-079870-0. Hardbound.

This volume focuses on mechanisms of uptake and metabolism of iron in plants and plant-associated microbial systems. Blending general knowledge with methodology sections, the book serves as a laboratory reference for researchers and graduate students in plant physiology, soil microbiology, and microbial ecology.

It addresses the biochemical activities of iron as an essential nutrient for plants and microorganisms associated with plants. Topics include: Evaluation of iron in soil samples; Mossbauer spectroscopy; Siderophore and phyto-siderophore systems; Physiological activities of iron, including uptake of iron in non-siderophore systems; In vivo systems, including plant and microbial ferritins, plus iron in nitrogenases, ferredoxins, and related enzymes; Biological control, including roles of iron in fungal and bacterial plant pathogens; A case study of soybeans: iron efficiency evaluation.

Price: USD 99

Orders to: Academic Press, Inc., 1250 Sixth Avenue, San

Diego, CA 92101-4311, U.S.A. or: Academic Press Ltd., 24-28 Oval Road, London NW1 7DX, U.K.,

Spurenelemente in der Umwelt. 2. bearbeitete Auflage. Umweltforschung. H.J. Fiedler und H.J. Rösler. Gustav Fischer Verlag, Jena, Stuttgart, 1993, 385 S. ISBN 3-334-60394-6.

Das Buch behandelt Vorkommen und Funktion von Spurenelementen in terrestrischen und aquatischen Ökosystemen, in wenig und stark belasteten Landschaften, in Pflanze, Tier und Mensch sowie in Siedlungen. Dabei stehen weniger die einzelnen Elemente selbst als vielmehr ihre Stellung in Ernährungsketten, Kreisläufen und Bilanzen sowie Umweltmedien und Organismen im Vordergrund. Das Buch ergänzt daher die bisher dominierende elementspezifische Darstellung der Umweltprobleme und schult die ganzheitliche Sicht und Urteilsfähigkeit des Lesers.

Gegenüber der 1. Auflage wurden der Stoff neu gegliedert, die Kapitel besser aufeinander abgestimmt, das Zahlenmaterial und die Literatur auf den neuen Stand gebracht, die Beispiele aus dem europäischen Raum vermehrt sowie das Kapitel Mensch und Umwelt neu verfasst. Beibehalten wurde eine für den wissenschaftlich geschulten Leser verständliche Ausdrucksweise, das umfassende Zahlenmaterial sowie das breite Fachspektrum von der Geologie bis zur Medizin, von der Forstwirtschaft bis zur Kommunalwirtschaft.

Preis: DM 78

Bestellungen an: Gustav Fischer Verlag, Villengang 2, Postfach 10 05 37, D-07705 Jena, Deutschland.

Agro-météorologie des cultures multiples en régions chaudes. C. Baldy et C.J. Stigter. Institut National de la Recherche Agronomique, Paris, 1993, 246 p. ISBN 2-7380-0442-3. Cartonné.

Très répandue dans le monde, la culture conjointe d'espèces (annuelles ou pérennes) se rencontre aussi bien en zones tropicales que méditerranéennes et même sous des climats tempérés.

Le présent ouvrage précise l'importance et les effets des modifications du climat dus à la cohabitation d'espèces différentes sur un même espace. Il démontre l'intérêt de ces pratiques et le caractère positif de tels ensembles pour les rendements, la réduction de la compétition par les mauvaises herbes, les attaques des parasites, etc. Il suffit chaque fois de bien choisir les associations, c'est-à-dire d'éviter les antagonismes vis-à-vis du milieu. L'ouvrage a été conçu comme un manuel destiné aussi bien à appuyer un enseignement qu'à fournir un référentiel de données sur les interactions entre le climat et des ensembles de plantes cultivées, dont les exigences trophiques sont différentes.

Prix: FF 180

Commandes à: INRA Editions, Route de St Cyr, F-78026 Versailles Cedex, France.

A Strategy to Develop Agriculture in Sub-Saharan Africa and a Focus for the World Bank. World Bank Technical Paper 203. K.M. Cleaver. The World Bank, Washington D.C., 1993, xii + 140 p. ISBN 0-8213-2420-9. Paperback.

This paper provides a vision for African governments, donor agencies and others working on African agriculture. After 25 years of agricultural growth slower than population growth, and increasing problems of food insecurity and environmental degradation, a reassessment of government and donor agricultural strategies in Sub-Saharan Africa is required. This document provides that assessment, identifying government and donor policies and in-

vestments in agriculture which have worked, and those which have not worked. Five major areas of activity have been identified which can significantly expand agricultural growth, and address food security and natural resource management objectives: (1) undertaking macro-economic and agricultural policy reform needed to make agriculture profitable, (2) developing and disseminating improved agricultural technology, (3) empowering farmers so that they can more widely participate in managing all aspects of agricultural development, (4) developing physical and social infrastructure in rural areas, and (5) improving the management of natural resources (soil, water, forest, wildlife, and biodiversity). Increased agricultural production is needed urgently in most African countries, and this can be stimulated by policy change combined with agricultural extension.

Orders to: see below.

Improving Cash Crops in Africa. Factors Influencing the Productivity of Cotton, Coffee, and Tea grown by Smallholders. World Bank Technical Paper 216. S.J. Carr. The World Bank, Washington D.C., 1993, xvi + 58 p. ISBN 0-8213-2509-4. Paperback.

This study draws together information on the technology available to small-scale farmers in Africa for the production of cotton, coffee and tea. It records the wide variation in the national average yields of these crops, as well as the differences in productivity that exist between smallholders and commercial growers in the same country.

