Long term experiments related to agriculture, with abstracts

Klaus Ammann, Web of Science and other sources, 20120919, 456 references

(1989). "[The relationship between population dynamics and the process of development: an interdependence requiring the definition of population policies]." Pop Sahel : bulletin d'information sur la population et le developpement(8): 23-5.
<Go to ISI>://MEDLINE:12316034

> The case of Senegal is used to illustrate the impact of population dynamics on the economic development of a country and the process of creating a population policy. 1 of the 6 principles of the Kilimanjaro Program of Action concerning African population and autonomous development was the interdependence between population and development, but interest in the problem was only sporadic until the deepening of the economic crisis. Population growth is now regarded as a major constraint on improvement of welfare for the population. The population of the Sahel countries has almost doubled in the past 2 decades as a consequence of very high fertility rates and declining mortality rates. About 44% of the Sahel population is under 15 years old and only about 53% is aged 15-64. The population is unequally distributed and the proportion urban increased from 18 to 23% between 1982-85. The general opinion is that the African population is increasing more rapidly than available resources. From 1973-83, Senegal's gross national product increased by 2.2%/year on average, less than the population increase of 2.5%. Cereal production increased by 1%/year between 1973-81. Investments in agriculture have declined continuously since 1973. Cereal needs are on the order of 6.69 million tons, while production is only 4.4 million tons. According to the World Bank the literacy rate for 5 Sahel countries was only 15% in 1982, and only 35% of school aged children are enrolled. The constant increase of population is also putting pressure on health services. In response to these problems, Senegal developed its population policy in 3 phases. In the 1st phase, 3 commissions and a working group carried out research and documentation around the country, producing sectorial documents. In the 2nd phase, workshops and seminars were held for the critical examination of the sectorial documents, culminating in presentation of a synthesis to the National Commission on Population and to the Interministerial Council, which adopted the work. The population policy is a longterm orientation seeking to balance population development with economic and social development in Senegal. The 4 parts of the policy declaration examine population and development problems in Senegal, present the different aspects of a population policy, outline legislative and regulatory actions to be undertaken, and identify personnel and institutions that will be involved.

(2003). "Royal society wants long-term monitoring of GM impact." Outlook on Agriculture **32**(3): 200-201.
<Go to ISI>://000186229400017

Aas, W. and A. Semb (2001). "Standardisation of methods for long-term monitoring." Water Air and Soil Pollution **130**(1-4): 1595-1600.
<Go to ISI>://000172012000114

> A monitoring programme should be designed for duration. This means that methods should not only be appropriate with respect to detection limits and accuracy, but they should also be as simple as possible and they should be documented in such a way that measurements will be comparable over many decades. In this connection, it is particularly important to understand that results are dependent on methods, instruments and procedures. Within the European monitoring network (EMEP) there are several different sampling procedures for the main air components, SO2, NO2, SO42-, NO3- + HNO3, and co-located experiments have therefore been initiated to quantify the difference between the measurements. Reference methods and reference instruments corresponding to the recommendation in the EMEP Manual have been run together with the usual measurements at EMEP sites in several countries. The results are generally satisfactory, especially in the case where identical methods are used. However, there are also some unacceptable differences, e.g. when comparing NO2 and SO2 monitors with the reference methods. The monitors do have a main advantage of providing easily accessible data with short time resolution; nevertheless, the accuracy at low concentrations is usually poor. The traditional reference methods need development and simplification in the direction of the more appealing automatic instruments.

AbuGhazaleh, A. A. and L. D. Holmes (2007). "Diet supplementation with fish oil and sunflower oil to increase conjugated linoleic acid levels in milk fat of partially grazing dairy cows." Journal of Dairy Science **90**(6): 2897-2904.
<Go to ISI>://WOS:000246603200033

> The objective of this study was to determine the longterm effect on milk conjugated linoleic acid (cis-9, trans-11 CLA) of adding fish oil (FO) and sunflower oil (SFO) to the diets of partially grazing dairy cows. Fourteen Holstein cows were divided into 2 groups (7 cows/treatment) and fed either a control or oil-supplemented diet for 8 wk while partially grazing pasture. Cows in group 1 were fed a grain mix diet (8.0 kg/d, DM basis) containing 400 g of saturated animal fat (control). Cows in the second group were fed the same grain mix diet except the saturated animal fat was replaced with 100 g of FO and 300 g of SFO. Cows were milked twice a day and milk samples were collected weekly throughout the trial. Both groups grazed together on alfalfa-based pasture ad libitum and were fed their treatment diets after the morning and afternoon milking. Milk production (30.0 and 31.2 kg/d), milk fat percentages (3.64 and 3.50), milk fat yield (1.08 and 1.09 kg/d), milk protein percentages (2.97 and 2.88), and milk protein yield (0.99 and 0.91 kg/d) for diets 1 and 2, respectively, were not affected by the treatment diets. The concentrations of cis-9, trans-11 CLA (1.64 vs. 0.84 g/100 g of fatty acids) and vaccenic acid (5.11 vs. 2.20 g/100 g of fatty acids) in milk fat were higher for cows fed the oil-supplemented diet over the 8 wk of oil supplementation. The concentration of cis-9, trans-11 CLA in milk fat reached a maximum (1.0 and 1.64 g/100 g of fatty acids for diets 1 and 2, respectively) in wk 1 for both diets and remained relatively constant thereafter.

The concentration of vaccenic acid in milk fat followed the same temporal pattern as cis-9, trans-11 CLA. In conclusion, supplementing the diet of partially grazing cows with FO and SFO increased the milk cis-9, trans-11 CLA content, and that increase remained relatively constant after 1 wk of oil supplementation.

Adjei, M. B. and J. E. Rechcigl (2004). "Interactive effect of lime and nitrogen on bahiagrass pasture." Soil and Crop Science Society of Florida Proceedings **63**: 52-56.
<Go to ISI>://WOS:000226859000006

Information is lacking on the long-term effect of University of Florida's recommendation for application of N (no P or K) on grazed bahiagrass (Paspalum notatum Flugge) pastures in south Florida on forage dry matter (DM) yield, nutritive value, and pasture botanical composition. This experiment consisted of four, annual, sub-plot, fertilizer treatments: 1) 67 kg N ha(-1) (N); 2) 67-12-56 kg N-P-K ha(-1) (NPK); 3) 67-12-56 kg N-P-K ha(-1) plus 22 kg ha(-1) of micronutrients mix (NPKM); and 4) control (no fertilizer), superimposed on two mainplot treatments: lime vs. no-lime to maintain a pH > 5.0 vs. < 4.5, respectively, from 1998 to 2002. The experiment was repeated under grazing conditions on four locations in central Florida. Although fertilized plots consistently yielded 20 to 30% more DM annually, and had greater crude protein (CP) concentration than the control, there were no yield nor CP differences (P > 0.05) between the N and NPK or NPKM treatments at three of the four sites. Mean annual forage yield increased from 6.5 Mg ha(-1) with the N treatment to 7.2 Mg hg(-1) with NPK or NPKM treatments on the deep sandy soil at Pasco Co., but CP remained similar among fertilized treatments. Forage IVOMD was generally unaffected by fertilizer or lime treatments, but tissue Ca, P, and K increased for amendments containing these elements. The percentage of bahiagrass stand that was yellow and/or dead and invaded by weeds in Hardee Co. averaged (5 yr) 5% for the control and 2 to 5% for the limed plots whether or not they were fertilized. The greatest (P < 0.01) deterioration in bahiagrass pasture (69% dead with weeds and only 31% green) occurred when grass was not limed but N-fertilized annually. While the N fertilizer alone may have longterm useful application to many bahiagrass pastures on flatwoods soils with spodic horizon close to the surface, the need for a fertilizer containing N, P and K on deep sandy soils may be warranted. Additionally, in acid-soil situations, it is better to lime to maintain the pH at 5.0 before N fertilization.

Agee, J. K. (2003). "Monitoring postfire tree mortality in mixed-conifer forests of Crater Lake, Oregon, USA." Natural Areas Journal **23**(2): 114-120.
<Go to ISI>://000182267800003

Tree mortality after a prescribed fire was monitored four times in 13 years in a mixed-conifer forest at Crater Lake, Oregon, USA. Immediate postfire mortality was concentrated in smaller size classes for all species. Mortality of larger and older trees continued, with a peak for Pinus ponderosa Dougl. and Pinus lambertiana Dougl. in the 3-7 y period following fire, and a peak for Abies concolor (Gord. & Glend.) Lindl in the 8- 13 y period. Monitoring mortality over long time periods showed that the burn objectives were achieved most closely immediately after the fire, but were compromised by subsequent mortality of large and older trees. This delayed mortality was probably linked to extended drought that also killed large trees in adjacent unburned areas. Further fuel reduction bums might reduce tree density below historic levels unless fires remain patchy. Melding structure and process goals will be essential for achieving resources management objectives in dry forests managed for natural values.

Alcock, R. E., A. E. Johnston, S. P. McGrath, M. L. Berrow and K. C. Jones (1993). "Long-Term Changes in the Polychlorinated Biphenyl Content of United-Kingdom Soils." Environmental Science & Technology **27**(9): 1918-1923.
<Go to ISI>://A1993LW24900033

Archived soils collected from five different long-term agricultural experiments in southern England have been analyzed retrospectively for a range of polychlorinated biphenyl (PCB) congeners. The change in soil PCB concentration over time has been similar in each field experiment, namely, that soil samples exhibited a sharp rise in soil PCB concentrations between about 1940 and the early 1960s, reaching a maximum (ca. 140-560 mug of SIGMAPCB/kg of soil) during the late 1960s/early 1970s. Since then there has been a dramatic reduction in SIGMAPCB concentrations, Such that contemporary concentrations (ca. 20-30 mug/kg) are now similar to those of the early 1940s soils. If these soil loadings were reflected nationwide, the SIGMAPCB burden of U.K. soils has fallen from ca. 26 600 t in 1970 to a contemporary burden of ca. 1500 t. This is equivalent to an annually averaged net loss of approximately 14 mug SIGMAPCB m-2 day-1, but a slower approximately 1 mug SIGMAPCB m-2 day-1 in recent years. Volatilization and subsequent long-range transport probably account for the bulk of this loss. A total of 67 000 t of PCBs was manufactured in the United Kingdom between 1954 and 1977, with an estimated 40 000 t used within the United Kingdom. There has been a gradual shift in the relative proportion of individual congeners since the peak, with a move toward greater proportions of the heavier homologue groups in the most recent samples.

Alcock, R. E., K. C. Jones, M. S. McLachlan and A. E. Johnston (1999). "Response to comment on "Evidence for the presence of PCDD/Fs in the environment prior to 1900 and further studies on their temporal trends"." Environmental Science & Technology **33**(1): 206-207.
<Go to ISI>://000077954100051

Alcock, R. E., M. S. McLachlan, A. E. Johnston and K. C. Jones (1998). "Evidence for the presence of PCDD/Fs in the environment prior to 1900 and further studies on their temporal trends." Environmental Science & Technology **32**(11): 1580-1587.
<Go to ISI>://000074032700023

This paper presents evidence for the existence of PCDD/Fs in the environment prior to the widespread development of the chloroaromatics and chlorine industry, by the analysis of a previously unopened bottle of soil collected in 1881 from a controlled long-term agricultural experiment at Rothamsted Experimental Station. Great care was taken to avoid contamination of the sample from dust or by exposure to modern air; an experiment was conducted to investigate the potential for contamination of the sample by such exposure, The 1881 soil sample (from the plowed 0-23 cm depth layer) contained 0.7 ng of Sigma TEQ/kg soil, and there were no detectable changes in its Sigma PCDD/F composition when aliquots of it were exposed over 32 days in a laboratory at Lancaster University. Modern soil sampled from the same field plot (which has never received any fertilizers or amendments) now

contains 1.4 ng of Sigma TEQ/kg, an increase resulting from cumulative atmospheric deposition of PCDD/Fs retained in the surface layers of the soil. Post-collection contamination issues were also addressed by PCDD/F analysis of dust and paper bags used to store more recent samples. The Sigma TEQ concentration of archived herbage samples collected year-on-year from Rothamsted between 1980 and 1995 have trended downward by a factor of 3-4, implying a recent decline in the atmospheric deposition of PCDD/Fs and supporting a previously reported (Kjeller et al. Environ. Sci. Techol. 1996, 31, 458-463) longer term decline. The significance of these results is discussed.

Ammann, K. (2007). "Bibliography on Long Term Effects in Organisms, Materials, with special reference to Agriculture and GM Crops." from http://www.botanischergarten.ch/Longterm/Bibliography-General-Longterm-20070909.pdf.

Archibold, O. W. and E. A. Ripley (2004). "Assessment of seasonal change in a young aspen (Populus tremuloides Michx.) canopy using digital imagery." Applied Geography **24**(1): 77-95.
<Go to ISI>://000188087500005

Direct and indirect measurements of leaf area distribution during the 2001-growing season were used to characterize the structure of a small aspen grove in relict grassland of the northern Great Plains. Located in the Kernen Prairie near Saskatoon, the 1.5 ha grove had last been burned in October 1986. Measurements included solar radiation inside and outside the grove; digital hemispheric images of the tree canopy taken bi-weekly, and mean areas of individual leaves at three canopy heights. The images were processed using Idrisi (R) digital image processing software designed for geographical information system (GIS) applications. 2 Leaf size averaged near 5 cm, varying little through the summer, although larger leaves were proportionally more abundant in the upper canopy early in the growing season. Hemispherical cover increased rapidly in early May from about 40% (no leaves) to about 80% (fully leafed), dropping back to the earlier value after leaf fall in late September and early October. Solar radiation under the canopy dropped from 55% of ambient before the first leaves appeared to 25% during most of the summer, increasing to near 50% by late October. Calculated plant (leaf plus stem) area indices increased from about 0.4 in the leafless phase to near 1.7 during the full-leaf stage in late June. Digital imagery analysis provided a rapid assessment of canopy structure. This may be useful for long-term monitoring of stand responses to different management techniques.

Asch, R. G. and D. D. Turgeon (2003). "Detection of gaps in the spatial coverage of coral reef monitoring projects in the US Caribbean and Gulf of Mexico." Revista De Biologia Tropical **51**: 127-140.
<Go to ISI>://000185198100016

As part of the US Coral Reef Task Force's National Program to Map, Assess, Inventory, and Monitor US Coral Reef Ecosystems, a comprehensive survey of projects/programs monitoring coral reef ecosystems and related habitats (i.e., seagrass beds and mangroves) in the US Caribbean and Pacific was undertaken. Information was gathered on a total of 296 monitoring and assessment projects conducted since 1990 in the US Caribbean and the Gulf of Mexico. Substantial gaps in monitoring coverage of US coral reef ecosystems were revealed through geographic information system (GIS) analysis of survey metadata. Although southern Florida contains approximately two-thirds of all marine monitoring projects found in the US Caribbean and Gulf of Mexico, we were unable to identify any ongoing projects that monitor coral reefs along Florida's western coast and off of the Florida Middle Grounds. Additionally, Florida is covered by approximately 1 900 km(2) of mangroves, yet there were only four ongoing projects that monitor this ecosystem, leaving gaps in coverage in the Lower and Middle Keys and along the eastern and western coasts. The Flower Garden Banks National Marine Sanctuary, located offshore of the Texas/Louisiana border, has an integral long-term monitoring program, but lacks a monitoring project that gathers long-term, quantitative data on reef fish abundance and certain water quality parameters. Numerous coral reef monitoring projects in Puerto Rico arc concentrated on the island's southwestern coast surrounding La Parguera, while far fewer monitoring projects are conducted along the northern and southeastern coasts and around Vieques Island. In the US Virgin Islands, the paucity of monitoring projects in large areas of St. Croix and St. Thomas contrasts with monitoring activity in three marine protected areas (MPAs), where 66% of the US Virgin Islands' coral reef monitoring sites were found. Only a series of assessments have been conducted at Navassa, a small, uninhabited island located 55 km west of Haiti and 137 km northeast of Jamaica. In order to better understand changes in coral reef communities and to produce a series of biennial reports on the status of US coral reef ecosystems, the National Oceanic and Atmospheric Administration (NOAA) is developing a national coral reef monitoring network. This network has already begun to fill some of these gaps in monitoring coverage through issuing cooperative grants to states and territories to build long-term monitoring capacity.

Avni, Y., N. Porat, J. Plakht and G. Avni (2006). "Geomorphic changes leading to natural desertification versus anthropogenic land conservation in an and environment, the Negev Highlands, Israel." Geomorphology **82**(3-4): 177-200.
<Go to ISI>://WOS:000243163200001

The Negev Highlands in southern Israel are currently under an erosive regime causing degradation of soil and vegetation; a process which has often been attributed to land mismanagement and overgrazing caused by the local Bedouin population. To estimate the anthropogenic role in the erosional processes in the Negev Highlands, two similar drainage basins were selected and studied, one undisturbed with almost no human impact and the other with intensive human modification including the establishment of Roman to Early Islamic agriculture. Field observations and luminescence dating indicate that during the Late Pleistocene glacial period (OIS 4 and 3) deposition of fluvio-loess sediments, with minor erosion cycles, occurred in the Negev Highlands. Severe erosion started during OIS 2 and continued into the Holocene. As the climate shifted during the termination of the Pleistocene to the present interglacial phase, higher rain intensity generated the incision of gullies and channels into the fine-grained alluvial sediments of the previous phase, causing extended soil erosion and reducing the natural biomass and the agricultural potential. Establishment of runoff-harvesting farms in the 3rd century interrupted the Holocene natural erosion and gully incision, and led to the redeposition of up to 3.5 in of fine alluvial loess sediments originating from Late Pleistocene loess sections. This accumulation is not related to any late-Holocene pluvial climatic phase and is solely the result of farming. We conclude that since the end of the Pleistocene a dynamic change in the soil/rock ratio related to the long-term process of adjustment of the geomorphologic system to the Holocene climate

has been taking place within the drainage basins in the Negev Highlands. The fluvio-loess sediments deposited in the region during OIS 4 and 3 have been eroding since the latest Pleistocene throughout the Holocene. This process causes degradation of the biomass and agricultural potential and leads onto natural desertification of the region. The historical intervention by establishment of runoff-harvesting agriculture, which as a by-product resulted in the accumulation of redeposited loess sediments, counteracted the natural trend of soil erosion. This was in fact a land-conservation act, applied by the ancient farmers in the semi-arid regions of the Middle East deserts. This activity and its geomorphic consequences are in contrast to the well-documented land degradation trend generated by recent anthropogenic impact on marginal lands elsewhere. In any case, the human impact, either contributing to land degradation or to soil conservation, is super-imposed on the natural longterm trend leading toward desertification.

Ayuba, H. K., A. O. Aweto and S. M. Abubakar (2000). "Soil nutrient dynamics under small-holder agricultural practices in Konduga, north-eastern Nigeria." Tropical Agriculture **77**(2): 116-118.
<Go to ISI>://WOS:000168102600011

The fertility of soil in the tropics is strongly influenced by the secondary soil factors of organic matter (OM), cation exchange capacity (CEC), and pH. Thus, information on the changes in the levels of these soil properties is very vital to agricultural land use planning. This study examined the changes which occur in these soil properties following the establishment of small-holder agricultural practices (SHAP), by comparing soil properties under the SHAP with a similar soil under a natural Savannah woodland (forest reserve). The results revealed that in the 0-10 cm layer of soil under small-holder agriculture, there was a significant decline ($P < 0.01$) in OM, CEC, and pH ($P < 0.05$) compared with similar properties in the adjoining Savannah woodland. In the 10-30 cm layer of soil, OM, CEC, and pH also declined significantly ($P < 0.05$), The results suggested a decline in soil fertility in the cultivated sites. The adoption of soil management techniques to conserve and enhance soil OM and nutrients appears crucial to the longterm productivity of the soil and sustainability of agriculture in the area.

Aziz, J. J., M. Ling, H. S. Rifai, C. J. Newell and J. R. Gonzales (2003). "MAROS: A decision support system for optimizing monitoring plans." Ground Water **41**(3): 355-367.
<Go to ISI>://000182672600014

The The Monitoring and Remediation Optimization System (MAROS), a decision-support software, was developed to assist in formulating cost-effective ground water long-term monitoring plans. MAROS optimizes an existing ground water monitoring program using both temporal and spatial data analyses to determine the general monitoring system category and the locations and frequency of sampling for future compliance monitoring at the site. The objective of the MAROS optimization is to minimize monitoring locations in the sampling network and reduce sampling frequency without significant loss of information, ensuring adequate future characterization of the contaminant plume. The interpretive trend analysis approach recommends the general monitoring system category for a site based on plume stability and site-specific hydrogeologic information. Plume stability is characterized using primary lines of evidence (i.e., Mann-Kendall analysis and linear regression analysis) based on concentration trends, and secondary lines of evidence based on modeling results and empirical data. The sampling optimization approach, consisting of a two-dimensional spatial sampling reduction method (Delaunay method) and a temporal sampling analysis method (Modified CES method), provides detailed sampling location and frequency results. The Delaunay method is designed to identify and eliminate redundant sampling locations without causing significant information loss in characterizing the plume. The Modified CES method determines the optimal sampling frequency for a sampling location based on the direction, magnitude, and uncertainty in its concentration trend. MAROS addresses a variety of ground water contaminants (fuels, solvents, and metals), allows import of various data formats, and is designed for continual modification of long-term monitoring plans as the plume or site conditions change over time.

Baker, C. J., D. P. Roberts, N. M. Mock and V. L. Blount (2004). "A novel open-system technique to monitor real-time oxygen consumption during early phases of seed germination." Seed Science Research **14**(1): 17-26.
<Go to ISI>://000220975400002

A novel technique allows long-term monitoring of real-time oxygen consumption during seed germination in an open system. Most current techniques used to detect oxygen consumption by seeds measure the decrease in oxygen concentration in a closed chamber. This is not ideal for long-term experiments because the chamber must be replenished with air periodically, subjecting the seeds to abrupt changes in oxygen concentration. The current technique employs an open system, in which seeds are submerged in a continuously aerated aqueous environment. Oxygen electrodes are used to measure the steady-state concentration of oxygen in the solution, which is a function of both the rate of oxygen consumption by the seed and the rate of aeration from the atmosphere. The rate of aeration is directly dependent on the oxygen concentration of the bathing solution; therefore, previous calibration of the system allows the direct conversion of steady-state oxygen concentrations into oxygen consumption rates. Because oxygen is not limiting, the experimental design described here can monitor the same sample non-intrusively every minute for more than 24 h, allowing for greater precision than hourly readings often reported with current techniques. Multiple treatments and/or replicates can be run simultaneously, allowing sensitive comparison of various seed treatments or seed types. To illustrate its potential application, the technique was used to follow the rehydration and pre-emergence phases of germination of cucumber (Cucumis sativum), pea (Pisum sativum) and mustard (Brassica juncea) seeds, detect the inhibitory effects of surface sterilization techniques on seed respiration of cucumber, and follow the interaction of a bacterial biocontrol agent with germinating cucumber and pea seeds.

Bartsch, D., Hans-Jörg Buhk, Karl-Heinz Engel, Christoph Ewen, Gerhard Flachowsky, Achim Gathmann, Petra Heinze, Christiane Koziolek, Georg Leggewie, Anke Meisner, Gerd Neemann, Ulli Rees, Andrea Scheepers, Stefanie Schmidt, Elisabeth Schulte, Kristina Sinemus and Anja Vaasen (2007). Long-term effects of genetically modified (GM) crops on health and the environment (including biodiversity), Final Report. BEETLE. Brussels, Federal Office of Consumer Protection of Food Safety, Berlin, Department of Food and Nutrition, TUM, Munic, team-ewen, Darmstadt,

Genius GmbH, Darmstadt, Institute of Animal Nutrition, Friedrich Löffler Institute, Braunschweig, BLaU - Consultancy on Landscape Ecology and Environmental Studies, Göttingen. **Reference: ENV.B.3/ETU/2007/0007:** 133.
http://ec.europa.eu/food/food/biotechnology/reports_studies/docs/lt_effects_report_en.pdf AND http://www.ask-force.org/web/Regulation/BEETLE-Report-Long-Term-2007.pdf

0. BEETLE1. 0. BEETLE Short Summary

1) In the BEETLE study, genetically modified (GM) crops with traits already on the market in the EU or possibly so in the near future were assessed with respect to potential long-term (10-20 years) adverse effects on environment and health. They included the following major crop/trait combinations:

· Maize: insect resistance (IR) - Oilseed rape: herbicide tolerance (HT)

· Sugar beet: herbicide tolerance (HT) - Potato: starch modification (SM)

· 2) Information sources:

· more than 700 scientific publications about GM crops and their potential effects on the environment including biodiversity, and more than 100 publications about GM crops and their potential effects on human and animal health, which were published mostly during the last decade, were analysed,

· contributions to online surveys from 100 of 167 invited environment experts and 52 of 185 invited health experts, representing a wide range of expertise with focus on the EU were received,

· potential ways forward for reducing uncertainty regarding environmental effects were discussed with 27 invited international experts in a CREA Space Workshop,

· input and guidance was received from a Peer-Review Committee of international experts throughout the study.

3) In more than 20 years of experimental field releases and more than 10 years of commercial cultivation, adverse long-term effects reported in the scientific literature concern (i) the development of resistance in Bt crop target organisms and (ii) tolerance in weeds to complementary herbicides used in HT crops. No other adverse long-term effects have yet been established. However, other potential long-term effects are discussed in the relevant scientific literature and in scientific fora in general.

4) Resistance development in plant pests targeted by GM crops expressing protective Bt proteins, and tolerance in weeds to complementary herbicides used on HT crops, are long-term effects which were already anticipated from the risk assessments.

5) There is at least 10 years experience of cultivating GM crops worldwide and only few established long-term effects have yet been reported (insect resistance development in Bt crops, feralization of GMHT oilseed rape). Due to the nature of potential long-term effects, it is not yet possible to quantify the long-term risks associated with GM crops. However, the BEETLE study has identified a qualitative priorization concerning the processes linked to GM plants that could have long-term effects on the environment (including biodiversity) and health.

6) The following generic conclusions can be drawn:

.. Potential adverse effects due to 'Cultivation and Management' issues:

Long-term effects of GM crops are most likely to be caused indirectly through changes in cultivation and agricultural management of HT crops and consequently affecting wider biodiversity. The use of complementary herbicides can potentially change the management practice. These specific effects of such changes will depend on crop/trait combinations cultivated and possibly regional aspects. This process was clearly assigned with highest priority.

.. Established adverse effects related to 'Resistance development' in pests targeted by IR crops, particularly Bt:

Direct long-term effects of GM crops (mainly Bt maize) are likely to become apparent due to resistance development in Target Organisms (TO).

.. Potential adverse effects on Non-Target Organisms1 (NTO) related to 'Gene flow to wild relatives':

Gene flow regarding GM traits from GM crop plants to wild relatives should be considered in cases of GM plants that have ancestors in the natural European flora, especially for crops related to the Brassica and Beta species, which have sexually compatible relatives. Although gene flow as such is not an adverse environmental effect, the long-term consequences for species conservation and biodiversity might be relevant. .. Potential adverse effects on 'NTO, ecological functions and the abiotic environment':

Long-term effects of GM crops on NTO (e.g. in soil), ecological soil functions, and the abiotic soil environment should be considered due to uncertainty indicated by the fact that only a few scientific publications are available. Long-term effects are most likely to affect NTOs closely related to TO of Bt maize (beetles and butterflies).

7) Long-term effects on animal or human health linked to GM crops have not yet been identified.

However, forthcoming generations of GM crops will include more complex genetic modifications, e.g. more stacked events (several GM traits in the same crop variety) which could increase exposure to potential allergens and thus the potential for allergies to develop. 1 A NTO is an organism which is affected by an interaction for which it was not the intended recipient.

This includes gene flow to wild relatives.

8

8) A tool for providing pre-market information2 on GMO characteristics is a database including novel bioinformatic applications guiding assessment of potential interaction between different genetic modifications, e.g. synergistic effects of stacked events (intended or unintended). Possible synergistic effects of proteins from intended and unintended combination of different GMOs should be considered during the ERA (according to Annex II of Directive 2001/18/EC) to improve the prognostic power of the long-term effect assessment.

9) The BEETLE report concludes that research studies, modelling and monitoring are appropriate tools to investigate long-term environmental effects during GMO cultivation close to practice3. It proposes the development of indicators and databases for an appropriate EUwide surveillance of long-term effects on soil and other biodiversity resulting from GM crop cultivation and management. Potential indicators should be further developed over time by risk assessors and risk managers. The indicators for environmental monitoring should be selected in accordance wi

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5) There is at least 10 years experience of cultivating GM crops worldwide and only few established long-term effects have yet been reported (insect resistance development in Bt crops, feralization of GMHT oilseed rape). Due to the nature of potential long-term effects, it is not yet possible to quantify the long-term risks associated with GM crops. However, the BEETLE study has identified a qualitative priorization concerning the processes linked to GM plants that could have long-term effects on the environment (including biodiversity) and health.

6) The following generic conclusions can be drawn:

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Long-term effects of GM crops are most likely to be caused indirectly through changes in cultivation and agricultural management of HT crops and consequently affecting wider biodiversity. The use of complementary herbicides can potentially change the management practice. These specific effects of such changes will depend on crop/trait combinations cultivated and possibly regional aspects. This process was clearly assigned with highest priority.

.. Established adverse effects related to 'Resistance development' in pests targeted by IR crops, particularly Bt:

Direct long-term effects of GM crops (mainly Bt maize) are likely to become apparent due to resistance development in Target Organisms (TO).

.. Potential adverse effects on Non-Target Organisms1 (NTO) related to 'Gene flow to wild relatives':

Gene flow regarding GM traits from GM crop plants to wild relatives should be considered in cases of GM plants that have ancestors in the natural European flora, especially for crops related to the Brassica and Beta species, which have sexually compatible relatives. Although gene flow as such is not an adverse environmental effect, the long-term consequences for species conservation and biodiversity might be relevant. .. Potential adverse effects on 'NTO, ecological functions and the abiotic environment':

Long-term effects of GM crops on NTO (e.g. in soil), ecological soil functions, and the abiotic soil environment should be considered due to uncertainty indicated by the fact that only a few scientific publications are available. Long-term effects are most likely to affect NTOs closely related to TO of Bt maize (beetles and butterflies).

7) Long-term effects on animal or human health linked to GM crops have not yet been identified.

However, forthcoming generations of GM crops will include more complex genetic modifications, e.g. more stacked events (several GM traits in the same crop variety) which could increase exposure to potential allergens and thus the potential for allergies to develop. 1 A NTO is an organism which is affected by an interaction for which it was not the intended recipient.

This includes gene flow to wild relatives.

8) A tool for providing pre-market information2 on GMO characteristics is a database including novel bioinformatic applications guiding assessment of potential interaction between different genetic modifications, e.g. synergistic effects of stacked events (intended or unintended). Possible synergistic effects of proteins from intended and unintended combination of different GMOs should be considered during the ERA (according to Annex II of Directive 2001/18/EC) to improve the prognostic power of the long-term effect assessment.

9) The BEETLE report concludes that research studies, modelling and monitoring are appropriate tools to investigate long-term environmental effects during GMO cultivation close to practice3. It proposes the development of indicators and databases for an appropriate EUwide surveillance of long-term effects on soil and other biodiversity resulting from GM crop cultivation and management. Potential indicators should be further developed over time by risk assessors and risk managers. The indicators for environmental monitoring should be selected in accordance with the crop/trait combination and the receiving environment

Basso, B., D. Cammarano, A. Troccoli, D. Chen and J. T. Ritchie "Long-term wheat response to nitrogen in a rainfed Mediterranean environment: Field data and simulation analysis." European Journal of Agronomy **33**(2): 132-138.
<Go to ISI>://WOS:000279416200009

Appropriate nitrogen management is one of the main challenges of agricultural production and for the environment. The objectives of this study were to evaluate the efficiency of crop N uptake in a longterm wheat crop in a Mediterranean environment of Southern Italy, and to identify optimal N rate for reasonable economic returns and minimum nitrate leaching using SAWS crop simulation model. The study was part of a long-term monoculture wheat system that started in 1991/1992 season, with two levels of nitrogen (0 and 90 kg N ha(-1)). Simulations of the treatment with no nitrogen (0N) and 90 kg N ha(-1) (90 N) were performed using the SALUS crop model for wheat. The model was tested against measurements of harvested grain yield, final N uptake, soil water content and

total soil N. Long-term simulation over 56 years showed that grain yield median value was 3435 kg ha(-1) for 0N and 3876 kg ha(-1) for 90 N. Simulation scenarios with different N rates (0, 30, 60, 90, 120, 180 kg N ha(-1)) showed that yield response was higher for 120 N (3528 kg ha(-1)), with the 60 and 90 N yields giving the same response, 3010 and 3054 kg ha(-1), respectively. The most profitable treatments were 120 N (302 Euro ha(-1)), followed by the 60 N (220 Euro ha(-1)). The simulation results showed that nitrate leaching was higher for the N rate of 120 and 180 with a mean annual value of 49 and 81 kg ha(-1), respectively. Results suggest that in such environment 60 kg N ha(-1) can be the most appropriate as an N fertilization management due to the best trade-off between leaching and economic. Since N fertilization rates are linked to nitrous oxide (N(2)O) emissions and N leaching, a trade-off between N fertilization rates profit and grain yield should be thought as way to reduce environmental pollution while keeping productivity and profit. The adoption of simulation models to approximate the best N rate for durum wheat in rainfed Mediterranean environment proved to be a useful tool for supporting management decisions through quantifying the temporal variability related to weather uncertainty as it influences on the yield and nutrient dynamics. (C) 2010 Elsevier B.V. All rights reserved.

Beck, A. J., G. L. Harris, K. R. Howse, A. E. Johnston and K. C. Jones (1995). "Effect of Crop Residue Management and Drainage on the Persistence and Movement of Isoproturon in a Structured Clay Soil over the Growing-Season of a Winter Barley Crop." Journal of Agricultural and Food Chemistry **43**(5): 1368-1376.
<Go to ISI>://A1995QY97800045

The persistence of isoproturon [3-(4-isopropylphenyl)-1,1-dimethylurea)] in the cultivated horizon and losses from mole drains in a structured clay soil sown with winter barley and managed by crop residue burning and ash incorporation were compared with those where the crop residues were chopped and plowed in. Desorption coefficients (X(app)) increased over time as isoproturon concentration declined and were greater on the burnt plot than on the unburnt plot on every sampling occasion. By contrast, sorption coefficients (K-d) were more consistent at approximately 5.0 L/kg on both plots. The variability of sorption and desorption was sensitive to temporal variation of rainfall. Sorption nonideality was observed on every sampling occasion with the nonideality index (K-d/K-app), declining with time following isoproturon application. Twenty-seven days following the autumn pre-emergent herbicide application [2.475 kg of active ingredient (ai) on October 9, 1991] KdKapp was approximately 0.5 and after 97 days had fallen to approximately 0.2, where it stabilized until the post-emergent application (1.625 kg of ai/ha on May 4, 1992) three months later. The variability of all parameters was almost as great at the local scale as at the field scale. Total isoproturon losses in drainflow over the growing season were similar at 869 and 943 mg/ha for the burnt plot and unburnt plot, respectively. However, temporal variation in leaching losses was complex, being influenced by a number of factors including dilution effects, soil solution contact times, and possibly particle-assisted transport.