A recurring theme in the paper is that, unlike food crops, which have to be produced for survival irrespective of government interventions, yields of these cash crops are heavily dependent upon government policies and management capacity. These range from the restriction of the growing of cotton to the most favoured areas in one country as compared to its encouragement in depressed marginal areas in another, to taxation, exchange rate, subsidy and input-supply policies. Technology suited to the needs of the small-scale farmer has been well developed for these crops and, although labour constraints account for the lack of adoption of some of the yield-enhancing practices, it is often inimical government strategies or failures in public-sector management that have removed the incentives for their uptake. One conclusion of the study is that any project intended to encourage increased efficiency of production or greater yields per unit of land should first focus on whether there are policy changes that must precede the wider uptake of the available intensifying technology.

Price: USD 6.95

Orders to: see below.

Improving Water Use in Agriculture. Experiences in the Middle East and North Africa. World Bank Technical Paper 201. W. Van Tuijl. The World Bank, Washington D.C., 1993, xiii + 55 p. ISBN 0-8213-2407-1. Paperback.

Emerging water shortages are of great concern in many countries of the region. As the agricultural sector is generally by far the most important water consumer and higher priority is given to meeting domestic and industrial water demands, it is to be expected that gradually less water will be available for agriculture. An overview is given of present system and on-farm water use efficiencies and the potential for water savings and yield increases through the use of improved distribution networks and more appropriate irrigation technologies for smallholders. The water conservation efforts of Israel, Cyprus and Jordan are examined in detail with respect to institutions, the irrigation infrastructure, water charges and demand management,

operation and maintenance, irrigation scheduling and extension, technology development and transfer, the role of the private sector, quality control on irrigation equipment, land tenure and land consolidation, and water users associations. The World Bank's experience with lending for the irrigation sector in the region is also described. The elements that would need to be considered for inclusion in a national program for water conservation in the agricultural sector are identified.

Price: USD 6.95

Orders to: see below.

Groundwater Irrigation and the Rural Poor. Options for Development in the Gangetic Basin. F. Kahnert and G. Levine, editors. The World Bank, Washington D.C., 1993, ix + 222 p. ISBN 0-8213-2401-2. Paperback.

This volume reports on a concerted effort to analyze and reflect on the possible role of groundwater development in helping to address the persistent rural poverty problem in Bangladesh, Nepal, and eastern India, an area in large part coincident with the Gangetic Basin. This publication contains the 11 papers presented at the World Bank Colloquium on Groundwater Irrigation, held in April 1989 in Washington D.C. It has an overview by the two editors and lists the key findings and recommendations.

Price: USD 21.95

Orders to: see below.

Irrigation-induced Salinity. World Bank Technical Paper 215. D.L. Umali. The World Bank, Washington D.C., 1993, xii + 78 p. ISBN 0-8213-2508-6. Paperback.

Irrigation-induced salinity is an increasing problem in several developing countries, threatening the productivity of agricultural lands. In some regions, the impact of salinity is felt across international borders. This report reviews the extent of the problem in various countries and examines the technical, economic, social, and institutional factors contributing to the onset of irrigation-induced salinity. It subsequently reviews the array of strategies that can be pursued to ameliorate the problem. The report finds that poor water management is the primary cause of irrigation-induced salinity. Although salinity is a technical problem, it is also the product of several other factors. Distortive government policies contribute to inefficient water use, and poor project planning and implementation leads to the rapid deterioration of infrastructures. In some cases, the lack of or weak understanding of the problem or the lack of or weak commitment to environmental protection by public officials and policy-makers contributed to the spreading problem of salinity.

Price: USD 7.95

Orders to: see below.

Uganda Agriculture. A World Bank Country Study. The World Bank, Washington D.C., 1993, xxix + 2078 p. ISBN 0-8213-2461-6. Paperback.

This report synthesizes the findings of previous studies and projects, and presents a vision of opportunities open to Government (and donors) for stimulating sustainable agricultural growth in Uganda. The analysis uses a careful review of specific cases to make generalized policy recommendations. Firstly the stage is set for the analysis with a brief review of agricultural growth since independence, and a description of the macroeconomic framework. The report then sets the parameters for action, with a description of the natural resource base and characteristics of rural Uganda. A section provides a review of those institutions: Governmental, cooperative, financial and private, which interact with the farming community and

through which change can be promoted. Problem areas, and measures needed to overcome these problems are identified for each case. Similarly the report goes through the review of each of the productive subsectors in agriculture. In another section, the problems are categorized, general conclusions drawn, and priorities and sequencing established according to Government's development priorities, and the flexibility of the response from each subsector. In the last section, the effects on the environment, the consequences for the alleviation of rural poverty, and the potential increases in exports which could result from the strategy are evaluated.

Price: USD 13.95

Orders to: World Bank Headquarters, 1818 H Street, N.W., Washington, DC 20433, USA.

Climate Change and Human Impact on the Landscape. F.M. Chambers, editor. Chapman & Hall, London, New York, 1993, xxi + 303 p. ISBN 0-412-46200-1. Hardbound.

This is an up-to-date volume of reviews and case studies in late Quaternary palaeoecology and environmental archaeology. It includes reviews of methods in Quaternary research, techniques (radiocarbon dating, mire stratigraphy, dendrochronology and dendroclimatology), records of climatic change, and interpretation of evidence for human impact on the landscape from the earliest known times.