Behm, A., A. Becker, H. Dorflinger, A. Franke, J. Kleinschmit, G. H. Melchior, H. J. Muhs, H. P. Schmitt, B. R. Stephan, U. Tabel, H. Weisgerber and T. Widmaier (1997). "Concept for the conservation of forest genetic resources in the Federal Republic of Germany." Silvae Genetica **46**(1): 24-34.
<Go to ISI>://WOS:A1997XU80600005

The aim of the ''Concept for the Conservation of Forest Genetic Resources in the Federal Republic of Germany'' is to: estimate the extent of danger to the genetic resources of our tree and shrub species; propose preventive measures for the maintenance of genetic variability of these species; consider proposals for the organisational realization of this programme and give a cost-estimate. The programme will help to reduce genetic losses due to anthropogenic environmental loads (immissions). but a basic precondition for this is a reduction of environmental load. The mandate of the working party for the elaboration of this concept was derived from a resolution made at a meeting held on 10.1.1985 between representatives of the Federal Ministry for Food, Agriculture and Forestry and the Federal States. The political importance of the project is emphasized by the resolution of the Bundesrat (Upper House of Parliament) made on 13.2.1985 concerning measures for conserving genetic diversity of forest tree species and the second edition of the Federal Government's action programme ''Save the Forests''. The latter states that the Federal Government identifies the conservation of natural genetic resources to be of major importance and that it will try to establish a forest genebank. The working party aims to compile all existing measures that either directly or indirectly aid the conservation of forest genetic resources, and to work out a framework, including cost-estimates, for conserving forest genetic resources. Because of the immobility and the longevity of tree and shrub species, high genetic variation is the longterm base for adaptability and thus for survival of these species. For biological, economical and ethical reasons, forestry depends on the maintenance of high genetic diversity. The forests and therefore the forest genetic resources were already endangered by the clearing of forests for cultivation and other diverse interventions into forest ecosystems. The survey of the damages caused by forest decline has shown that serious gene losses from anthropogenic environmental loads are continuing. The influence of existing legal regulations on the conservation of forest genetic resources was evaluated. The Act on Forestry Seed and Planting Stock (Bundesgesetzblatt 1979) demands that forests be maintained because of their economic and environmental importance; the provision of habitat for other species is particularly important. Consequently, the high genetic variability of forests has to be maintained. However, no regulations exist for the realization of this aim either in the Federal Forest Law or in the respective laws of the states. In addition, the legal regulations concerning forest reproductive material and nature conservation do not offer such an instrumentation. Existing measures within the Federal Republic which directly serve gene conservation are concentrated in public organisations such as Federal Research Institutes and State Forest Administrations with their research institutes and seed extractories. There is little activity in the private sector Direct activities include: conservation of breeding material within the framework of breeding programmes; collection of provenances, families and clones in field tests and clonal archives; genebanks of seed, pollen and tissue cultures. Up to now, these conservation measures have been funded from the budgets of the research institutes, but these are insufficient for the additional activities which are needed. The criteria for the selection of material ''worthy of conservation'' are for example: selected or comparable populations covered by the Act on Forestry Seed and Planting Stock (Bundesgesetzblatt, 1979), populations under specific ecological conditions, marginal populations and the ''necessity for conservation'' which results from the degree of current damage or from the rarity of the material. Conservation is necessary for: 18 tree species and the genus Populus as covered by the Act on Forestry Seed and Planting Stock

(Bundesgesetzblatt, 1979); 29 species not under the law, but with importance for forestry; 10 indigenous and introduced tree species important from a regional view; and 37 indigenous shrub species. The measures for conservation depend on the biology, the developmental stage of the material, the technical feasability and on the costs. The following can be applied with different prospects for success depending on the tree species: conservation of stands; natural regeneration; sowing and planting in situ and ex situ; seedling and clonal seed orchards; clone collections; conservation of seed, pollen, plants, parts of plants including tissue, and conservation by macro-and microvegetative propagation. The individual measures are evaluated. In addition, the total work necessary in forest genetic conservation is presented. The current situation is discussed. The fields to be covered in the frame of the programme can only be achieved by close cooperation between the Federal and State Forest Administrations and their institutions. The following principles for cooperation are proposed: Activities for conservation of forest genetic resources are pel formed by the Federal Forest Research Centre and the State Forest Research Institutes including the respective seed extractories. These institutions have the professional capacity, the direct connection to forestry, the necessary technical facilities and the scientific background. In addition, they cover the interests of the States. The selection of genetic resources to be conserved will be coordinated and the institutions responsible for the conservation of forest genetic resources in the Federal Republic of Germany will regularly exchange information about incoming and outgoing gene resource material. To minimize the risk of loss, samples for ex situ conservation (seed, pollen, plants, parts of plants) will be stored at least at 2 locations. Research necessary for gene conservation occurs in the institutes of the forestry faculties at the universities, and the respective federal and state institutes in close coordination. Independent of the constitutional responsibilities for the single measures, Federal Government and States will coordinate the activities for conservation of forest genetic resources. It is proposed to give the responsibility for the coordination of the activities between Federal Government and States to the ''Federal and State Working Group on Conservation of Forest Genetic Resources''. The Federal Government will maintain responsibility for its legal obligations, collective representation, resource orientated research and the safeguarding of important inter national relationships. Division of duties between Federal and States will be according to Article 30 of the constitution. For the further procedures it is recommended that the programme should be discussed at the conference of Federal and State Ministers for Agriculture and Forestry with the aim to reach an agreement for cooperation in the field of conservation of forest genetic resources. The forest administrations and the Federal and State Research Institutes should be charged with implementing the programme. In this paper, facts are presented, possibilities outlined and urgent recommendations given from a professional view. The realization of the necessary measures for the conservation of forest genetic resources needs the political decision. Forests are ecologically and economically an important stabilizing factor in the Federal Republic of Germany. The forest genetic resources therefore have to be saved; actions for their conservation have to be started without delay. The present state of the conservation programme is described.

Bennett, L. P. and R. J. Milne (2004). "Criteria to assess and select sites for long-term avian monitoring in an urbanizing landscape." Environmental Monitoring and Assessment **94**(1-3): 147-162.
<Go to ISI>://000189078400011

A methodology was developed to prioritize the suitability of sites for long-term monitoring of avian populations, including Vulnerable species, both to enhance assessment of changes in ecological resources and to facilitate land-use planning at the regional scale. This paper argues that a successful monitoring program begins with a site prioritization procedure that integrates scores based on spatial controls with ecological and socio-economic indicators, particularly those dependent on community involvement. The evaluation strategy in this study combines 1) spatial controls such as land ownership and accessibility, with 2) biological and habitat indicators such as vulnerable species and habitat connectivity, and 3) community and agency variables such as volunteer commitment and agency priorities. In total, a set of ten indicators was identified. This strategy was applied to predominantly agricultural landscapes, which are experiencing increasing human pressures, in three sub-watersheds of the Credit River, Southern Ontario. Specifically, bird populations were recorded during the breeding seasons of 2000-2002 in nine land units or habitat types including marsh, deciduous forest, and grasslands as mapped by Credit Valley Conservation (CVC) following Ecological Land Classification (ELC) guidelines. CVC selected sites for long-term monitoring in 2002 and the relationships between the scored (or ranked) sites and the selected long-term monitoring sites are discussed.

Bennun, L. A. (2001). "Long-term monitoring and the conservation of tropical wetlands: high ideals and harsh realities." Hydrobiologia **458**: 9-19.
<Go to ISI>://000173248500003

Long-term monitoring of wetlands is an essential element of management for 'wise use'. Indeed, the Ramsar Convention requires regular monitoring in order to detect changes in ecological character at listed sites. However, there are few examples of successful long-term monitoring in tropical wetlands. Monitoring schemes run into three kinds of difficulties: Conceptual, logistical and political. To be effective, monitoring schemes must be carefully planned and designed. In practice, the questions to be addressed are rarely made explicit. Strictly defined, monitoring should assess deviations from a pre-set level so that appropriate corrective action can be taken. This assumes that good baseline information exists, and that we have sufficient knowledge of the system to set sensible signal levels. Neither is usually the case in tropical wetlands. This means that carefully focused surveillance (a time-series of systematic observations) is an essential first step, Providing resources and co- ordination for surveillance or monitoring is challenging over the long term, especially if the variables being measured require expensive analyses and highly trained staff. I suggest that surveillance or monitoring programmes should focus on likely threat.,,, and ecological or economic concerns, should be as simple, robust and inexpensive as possible, should be sustained and consistent, and should involve local people and volunteers. If it is to be effective, monitoring must have a clear linkage to wetland management. Ideally, it should form part of each country's wetland policy. I suggest sonic variables that could be incorporated in sustainable long-term monitoring programmes. Two examples of successful surveillance,work at Kenyan wetlands illustrate (hat the challenges involved in long-term programmes can, at least in part, be overcome.

Beraud, J., P. Fine, U. Yermiyahu, M. Keinan, R. Rosenberg, A. Hadas and A. Bar-Tal (2005). "Modeling carbon and nitrogen transformations for adjustment of compost application with nitrogen uptake by wheat." Journal of Environmental Quality **34**(2): 664-675.
<Go to ISI>://WOS:000228014800030

Environmentally sound management of the use of composts in agriculture relies on matching the rate of release of available N from compost-amended soils to the crop demand. To develop such management it is necessary to (i) characterize the properties of composts that control their rates of decomposition and release of N and (ii) determine the optimal amount of composts that should be applied annually to wheat (Triticum aestivum L.). Carbon and N mineralization were measured under controlled conditions to determine compost decomposition rate parameters, and the NCSOIL model was used to derive the organic wastes parameters that control the rates of N and C transformations in the soil. We also characterized the effect of a drying period to estimate the effects of the dry season on C and N dynamics in the soil. The optimized compost parameters were then used to predict mineral N concentration dynamics in a soil-wheat system after successive annual applications of compost. Sewage sludge compost (SSC) and cattle manure compost (CMC) mineralization characteristics showed similar partitioning into two components of differing ease of decomposition. The labile component accounted for 16 to 20% of total C and 11 to 14% of total N, and it decomposed at a rate of 2.4 x 10(-2) d(-1), whereas the resistant pool had a decomposition rate constant of 1.2 to 1.4 x 10(-4) d(-1). The main differences between the two composts resulted from their total C and N and inorganic N contents, which were determined analytically. The longterm effect of a drying period on C and N mineralization was negligible. Use of these optimization results in a simulation of compost mineralization under a wheat crop, with a modified plant-effect version of the NCSOIL model, enabled us to evaluate the effects of the following factors on the C and N dynamics in soil: (i) soil temperature, (ii) mineral N uptake by plants, and (iii) release of very labile organic C in root exudates. This labile organic C enhanced N immobilization following application, and so decreased the N available for uptake by plants.

Berenbaum, M. (2001). "Pesticide resistance: Getting off the treadmill." Ecological Society of America Annual Meeting Abstracts **86**: 7.
<Go to ISI>://BIOSIS:PREV200200289294

Beswick, K. M., T. W. Choularton, D. W. F. Inglis, A. J. Dore and D. Fowler (2003). "Influences on long-term trends in ion concentration and deposition at Holme Moss." Atmospheric Environment **37**(14): 1927-1940.
<Go to ISI>://000182301700007

Long-term monitoring of rain and cloud water has been carried out at a high level site within the urban plume downwind of Manchester in north-west England. Samples have been taken weekly at Holme Moss. The site experiences significant orographic cloud cover, resulting in enhancement of rainfall volume via the seeder-feeder process. Samples are analysed for major ions, with the results being interpreted in the light of the effects of the seeder-feeder enhancement and reductions in UK emissions of pollutants. Rainfall volume enhancement is dependent on the spatial and temporal extent of orographic cloud at the site, with resultant consequences on ionic strength in the samples. Large rainfall amounts are associated with longer cloud duration and lower cloud base. Rain passing through the cloud scavenges proportionately more larger droplets, resulting in relatively lower ionic concentration. Coupled with increased washout upwind, this limits the amount of deposition, with some ions showing a decrease in deposition at high rainfall amounts. Clear downward trends are seen in sulphate concentration in rain and cloud water, with both emissions reduction and the dilution effect of increasing rainfall being responsible. Less significant downward trends are observed for nitrate,,although this is in line with national patterns of deposition. Deposition at Holme Moss for all ions is dominated by the prevailing, predominantly maritime, southwesterly airflow, although for non-marine ions there are significant contributions from the industrial areas of Yorkshire to the east, and to a lesser extent the Birmingham conurbation to the south. (C) 2003 Elsevier Science Ltd. All rights reserved.

Bhattacharyya, T., D. K. Pal, M. Easter, S. Williams, K. Paustian, E. Milne, P. Chandran, S. K. Ray, C. Mandal, K. Coleman, P. Falloon, D. Powlson and K. S. Gajbhiye (2007). "Evaluating the century C model using long-term fertilizer trials in the Indo-Gangetic Plains, India." Agriculture Ecosystems & Environment **122**(1): 73-83.
<Go to ISI>://WOS:000246320300008

The GEFSOC Project developed a system for estimating soil carbon (C) stocks and changes at the national and sub-national scale. As part of the development of the system, the Century ecosystem model was evaluated for its ability to simulate soil organic C (SOC) changes in environmental conditions in the Indo-Gangetic Plains, India (IGP). Two long-term fertilizer trials (LTFT), with all necessary parameters needed to run Century, were used for this purpose: a jute (Corchorus capsularis L.), rice (Oryza sativa L.) and wheat (Triticum aestivum L.) trial at Barrackpore, West Bengal, and a rice-wheat trial at Ludhiana, Punjab. The trials represent two contrasting climates of the IGP, viz. semi-arid, dry with mean annual rainfall (MAR) of < 800 mm and humid with > 1600 turn. Both trials involved several different treatments with different organic and inorganic fertilizer inputs. In general, the model tended to overestimate treatment effects by approximately 15%. At the semi-arid site, modelled data simulated actual data reasonably well for all treatments, with the control and chemical N + farm yard manure showing the best agreement (RMSE = 7). At the humid site, Century performed less well. This could have been due to a range of factors including site history. During the study, Century was calibrated to simulate crop yields for the two sites considered using data from across the Indian IGP. However, further adjustments may improve model performance at these sites and others in the IGP. The availability of more longterm experimental data sets (especially those involving flooded lowland rice and triple cropping systems from the IGP) for testing and validation is critical to the application of the model's predictive capabilities for this area of the Indian sub-continent. (C) 2007 Elsevier B.V. All rights reserved.

Bigelow, C. A., D. C. Bowman and D. K. Cassel (2004). "Physical properties of three sand size classes amended with inorganic materials or sphagnum peat moss for putting green rootzones." Crop Science **44**(3): 900-907.
<Go to ISI>://WOS:000221390000028

Modern putting green rootzones are typically constructed using sands to avoid compaction and facilitate rapid drainage. Sands are often amended with organic matter (OM) such as sphagnum peat moss (SP) to increase moisture holding capacity. However, OM

decomposition into finely divided material may negatively affect longterm soil physical properties. Inorganic amendments (IAs) having high water retention may be more suitable because of their resistance to biodegradation. A laboratory study determined the physical properties [bulk density, saturated hydraulic conductivity (K-sat), water retention, and pore size distribution] of three USDA sand size classes (fine, medium, and coarse) with and without amendment. Amendments used were calcined clay, vitrified clay, extruded diatomaceous earth, a processed zeolite, and SP. Amendments were tested at two incorporation rates (10 and 20% v/v), and in situ in 30-cm-deep rootzones at two incorporation depths (15 and 30 cm). Bulk density decreased, total porosity increased, and K-sat declined with amendment rate, but varied considerably depending on amendment, sand size, and incorporation depth. The K-sat was high for all mixtures, averaging 250 cm h(-1), probably because of the very uniform sands. On the basis of standard pressure plate methods, IAs increased total water holding capacity (WHC) of all three sands but did not increase available water. However, a unique bioassay for available water indicated that porous IAs may contain appreciably more available water than measured by the pressure plate technique. Although the IAs significantly altered the physical properties of the three sands, they were not as effective as SP at improving water retention in coarse-textured, drought-prone sands.

Blaise, D., C. D. Ravindran and J. V. Singh (2007). "Effect of nutrient-management practices on growth, fruiting pattern, and yield of Asiatic cotton (Gossypium arboreum L.)." Journal of Plant Nutrition and Soil Science-Zeitschrift Fur Pflanzenernahrung Und Bodenkunde **170**(3): 426-433.
<Go to ISI>://WOS:000247607300016

Asiatic cotton (Gossypium arboreum) is mostly grown in the rainfed regions of India. However, little is known about the effects of nutrient-management practices on plant growth and fruiting pattern of Asiatic cotton. Therefore, plant growth and fruiting pattern under four nutrient-management treatments, N, NPK, FYM (10 Mg ha(-1)), and INM (integrated nutrient management: a combination of NPK and FYM) were quantified during 2000-01 to 2002-03 (years 16 to 18 of a long-term field experiment). Plants of the INM and FYM treatments were taller (68.4-149.5cm) and had more main stem nodes per plant (30.5-44.5) as compared to N and NPK treatments. In treatment N, the shortest plants (50.9-83.6cm) and the least number of fruiting structures were produced. Plants of the INM and FYM treatments accumulated more squares and bolls. Maximum boll production was 10-19 days earlier with the manure-amended than the N and NPK treatments. Treatment N had the lowest seed cotton yield (639-790 kg ha-1), because of small boll size (1.48-1.73 g) and few open bolls. Seed cotton yield followed the trend: NPK (815-1278kg ha(-1)) < INM (776-1551 kg ha(-1)) < FYM (902-1593 kg ha(-1)). Water stress and nutrient deficiencies (P and Zn in the N and Zn in the NPK treatments) as a consequence of nutrient depletion over the years may have decreased seed cotton yields in treatments that received mineral fertilizer alone in comparison with manure-amended treatments. On a longterm basis, FYM application should therefore form an integral part of nutrient recommendation.

Blanchard, P., M. Festa-Bianchet, J. M. Gaillard and J. T. Jorgenson (2003). "A test of long-term fecal nitrogen monitoring to evaluate nutritional status in bighorn sheep." Journal of Wildlife Management **67**(3): 477-484.
<Go to ISI>://000184297500003

We analyzed 23 years of monitoring data from a bighorn sheep (Ovis canadensis) population to determine whether fecal nitrogen (FN), expected to reflect diet quality, can be used to track population nutritional status over the long term. We considered 3 measures of FN: its maximum value each spring (FN peak), the date of the peak, and the area under the curve relating julian date to summer FN (FN-total). We first determined the sources of variation in these 3 measures. Population density had a strong negative effect on FN-total while summer precipitation was positively related to FN-total, suggesting that diet quality declined with increasing density and improved with precipitation. Most sheep were recaptured every year, allowing us to assess FN as an indicator of nutritional condition by examining the relationships between summer mass gain and both FN peak and FN-total. The value of FN peak was not related to summer mass gain for any sex-age class, but FN-total was positively related to Summer mass gain of nonlactating females and yearling females. Our results suggest that FN can be used as an index of forage quality over several years. Over several years, FN also reflects aspects of bighorn sheep body growth and is correlated with changes in density that may ultimately affect population performance. Short-term monitoring of FN, however, may not provide much useful information.

Blanco-Canqui, H., R. Lal and R. Lemus (2005). "Soil aggregate properties and organic carbon for switchgrass and traditional agricultural systems in the southeastern United States." Soil Science **170**(12): 998-1012.
<Go to ISI>://WOS:000234359700005

Switchgrass (Panicum virgatum L.), a potential biofiael crop, can sequester soil organic carbon (SOC) and improve soil quality. However, its influence on soil aggregate mechanical properties controlling the macro-scale behavior of the whole soil needs to be assessed to understand processes that affect soil quality. This study assessed the impact of long-term (> 10 years) switchgrass, row crop, cool season grass pasture, and forest management on properties of soil aggregates for five ecosystems in the southeastern United States, including Blacksburg and Orange (VA), Knoxville (TN), Morgantown (WV), and Raleigh (NC). Relationships among aggregate properties were also determined. Tensile strength (TS), bulk density (p,g,), soil moisture retention (SMR), and SOC concentration of 1- to 8-mm aggregates were determined at the 0- to 10-cm and 10- to 20-cm soil depths. Management significantly affected the aggregate properties ($P < 0.05$), but the magnitude of the effects was site-dependent. The TS for switchgrass was the lowest (similar to 271 kPa) at all but the Blacksburg site for the 0- to 10-cm depth. The rho(agg) for switchgrass was 10% lower at Blacksburg and 20% lower at Orange than that for row crop at the 0- to 10-cm depth. The SOC concentration for switchgrass was 2.5 times higher than that for row crop at Orange but not at Blacksburg. The TS increased with increasing rho(agg) at Morgantown and Raleigh, but it decreased with increasing aggregate size at all sites. Aggregate size, rho(agg), and SOC were significant predictors of TS. Longterm switchgrass systems in the southeastern United States improve the aggregate strength properties, unlike row crop and cool season grass pastures, but their impact on SOC concentration is variable.

Bogdanov, S., V. Kilchenmann, K. Seiler, H. Pfefferli, T. Frey, B. Roux, P. Wenk and J. Noser (2004). "Residues of para-dichlorobenzene in honey and beeswax." Journal of Apicultural Research **43**(1): 14-16.

<Go to ISI>://000221055500003

Para-dichlorobenzene (PDCB) is an insecticide used in beekeeping for wax moth control. Analysis of PDCB residues were carried out on Swiss retail market honey samples by the cantonal food control authorities in 1997, 1998, 2000, 2001 and 2002. 173 Swiss honeys and 287 imported samples were analysed. On average, 30% of the Swiss honeys contained PDCB, 13% of them being above the Swiss tolerance value of 10 mug/kg. On the other hand, only 7% of the imported honeys were contaminated. The minimum values were 2 mug/kg, the maximum ones 112 mug/kg. Long-term monitoring of Swiss beeswax, carried out from 1993 to 2000, showed that most of the comb foundation beeswax produced in Switzerland is contaminated by PDCB with values ranging from one to 60 mg/kg. The results show that the reason for this contamination is the use of PDCB for the control of wax moth. These residues can be avoided as wax moth can be controlled successfully with alternative methods, carried out according to good apicultural practice.

Boller, M. (1997). "Tracking heavy metals reveals sustainability deficits of urban drainage systems." Water Science and Technology **35**(9): 77-87.
<Go to ISI>://WOS:A1997XW73100008

Heavy metals such as cadmium, copper, lead and zinc are the critical metals in domestic wastewaters. Based on mass flow studies, the runoff from roofs and streets contribute 50-80% of these metals to the total mass flow in domestic sewage. Depending on the sewerage concept, the metals accumulate in different environmental compartments. With the combined sewer system, most commonly applied, the major part of the metals is bound to the sludge during sewage treatment If the sludge is used in agriculture, the metals are enriched slowly in the top soils. With separate sewer systems, the metal loads to the receiving waters are increased, finally leading to accumulation in the sediments. If the new concept for the infiltration of runoff waters is applied, rapid and concentrated accumulation at the infiltration sites will occur. As a short term measure, new adsorptive elements in infiltration facilities would allow us to control the accumulation. The deposition of heavy metals in the environment cannot be avoided as long as no further efforts are made to reduce metal emission at the source. New partnerships between environmental/sanitary engineers and other professional groups such as architects, plumbers. car engineers, material technologists have to be established in order to minimize diffuse longterm deposition of hazardous substances and to be able to realize sustainable small water cycles without negative side-effects. (C) 1997 IAWQ. Published by Elsevier Science Ltd.

Bonkoungou, E. and R. Catinot (1989). "[The forest, the land, and man]." Developpement et sante : revue de perfectionnement medical et sanitaire en pays tropical(84): 23-7.
<Go to ISI>://MEDLINE:12282919

The faulty perception of the natural environment and cultural practices of the Sahel have led to inappropriate responses to the problems of providing firewood and of deforestation. The public rapidly became aware of damage caused by deforestation of the Sahel, but the tendency to attribute the damage to collection of firewood was overly simplistic. When desertification began to attract notice, there was little scientific, technical, or statistical knowledge of the dry zone forest. Research efforts were concentrated on the humid zone forests which were perceived to be potentially more lucrative. No systematic inventories of the dry zone forests or studies of their regeneration were available. In fact, under traditional cultivation techniques the clearing of the land did not cause destruction of the ecosystem because of its capacity for regeneration so long as the land was allowed to lie fallow. Most of the tree plantations installed by governments and nongovernmental organizations have failed because they were planted in overly dry zones, the species chosen where not appropriate for the climate, or the local populations were unable to care for them at times when their own time requirements for agriculture were greatest. In addition, the tree plantings did not provide the other foods and forest products utilized in cooking, curing, and trade. In traditional agriculture, a family plot of hectare or more is cleared, cultivated for 2-3 years, allowed to lie fallow for 8-9 years, and cultivated again for 2-3 years before being abandoned to a longterm fallow when the family moves on. Demographic growth in the region has led to a general shortening of fallow periods and cultivation of increasingly fragile and marginal zones. This factor, and pasturing of excessive numbers of animals, have been the main causes of desertification. New cultivation patterns and more appropriate tree plantings are urgently needed. Field studies should be conducted to help identify ecologically appropriate and socially accepted measures. If the current system is allowed to continue, catastrophic deforestation will ensue.

Borken, W. and E. Matzner (2004). "Nitrate leaching in forest soils: an analysis of long-term monitoring sites in Germany." Journal of Plant Nutrition and Soil Science-Zeitschrift Fur Pflanzenernahrung Und Bodenkunde **167**(3): 277-283.
<Go to ISI>://000222121200004

Elevated atmospheric inputs of NH4+ and NO3- have caused N saturation of many forest ecosystems in Central Europe, but the fate of deposited N that is not bounded by trees remains largely unknown. It is expected that an increase of NO3 leaching from forest soils may harm the quality of groundwater in many regions. The objective of this study was to analyze the input and output of NH4+ and NO 3 - at 57 sites with mature forest stands in Germany. These long-term study sites are part of the European Level 11 program and comprise 17 beech, 14 spruce, 17 pine, and 9 oak stands. The chloride balance method was used to calculate seepage fluxes and inorganic N leaching below the rooting zone for the period from 1996 to 2001. Nitrogen input by throughfall was significantly different among most forest types, and was in the order: spruce > beech/oak > pine. These differences can be largely explained by the amount of precipitation and, thus, it mirrors the regional and climatic distribution of these forest types in Germany. Mean long-term N output with seepage was log-normal distributed, and ranged between 0 and 26.5 kg N ha(-1) yr(-1), whereby 29 % of the sites released more than 5 kg N ha(-1) yr(-1). Leaching of inorganic N was only significantly lower in the pine stands ($P < 0.05$) compared with leaching rates of the spruce stands. Median N output : input ratio ranged between 0.04 and 0.11 for the beech, oak, and pine stands, while the input : output ratio of the spruce stands was 0.24, suggesting a higher risk of NO3 leaching in spruce forests. Following log-transformation of the data, N input explained 38 % of the variance in N output. The stratification of the data by the C : N ratio of the 0 horizon or the top mineral soil revealed that forests soils with a C : N ratio < 25 released significantly more NO3 (median of 4.6 kg N ha(-1) yr(-1)) than forests with a C : N ratio > 25 (median of 0.8 kg N ha(-1) yr(-1)). The stratification improved the correlation between N input and N output for sites with C : N ratios < 25 ($r2 = 0.47$) while the correlation for sites with C : N ratios > 25 was weaker ($r(2) = 0.21$) compared with the complete data set. Our results suggest that NO3- leaching may increase

in soils with wide C: N ratios when IN deposition remains on a high level and that the potential to store inorganic N decreases with C : N ratios in the O horizons becoming more narrow.

Borsuk, M. E., C. A. Stow and K. H. Reckhow (2004). "A Bayesian network of eutrophication models for synthesis, prediction, and uncertainty analysis." Ecological Modelling **173**(2-3): 219-239.
<Go to ISI>://000220480700006

A Bayesian network consists of a graphical structure and a probabilistic description of the relationships among variables in a system. The graphical structure explicitly represents cause-and-effect assumptions that allow a complex causal chain linking actions to outcomes to be factored into an articulated series of conditional relationships. Each of these relationships can then be independently quantified using a submodel suitable for the type and scale of information available. This approach is particularly useful for ecological modelling because predictable patterns may emerge at a variety of scales, necessitating a multiplicity of model forms. As an example, we describe a Bayesian network integrating models of the various processes involved in eutrophication in the Neuse River estuary, North Carolina. These models were developed using a range of methods, including: process-based models statistically fit to long-term monitoring data, Bayesian hierarchical modelling of cross-system data gathered from the literature, multivariate regression modelling of mesocosm experiments, and judgements elicited from scientific experts. The ability of the network to accommodate such a diversity of methods allowed for the prediction of policy-relevant ecosystem attributes not normally included in models of eutrophication. All of the submodels in the network include estimates of predictive uncertainty in the form of probability distributions which are propagated to model endpoints. Predictions expressed as probabilities give stakeholders and decision-makers a realistic appraisal of the chances of achieving desired outcomes under alternative nutrient management strategies. In general, the further down the causal chain a variable was, the greater the predictive uncertainty. This suggests that a compromise is necessary between policy relevance and predictive precision, and that, to select defensible environmental management strategies, public officials must adopt decision- making methods that deal explicitly with scientific uncertainty.

Bouma, J. and M. J. D. Hacktenbroeke (1993). "Simulation Modeling as a Method to Study Land Qualities and Crop Productivity Related to Soil-Structure Differences." Geoderma **57**(1-2): 51-67.
<Go to ISI>://A1993KY59300003

Research on soil biota under natural conditions in the field is complicated because large fluctuations in populations of certain species may occur as a result of natural or man-induced fluctuations in soil physical and chemical conditions. As a result, many experiments have therefore been made in the laboratory under controlled conditions. Though quite valuable, such data may be difficult to extrapolate to field conditions. To better relate biotic data to physical and chemical conditions in the field, expensive long-term monitoring programs can be initiated to collect both types of data. Physical, and chemical processes in soils can also be characterized by simulation techniques. Simulation requires one-time measurement of some basic and characteristic soil parameters, such as hydraulic conductivity and moisture retention, which are used in a model that calculates water contents in the soil at any given depth and time as a function of precipitation, evaporation and water table levels. Simulation modelling has been applied successfully to calculate water regimes in the soil, for periods of many years. The technique would appear to be particularly appropriate for use in a dynamic physical characterization of different types of soil structure, formed by various soil biota. Results are presented of a study in a sandy loam soil in the Netherlands with biogenic structures in grassland and a more compact physicogenic structure in arable land. Measured hydraulic conductivity and moisture retention data, and their variability were used in a simulation model to calculate important land qualities for a thirty year period. Land qualities were expressed in stochastic terms by focusing on the probability that certain water and associated air contents and trafficabilities would occur at any given data. Results also reflected the effects of variability of input data. Exploratory modelling was used in this study to estimate effects of an increase of the hydraulic conductivity (which might result from an increase of biological activity), on water and air contents in the soil during the year.

Bourdot, G. W., S. V. Fowler, G. R. Edwards, D. J. Kriticos, J. M. Kean, A. Rahman and A. J. Parsons (2007). "Pastoral weeds in New Zealand: status and potential solutions." New Zealand Journal of Agricultural Research **50**(2): 139-161.
<Go to ISI>://WOS:000248244800005

Currently there are some 187 plant species, almost all exotic in origin, occurring as "weeds" in pastures in New Zealand. Judging from their occurrence in scientific papers published in the proceedings of the New Zealand Plant Protection Society, 65 of these species are, or have been considered historically, to be significant pastoral weeds. While 34 of these pastoral weeds are currently being managed under Regional Pest Management Strategies, 15 of these regionally managed species are apparently un-researched in New Zealand, implying that their management does not have a scientific basis. The aggregate cost of pastoral weeds to the New Zealand economy is estimated to be NZ$1.2 billion per annum, based on an analysis made in 1984, but this analysis is hampered by a lack of both objective data on the impacts of weeds on pastoral production and an accurate and comprehensive national census of the main problem species. Ongoing naturalisations, from an existing pool of exotic plant species estimated currently at 25 000, and new arrivals through international trade in plant species and germplasm, can be expected to steadily add to, the list of pastoral weeds. Prioritisation of these weed species will be necessary if New Zealand's pastoral agricultural industries are to make longterm, economically optimal decisions about their management. Such prioritisation will require robust models of their current and potential distributions, their rates of population increase and spread, a full understanding of the merits and pitfalls of alternative control options, and robust models of their impacts on pastoral productivity. Currently there are some 187 plant species, almost all exotic in origin, occurring as "weeds" in pastures in New Zealand. Judging from

Bragg, D. C., M. G. Shelton and B. Zeide (2003). "Impacts and management implications of ice storms on forests in the southern United States." Forest Ecology and Management **186**(1-3): 99-123.
<Go to ISI>://000186868100009

This review explores the ecological and silvicultural impacts of ice storms on forests in the southern United States. Different environmental factors like weather conditions, topography, vegetation, stand density, and management practices influence the degree of glaze damage a particular forest may experience. Additionally, the frequent contradictions in the relationships between these factors and the resulting damage suggests a complexity that makes each ice storm unique and difficult to predict. We recommend a series of silvicultural responses to ice storms, including density management, planting species selection, post-event evaluation, salvage, stand rehabilitation, and long-term monitoring of forest health. Published by Elsevier B.V.

Breckling Broder, Reuter Hauke and Verhoeven Richard, Eds. (2008). Implications of GM-Crop Cultivation at Large Spatial Scales, Proceedings of the GMLS-Conference 2008 in Bremen. Bremen and Frankfurt am Main, Berlin, Bern, Bruxelles, New York, Oxford, Wien,, Peter Lang.
http://www.peterlang.com/LOCALPDF/Buecher/BookDetail_58939.pdf?CFID=26834529&CFTOKEN=33100549

Ecological, agricultural and economic implications of genetically modified plants on large spatial scales are currently discussed in science, administration, and in the context of agricultural practice. It is still controversial how effects with great spatial extent can be assessed in risk analysis, in the approval procedure, in the planning of co-existence measures, and in post market monitoring. With this volume we present the proceedings of the international conference on «Implications of GM-Crop

Cultivation at Large Spatial Scales, GMLS 2008», which provided a platform to collate and discuss available methods, strategies and the state-of-the-art in the relevant disciplines. The conference was held at the University of Bremen, Germany, 2nd to 4th of April 2008.

Contents : Karin Mathes: Welcome Address of the Vice President of the Bremen State Parliament - Christoph Then/Antje Lorch: A simple question in a complex environment: how much Bt toxin do genetically engineered MON810 maize plants actually produce? - Algimantas Paulauskas/Milda Jodinskiene/Judita Zukauskiene: Identification of suitable RAPD primers to analyse oilseed rape (Brassica napus L.) genetic variability in some regions of Lithuania - Barbara Pipan/JelkaSustar-Vozlic/Vladimir Meglic: Oilseed rape production at the Slovenian landscape level and survey of crop to wild gene flow - Rikke B. Jørgensen/Thure Hauser/Tina D'Hertefeldt: The variability of processes involved in transgene dispersal - case studies from Brassica and other crop genera - Terje Traavik: GMOs and their unmodified counterparts: substantially equivalent or different? - Christiane Eschenbach/Andreas Rinker/David Windhorst/Wilhelm Windhorst: Cause effect chains on potential GMO cropping in Schleswig-Holstein - Karen Höltl/Angelika Wurbs: Simulation of GM maize-cultivation scenarios under different coexistence regulations - Hauke Reuter/Simone Böckmann/Broder Breckling: Analysing cross-pollination studies in maize - Hauke Reuter/Broder Breckling/ Angelika Wurbs/Karen Höltl: Modelling maize cross-pollination probabilities on the regional level - exemplary simulations for the county Elbe Elster in Brandenburg, Germany - Simone Gorelli/Alessandro Santucci/Elena Balducci/Marco Mazzoncini/Riccardo Russu: Spatial simulation model to analyse pollen dispersal and coexistence scenarios between GM and GM-free crops, Nathalie Colbach: Effect of cropping systems on species dynamics and gene flow at the landscape level - a modelling approach - Victoria I. S. Lenz-Wiedemann/Christian W. Klar/Karl Schneider: Assessing ecohydrological impacts of crops in a catchment area - Anja Vaasen/Achim Gathmann/Jana Storch/Detlef Bartsch: Public GMO location registers in Germany for supporting national monitoring measures - Wiebke Züghart: Long-term and large-scale effects of genetically modified organism require specific environmental monitoring designs - Jürgen Franzaring/Ingo Holz/Andreas Fangmeier/Jürgen Zipperle: Standardised exposure of bait plants to determine the outcrossing from oilseed rape (OSR) into wild relatives - Jürgen Franzaring/Ingo Holz/Andreas Fangmeier/Jürgen Zipperle: Monitoring the absence of glyphosate and glufosinate resistance traits in feral oilseed rape and wild crucifer populations - Maren Langhof/Bernd Hommel/Alexander Hüsken/Joachim Schiemann/Peter Wehling/Ralf Wilhelm/Gerhard Rühl: Large-scale field trials on gene flow in maize for the development of coexistence measures - Maren Langhof/Bernd Hommel/Alexandra Hüsken/Joachim Schiemann/Peter Wehling/Ralf Wilhelm/Gerhard Rühl: Two year field study on maize gene flow over large distances - Lukas Kleppin/Gunther Schmidt/Winfried Schröder: Web-based Geoinformation Systems: application for GMO related issues - Geoffrey R. Squire/Cathy Hawes/Graham Begg/Ali Karley/Pietro Iannetta/Mark Young: Cumulative impacts of GM herbicide-tolerant cropping on arable plants assessed through species-based and functional taxonomies - Masaharu Kawata: Dispersal and persistence of genetically modified oilseed rape around Japanese harbours - Ewen Mullins/Yann Tricault/Paul Flanagan/Nathalie Colbach/Reamonn Fealy: Developing strategies to assist in the coexistence of GM and non-GM oilseed rape crops on an Irish landscape - Antje Lorch: GM agrofuels - more problems to come. Denis W. Aheto/Broder Breckling: Analysis of the spatial density and neighbourhood distances of cultivated oilseed rape (Brassica napus) fields in Northern Germany, Walter Haefeker: Co-existence of GM-crops with beekeeping - impact of GM-crops on the supply chain for honey and other bee products - Angela Cordeiro Antonio Carlos Alves/Juliana Ogliari: Challenges for co-existence in samll-scale farming: the case of maize in Brazil - Paul Flanagan/Conor Meade/Ewen Mullins: Evaluating management strategies to mitigate the impact of seed-mediated gene flow - Kathrin Pascher/Dietmar Moser/Stefan Dullinger/Leopold Sachslehner/Helmut Höttinger/Andreas Traxler/Norbert Sauberer/Thomas Frank/Georg Grabherr: Monitoring design to evaluate biodiversity in Austrian agricultural regions - Stéphane McLachlan/Ian Mauro/Alexis Knispel: Beauty and the beast: the socio-ecology of GM canola in Western Canada - Kathleen Hewlett/Gundula Azeez: The economic impacts of GM contamination incidents on the organic sector - Matty Demont/Koen Dillen/Eric Tollens: Economics of spatial coexistence: isolation distances versus pollen barriers - Katja Rath: The potential of green gene technology in biomass production - a legal examination - Broder Breckling: Evolutionary integrity - an issue to be considered in the long-term and large-scale assessment of genetically modified organisms - Florian Keil/Thomas Jahn: Social-ecological approaches to address and manage systemic risks - Stefan Böschen: Hybrid regimes of knowledge: challenges for specifying non-knowledge in the context of the GMO-debate.