The volume has interdisciplinary appeal across the range of Quaternary sciences for lecturers, researchers and students in archaeology, biology, geography, geology and pedology, and others interested in the development of the cultural landscape over the Holocene - the last ten thousand years. It covers climatic change studies from the stratigraphic evidence of peat bogs, the relationship between forest and climate, and ranges from the earliest known pollen evidence for human impact to later prehistory and Roman times, with a number of pertinent case studies. A particular feature is the discussion of the difficulty of separating evidence for climatic change from human impact, including examples drawn from the Great Lakes region in North America.

Price: GBP 49

Orders to: Chapman & Hall, 2-6 Boundary Row, London SE1 8HN, England; or: Chapman & Hall, 29 West 35th Street, New York, NY 10001-2291, U.S.A.

BASCAD: A Computer Program for Level Basin Irrigation. Completely updated version. International Institute for Land Reclamation and Improvement, Wageningen, 1988, 32 p. and update diskette (1992). ISBN 90-70754-12-6. Paperback.

Since the introduction of BASCAD in 1988, the authors have completely updated the accompanying computer program. BASCAD 2.0 is a fully interactive, user-friendly program with pull-down menus and help screens to guide the user through the different options. For the various input parameters, the user can select the units he commonly works with. The programme includes graphs showing advance time, infiltrated depth, and over-/under-irrigation along the length of the basin. The results of the calculations can be stored, either for each set of in- and output parameters separately, or as a sequence of different sets of these parameters, a so-called track record.

Price: NLG 28, USD 16

Orders to: ILRI, P.O.Box 45, 6700 AA Wageningen, The Netherlands.

Acidification Research: Evaluation and Policy Applications. Studies in Environmental Science 50. T. Schnei-

der, editor. Elsevier Science Publishers, Amsterdam, New York, 1992, xiv + 583 p. ISBN 0-444-89306-7. Hardbound.

A large number of nationwide research programmes in the field of acidification have been carried out in the last decade. Especially in Western Europe, extensive programmes have resulted in a good overview of all the effects - mostly negative - caused by acidifying substances. There is now consensus that types of acidification damage relate to the unique geography of an area: air pollution affects vegetation; acid aerosol the ozone layer. New in this volume is the relation between scientific results of integrated research programmes and policy actions to prevent, reduce and limit the widespread damage caused by acidification. The results of many different national research programmes are evaluated and compared to present a compilation for the research scientist and policy maker. Thematic reviews on specific topics of acidification research are presented, followed by overviews of acidification policy plans and actual

abatement plans. The result is a review of acidification research carried out worldwide during the last decade and presentation of the critical relation between research results and policy actions.

Price: USD 200, NLG 350

Orders to: see below.

Regolith Exploration Geochemistry in Tropical and Subtropical Terrains. Handbook of Exploration Geochemistry No. 4. C.R.M. Butt and H. Zeegers. Elsevier Science Publishers, Amsterdam, New York, 1992, 630 p. ISBN 0-444-89095-5.

The use of exploration geochemistry has increased enormously in the last decade. The present volume addresses geochemical exploration practices appropriate for tropical, sub-tropical and adjacent areas - in environments ranging from rainforest to desert. Practical recommendations are made for the optimization of sampling, and analytical and interpretational procedures for exploration according to the particular nature of tropically weathered terrains. The underlying theme is the recognition that regions between 35xN and 35xS in particular have a common history of deep chemical weathering and lateritization during the late Mesozoic and early Tertiary. This has had a profound and lasting effect, so that the surface geochemical expressions of mineralization throughout these regions have many similar features, with local modification due to more recent weathering under changed climates. The volume discusses research data and case studies in terms of exploration and dispersion models based on the weathering and geomorphological history. The models permit valid comparisons between equivalent terrains that may be geographically widely separated. The basis of the volume is to view geochemical dispersion within the context of a genetic understanding of the evolution of landforms and the regolith (i.e. landscape geochemistry) and to develop exploration procedures based on this understanding.

Price: USD 205.50; NLG 360

Orders to: see below.

Hazardous Metals in the Environment. Techniques and Instrumentation in Analytical Chemistry No. 12. M. Stoepler, editor. Elsevier Science Publishers, Amsterdam, New York, 1992, x + 542 p. ISBN 0-444-89078-5. Hardbound.

The execution of studies on the fate and levels of hazardous elements in the environment, foodstuffs and in human beings has become a major task in environmental research and especially in analytical chemistry. This has

led to a demand to develop new methodologies and optimize those already in use. The book presents an introduction to the problem areas that are currently being tackled, followed by chapters on sampling and sample preservation, strategies and applications of the archiving of selected representative specimens for long-term storage in environmental specimen banks. Following chapters review sample treatment, present an overview on the most frequently and successfully applied trace analytical methods for metals and metal compounds, and introduce the increasingly important methods for identifying and quantifying metal species in sediments and soils.

In the second part data are given on analytical methods for determining the levels of toxicologically, ecotoxicologically and ecologically important elements in environmental and biological materials. The elements treated are aluminium, arsenic, cadmium, chromium, cobalt, lead, mercury, nickel, selenium and thallium. The final chapter treats quality assurance and the importance of the continuous use of appropriate reference materials to avoid erroneous

Price: USD 225.50; NLG 395

Orders to: in the USA and Canada: Elsevier Science Publishing Co. Inc., P.O.Box 882, Madison Square Station, New York NY 10159, USA; *Elsewhere:* Elsevier Science Publishers, P.O.Box 211, 1000 AE Amsterdam, the Netherlands.

Man-made lowlands. History of Water Management and Land Reclamation in The Netherlands. G.P. van de Ven, editor. Stichting Matijis, 1993, 293 p. ISBN 90-5345-030-0. Hardbound.

Well over a thousand years ago the inhabitants of the estuary of the rivers Rijn, Maas and Schelde - the later Netherlands - started to make their surroundings habitable by digging ditches. A simple method of draining but with drastic consequences: the ground level dropped to below sea level and the inhabitants not only had to try and get rid of the water inside, but they also had to see to it that their land would be swallowed up by sea or river water. The need to control the water has profoundly influenced Dutch society ever since.

In a fascinating tale of the fight against water, the loss of land and the reclamation of land until around 1800, the authors not only deal with the reclamation of lakes by using the world-famous windmills, but they also dwell in detail on the water management in the Middle Ages. For it was in this period that the foundation was laid for the success of the Dutch hydraulic engineers.

The period after 1800 is characterized by the invention of machinery, new sources of energy and a considerable increase in scale. Now that the IJsselmeerpolders and the Deltaplan have been completed, this last trend appears to have come to an end. Nowadays integrated water management is being emphasized. This recent development, too, is focused on in this publication. It presents a comprehensive and richly illustrated picture of the way in which the Dutch have made and kept their lowlands habitable.

Price: NLG 69.90

Orders to: Uitgeverij Matijis, P.O.Box 670, 3500 AR Utrecht, the Netherlands.

Biological Effects of Plant Residues with Contrasting Chemical Compositions on Plant and Soil under Humid Tropical Conditions. G. Tian. Doctoral thesis, Wageningen Agricultural University, The Netherlands, 1992. 115p. ISBN 90-5485-029-9.

This thesis focuses on plant residue decomposition and nutrient cycling, as influenced by resource quality and in-

teractions with soil organism community. Results showed that soil fauna and chemical compositions of plant residues (C:N ratio, lignin and polyphenol content) considerably affected plant residue decomposition and nutrient cycling. It is concluded that a keen choice of plant residues in terms of nutritional effects and mulching effects on soil microclimate is a prerequisite for the application of soil fauna-mediated decomposition and nutrient cycling towards synchronization of soil nutrient supply and plant nutrient demand.

Requests to: Dr. G. Tian, IITA, c/o L.W. Lambourn & Co., Carolyn House, 26 Dingwall Road, Croydon CR9 3EE, England.

Applied Ecology. E.I. Newman. Blackwell Scientific Publications, Oxford, 1993, viii + 328 p. ISBN 0-632-03657-5. Paperback.

This book explains the ways in which ecological science can be applied to solving some of the crucial problems facing the world today. A major theme is how resources can be managed and exploited in a sustainable manner, there are chapters on energy, farming, ocean fisheries and forests. Further chapters consider the control of pests and disease, pollution, and the conservation and management of wildlife.

Each chapter starts with a list of questions, setting out problems to be considered. These problems are approached at a fundamental level. Interwoven with these practical problems is an explanation of the underlying basic science - ecology studied from the level of the ecosystem and population down to the physiological and genetic

This book has been written primarily for undergraduates studying biological or environmental sciences, but it should be useful to many other people. It is suitable for readers in most parts of the world - the examples used come from every continent and every ocean.

Price: GBP 17.50

Orders to: in the U.S.A.: Blackwell Scientific Publications Inc., 3 Cambridge Center, Cambridge, MA 02142, U.S.A. *Elsewhere:* Marston Book Services Ltd., P.O. Box 87, Oxford OX2 0DT, England.

Electrochemical Methods in Soil and Water Research. T.R. Yu and G.L. Ji. Pergamon Press, Oxford, New York, 1993, xvi + 462 p. ISBN 0-08-041887-2. Hardbound.

Electrochemical methods are characteristically simple and rapid in operation. In particular, many of them can be carried out in the field. Their application in soil and water research has helped to open up a number of new research fields and there is still great potential. This book was written by the staff of the Institute of Soil Science of the Chinese Academy of Sciences, based on their experience from the last three decades. Dealing with the principles and practices of these methods, it begins with the basis of potentiometric methods, including electrode potential, principles of potentiometric methods, reference electrodes, liquid-junction potential and characteristics of ion-selective electrodes. Then the principles, fabrication, properties and applications of various types of potentiometric electrodes, including glass, solid-state membrane, liquid-state membrane, liquid-state membrane, oxidation-reduction and gas sensors are described. In order to aid readers not familiar with the methods, a special chapter is devoted to common problems in potentiometric measurements. In the last three chapters conductometric methods, voltammetric methods and electrochemical instruments are discussed. The book may be used as a reference for soil and water scientists as well as for scientists of related fields, such as environmental, earth and biological sciences.

Price: GBP 65; USD 105

Orders to: in North America: Pergamon Press Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A. *Elsewhere:* Pergamon Press, Headington Hill Hall, Oxford OX3 0BW, U.K.

Vocabulary of Global Warming. Volume I: Contributors to the Greenhouse Effect. Minister of Supply and Services, Canada, 1992, xix + 597 p. ISBN 0-660-57945-6. Paperback.

This publication is the first in a series of vocabularies on the environment. Containing nearly 7,000 entries, it offers the reader all the new terminology used to describe the recent phenomenon of global warming, including a complete typology of the various categories of major greenhouse gases (NH₄, N₂O, O₃, CFCs). Special emphasis has been given to CFCs or chlorofluorocarbons. The Vocabulary also focuses on the terminology of atmospheric particles (aerosols) and air humidity (clouds), two greenhouse contributors whose behaviour is of vital interest to modelers. The terminology used in connection with the protection of the ozone layer, a related problem of equal importance to the greenhouse effect, has also been carefully researched and included here.