Brookes, P. C., A. Gildon, P. W. Lane and A. E. Johnston (1979). "Effects of Different Watering Methods, Soil Weights, Soil Diluents and Soil Coverings on the Yield and Nutrient-Uptake by Ryegrass Grown in a Controlled Environment." Journal of the Science of Food and Agriculture **30**(5): 528-531.
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Brussaard, L., V. M. Behan-Pelletier, D. E. Bignell, V. K. Brown, W. Didden, P. Folgarait, C. Fragoso, D. W. Freckman, V. Gupta, T. Hattori, D. L. Hawksworth, C. Klopatek, P. Lavelle, D. W. Malloch, J. Rusek, B. Soderstrom, J. M. Tiedje and R. A. Virginia (1997). "Biodiversity and ecosystem functioning in soil." Ambio **26**(8): 563-570.
<Go to ISI>://WOS:000071643500017

We review the current knowledge on biodiversity in soils, its role in ecosystem processes, its importance for human purposes, and its resilience against stress and disturbance. The number of existing species is vastly higher than the number described, even in the macroscopically visible taxa, and biogeographical syntheses are largely lacking. A major effort in taxonomy and the training of a new generation of systematists is imperative. This effort has to be focussed on the groups of soil organisms that, to the best of our knowledge, play key roles in ecosystem functioning. To identify such groups, spheres of influence (SOI) of soil biota - such as the root biota, the shredders of organic matter and the soil bioturbators - are recognized that presumably control ecosystem processes, for example, through interactions with plants. Within those SOI, functional groups of soil organisms are recognized. Research questions of the highest urgency are the assignment of species to functional groups and determining the redundancy of species within functional groups. These priorities follow from the need to address the extent of any loss of functioning in soils, associated with intensive agriculture, forest disturbance, pollution of the environment, and global environmental change. The soil biota considered at present to be most at risk are species-poor functional groups among macrofaunal shredders of organic matter, bioturbators of soil, specialized bacteria like nitrifiers and nitrogen fixers, and fungiforming mycorrhizas. An experimental approach in addressing these research priorities is needed, using longterm and large-scale field experiments and modern methods of geostatistics and geographic information systems.

Buczko, U., R. O. Kuchenbuch and B. Lennartz "Assessment of the predictive quality of simple indicator approaches for nitrate leaching from agricultural fields." Journal of Environmental Management **91**(6): 1305-1315.
<Go to ISI>://WOS:000277760800007

Diffuse N losses from agriculture are a major cause of excessive nitrate concentrations in surface and groundwaters. Leaching through the soil is the main pathway of nitrate loss. For environmental management, an anticipatory assessment and monitoring of nitrate leaching risk by indicator (index) approaches is increasingly being used. Although complex Nitrogen Loss Indicator (NLI) approaches may provide more information, relatively simple NLIs may have advantages in many practical situations, for instance, when data availability is restricted. In this study, we tested four simple NLIs to assess their predictive properties: 1. N balance (Nbal); 2. Exchange frequency of soil solution (EF); 3. Potential nitrate concentration in leachate (PNCL); 4. A composite NLI (balance exchange frequency product, BEP). Field data of nitrate leaching from two sites in northeast Germany along with published data from several sites in Germany, Scotland and the USA were utilized. Nbal proved to be a relatively poor indicator of Nloss for the time frame of one year, whereas its prediction accuracy improved for longterm-averaged data. Correlation between calculated EF and experimental data was high for single-year data, whereas it was lower for longterm-averaged data. PNCL gave no significant correlations with measured data and high deviations. The results for BEP were intermediate between those for Nbal and EF. The results suggest that the use of EF is appropriate for assessing N leaching loss for single-year data and specific sites with comparable N input and management practices, whereas for longterm-averaged data. Nbal is better suited. BEP is an appropriate NLI both for single year and longterm data which accounts for source and transport factors and thus is more flexible than source-based Nbal and transport-based EF. However, such simplified NLIs have limitations: 1. The N cycle is not covered completely; 2. Processes in the vadose zone and the aquifer are neglected, 3. Assessment of management factors is restricted. (C) 2010 Elsevier Ltd. All rights reserved.

Burge, S. R. and R. G. Burge (2002). "Multiple-sensor, long-term monitoring system for environmental contaminants." Abstracts of Papers of the American Chemical Society **223**: 010-NUCL.
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Busck, A. G., S. P. Kristensen, S. Praestholm and J. Prinidahl (2008). "Porous landscapes - The case of Greater Copenhagen." Urban Forestry & Urban Greening **7**(3): 145-156.
<Go to ISI>://BIOSIS:PREV200800538938

Many blueprints for urban development argue for the benefits of a sharp distinction between rural and urban space. While Such planning designs have been quite Successful in maintaining a physical distinction between rural and urban, major transformations of the socio-economic environment in peri-urban areas are creating a more diffuse and Porous interface.This paper examines socio-economic consequences of the current transformation of peri-urban areas. Three themes are elected for analysis: changing economies, Overall impact of urbanisation as perceived by the individual farm owner and the degree of their local orientation and engagement. Based on case Studies ill Greater Copenhagen, longitudinal trends and details of the Current situation are analysed. In addition, by differentiating between newcomers and longterm residents, possible future changes are indicated. The analysis shows that the importance of agriculture has declined, whereas Other gainful activities and residential use have increased. Thus, the functions Of the local economy and community are changing. An increasing proportion of the farm owners appreciate the proximity to urban agglomerations (public services, shopping, public transport, social relationships and markets), but this location also has drawbacks, for example in terms of uncertainty concerning future urban development, inconveniences For agricultural production and problems related to public access to private properties.Differences between newcomers and long-time residents are identified. Newcomers Without ally agricultural background are Frequent. They often work outside the municipality and are more frequently personally involved in Other gainful activities on-farm. Newcomers perceive more problems related to people accessing the farm properties and are less involved in local activities. In combination, these trends indicate possible Future increase in conflicts between farm owners and the public and that the local engagement may be declining. The analysis, however, also shows similarities between newcomers and long-time residents, and therefore does not indicate the development of two Cultures or "two nations". Rather, the urban fringe population is becoming more heterogeneous, ranging from full-time farmers to residents with their social and

professional network outside the local area or people engaging in non-agricultural business on-farm. (c) 2007 Elsevier GmbH. All rights reserved.

Bustos-Baez, S. and C. Frid (2003). "Using indicator species to assess the state of macrobenthic communities." Hydrobiologia **496**(1-3): 299-309.
<Go to ISI>://000185919300028

Environmental impact assessments are often followed by the continuous monitoring needed to determine community change. This long-term monitoring can be time-consuming and expensive. The concept of indicator species attempts to use their presence in a sample or area to characterise a certain degree of community change or pollution effects. This approach has been widely applied to benthic monitoring studies. However, many studies develop their own list of 'indicators' in cases without having a prior knowledge of the area or any long-term data. This can result in the production of circular arguments. We carry out a meta-analysis on data sets from 5 of the 20 designated United Kingdom's sewage sludge dumping grounds and the data set from the classic study of Pearson & Rosenberg (1978). We construct a number of indices to examine this robustness across studies. Having refined our criteria for an 'indicator taxa' we examine the spatial and temporal changes in macrobenthic communities occurring at the Tyne sewage sludge dumpsite to examine the utility of this approach. Of the total pool of 123 taxa, 81 taxa responded in one study only. While Spio filicornis (O. F. Muller), Spiophanes bombyx (Claparede), Lagis koreni (Malmgren) and Nephtys cirrosa (Ehlers) showed directly contradictory patterns in different locations. The Spearman's rank correlation test showed a significant negative relationship between the density of macro-litter per station found at the Tyne dumping ground and the abundance of Abra alba (Wood) (r(s) = 0.462, n = 6, P = 0.1) and Amphiura filiformis (O. F. Muller)(r(s) = 0.493, n = 6, P = 0.1). These were the only indicator taxa, which showed a strong relationship to sewage contamination. We therefore conclude that while the concept of indicators may be widely applicable, the actual indicator taxa are not. This demonstrate that the used of indicators must be continually developed providing prior information of the study area.

Butt, K. R., C. N. Lowe, J. Frederickson and A. J. Moffat (2004). "The development of sustainable earthworm populations at Calvert landfill site, UK." Land Degradation & Development **15**(1): 27-36.
<Go to ISI>://000189037000003

Earthworms Allolobophora chlorotica and Aporrectodea longa were inoculated into Calvert landfill site in spring 1992, in conjunction with the planting of two tree species Alnus glutinosa and Acer pseudoplatanus. Monitoring has taken place over a period of 11 years. Sampling in 2003 revealed that earthworm distribution no longer equated to the inoculation treatments; the worms had spread extensively. The presence of A. glutinosa had a significant effect($p < 0(.)01$) on earthworm number (mean density 198 m(-2)) and biomass (34 g m(-2)) compared to plots where A. pseudoplatanus had been planted and subsequently died (mean density 118 m(-2); biomass 21 g m(-2)). Results suggest that tree presence may be critical to earthworm community development. In 2002, the spread of A. chlorotica from the original points of inoculation had reached. 60 m with the highest recorded population density at 108 m(-2) with a mass of 18(.)6 g m(-2). A. longa was recorded at a distance of 132 m from the nearest point of inoculation with the highest recorded population density at 70 m(-2) with a mass of 49(.)3 g m(-2), 10 m from the original inoculation grid. Other species recorded (and % of total) were Aporrectodea rosea (0(.)9) Lumbricus castaneus (7(.)4), Eiseniella tetraedra (21(.)5) and Lumbricus rubellus (4(.)5). The two inoculated species, A. chlorotica (40(.)4) and A. longa (25(.)3), accounted for two thirds of the earthworms found on site. The highest earthworm community density was, 213 m(-2) with a mass of 73(.)9 g m(-2) at 10 m from original point of inoculation. In 1999, treatments of surface organic matter (OM), in the form of composted green waste, and rotavation were applied to non-replicated plots of 50 m(2) with the effects on earthworm distribution and abundance recorded in 2002. Addition of OM alone led to an increase in number and mass (331 m(-2); 95 g m(-2)) compared to the control (233 m(-2); 51 g m(-2)), while rotavation alone (111 m(-2); 36 g m(-2)) had a detrimental effect over the given time period. This long-term monitoring programme has demonstrated the development of sustainable earthworm communities on a landfill site. Natural nutrient accumulation and addition of OM on or into the soil-forming material appeared to assist this process. This work may help to inform post-capping treatment at similar landfill sites. Copyright (C) 2004 John Wiley Sons, Ltd.

Butt, K. R., M. J. Shipitalo, P. J. Bohlen, W. M. Edwards and R. W. Parmelee (1999). "Long-term trends in earthworm populations of cropped experimental watersheds in Ohio, USA." Pedobiologia **43**(6): 713-719.
<Go to ISI>://000084831700033

Earthworm communities in 7 experimental watersheds at Coshocton, Ohio were monitored twice annually (Spring and Autumn) for 5 years (1990-94). Sampling by formalin extraction was undertaken along a transect running up slope within the small (0.5-0.7 ha) watersheds that were used for row crop production under a variety of tillage practices. Six earthworm species were found: Aporrectodea turgida, A. trapezoides, Lumbricus rubellus, and Octolasion tyrtaeum present in all watersheds, plus A. tuberculata and L. terrestris with restricted distributions. In individual watersheds, earthworm density was lowest at 3 m(-2) (Autumn 1991) and highest at 397 m(-2) (Spring 1994), with overall watershed averages fluctuating between 55 and 247 m(-2). Tillage practice and crop type did not have, a significant effect on earthworm numbers ($p > 0.05$). Equally, position along the transect was not significant for all watersheds, however, in some years (e. g. 1991) more worms were found towards the slope bottom. This suggested a link with rainfall but no significant correlations were found between recorded rainfall and earthworm numbers over the 5 year period. Additional sampling during Spring 1994 using a combination of formalin extraction and hand-sorting revealed that some populations may have been underestimated by 75 % (this difference mainly due to the smaller species), but overall no significant differences were recorded ($p > 0.05$) for biomass or density. The presence of deep burrowing species has a marked effect on rainfall infiltration. Therefore, attempts were made to establish L. terrestris in one watershed where it was previously absent. These proved unsuccessful, even though a number of techniques were used. This indicated that the distribution of earthworms within this system was not simply a factor of colonisation ability.

Carneiro Amado, T. J., C. Bayer, P. C. Conceicao, E. Spagnollo, B.-H. Costa de Campos and M. da Veiga (2006). "Potential of carbon accumulation in no-till soils with intensive use and cover crops in southern Brazil." Journal of Environmental Quality **35**(4): 1599-1607.

<Go to ISI>://WOS:000239189900067

The area under no-till (NT) in Brazil reached 22 million ha in 20042005, of which approximately 45% was located in the southern states. From the 1970s to the mid-1980s, this region was a source of carbon dioxide to the atmosphere due to decrease of soil carbon (C) stocks and high consumption of fuel by intensive tillage. Since then, NT has partially restored the soil C lost and reduced the consumption of fossil fuels. To assess the potential of C accumulation in NT soils, four longterm experiments (7-19 yr) in subtropical soils (Paleudult, Paleudalf, and Hapludox) varying in soil texture (87-760 g kg(-1) of clay) in agroecologic southern Brazil zones (central region, northwest basaltic plateau in Rio Grande Sul, and west basaltic plateau in Santa Catarina) and with different cropping systems (soybean and maize) were investigated. The lability of soil organic matter (SOM) was calculated as the ratio of total organic carbon (TOC) to particulate organic carbon (POC), and the role of physical protection on stability of SOM was evaluated. In general, TOC and POC stocks in native grass correlated closely with clay content. Conversely, there was no clear effect of soil texture on C accumulation rates in NT soils, which ranged from 0.12 to 0.59 Mg ha(-1) yr(-1). The C accumulation was higher in NT than in conventional-till (CT) soils. The legume cover crops pigeon pea [Cajanus cajan (L.) Millsp] and velvet beans (Stizolobium cinereum Piper & Tracy) in NT maize cropping systems had the highest C accumulation rates (0.38-0.59 Mg ba(-1) yr(-1)). The intensive cropping systems also were effective 1 in increasing the C accumulation rates in NT soils (0.25-0.34 Mg ha(-1) yr(-1)) when compared to the double-crop system used by farmers. These results stress the role of N fixation in improving the tropical and subtropical cropping systems. The physical protection of SOM within soil aggregates was an important mechanism of C accumulation in the sandy clay loam Paleudult under NT. The cropping system and NT effects on C stocks were attributed to an increase in the lability of SOM, as evidenced by the higher POC to TOC ratio, which is very important to C and energy flux through the soil.

Carstensen, J., D. Conley and B. Muller-Karulis (2003). "Spatial and temporal resolution of carbon fluxes in a shallow coastal ecosystem, the Kattegat." Marine Ecology-Progress Series **252**: 35-50.
<Go to ISI>://000183325800003

Spatial and temporal variations in pelagic carbon fluxes were examined by means of a large-scale and long-term monitoring data set from the Kattegat, a shallow marginal sea impacted by man-induced eutrophication. Flows of carbon, nitrogen and phosphorus in the upper mixed layer (0 to 10 m) were estimated from a simple descriptive model using measurements of primary production, temperature, and phytoplankton/zooplankton biomass as input variables. For all years combined, annual primary production at coastal stations (171 g C m(-2) yr(-1); 8 stations) was almost twice that at the deeper open-water stations (105 g C m(-2) yr 1; 5 stations), which resulted in an annual primary production of 116 g C m(-2) yr(-1) for the region as a whole during the entire study period (1989 to 1997). Interannual variation in primary production was substantially smaller than the between-station variation. The phytoplankton spring bloom contributed substantially to annual production (10 to 20 %), but the magnitude and timing were highly variable between years. Respiration accounted for on average 12 % of the measured primary production. Annual sedimentation was estimated at 55 g C m(-2) yr(-1), equivalent to 54 % of net primary production. The estimated new production was significantly related to nitrogen loading from the land and atmosphere, and a regression analysis predicted declines of between 20 and 47 % in annual net primary production from a 50 % reduction in nitrogen loading. Carbon and nutrient fluxes are consistent with those of earlier studies from the Kattegat based on small-scale and short-term data sets. However, combining monitoring data with a budget model greatly improved data resolution in both time and space. Estimated C/N/P fluxes from the model can act as reliable indicators for assessing the state of eutrophication in the Kattegat and other inland seas impacted by man-induced nutrient loading.

Cassell, E. A., J. M. Dorioz, R. L. Kort, J. P. Hoffmann, D. W. Meals, D. Kirschtel and D. C. Braun (1998). "Modeling phosphorus dynamics in ecosystems: Mass balance and dynamic simulation approaches." Journal of Environmental Quality **27**(2): 293-298.
<Go to ISI>://WOS:000072723300007

Phosphorus (P) export from agriculture is a major cause of eutrophication in many lake ecosystems. Human activity, hydrology, and physicochemical and biological processes that store, transform, and transport P, define P export patterns over time and space. We suggest that an ecosystem paradigm is useful to holistically view P dynamics within complex watersheds. An ecosystem model of a dairy agricultural system was created within a hierarchical compartment-flux structure of a conceptual watershed ecosystem. Mass balance calculations with our Agriculture Ecosystem model (AEP model) describe P dynamics for the farm system, which are driven by the amount of P stored in agricultural soils and system management practices. Longterm P dynamics respond predominately to human interventions in watersheds and define conditions for future generations, Model simulations suggest that long-term environmental protection programs should incorporate the notions of P sustainability into management decisions. Dynamic simulation modeling is a valuable paradigm for understanding how complex watersheds process P and for developing management perspectives and public policy to achieve goals of environmental quality as well as economic and resource sustainability.

Castaldini, M., A. Turrini, C. Sbrana, A. Benedetti, M. Marchionni, S. Mocali, A. Fabiani, S. Landi, F. Santomassimo, B. Pietrangeli, M. P. Nuti, N. Miclaus and M. Giovannetti (2005). "Impact of Bt corn on rhizospheric and on beneficial mycorrhizal symbiosis and soil eubacterial communities iosis in experimental microcosms." Applied and Environmental Microbiology **71**(11): 6719-6729.
<Go to ISI>://000233225000033 AND http://www.ask-force.org/web/Longterm/Castaldini-Impact-Bt-Rhizospheric-2005.pdf

A polyphasic approach has been developed to gain knowledge of suitable key indicators for the evaluation of environmental impact of genetically modified Bt 11 and Bt 176 corn lines on soil ecosystems. We assessed the effects of Bt corn (which constitutively expresses the insecticidal toxin from Bacillus thuringiensis, encoded by the truncated Cry1Ab gene) and non-Bt corn plants and their residues on rhizospheric and bulk soil eubacterial communities by means of denaturing gradient gel electrophoresis analyses of 16S rRNA genes, on the nontarget mycorrhizal symbiont Glomus mosseae, and on soil respiration. Microcosm experiments showed differences in rhizospheric eubacterial communities associated with the three corn lines and a significantly lower level of mycorrhizal colonization in Bt 176 corn roots. In greenhouse experiments, differences between Bt and non-Bt corn plants were detected in rhizospheric eubacterial communities (both total and active), in culturable rhizospheric heterotrophic bacteria, and in mycorrhizal colonization. Plant residues of transgenic plants, plowed under at harvest and kept mixed with soil for up to 4 months, affected soil respiration, bacterial communities, and mycorrhizal establishment by indigenous endophytes. The multimodal approach utilized in

our work may be applied in long-term field studies aimed at monitoring the real hazard of genetically modified crops and their residues on nontarget soil microbial communities.