Vocabulaire du Réchauffement Climatique. Volume I: Les Agents à Effet de Serre. Ministère des Approvisionnements et Services, Canada, 1992, xix + 597 p. ISBN 0-660-57945-6. Cartonné.

Cette publication, la première d'une série de vocabulaires consacrés à l'environnement, contient près de 7000 termes en entrée. Le lecteur y trouvera toute la terminologie néologique employée pour décrire ce phénomène contemporain, y compris une typologie complète des différentes catégories de gaz à effet de serre importants (NH₄, N₂O, O₃, CFC). Une attention toute particulière a été portée au CFC ou chlorofluorocarbures. Le document fait également une large part à la terminologie des particules atmosphériques (aérosols) ainsi qu'à celle de l'humidité de l'air (nuages), deux agents à effet de serre dont le comportement intéresse au plus haut point les modélisateurs. La terminologie de la protection de la couche d'ozone, un problème connexe aussi important que celui de l'effet de serre, a également été soigneusement répertoriée.

Price/Prix: CanD 36.95; USD 48.05

Orders to/Commandes à: Canada Communication Group - Publishing, Ottawa, Canada K1A 0S9.

Integrating Economics, Ecology and Thermodynamics. Ecology, Economy and Environment No. 3. M. Ruth. Kluwer Academic Publishers, Dordrecht, Boston, 1993, xi + 251 p. ISBN 0-7923-2377-7. Hardcover

Economies are open systems embedded in an ecosystem with which they exchange matter and energy. Interactions among these systems are vital for each system's performance and are constrained by the laws of physics. This volume pays tribute to economy-environment interactions simultaneously from an economic, ecological and physical perspective.

This publication provides a first step in identifying and combining the principles of economics, ecology and thermodynamics on a fundamental level. Part I lays out the general context for the approach chosen. Part II familiarizes readers with core concepts of, and methods used in, the three disciplines of economics, ecology and thermodynamics. Part III assesses ways in which these disciplines can be integrated to provide an improved understanding of economy-environment interactions. Part IV illustrates the integration of the three disciplines with a dynamic model of a human community interacting with its environment. In Part V the volume closes with a brief summary

and a set of conclusions on the relevance of integrated, interdisciplinary approaches to economy-environment interactions.

Price: NLG 195; USD 119; GBP 78

Orders to: In U.S.A. and Canada: Kluwer Academic Publishers, 101 Philip Drive, Norwell, MA 02061, U.S.A. *Elsewhere:* Kluwer Academic Publ. Group, P.O. Box 322, 3300 AH Dordrecht, The Netherlands.

A Future for the Land. Organic Practice from a Global Perspective. P. Conford, editor. Green Books, 1992, xii + 244 p. ISBN 1-870098-49-8. Paperback.

Modern farming methods threaten the environment in many ways: soil erosion, water pollution, the destruction of wildlife habitats, deforestation, and the deteriorating fertility of the soil itself. They also bring health risks through the widespread use of pesticides and herbicides. As a result organic methods of cultivation are being revalued, and ever more widely adopted.

This volume brings together the views of practitioners, writers, campaigners and politicians concerned with these issues. They make a critique of industrialised agriculture; look at land-use practice in a number of countries, and put forward constructive proposals for the future. From the problems and potential of small-scale organic growing to the efforts of the Colombian government to conserve their rainforest, they discuss the policies and practices that can develop the long-term health and productivity of the land.

Price: GBP 14.95

Orders to: Green Books, Ford House, Hartland, Bideford, Devon EX39 6EE, England.

World Land Climate Map. M.M. Striker, 1991.

This world climate map at 1:35,000,000 scale, with equal-area projection for continents and islands (excepting Antarctica and Pacific Islands), is the outcome of review and classification of data from some 8000 weather station records. There are twelve moisture types and twelve temperatures types, named and defined in climate terms in the legends. Coloured month-season graphs show average precipitation distribution and temperature conditions for some 147 places. Tables, annotations and notes give additional information. Moisture type delineations are in eight colours.

This international classification scheme emphasizes the moisture conditions when average temperatures are above 55 Fahrenheit (12.8°C), the growing season for agriculture and vegetation. The map is useful for seasonal comparison of regions, places and countries.

Orders to: M.M. Striker, 3857 SW 4th PL., Gainesville, FL 32607, U.S.A.

Proceedings International Symposium on Rice Research: New Frontiers. K. Muralidharan, K.V. Rao, K. Sattyanarayana, G.S.V. Prasad and E.A. Siddiq, editors. Directorate of Rice Research, Hyderabad, 1991, 465 p. ISBN 81-7232-001-9. Paperback.

This book contains the extended summaries of more than 200 papers presented at the International Symposium on Rice Research "New Frontiers" held in November 1990 in Hyderabad. They are arranged in the following chapters: Plant Breeding (18), Genetics (21), Biotechnology (17), Entomology (35), Plant Pathology (31), Agronomy (37), Soil Science (17), Plant Physiology (23), and miscellaneous (10).

Orders to: Directorate of Rice Research, Hyderabad 500 030, India.

Carbon Cycling in Boreal Forests and Sub-Arctic Ecosystems. T.S. Vinson and T.P. Kolchugina, editors.

United States Environmental Protection Agency, Cincinnati, 1993, ix + 282 p. Paperback.

In recognition of the need to assess the effect of tundra, peat lands and boreal forests on terrestrial carbon dynamics, an international workshop was convened with the following objectives: Identify available tools and methods that may be used to provide extensive, early evaluation of responses and feedbacks in boreal forest and sub-arctic ecosystems; Identify available carbon dynamics data and models that may be used to conduct preliminary analyses of carbon cycling and sequestering patterns in boreal forest and sub-arctic ecosystems and establish carbon budgets for boreal and sub-arctic countries; Identify the necessary elements of a framework to establish the carbon budget for a boreal forest and/or sub-arctic country. The written contributions to the workshop, held in September 1991 in Corvallis are presented in this book. *Orders to:* United States Environmental Protection Agency, EPA Publications and Information Center, P.O.Box 42419, Cincinnati, OH 45242-0419, USA.

World Agriculture 1993. A. Cartwright, editor. Sterling Publications, London, 1993, 191 p. ISSN 0968-297X. Paperback.

This volume comprises a collection of short articles and reports on the following topics: crop production (5); plant protection and nutrition (8); horticulture and protected cultivation (4); animal production and health (10); irrigation and water engineering (3); mechanisation and agricultural engineering (6); postharvest technologies and agri-industries (4); and agricultural management and economics (8). A large part of this book is taken up by commercial advertising.

Orders to: Sterling Publishing Group PLC, 86-88 Edgware Road, London W2 2YW, England; or: Sterling Publishing Group PLC, c/o Room 1210, World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Shatin, N.T., Hong Kong.

Cultura da Soja nos Cerrados. N.E. Arantes e P.I. de Mello de Souza, editores. Associação Brasileira para Pesquisa da Potassa e do Fosfato, Piracicaba, 1993, xxv + 535 p.

A cultura da soja nos cerrados, inexpressiva há vinte anos, apresenta hoje rendimentos superiores aos das regiões tradicionais e contribui com mais de 40% da produção brasileira.

Os principais problemas técnicos e econômicos enfrentados pela soja nos cerrados foram amplamente discutidos durante o Simposio sobre a Cultura da Soja nos Cerrados (Uberaba-MG, 16-20 de março 1992). O livro, contendo 17 contribuições dos diversos autores, traz a mais atualizada tecnologia agrícola sobre a cultura da soja nos cerrados.

Encomendas: Associação Brasileira para Pesquisa da Potassa e do Fosfato, Caixa Postal 400, 13400-970 Piracicaba-SP, Brasil.

Trace Gas Exchange in a Global Perspective. Ecological Bulletins 42. D.S. Ojima and B.H. Svensson, editors. Ecological Bulletins, 1992, 206 p. ISBN 87-16-15009-0. Hardback.

The material presented here is based on presentations and discussion held at the 1990 Sigutuna workshop. It is organized into five sections, the first containing papers of general relevance to all the developed research plans, followed by three sections divided by geographical regions (high-latitude, mid-latitude, and tropical ecosystem regions), and the final section dealing with rice paddy agriculture, which because of its potential role as a significant

source of CH_4 and N_2O was singled out for a specific set of studies. Each section, except the first, concludes with a working group report developed at the workshop. These reports identify specific research needs to address biosphere atmosphere exchange research for each region.

Price: DKK 250

Orders to: Munksgaard, P.O.Box 2148, 1016 Copenhagen K, Denmark.

Soil Surface Sealing and Crusting. Catena Supplement 24. J.W.A. Poesen and M.A. Nearing, editors. Catena, Cremlingen-Destedt, 1993, viii + 139 p. ISBN 3-923381-33-6. Hardback.

The boundary between soil and atmosphere is an important and active place. It controls to a large extent the flux of nutrients, water, gasses and heat to and from the underlying soil. So it has a direct influence on the conditions of the soil below the interface, the microbes, animals and plants that live in the soil, and the amount of surface runoff generated from excess rainfall. The upper few millimetres of soil is the gateway to the soil below.

Enormous amounts of energy and very high transient forces are imparted to the soil surface by impacting raindrops which break down aggregates, dislodge soil particles, and compress the upper few millimetres of soil. The physical disruption is aided by chemical processes, including dispersion, which further act to break down soil aggregates and greatly alter the surface characteristics of the soil. The resulting dense surface layer of soil is referred to generally as a surface seal. When the seal dries other physical and chemical factors cause a crust to form, which continues to have a dominating influence on gas, vapour, and heat exchange between soil and atmosphere, as well as an effect on seedling emergence.

While soil surface sealing and crusting are certainly functions of local soil properties and climate, the processes are recognized and studied worldwide. At the "International Symposium on Soil Crusting: Chemical and Physical Processes", which was held May 31-June 1, 1991 at the University of Georgia, Athens, Georgia, USA, 37 papers/posters were presented by representatives from every continent. This Catena Supplement includes selected papers from the symposium.

Price: DM 139, USD 99

Orders to: see below.

Karst Terrains. Environmental Changes and Human Impact. Catena Supplement 25. P.W. Williams, editor. Catena, Cremlingen-Destedt, 1993, vi + 268 p. ISBN 3-923381-34-4. Hardback.

Natural and human induced changes are sometimes difficult to separate, but human impacts occur at a different rate and are often of a different type to those changes caused by natural processes. Human impacts on karst terrains have been caused by cave occupation, deforestation, agriculture, water exploitation, quarrying and mineral extraction, urbanization, military activity, and tourism and recreation. Undoubtedly the most profound impact has come from devegetation of karsts and follow-up agricultural activity that results, as its extreme, in a very severe form of land degradation justifiably termed "rocky desertification".

Water resource depletion by pumping and contamination is also a widespread and a growing problem. This book with 16 contributions addresses many aspects of human and natural impacts on karst terrains, and the need for appropriate land and water management to promote rehabilitation and ensure ecosystem sustainability. Examples are drawn from throughout the world.

Price: DM 189, USD 126

Orders to: Catena Verlag, Brockenblick 8, W-3302 Cremlingen 4, Germany.