Catt, J. and I. Henderson (1993). "Rothamsted Experimental Station – 150 Years of Agricultural Research<br xmlns="http://pub2web.metastore.ingenta.com/ns/"></br> The Longest Continuous Scientific Experiment?" Interdisciplinary Science Reviews **18**(4): 365-378.
http://www.ingentaconnect.com/content/maney/isr/1993/00000018/00000004/art00010 AND http://dx.doi.org/10.1179/030801893789766609 AND http://www.ask-force.org/web/Longterm/Catt-Rothamsted-Experimental-Station-Longest-1993.pdf

In 1993, Rothamsted Experimental Station, the oldest agricultural research institute in the world, celebrated 150 years of experimental work on the production of farm crops. Most of the station's 'classical experiments', begun by its founder John (later Sir John) Lawes between 1843 and 1856, continue today and provide useful information for contemporary agriculture and ecology which Lawes could never have envisaged. These include development of a model for the turnover of organic matter in soil, assessments of the increasing pollution of soil by toxic metals and organic carcinogens resulting from twentieth century industrial activities, and insights into the ecological consequences of changes in agricultural policies. The experiments also provide many examples of the value of long term, systematic data collection and interdisciplinary research in agricultural production, ecology and environmental pollution. Facilities for this work became available through the scientific flair and foresight of Lawes, and since his death have been maintained and extended by generations of dedicated scientists.

Chai, J. C. and N. Miura (2004). "Field vapor extraction test and long-term monitoring at a PCE contaminated site." Journal of Hazardous Materials **110**(1-3): 85-92.
<Go to ISI>://000222315600009

The results of a field investigation, vapor extraction tests, and long-term monitoring at a PCE-contaminated site in Saga, Japan, are reported. The field investigation indicated that PCE likely was trapped in a surface clayey sand layer (vadose zone), and soil vapor extraction (SVE) was adopted as the remediation approach. The field test results the effectiveness of SVE in removing volatile organic compounds (VOCs) from contaminated sites. For the case where the radius of influence for an extraction well was 15-20 m, the blower capacity had no obvious effect on the radius of influence possibly due to the short circuiting of air from the ground surface. However, the maximum negative pressure (difference between vapor pressure and ambient pressure) in the extraction well was approximately proportional to blower capacity for the range of blower capacities tested. The long-term monitoring results indicate that PCE concentration varied seasonably, and temperature and rainfall are two of the influencing factors. (C) 2004 Elsevier B.V. All rights reserved.

Chan, K. Y., D. P. Heenan and H. B. So (2003). "Sequestration of carbon and changes in soil quality under conservation tillage on light-textured soils in Australia: a review." Australian Journal of Experimental Agriculture **43**(4): 325-334.
<Go to ISI>://000182927000001

Light-textured soils (<35% clay) make up more than 80%, by area, of cropping soils in Australia. Many have inherent soil physical problems, e. g. hardsetting, sodicity and low organic carbon levels. Maintenance and improvement of soil organic carbon levels are crucial to preserving the soil structure and physical fertility of these soils. A review of field trials on conservation tillage (3-19 years duration) on these soils in southern Australia revealed that significantly higher soil organic carbon levels compared with conventional tillage were found only in the wetter areas (>500 mm) and the differences were restricted to the top 2.5-10.0 cm. The average magnitude of the difference was lower than that reported in the USA. The lack of a positive response to conservation tillage is probably a reflection of a number of factors, namely low crop yield (due to low rainfall), partial removal of stubble by grazing and the high decomposition rate (due to the high temperature). There is evidence suggesting that under continuous cropping in the drier areas, the soil organic carbon level continues to decline, even under conservation tillage. Better soil structure and soil physical properties, namely macro-porosity, aggregate stability and higher infiltration have been reported under conservation tillage when compared with conventional tillage. However, little information on long-term changes of these properties under conservation tillage is available. As many of these soil qualities are associated directly or indirectly with soil organic carbon levels, the lack of significant increase in the latter suggests that many of these improvements may not be sustainable in the longer term, particularly in the drier areas. Continuous monitoring of long-term changes in the soil organic carbon and soil quality under conservation tillage in different agro-ecological zones is needed.

Chang, S.-H., C.-K. Ho and J.-Y. Tsay (2005). "Effect of cold storage on the survival, growth, and taxane content of Taxus mairei shoots in vitro." Taiwan Journal of Forest Science **20**(1): 49-59.
<Go to ISI>://BIOSIS:PREV200510074363

Taxus mairei (Lemee & Levl.) SY Hu ex Liu shoots were stored in vitro at 4 and 12 degrees C for 3 mo. They were then recultured with normal culture conditions for 1.5 mo to determine the factors which affected their survival, such as shoot size, preculture period prior to storage at low temperature, medium composition, and illumination. Shoots transferred into normal conditions for 1.5 mo after low-temperature storage, which were 1.5 cm long and precultured on MS medium containing 10 mu M ABA for 2 wk, exhibited the greatest survival rates compared to the other treatments. In this pretreatment, the survival rates of shoots stored at 2 low temperatures and cultured in either light or dark exceeded 97%. When extending the period of cold storage from 3 to 24 mo, survival rates of cultures after being stored for 0.5, 1, 1.5, and 2 yr were 97, 90, 87, and 72% respectively at 12 degrees C, and 95, 75, 72, and 59% respectively at 4 degrees C. Although leaf browning and necrosis occurred during the low-temperature storage, the growth of surviving shoots recovered well. The concentrations of taxanes between regularly subcultured shoots and 2-yr-old shoots placed in cold storage did not significant differ. This suggests that the best way for longterm storage is to store the in vitro shoots in the dark at 12 degrees C.

Changnon, S. A., B. C. Farhar and E. R. Swanson (1978). "HAIL SUPPRESSION AND SOCIETY." Science **200**(4340): 387-394.
<Go to ISI>://WOS:A1978EV30100008

Chapman, S. J., C. D. Campbell and G. Puri (2003). "Native woodland expansion: soil chemical and microbiological indicators of change." Soil Biology & Biochemistry **35**(6): 753-764.
<Go to ISI>://000183610500003

The regeneration of native pine woodlands, a habitat of high biodiversity value, is being actively encouraged by conservation agencies as a positive future change in land use. A field study was carried out at Abernethy Forest, Scotland by sampling soil along three parallel transects running from open moorland, through an intermediate zone showing tree seedling colonization, into mature native pinewood forest with the aim of establishing a long-term monitoring site and providing baseline data. The specific objectives were to determine, first, which physical, chemical or microbiological properties in moorland soils would be affected by tree colonization and, secondly, what might be the implications of forest expansion on the soil carbon balance. Moving from moorland to forest, moisture and soil acidity decreased significantly and paralleled vegetation changes but there was little change in %C or %N. Microbial biomass, measured as the total carbon in the soil microflora, decreased markedly towards the forest while the metabolic quotient, a relative measure of microbial activity, showed a significant increase. None of the chemical or microbial indicators were able to detect changes due to seedling colonization at their present stage of development. However, microbial indicators appeared to be more sensitive than physico-chemical properties to the aboveground vegetation. Both the microbial biomass C and the metabolic quotient are likely to be good indicators of change as colonization develops. Estimation of the total sequestered soil carbon indicated more in the moorland (524 t C ha(-1)) than in the forest (288 t C ha(-1)), but this did not include the modest aboveground carbon stored in the tree biomass. At this particular site, forest expansion may result in some loss of soil C that would be partly offset by increases in aboveground C. (C) 2003 Elsevier Science Ltd. All rights reserved.

Choi, Y. D. (2004). "Theories for ecological restoration in changing environment: Toward 'futuristic' restoration." Ecological Research **19**(1): 75-81.
<Go to ISI>://000188540600010

Ecological restoration is one of the fastest growing fields in applied ecology providing new ideas and opportunities for biological conservation and natural resource management. Despite countless attempts in the past, large portions of restoration projects have been considered unsuccessful mainly due to: unrealistic goals; inadequate restoration plans based on an ad-hoc approach; lack of explicit and quantified evaluation criteria for restoration success; lack of ecological understanding; social, economic, and political constraints; or combinations of these factors. Existing ecological theories, particularly succession theories, may provide a conceptual framework for a restoration trajectory. However, projecting a 'desirable' trajectory and outcome is often challenged by the unpredictability of ecological communities in the changing environment. Particularly, the sustainability of reconstructed 'historic' ecosystems appears to be an unlikely goal in the ever-changing and unpredictable future environment. This paper calls for a shift in the restoration paradigm from 'historic' to 'futuristic.' A 'futuristic' restoration is: (i) to set realistic and dynamic (instead of static) goals for future, instead of past, environment; (ii) to assume multiple trajectories acknowledging the unpredictable nature of ecological communities and ecosystems; (iii) to take an ecosystem or landscape approach, instead of ad-hoc gardening, for both function and structure; (iv) to evaluate the restoration progress with explicit criteria, based on quantitative inference; and (v) to maintain long-term monitoring of restoration outcomes. A theoretical framework for 'futuristic' restoration, in terms of goals, trajectories, evaluation criteria, and monitoring, along with a historical perspective is presented in this paper.

Chou, W. R., K. S. Tew and L. S. Fang (2002). "Long-term monitoring of the demersal fish community in a steel- slag disposal area in the coastal waters of Kaohsiung, Taiwan." Ices Journal of Marine Science **59**: S238-S242.
<Go to ISI>://000179243500038

Dumping of approximately two million tonnes of steel slag in a shallow (ca. 40 m), sandy-bottom area in southern Taiwan from 1984 to 1989 has caused major changes of the substrate. After cessation of slag disposal, the demersal fish community in the area was monitored for 9 years (1990-1998). Species richness and the Shannon diversity index at the disposal site and a control site were significantly different, while the number of individuals and the Index of Multivariate Dispersion, as a measure of relative variation, were not. Splitting the data according to three 3-year periods did not reveal significant differences in any of the univariate community metrics. However, multivariate analysis revealed significant temporal differences, dispersion becoming smaller over time. It is concluded that slag disposal created a reef-like habitat and the associated fish fauna had a higher diversity than that seen on the sandy bottom present originally, partly caused by increased habitat complexity and partly by diversion of fishing activities because of potential gear damage. However, in the long run the ecological benefits may not last because the habitat is gradually being covered up again by sand. (C) 2002 International Council for the Exploration of the Sea. Published by Elsevier Science Ltd. All rights reserved.

Chourrout, D. (1995). Genetically modified fish: technologies and teir potential environmental impacts. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, Council of Europe Press.

Clark, R. A., C. L. J. Frid and K. R. Nicholas (2003). "Long-term, predation-based control of a central-west North Sea zooplankton community." Ices Journal of Marine Science **60**(2): 187-197.
<Go to ISI>://000220347100002

Long-term monitoring of the zooplankton community at a station 5.5 miles from the English coast in the central-west North Sea has been performed since 1968. Analyses of these data have revealed an inverse relationship between annual total zooplankton abundance and the position of the Gulf Stream North Wall (GSNW). This long-term relationship is opposite to the long-term positive association observed between the GSNW and total zooplankton abundances throughout most of the oceanic NE Atlantic region and

the northern and central North Sea using Continuous Plankton Recorder data. This study investigates the mechanism behind the inverse relationship with the GSNW, focussing on the importance of zooplankton predators in influencing long-term changes in the zooplankton community of the central-west North Sea. The results suggest that the dominant zooplankton predator Sagitta elegans plays a key role in mediating spring copepod population growth rates and thus their maximum and overall productivity during any one particular year. In turn, the abundance of Sagitta during the spring appears to be related to climatic factors. The implications of this on the zooplankton community are discussed. (C) 2003 International Council for the Exploration of the Sea. Published by Elsevier Science Ltd. All rights reserved.

Clements, W. H. (2004). "Small-scale experiments support causal relationships between metal contamination and macroinvertebrate community responses." Ecological Applications **14**(3): 954-967.
<Go to ISI>://000222174000026

Routine biomonitoring studies that compare abundance of benthic macro-invertebrates upstream and downstream from contaminant discharges generally cannot be used to demonstrate causal relationships between stressors and biological responses. In this study I describe stream microcosm and field experiments designed to support results of a 12-year monitoring project in the metal-polluted Arkansas River, Colorado. Microcosm experiments established concentration-response relationships between heavy metals and several structural (abundance, richness) and functional (macroinvertebrate drift, community respiration) endpoints. EC10 values, the metal concentration that reduced abundance or richness by 10%, were generally lowest for mayflies and stoneflies, indicating greater metal sensitivity for these groups. Macro invertebrate drift and community respiration showed highly significant concentration- response relationships with heavy metals and were generally more sensitive than structural measures. Potential interactions among metals were investigated, by comparing community-level responses to Zn alone, Zn+Cd, and Zn+Cu+Cd. Results showed that macroinvertebrate responses to a mixture of three metals were generally greater than responses to either Zn alone or Zn+Cd. Long-term monitoring in the Arkansas River (Colorado) before and after remediation of metal inputs provided correlative evidence that elevated heavy metal concentrations altered community composition and:reduced abundance of metal-sensitive organisms. However, these field data were not especially useful for estimating safe concentrations of heavy metals that would be protective of benthic communities. Microcosm and field experiments provided further support for the hypothesis that metals caused alterations in benthic community structure and provided more precise estimates of safe metal concentrations.

Cogle, A. L., M. A. Keating, P. A. Langford, J. Gunton and I. S. Webb "Runoff, soil loss, and nutrient transport from cropping systems on Red Ferrosols in tropical northern Australia." Soil Research **49**(1): 87-97.
<Go to ISI>://WOS:000286945800008

Runoff, soil loss, and nutrient loss were assessed on a Red Ferrosol in tropical Australia over 3 years. The experiment was conducted using bounded, 100-m(2) field plots cropped to peanuts, maize, or grass. A bare plot, without cover or crop, was also instigated as an extreme treatment. Results showed the importance of cover in reducing runoff, soil loss, and nutrient loss from these soils. Runoff ranged from 13% of incident rainfall for the conventional cultivation to 29% under bare conditions during the highest rainfall year, and was well correlated with event rainfall and rainfall energy. Soil loss ranged from 30 t/ha. year under bare conditions to <6 t/ha. year under cropping. Nutrient losses of 35 kg N and 35 kg P/ha. year under bare conditions and 17 kg N and 11 kg P/ha. year under cropping were measured. Soil carbon analyses showed a relationship with treatment runoff, suggesting that soil properties influenced the rainfall runoff response. The cropping systems model PERFECT was calibrated using runoff, soil loss, and soil water data. Runoff and soil loss showed good agreement with observed data in the calibration, and soil water and yield had reasonable agreement. Longterm runs using historical weather data showed the episodic nature of runoff and soil loss events in this region and emphasise the need to manage land using protective measures such as conservation cropping practices. Farmers involved in related, action-learning activities wished to incorporate conservation cropping findings into their systems but also needed clear production benefits to hasten practice change.

Collin, A., C. Berri, S. Tesseraud, F. E. R. Rodon, S. Skiba-Cassy, S. Crochet, M. J. Duclos, N. Rideau, K. Tona, J. Buyse, V. Bruggeman, E. Decuypere, M. Picard and S. Yahav (2007). "Effects of thermal manipulation during early and late embryogenesis on thermotolerance and breast muscle characteristics in broiler chickens." Poultry Science **86**(5): 795-800.
<Go to ISI>://WOS:000245895900002

Genetic selection has significantly improved the muscle development of fast-growing broiler chickens in the last 50 yr. However, improvement in muscle growth has coincided with relatively poor development of visceral systems, resulting in impaired ability to cope with high environmental temperatures. The aim of this study was to elucidate the effects of thermal manipulation (TM) during different periods of embryogenesis on chick hatchability, BW and thermoregulation upon hatching, on their ability to cope with thermal challenge at 42 d of age, and on carcass and breast meat traits. Control embryos were incubated at 37.8 degrees C. The TM embryos were incubated at 37.8 degrees C and treated for 3 h at 39.5 degrees C on the following days of embryogenesis: E8 to E10 [early (EA)], E16 to E18 [late (LA)], and both E8 to E10 and E16 to E18 (EA-LA). Body weight and body temperature (T-b) were measured at hatching and throughout the growth period as well as during exposure of 42-d-old chickens to a thermal challenge at 35 degrees C for 6 h. The LA and EA chicks exhibited significantly lower T-b than control chicks (37.9 vs. 38.2 degrees C) at hatching, but during the growth period, differences in T-b between treated and control chicks decreased with age. Significant hyperthermia (over 44 degrees C) was monitored in all groups during the thermal challenge, but mortality was higher in treated than in control chickens. No effect of treatments on BW was found during the entire growth period. However, breast yield was higher in LA chickens than in controls at slaughter. The EA and EA-LA treatments slightly decreased the ultimate pH of breast meat, whereas the LA treatment had no effect. In conclusion, none of the TM conditions tested in the present study were able to improve longterm thermotolerance in chickens. Late treatment favored breast muscle growth without affecting ultimate pH and drip loss of breast meat.