Runoff Irrigation in the Sahel Zone. Remote sensing and geographical information systems for determining potential sites. W. Tauer and G. Humborg. Technical Centre for Agricultural and Rural Cooperation, Ede, 1992, 192 p. + 10 colour maps/photographs. ISBN 3-8236-1212-3. Paperback.

The agricultural production in the Sahel region is widely affected by the sporadic character of rainfalls. Production could be largely increased by a better utilization of the water resources. Even simple techniques which do not require heavy investments or entail high maintenance costs could bring considerable improvement. One of these techniques is runoff irrigation. A rational utilization of water, collected from small watersheds from where it is conveyed to arable patches of land, allows the alimentations of plants with a superior water quantity to that of rainfall and enables storage of a sufficient quantity in the soil ensuring the plant's survival. Although the technique is simple, a number of different factors is involved. The methodology developed in this book combines both theoretical studies and remote-sensing technology with respect to their practical application on large areas. The authors have thus been able to compare different approaches and to combine them with traditional techniques. The methodology presented allows the elaboration of reproducible models which are adaptable to special site conditions.

Price: NLG 45 (free of charge for ACP countries)
Requests to: for ACP countries: CTA, P.O.Box 380, 6700 AJ Wageningen, the Netherlands.

Drainage Principles and Applications (2nd revised edition). ILRI Publication No. 16. International Institute for Land Reclamation and Improvement, Wageningen, 1993, 1200 p. ISBN 90-70754-33-9. Cloth.

Some twenty-five years ago the board of ILRI's International Course on Land Drainage decided to publish selected lecture notes from the Course in order to make them available to a wider audience. In 1972, the first volume appeared. The second, third and fourth volumes followed in successive years to form, with volume 1, a set that comprises some 1200 pages. Since then, Publication 16 has been one of ILRI's most popular publications, with sales of more than 40,000 copies worldwide. The text has now been revised and includes current development in drainage and drainage technology. The contents have been completely re-edited in the light of this new information. The presentation has been improved with a new layout and new figures, and is in one volume.

Price: NLG 175, USD 100

Orders to: see below.

Selected paper of the Ho Chi Minh City Symposium on Acid Sulphate Soils. ILRI Publication No. 53. D.L. Dent and M.E.F. van Mensvoort, editors. International Institute for Land Reclamation and Improvement, Wageningen, 1993, 425 p. ISBN 90-70754-312. Cloth.

This symposium, held in March 1992, has been able to concentrate on current problems, recent advance and also setbacks. Uniquely, acid sulphate soils and the problems they bring are the products of land reclamation and improvement. The first goal of land reclamation remains what it has always been: production. Now other, equally vital, goals have forced themselves on our consciousness: economic viability, sustainability, and environmental protection. For the first time, farming systems, modelling of processes, and environmental management have been addressed by specific sessions of the symposium.

The selected papers are arranged in broad themes: (1) looking at the landscape; (2) identifying problems and seeking solutions; the farmers' way; by experimental work on fertility and management; by attempts at land evaluation; by modelling; and (3) environmental management.

It is a reasonable prediction that, in the near future, large areas of acid sulphate soils will become wasteland as a result of rising costs of production relative to better soils and diminishing water resources as these are needed elsewhere. This bleak scenario can be mitigated by managing landscapes as a whole, rather than considering acid sulphate soils in isolation; and changing the direction of research.

It was impossible to include all material presented at the symposium in this book. The ISSS Working Group on Acid Sulphate Soils intends to report on most of the remaining material in its Newsletter.

Price: NLG 88, USD 50

Orders to: ILRI, P.O.Box 45, 6700 AA Wageningen, the Netherlands.

Gender and Irrigation. A manual for the planning and assessment of small scale irrigation projects. L. van der Wel. SAWA Consultants for Development, Ede, 1993, iii + 38 p.

This report tackles the issue of integrating effective gender studies in irrigation development and management. It not only links insights from gender studies with the different technological requirements of various irrigated farming systems, but also looks at gender issues raised by different objectives in promoting or intensifying irrigation, especially in increasing equity for women rather than simply household survival or productivity.

Requests to: Ms. S. Vlaar, SAWA Consultants, Beukenlaan 2B, 6711 NH Ede, The Netherlands.

Atlas de la Polynésie Française. Institut Français de la Recherche Scientifique pour le Développement en Coopération, Paris, 1993, 112 planches cartographiques. ISBN 2-7099-1147-7. (Résumés en anglais)

Cet atlas thématique se présente comme une synthèse graphique des connaissances sur le milieu des archipels, les hommes, leur histoire et leurs activités. Il intègre de nombreuses recherches scientifiques inédites.

Il comporte six grandes parties qui regroupent, chacune, plusieurs modules: (1) Tahiti et les archipels: données géographiques et géopolitiques; (2) Des milieux physiques aux milieux vivants: l'environnement océanique, origine et nature des îles; (3) Ecologie de la Polynésie française: écologie du domaine marin, écologie des milieux terrestres; (4) Les hommes et leur emprise: les Polynésiens, premiers occupants des archipels; la fin des isolats: changement, rémanences; (5) La Polynésie française aujourd'hui: données et atouts - le constat démographique, les facteurs explicatifs; et (6) La Polynésie française aujourd'hui: défis et limites - Les facteurs confortatifs ou synergétiques, les limites du système.

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The Eco-Management and Audit Scheme: A Practical Guide. Business and the Environment Practitioners Series. R. Hillary. Technical Communications, Letchworth, vii + 113 p. ISBN 0-946655-81-2. Paperback.