Collins, R., Z. Paul, D. B. Reynolds, R. F. Short and S. Wasuwanich (1997). "Controlled diffusional release of dispersed solute drugs from biodegradable implants of various geometries." Biomedical sciences instrumentation **33**: 137-42.
<Go to ISI>://MEDLINE:9731349

Chronic diseases and pathological medical conditions requiring the administration of longterm pharmaceutical dosages have in the past been treated by oral administrations of tablets, pills and capsules or through the use of creams and ointments, suppositories, aerosols, and injectables. Such forms of drug delivery, which are still currently used today, provide a prompt release of the drug, but with significant fluctuations in the drug levels within various regions of the body. Repeated administrations of the drug are often needed, at rather precise intervals of time, in order to maintain these levels within a relatively narrow therapeutic range as a means of assuring effectiveness at the low end and of minimizing adverse effects at the higher end of the fluctuation spectrum. Recent technical advances now permit one to control the rate of drug delivery. The required therapeutic levels may thus be maintained over long periods of months and years through implanted rate-controlled drug release capsules. Two such novel drug delivery systems currently employed are implanted erodible polymeric and ceramic capsules. Mathematical modeling and computer simulations can be very effective in improving and optimizing the performance of the self-regulating release of therapeutic drugs into specific regions of the body. Further development is needed for the optimal design of such capsules. It is in this area, in particular, that a review will be presented of the mathematical modeling techniques susceptible to refine the development of a reliable tool for designing and predicting the resulting pharmaceutical dosages as a function of time and space. Of primary importance in such models are the time-varying effective permeability of the capsule to the various molecules composing the drug, the effective solubility and diffusion coefficients of the drug and its metabolites in the surrounding tissues and fluids and, finally, the uptake of the drug at the target organ. Mathematical models are presented for the diffusional release of a solute from an erodible matrix in which the initial drug loading c0 is greater than the solubility limit cs. An inward moving diffusional front separates the reservoir (unextracted region) containing the undissolved drug from the partially extracted region. The mathematical formulation of such moving boundary problems has wide application to heat transfer with melting phase transitions and diffusion-controlled growth of particles, in addition to our topic of controlled-release drug delivery. In spite of this diversity of applications, only a very few mathematical descriptions have been published for the analysis of release kinetics of a dispersed solute from polymeric or ceramic matrices. In these rare instances, perfect sink conditions are assumed, while matrix swelling, concentration-dependence of the solute diffusion coefficient and the external mass transfer resistance have been largely neglected. The ultimate goal of such an investigation is to provide a reliable design tool for the fabrication of specialized implantable capsule/drug combinations which will deliver pre-specified and reproducible dosages over a wide spectrum of conditions and required durations of therapeutic treatment. Such a mathematical/computational tool can also prove effective in the prediction of suitable dosages for other drugs of differing chemical and molecular properties which have not been subjected to time-consuming animal laboratory testing. Finally, such models may permit more realistic scaling of the required dosages of therapeutic drug for variations in diverse factors such as body weight or organ size and capacity of the patient (clinical medicine) or animal (veterinary medicine for farm animals). Additional applications of controlled-release drug delivery for insecticide and pesticide use in agriculture, and the control of pollution in lakes, rivers, marshes, etc. in which a pre-programmed dose-time schedule is necessary, further

Compton, J. E. and R. D. Boone (2000). "Long-term impacts of agriculture on soil carbon and nitrogen in New England forests." Ecology **81**(8): 2314-2330.
<Go to ISI>://WOS:000088888900023

Abandonment and reforestation of agricultural lands has been a major influence on the landscape of eastern North America. Cultivation and soil amendments can dramatically alter soil nutrient pools and cycling, yet few studies have examined the longterm (>50 yr) influence of pasturing and cultivation on soil processes in the forests that develop after abandonment. Twelve forested sites at Harvard Forest in central New England were compared 90-120 yr after abandonment from agricultural use. We measured soil carbon (C), nitrogen (N), and phosphorus (P); light fraction C, N. and delta(15)N; microbial chloroform-N; net N mineralization and nitrification; nitrification potential, and culturable nitrifiers on sites with differing land-use history and vegetation. The sites had similar soil series and topography but were arrayed along a soil disturbance gradient from permanent woodlots (selective logging but no mineral soil disturbance) to formerly pastured sites (clearcut and grazed but no deep [>10 cm] soil disturbance) to formerly cultivated sites (cleared-with-plow horizon 15-20 cm thick). Mineral soil C (0-15 cm soil depth) was very similar among all sites, but the forest floor C was lower in the cultivated sites than in the woodlots of both stand types. Mineral soil in cultivated sites contained 800 kg N/ha and 300 kg P/ha more than woodlots, a relative increase of 39% for N and 52% for P. The cultivated soils had lower C:N and C:P ratios, largely driven by higher soil N and P. The light fraction appeared to be more sensitive to prior land use than the bulk soil organic matter. The C content and C:N ratio of light fraction were lower in cultivated soils, which suggests that input and/or turnover of organic matter pools of relatively recent origin remain altered for a century after abandonment. Similar delta(15)N for the light and heavy fraction organic matter pools in cultivated soils suggests that cultivation accelerates the mineralization of humus N, increasing the proportion of N available for plant uptake, resulting in a convergence of the light and heavy fractions. The N pool in the woodlot soils may have been subject to preferential losses of small amounts of (14)N over a longer time period, resulting in a more pronounced divergence between the light fraction (reflecting recent plant inputs) and the mineral-associated heavy fraction (more recalcitrant). Nitrification was strongly influenced by land-use history, with highest rates in formerly cultivated sites. In contrast, soil net N mineralization and chloroform-N were more strongly influenced by present vegetation. Nitrifying bacteria were relatively abundant in all pastured and cultivated sites: however, only the cultivated hardwood sites, with lowest C:N ratios (16-18), had substantial net nitrification. Historical manure inputs may explain the more rapid soil net nitrification rates, by decreasing soil C:N ratios and thus reducing nitrate immobilization in the mineral soil of cultivated sites. Regionally, 65% of the land area was pastured, and a proportion of the nutrients obtained from grazing was transferred to the cultivated croplands, which comprise less than or equal to 15% of the land area. Pastures generally had intermediate nutrient ratios and N transformations but were often more similar to woodlots, which suggests that plowing and amendments, rather than forest clearance, have the greatest impact on soil organic matter and nutrients. The influence of land-use history on soil N and P and nitrification rates was more dramatic in hardwood sites, which indicates that characteristics of the recovering vegetation and/or changes in plant community composition

associated with prior land use are important factors in the rate of recovery. Our findings lead to the surprising conclusion that 19th century agricultural practices decreased forest floor nutrient content and ratios, and increased nitrifier populations and net nitrate production for approximately a century after abandonment. Consideration of site history clearly deserves more attention in the design of field experiments, and in our understanding of patterns of element distributions and transformations in dynamic forested landscapes.

Conway, D. (1984). "Trinidad's mismatched expectations. Planning and development review." UFSI reports(26): 1-12.
<Go to ISI>://MEDLINE:12266931

In 1974 petrodollars helped to boost living standards for many of the population of the Republic of Trinidad and Tobago. Yet, a failure to address the consequences of uncontrolled urbanization, especially in and around the capital, Port of Spain, threatens to undermine further improvements in the quality of Trinidadian life. Trinidad's urbanization has been associated with upward social mobility and a burgeoning middle class, such that social aspirations and spatial mobility tend to coincide. Thus, internal migration has involved a heterogeneous mixture of classes with the common denominator being a desire to improve one's standard of living. For most this means residence in or proximity to Port of Spain, the country's commercial, administrative, and cultural hub. Migration into and within Port of Spain and northwest corridors of West and East St. George County has contributed to several tricky problems, overwhelming regional planning efforts, inflating the costs of houses and land, and accelerating social alienation among urban Trinidadians. Problems could have been eased if government planning had given adequate recognition to spatial variations in societal organization, regional economic structures, and resource distribution. Trinidad changed markedly in the years 1974-81. New wealth has brought its own problems and old problems have worsened for lack of attention. The idea of decentralized growth poles at Sangre Grande, Point Fortin, La Brea, and Guayaguayare-Galeota now seems impossible to realize. The Capital region has for 10 years been absorbing a larger share of the population, now roughly half the total. It generates virtually all the island's employment opportunities and attracts the lion's share of private sector investment. Overcrowding in residences, unsanitary drainage, shortages of potable water, traffic congestion, and air pollution all have reduced the quality of life compared to 10 years ago. From 1974 onward the issue of economic development no longer focused on whether or not local or foreign financial resources could be mobilizied, but rather how this huge financial surplus would be deployed to encourage a diversified and interdependent econmy with longterm sustainable capacities to absorb and provide for Trinidadian and Tobagonian workers and their dependents. The Prime Minister's model of state capitalism failed to generate sufficient output and economic vigor to enable Trinidad's economy to withstand the 1981-83 recession. The high level of government involvement in running the economy has not meant centralized regulation or even coordination of state enterprises. Final discussion turns to the internal migration and growth of the capital region, the preeminence of Port of Spain, land and housing problems, and the inflationary spiral in land and housing prices.

Council of Europe (1995). Potential long-term ecological impact of genetically modified organisms. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, 24-26 November 1993, Council of Europe Press.

Courchamp, F., J. L. Chapuis and M. Pascal (2003). "Mammal invaders on islands: impact, control and control impact." Biological Reviews **78**(3): 347-383.
<Go to ISI>://000185687200001

The invasion of ecosystems by exotic species is currently viewed as one of the most important sources of biodiversity loss. The largest part of this loss occurs on islands, where indigenous species have often evolved in the absence of strong competition, herbivory, parasitism or predation. As a result, introduced species thrive in those optimal insular ecosystems affecting their plant food, competitors or animal prey. As islands are characterised by a high rate of endemism, the impacted populations often correspond to local subspecies or even unique species. One of the most important taxa concerning biological invasions on islands is mammals. A small number of mammal species responsible for most the damage to invaded insular ecosystems: rats, cats, goats, rabbits, pigs and a few others. The effect of alien invasive species may be simple or very complex, especially since a large array of invasive species, mammals and others, can be present simultaneously and interact among themselves as well as with the indigenous species. In most cases, introduced species generally have a strong impact and they often are responsible for the impoverishment of the local flora and fauna. The best response to these effects is almost always to control the alien population, either by regularly reducing their numbers, or better still, by eradicating the population as a whole from the island. Several types of methods are currently used: physical (trapping, shooting), chemical (poisoning) and biological (e.g. directed use of diseases). Each has its own set of advantages and disadvantages, depending on the mammal species targeted. The best strategy is almost always to combine several methods. Whatever the strategy used, its long-term success is critically dependent on solid support from several different areas, including financial support, staff commitment, and public support, to name only a few. In many cases, the elimination of the alien invasive species is followed by a rapid and often spectacular recovery of the impacted local populations. However, in other cases, the removal of the alien is not sufficient for the damaged ecosystem to revert to its former state, and complementary actions, such as species re- introduction, are required. A third situation may be widespread: the sudden removal of the alien species may generate a further disequilibrium, resulting in further or greater damage to the ecosystern. Given the numerous and complex population interactions among island species, it is difficult to predict the outcome of the removal of key species, such as a top predator. This justifies careful pre-control study and preparation prior to initiating the eradication of an alien species, in order to avoid an ecological catastrophe. In addition, long-term monitoring of the post-eradication ecosystem is crucial to assess success and prevent reinvasion.

Craig, W., M. Tepfer, G. Degrassi and D. Ripandelli (2008). "An overview of general features of risk assessments of genetically modified crops." Euphytica **164**(3): 853-880.
http://dx.doi.org/10.1007/s10681-007-9643-8 AND http://www.ask-force.org/web/Longterm/Craig-Overview-Genreal-Features-2008.pdf

The intentional introduction into the environment or market of genetically modified organisms (GMOs) is nearly always governed by a framework of science-based risk assessment and risk management measures. This is usually implemented through the integration of hazard identification and characterisation of all of the elements of risk associated with a new GM crop or derived product. Typical categories of hazards arising from the introduction of transgenic crops include: possible unintended negative health effects in a susceptible subgroup of the consumer (target) population; the evolution of resistance in the targeted pest/pathogen populations when the transgene confers resistance to a pest or pathogen; non-target hazards associated directly or indirectly with the transgenic plant or transgene product outside the plant; and those associated with the integration and subsequent expression of the transgene in a different organism or species following gene flow. The consequences of likely exposure to these and other hazards are considered in this introduction to the main issues raised when evaluating the possible risks arising from the importation or cultivation of genetically modified crops.

Crawford, C. (2003). "Environmental management of marine aquaculture in Tasmania, Australia." Aquaculture **226**(1-4): 129-138.
<Go to ISI>://000185998700011

Marine farming is an important rural industry in coastal bays and estuaries of Tasmania. The two main species cultured are the introduced Pacific oyster, Crassostrea gigas, and Atlantic salmon, Salmo salar. Legislation has been introduced to assist the development of aquaculture, and this includes requirements for environmental management, such as baseline assessments and routine monitoring of leases. Local impacts on the seabed around salmon farms are monitored using video footage, analysis of benthic invertebrate infauna, and chemical measures (redox and organic matter). Monitoring of shellfish farms is minimal because our research has shown that shellfish culture is having little impact on the environment. Research related to management of aquaculture wastes is ongoing. Studies include investigating appropriate inexpensive measures for an industry- wide long-term monitoring program. Mitigation measures against excessive loadings of organic matter from fish farms, mainly by fallowing, i.e. rotating the position of fish pens around a lease, are currently being researched. Rates of recovery of a heavily impacted salmon lease area after the removal of fish have also been studied. A new project is investigating system- wide effects of salmon farming on the environment, in particular, increased release of nutrients into waterways. This includes monitoring dissolved oxygen, nutrients and phytoplankton, modelling the system, and investigating ecological indicators of eutrophication.

Crawley, M. and S. Brown (2004). "Spatially structured population dynamics in feral oilseed rape." Proc. R. Soc. Lond. B **271**: 1909–1916.
http://www.journals.royalsoc.ac.uk/media/53F7YLTRVQ4Q54QMHQVL/Contributions/1/R/8/K/1R8KTGGXUP8AN0T5.pdf and
http://www.botanischergarten.ch/Feral/Crawley-Spacially-Struct-2004.pdf and F1000-evaluation
http://www.facultyof1000.com/article/nonpub49848/evaluation

We studied the population dynamics of feral oilseed rape (Brassica napus) for 10 years (1993–2002) in 3658 adjacent permanent 100m quadrats in the verges of the M25 motorway around London, UK. The aim was to determine the relative importance of different factors affecting the observed temporal patterns of population dynamics and their spatial correlations. A wide range of population dynamics was observed (downward or upward trends, cycles, local extinctions and recolonizations), but overall the populations were not self-replacing ($k < 1$). Many quadrats remained unoccupied throughout the study period, but a few were occupied at high densities for all 10 years. Most quadrats showed transient oilseed rape populations, lasting 1–4 years.

There were strong spatial patterns in mean population density, associated with soil conditions and the successional age of the plant community dominating the verge, and these large-scale spatial patterns were highly consistent from year to year. The importance of seed spilled from trucks in transit to the processing plant at Erith in Kent was confirmed: rape populations were significantly higher on the 'to Erith' verge than the 'from Erith' verge (overall mean 2.83-fold greater stem density). Quadrats in which $k > 1$ were much more frequent in the 'to Erith' verge, indicating that seed immigration can give the spurious impression of self-replacing population dynamics in time-series analysis.

There was little evidence of a pervasive Moran effect, and climatic forcing did not produce widespread large-scale synchrony in population dynamics for the motorway as a whole; just 23% of quadrats had significant rank correlations with the mean time-series. There was, however, significant local spatial synchrony of population dynamics, apparently associated with soil disturbance and seed input. This study draws attention to the possibility that different processes may impose population synchrony at different scales. We hypothesize that synchrony in this system is driven by at least three processes: small-scale, local forcing caused by soil disturbance, intermediate-scale forcing as a result of seed input, and large-scale climatic forcing (e.g. winter rainfall) that affects the motorway as a whole.

Crawley, M. J. (1986). "Ecological Knowledge and Environmental Problem-Solving - Concepts and Case-Studies - Orians,Gh." Nature **322**(6076): 219-219.
http://www.botanischergarten.ch/Longterm/Crawley-Committee-Ecology-1986.pdf

Crawley, M. J. (1986). "The Population Biology of Invaders." Philosophical Transactions of the Royal Society of London Series B-Biological Sciences **314**(1167): 711-731.
<Go to ISI>://A1986F345800014 AND http://www.botanischergarten.ch/Longterm/Crawley-Population-Invaders-1986.pdf

Crawley, M. J. (1989). "Insect Herbivores and Plant-Population Dynamics." Annual Review of Entomology **34**: 531-564.
<Go to ISI>://A1989T004500024 NOT EZB, NOT NEBIS

Crawley, M. J. (1995). Long term ecological impacts of the release of genetically modified organisms. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, Council of Europe Press.
http://book.coe.int/EN/ficheouvrage.php?PAGEID=36&=EN&produit_aliasid=1134

Crawley, M. J., S. L. Brown, R. S. Hails, D. D. Kohn and M. Rees (2001). "Biotechnology - Transgenic crops in natural habitats." Nature **409**(6821): 682-683.
http://www.botanischergarten.ch/Monitoring/Crawley-Natural-2001.pdf

Crick, H. Q. P., S. R. Baillie and D. I. Leech (2003). "The UK Nest Record Scheme: its value for science and conservation." Bird Study **50**: 254-270.
<Go to ISI>://000186700200006

Capsule A review of its methodology, analytical procedures and uses. Aims To provide a comprehensive review of the UK Nest Record Scheme (NRS), its methodology and value to science and conservation. \Methods We reviewed the history of the development and current methodology used in the analysis of NRS data in the scientific literature and unpublished documents and from our personal knowledge. Results The British Trust for Ornithology's (BTO's) NRS is the largest, longest running and most highly computerized such scheme in the world. Advanced and efficient techniques of data gathering, data capture and analysis are used. It was founded in 1939 to provide information on the breeding biology of birds, but has since developed into a key component of the overall monitoring strategy for birds in the UK. A range of specialized analytical methods is available for NRS data and potential biases need careful treatment. More than 250 scientific publications have used NRS data to describe aspects of basic breeding biology and performance, to study the population dynamics of bird populations and to investigate the demographic causes of bird population declines in the UK. Conclusions Extensive long-term monitoring schemes, such as the NRS, that collate large historical data sets will become increasingly valuable for monitoring the impact of environmental change. While aspects of the NRS, its recording methods, data capture and analysis can be developed further, the scheme will continue to advance our understanding of both the impacts of new environmental stresses in the UK and the effectiveness of new conservation measures in the wider countryside. This has been amply demonstrated by its use for exploring the impacts of global climate change on the UK's avifauna.

Cumming, A. and J. Macbeth (2004). "The thermal evolution following a superburst on an accreting neutron star." Astrophysical Journal **603**(1): L37-L40.
<Go to ISI>://000189344000010

Superbursts are very energetic type I X-ray bursts discovered in recent years by long-term monitoring of Xray bursters and are believed to be due to unstable ignition of carbon in the deep ocean of the neutron star. In this Letter, we follow the thermal evolution of the surface layers as they cool following the burst. The resulting light curves agree very well with observations for layer masses in the range 10(25)-10(26) g expected from ignition calculations and for an energy release greater than or similar to10(17) ergs g(-1) during the flash. We show that at late times the cooling flux from the layer decays as a power law F proportional to t(-4/3), giving timescales for quenching of normal type I bursting of weeks, in good agreement with observational limits. We show that simultaneous modeling of superburst light curves and quenching times promises to constrain both the thickness of the fuel layer and the energy deposited.

Cunfer, B. M., G. D. Buntin and D. V. Phillips (2006). "Effect of crop rotation on take-all of wheat in double-cropping systems." Plant Disease **90**(9): 1161-1166.
<Go to ISI>://WOS:000240039700007

Take-all of wheat (Triticum aestivum), caused by Gaeumannomyces graminis var. tritici, became a serious problem with the widespread adoption of wheat:soybean double-cropping and minimum tillage farming systems in the southeastern United States during the past 30 years. A longterm crop rotation study was initiated in 1994 with 12 double-cropping sequences incorporating wheat, rye, or canola as the fall-planted crop and soybean or grain pearl millet as the summer crop. Cotton and fallow were included in some summer rotations during the last 2 years of the study. The purpose was to identify sustainable alternatives to the continuous wheat:soybean system that would provide acceptable management of take-all. G. grammis var. tritici cultured on autoclaved oats was incorporated into soil prior to planting the first season's crop. Take-all was severe in rotations with continuous wheat each year. Pearl millet was compatible with the cropping system but did not affect incidence or severity of take-all in a following wheat crop. Soybean or pearl millet had little effect on yield loss due to take-all in a subsequent wheat crop. A 1-year rotation with canola significantly reduced take-all incidence and severity. At the end of the second and third seasons, in those rotations where wheat followed I year of canola, wheat grain yield was the same as that in control plots that bad little or no take-all. Two consecutive years of canola did not suppress take-all or improve wheat yields any more than a single year of canola between wheat crops. Seedling assays for take-all incidence and severity in growth chambers were conducted using soil collected twice each year near the end of each crop's growing season. Results were similar to those observed in the field. However, canola in the rotation had a greater effect in suppressing disease severity than disease incidence. Canola can be a valuable rotational crop for management of take-all in wheat in the southeastern United States.