This report places the Eco-management and audit scheme in the context of the EC's new approach to the environment outlined in the EC's 5th Action Program: Towards Sustainability. As a market-based tool, the scheme has the double benefits for businesses of being both voluntary, and embodying the spirit of self-regulation. Rewards are expected to come from the market.

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Improving Environmental Performance: a Guide to a Proven and Effective Approach. Business and the Environment Practitioners Series. S. Bragg, P. Knapp and R. McLean. Technical Communications, Letchworth, iv + 86 p. ISBN 0-946655-87-2. Paperback.

The concept of environmental performance improvement is a new one. A decade or so ago, companies' understanding and concern for the environmental impacts of their activities were limited to avoiding major disasters and regulatory enforcement. In recent years we have seen an upsurge in social and political forces unleashed by concern for the environment. The European Community and national legal frameworks have laid down the ground rules. Now, public consciousness and expectations are adding to the pressures for the private sector to get its house in order.

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Applications de la recherche opérationnelle. Problèmes de l'agriculture dans les pays en voie de développement. C. Schweigman. Institut Royal des Tropiques, Amsterdam, 1993, 201 p. ISBN 90-6832-082-3. Cartonné.

Cet ouvrage souhaite contribuer à l'analyse des problèmes en agriculture, nutrition, transports, distribution et alimentation en eau dans les pays en voie de développement. Il traite de l'utilisation des techniques de recherche opérationnelle dans la pratique agricole, sachant qu'au niveau des villages, le choix des techniques à adopter est un problème central pour les agriculteurs. Le premier chapitre est consacré aux décisions à prendre concernant la production, les disponibilités en terres, main-d'oeuvre et capital; à la nécessaire rotation des cultures et à la satisfaction des besoins nutritionnels. Le deuxième chapitre rend compte du caractère aléatoire des récoltes et de la fluctuation des prix. Il met l'accent sur le processus de prise de décision dans des situations de risque. La dernière partie aborde la question de l'agriculture irriguée et des barrages dans des conditions d'alimentation en eau aléatoires.

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Landscape Ecology and Geographical Information Systems. R. Haines-Young, D.R. Green and S.H. Cousins, editors. Taylor & Francis, London, New York, 1993, xi + 288 p. ISBN 0-7484-0002-8. Hardbound.

Landscape ecology focuses on the way in which a range of processes interact, and provides a framework to facilitate the understanding of human impact on the environment and the development of suitable management strategies. The questions landscape ecologists ask are complex and highly demanding of data. However, the growth of the discipline through the 1980s has been stimulated by access to new technologies which handle spatial information.

This book reviews and debates the new analytical tools being employed by landscape ecologists: geographical information systems (GIS), which are designed for the input, storage, analysis, display, and manipulation of spatial information; remote sensing systems, which are designed to capture and process that information.

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Road Building in the Tropics. State of the Art Review 9. R.S. Millard. HMSO, London, 1993, ix + 312 p. ISBN 0-11-551062-1. Hardback.

Devising methods of design and construction to provide an effective road system suitable for the needs of tropical countries has proved difficult, and considerable research has been necessary to understand the nature of the materials available, and the behaviour of the road structures themselves. This book has been written to provide a comprehensive source of information for engineering students and highway engineers practising in hot, tropical countries. The first part deals with tropical soils and road-building materials, describing their formation, characteristics and methods of testing. The second part describes the methods used to design and build roads, and includes chapters on all of the different types of pavements, including concrete and unpaved roads.

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Land use change: the causes and consequences. ITE Symposium 27. M.C. Whitby, editor. HMSO, London, 1992, iv + 201 p. ISBN 0-11-701553-9, Paperback.

Increased population density, a rise in standards of living and improved, more widespread, personal mobility have meant increasing competition for rural land use. The long-standing primary position of agriculture and forestry as economic activities in land use is being slowly undermined. Growing competition between different interest groups has created a pressing need for a re-evaluation of current land use policy. This volume contains the proceedings of a conference held at Newcastle upon Tyne; they detail focus on four areas which require effective research before policy changes can be developed to identify new opportunities and to solve specific problems. Analysis of the causes of change, assessment of the consequences of change, the detection of change and the assessment of land use options, are essential areas of investigation requiring a multidisciplinary effort in deciding priorities for the future. This book provides a comprehensive overview of the main issues and takes a tentative look at the options for the future.

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Remote Sensing for Monitoring the Changing Environment of Europe. P. Winkler, editor. A.A. Balkema, Rotterdam, Brookfield, 1993, xi + 304 p. ISBN 90-5410-311-6. Hardbound.

In 1992 the European Association of Remote Sensing Laboratories (EARSeL) made history by holding its 12th annual symposium in an eastern European country, hosted by its first member laboratory from Hungary, the FMI Remote Sensing Centre in Budapest. The papers presented in this symposium under the theme "Remote Sensing for Monitoring the Changing Environment of Europe", are presented in these proceedings. This theme was particularly appropriate since remote sensing or Earth observation from aircraft and satellites, has a key role to play in helping scientists to understand processes on a regional and global scale in all areas of the natural environment. Visible and infrared imaging systems and now, with data flowing from ERS-1, microwave, both passive and active, are of particular importance for the study of land surface processes. Much work was presented which was new to many Western observers. This included studies of environmental problems in Central and Eastern Europe, urban studies, water management and the use of fractals in geophysical fields. A frequently recurring theme was the integration of remotely sensed data into other types of data, the use of GIS and modelling. The future of remote sensing for environmental management is thus seen to be extremely promising allowing the systematic and regular monitoring of fragile ecosystems.

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