Cutispoto, G., S. Messina and M. Rodono (2003). "Long-term monitoring of active stars - X. Photometry collected in 1994." Astronomy & Astrophysics **400**(2): 659-670.
<Go to ISI>://000181298700030

As part of an extensive program focused on the global properties and evolution of active stars, high-precision UBV(RI)(c) and UBV photometry of 18 selected stars is presented. UBV(RI)(c) observations were collected at the European Southern Observatory over the intervals 21-28 September 1994 and 25 November-05 December 1994. Additional UBV photometry obtained late in 1994 by Catania Astrophysical Observatory Automatic Photoelectric Telescope is also presented. Significant evolution of the light curves, period variations and evidence for long-term variability of the global degree of spottedness are found. Some spectral classifications are revised and photometric parallaxes are compared, whenever possible, with the values measured by the Hipparcos satellite.

These observations are finalized to the construction of an extended photometric database, which can give important clues on topics such as the stability of spotted areas, differential stellar rotation, solar-like activity cycles and the correlation between inhomogeneities at different atmospheric levels.

Dalal, R. C., R. Eberhard, T. Grantham and D. G. Mayer (2003). "Application of sustainability indicators, soil organic matter and electrical conductivity, to resource management in the northern grains region." Australian Journal of Experimental Agriculture **43**(3): 253-259.
<Go to ISI>://000182063200006

Sustainability is a multifaceted concept. It is expressed here as 'to ensure that the past and current management and use of natural resources does not diminish their capacity to meet economic, environmental, social and aesthetic needs and opportunities of the present and future generations'. Sustainability indicators can be used to monitor responses in condition and trend as a result of natural resource management. We report here 2 case studies that demonstrate the significance of sustainability indicators in discerning trends in land and water resources in the southern Brigalow (Acacia harpophylla) Belt, a major region of the Queensland Murray - Darling Basin. First, soil organic matter was used as a sustainability indicator of soil productivity, soil aggregation, and its association with soil sodicity since these soil attributes affect infiltration rates, runoff and drainage. The second study involved comparing the trends in stream salinity (electrical conductivity) over 35 years and sustainability indicators for a dominant Vertosol in a region used for cereal cropping. Groundwater level and electrical conductivity of a long-term monitoring bore in the Dalby - Chinchilla region, were also analysed to discern trends in salinity and association of the groundwater with soil and stream salinity. Soil organic matter declined exponentially as the cultivation period for cereal cropping increased. This resulted in a reduction in soil nitrogen supply, and lower grain protein and cereal grain yields. The associated effects were reduced soil aggregation and increased soil sodicity. Electrical conductivity of the soil as well as stream water showed weak but declining trends with time. Groundwater level from the long-term monitoring bore near the stream and groundwater salinity showed significantly declining trends over the 35 years sampling period. Groundwater salinity was similar to the Vertosol electrical conductivity at 240 - 300 cm depths, suggesting groundwater connectivity to the overlaying soil. Thus, use of sustainability indicators provided a strong association among the various attributes of the landscape. However, it is still a challenge to integrate the various sustainability indicators in a landscape context, integrated over space (spatial and geographical distribution), attributes (quality characteristics) and time (trend).

Davidson, J. (1993). "Women's relationship with the environment." Focus on gender **1**(1): 5-10.
<Go to ISI>://MEDLINE:12287131

In developing countries, all development activities as well as reclamation of degraded areas, pollution reduction, and preservation of biodiversity affect women's environment, especially in rural areas. Women produce most subsistence foods and cash crops, but control only about 1% of the world's land. Lack of land tenure and of access to it keep women from obtaining credit, training, and other supports, thereby preventing them from using their traditional, longterm conservation practices. In many developing countries, commercial producers force women off the most productive lands and onto marginal lands where they grow subsistence crops. They tend to overuse the marginal land and to allow little time for soil recovery. Soil degradation is exacerbated when women need to travel greater distances to collect fuelwood, water, fodder, and food. Almost complete desertification awaits Rajasthan, India, where such events and intensive cash cropping occur. Heavy pesticide use on large commercial farms increases pest resistance, thereby boosting infestation and reducing species diversity. Women are testing sustainable agricultural techniques, for instance, interplanting and crop rotation. Even though women supply water needs, they tend to be excluded from planning, implementing, and maintaining water supplies. Women depend on forests to provide food, fodder, fuel, building materials, medicines, and many materials for income-earning efforts. Commercial logging, migration and resettlement, agricultural development, and cutting for firewood and charcoal destroy these forests. Reforestation schemes do not consider women's needs. Deforestation and desertification increase women's work burdens. Poor women who have migrated to urban areas also experience environmental degradation, deteriorating health, and resource depletion; most live in squatter settlements. Deteriorating economic circumstances in developing countries, reduced flows of official development assistance to developing countries, rapid population growth, lack of women's support mechanisms, and civil conflict are underlying factors for environmental degradation.

De Marco, M. A., E. Foni, L. Campitelli, E. Raffini, M. Delogu and I. Donatelli (2003). "Long-term monitoring for avian influenza viruses in wild bird species in Italy." Veterinary Research Communications **27**: 107-114.
<Go to ISI>://000185514200017

De Marinis, E., P. Picco and R. Meloni (2003). "Monitoring polynyas with Ocean Acoustic Tomography: a feasibility study in Terra Nova Bay." Antarctic Science **15**(1): 63-75.
<Go to ISI>://000181701700009

This study looks at the feasibility of using Ocean Acoustic Tomography for long-term monitoring of polynyas using both observations in Terra Nova Bay polynya (Ross Sea) and simulations with a range dependent, multi-layered adiabatic normal mode acoustic propagation model. The summer sound speed profile is characterized by surface values of around 1450 m s(- 1), a minimum of 1441 m s(-1) around 50 m depth and a linear increase with a 0.016 s(-1) slope. Thus, the sound propagation is apparently ducted in the near surface layer and is refracted upward below it. During winter, due to water cooling and mixing processes, the subsurface minimum disappears, the surface sound speed is about 1440 m s(-1) and no near surface layer ducted propagation occurs. Because of the specificity of the Terra Nova Bay seasonal sound speed profile ;and to cope with both deep and shelf water applicability, the feasibility study of acoustic inversion was undertaken using normal mode Match Field Tomography instead of the more classical travel-time inversion. The results from simulations demonstrate that ocean acoustic tomography is able to reproduce quite well the vertical sound speed profile, in particular the temporal evolution of summer stratification and winter mixing processes, thus providing information on the upper layer, where direct measurements are not possible.

DeHaan, K. R., G. T. Vessey, D. A. Holmstrom, J. A. MacLeod, J. B. Sanderson and M. R. Carter (1999). "Relating potato yield to the level of soil degradation using a bulk yield monitor and differential global positioning systems." Computers and Electronics in Agriculture **23**(2): 133-143.
<Go to ISI>://000082900200005

The adoption of soil conservation practices is often dependent on linking reductions in crop productivity to declines in soil and land quality. A bulk yield monitoring system was installed on a commercial potato harvester for the purpose of showing a relationship between potato yield and the level of degradation on fine sandy loam soils (Orthic Podzols) in the cool, humid climate of Prince Edward Island, Atlantic Canada. Although data are preliminary, initial results indicate that potato yields will be substantially reduced as a result of soil physical properties being altered by excessive long-term soil degradation. Significant correlations were identified between potato yield and a number of physical factors representative of soil degradation including the slope length and steepness factor, cation exchange capacity, depth of topsoil and water holding capacity. If, after confirmation from further study, the relationship between potato yield and the level of soil degradation can be quantified, it will provide a valuable tool in terms of encouraging farmers to adopt soil conserving practices. (C) 1999 Elsevier Science B.V. All rights reserved.

Dehne, M. G., A. Sablotzki, J. Muhling, K. L. Dehne, R. Rohrig and G. Hempelmann (2002). "Long-term monitoring of renal function in poly-traumatized intensive care patients." Renal Failure **24**(4): 493-504.
<Go to ISI>://000177753400010

Introduction: For the long-term monitoring of kidney function, polytraumatized patients were examined and routine as well as specialized parameters were compared. Materials and methods: 30 patients of the Surgical Intensive Care Unit (ICU) were examined daily over the entire period they stayed in the ICU. The patients were retrospectively classified as either survivors or deceased patients. Group 1 consisted of 20 patients who resided in the ICU for 11-15 (Median 14) days before they could be transferred to a normal hospital unit. Group 2 consisted of 10 patients who had passed away after 13- 18 (Median 16) days in the ICU. In addition to the routine parameters diuresis, serum creatinine and serum urea, specialized parameters for kidney function including the excretion rates of alpha1-microglobulin (alpha1-MG), N-Acetyl- beta-D-glucosaminidase (NAG), angiotensinase A (ATA) and immunoglobulin G (IgG) were determined. Results: Similar biometric data were shown by all patients at admission into the ICU, but differences did exist regarding the Revised Trauma Score, Injury Severity Score and the APACHE-II-Score. In the period between the 5th and 8th day of intensive treatment almost all patients showed pathological excretion rates of tubular and glomerular parameters whereby no increased frequency of unusual events could be determined at these time- points. Conclusion: During treatment in the ICU, all examined patients showed at times pathological excretion rates of specialized kidney function parameters. Such transient damage was only apparent in a few of the patients when the standard parameters serum creatinine and serum urea were employed. In 90% of the surviving patients the kidney parameters had normalized until the time they were transferred, indicating that such parameters reflected the general state of health of these patients.

Denison, R. F., D. C. Bryant and T. E. Kearney (2004). "Crop yields over the first nine years of LTRAS, a long-term comparison of field crop systems in a Mediterranean climate." Field Crops Research **86**(2-3): 267-277.
<Go to ISI>://000220297200014

The Long-Term Research on Agricultural Systems (LTRAS) experiment has been monitoring the long-term effects of conventional and alternative practices on crop yields and soil properties since 1993, with a planned duration of 100 years. Data for the first 9 years are presented here. Ten, 2-year rotations, each with three 0.4 ha plots per phase of the rotation, range from low-input tainted unfertilized wheat to high-input irrigated conventional and organic maize-tomato systems. For years 3-9, average yields of alternative (organic and green manure) systems were significantly lower than those of comparable conventional systems, except that there were no significant differences in average yields of tomato. Delayed seeding after a winter legume cover crop (LCC) limited maize yields. Yield trends over years were somewhat obscured by variability due to weather. Negative yield trends over years in unfertilized wheat controls were statistically significant, but only when data for the 9th year were included. Yield trends for organic maize were also significantly negative, but tomato yields in the same system showed a significant positive trend, as did yields of conventional maize. As this experiment continues, long-term trends in soil properties and processes could alter the magnitude or direction of trends seen to date. (C) 2003 Elsevier B.V. All rights reserved.

Devitt, D. A., M. Lockett, R. L. Morris and B. M. Bird (2007). "Spatial and temporal distribution of salts on fairways and greens irrigated with reuse water." Agronomy Journal **99**(3): 692-700.
<Go to ISI>://WOS:000246567400014

A 4-yr study was conducted to assess the impact of reuse water on soil salinization of nine golf courses in southern Nevada: three longterm reuse courses, three fresh-water courses, and three courses that transitioned to reuse water during the experimental period. Four of nine fairways had positive leaching fractions (LFs) during all 4 yr, with statistical separation occurring based on 4-yr averages ($p < 0.001$). Soil salinity levels followed a sinusoidal seasonal curve, with 70% of all peaks associated with summer months. Salinity contour maps (surface soil) were compared over time. More than 85% of the surface area of greens were mapped as electrical conductivity of saturation extract (ECe) < 4.0 dS m(-1), whereas 64% of the fairways were mapped at ECe < 4.0 dS m(-1). This salinity relationship dropped to 13% on fairways of long-term reuse courses. Changes in the average ECe values after transition to reuse water were primarily driven by the number of days a course had been irrigated with reuse water (R-2 = 0.69***). Depth-averaged salinity (sensors) was found to be highly correlated with LF on reuse courses (R-2 = 0.86***) and transitional courses (R-2 = 0.87***). Yearly changes in depth-averaged sensor values on transitional courses were described by an equation that included the number of days a golf course was irrigated with reuse water, the LF, and the uniformity of the irrigation system (R-2 = 0.83***). Although deficit irrigating can be practiced for short periods, adequate LFs are essential for the long-term success of golf courses irrigated with reuse water.

Dhara, V. R. and R. Dhara (2002). "The Union Carbide disaster in Bhopal: A review of health effects." Archives of Environmental Health **57**(5): 391-404.

<Go to ISI>://000181523000001

The authors have reviewed studies of human health effects that resulted from exposure to methyl isocyanate gas that leaked from the Union Carbide plant in Bhopal, India, in 1984. The studies were conducted during both the early and late recovery periods. Major organs exposed were the eyes, respiratory tract, and skin. Although mortality was initially high, it declined over time, but remained elevated among the most severely exposed population. Studies conducted during the early recovery period focused primarily on ocular and respiratory systems. Major findings included acute irritant effects on the eyes and respiratory tract. In follow-up studies, investigators observed persistent irritant effects, including ocular lesions and respiratory impairment. Studies conducted during the late recovery period focused on various systemic health endpoints. Significant neurological, reproductive, neurobehavioral, and psychological effects were also observed. Early and late recovery period studies suffered from several clinical and epidemiological limitations, including study design, bias, and exposure classification. The authors herein recommend long-term monitoring of the affected community and use of appropriate methods of investigation that include well-designed cohort studies, case-control studies for rare conditions, characterization of personal exposure, and accident analysis to determine the possible components of the gas cloud.

Doherty, M. J., S. Jayadev, J. W. Miller, D. F. Farrell, M. D. Holmes and C. B. Dodrill (2003). "Age at focal epilepsy onset varies by sex and hemispheric lateralization." Neurology **60**(9): 1473-1477.
<Go to ISI>://000182754100016

Background: Previous studies have shown that interictal epileptiform discharges favor the left hemisphere in adults but the right side in children up until age 5. This may be due to sex-influenced asymmetric brain maturation. To clarify this relationship, the authors analyzed age at epilepsy onset by sex and by lateralization of epileptiform activity. Methods: An adult epilepsy center long-term monitoring database was used to define patients with exclusively unilateral epileptiform findings. Three groups were studied: any epileptiform activity (n = 404), ictal activity (n = 287), and interictal activity (n = 265). The second and third groups were drawn from the first group and the second and third groups overlapped with each other. Side of lateralized finding and sex were analyzed via factorial two-way analysis of variance with the outcome variable being age at epilepsy onset. Comparison analysis included patients with generalized epilepsy (n = 114), nonepileptic seizures (NES, n = 232), and surgical mesial temporal sclerosis (MTS, n = 116). Results: Patients with unilateral epileptiform activity displayed bimodal epilepsy onset ages with infant and adolescent peaks. For patients with a right-sided focus, epilepsy onset was earlier in men (14.4 years) than women (20.7 years). In contrast, among patients with a left-sided focus, epilepsy began earlier in women (18.2 years) than men (19.9 years, $p < 0.01$). Parallel results were found in unilateral ictal ($p < 0.01$) and unilateral interictal activity ($p = 0.01$). Patients with surgical MTS, NES, or generalized seizure showed no similar patterns. Conclusions: In adult patients with focal epilepsy, sex and lateralized epileptiform abnormalities may be related to age at epilepsy onset.

Doluschitz, R. and W. Trunk (1993). "ECONOMICAL ASPECTS OF DAIRY FARMING SUBJECT TO HERD-SIZE." Berichte Uber Landwirtschaft **71**(2): 256-269.
<Go to ISI>://WOS:A1993LD30800005

Structural changes in the East German agriculture focussed the economical discussion onto the issue what the optimal herd-size for dairy farms in terms of the monetary result is. The answer to this question is in the first place important for the reorganisation of the East German agriculture but also for the other dairy farmers to compare their own costs and output. After all farmers can compare how competitive they are and in which way they have to improve their operation to receive a sufficient labour income. The results of this analysis show that the determination of profitable herd-sizes for dairy farms is a sophisticated issue. By the use of different methods and emperical data the following conclusions can be drawn: The economies of scale in dairy farming under middle European conditions seem to reach their optimum at a herd-size of about 200 cows. Below this herd-size the costs for manpower and capital decrease. In larger farms the decrease in the economies of scale and increasing transaction costs (transport, controlling, administration) raise the costs steadily. Milk production seems to be feasible in a wide range of farming systems in terms of technical equipment, organisation and legal form. Especially the farms between 60 and 500 cows show good economic results. The examination of the evolution in the past confirms this acertainment. In the former FRG operations with less than 30 cows lost importance and in the former GDR there can be observed a drastic reduction of farms with more than 500 cows. Investments in very big dairy farms in Eastern Germany should be calculated precisely because they are only profitable under exceptional conditions. Existing extremely large herds should be divided or the number of cows should be reduced until technical and organisational conditions meet the requirements for a profitable milk production. In the former FRG particularly the smaller dairy farmers should think about cooperating with colleagues to reach a longterm profitable herd-size.

Doluschitz, R. and W. Trunk (1994). "ECONOMICAL ASPECTS OF DAIRY FARMING SUBJECT TO HERD-SIZE." Praktische Tierarzt **75**(2): 112-&.
<Go to ISI>://WOS:A1994MX42000005

Structural changes in the East German agriculture focussed the economical discussion onto the issue what the optimal herd-size for dairy farm in terms of the monetary result is. The answer to this question is in the first place important for the reorganisation of the East-German agriculture but also for the other dairy farmers to compare their own costs and output. After all farmers can compare how competitive they are and in which way they have to improve their operation to receive a sufficient labour-income. The results of this analysis show that the determination for profitable herd-sizes of dairy farms is a sophisticated issue. By the use of different methods and data the following conclusions can be drawn: The economies of scale in dairy farming under Middle European conditions seem to reach their optimum at a herdsize of about 200 cows. Below this herdsize the costs for manpower and capital decrease. In larger farms the decrease in the economies of scale and increasing transactions costs (transport, controlling, administration) raise the costs steadily. Milk production seems to be feasible in a wide range of farming systems in terms of technical equipment, organisation and legal form. Especially the farms between 60 and 500 cows show good economical results. The examination of the evolution in the past confirms this acertainment: in the former FRG operations with less than 30 cows lost importance and in the former GDR there can be observed a drastic reduction of farms with more than 500 cows. Investments in very

big dairy farms in Eastern Germany should be calculated precisely because they are only profitable under exceptional conditions. Existing extremely large herds should be divided or the number of cows should be reduced until technical and organisational conditions meet the requirements for a profitable milk production. In the former FRG particularly the smaller dairy farmers should think about cooperating with colleagues to reach a longterm profitable herd-size.

Donnan, G. A., H. M. Dewey and B. R. Chambers (2004). "Warfarin for atrial fibrillation: the end of an era?" Lancet Neurology **3**(5): 305-308.
<Go to ISI>://000221160700024

Background Warfarin has been in routine clinical use for more than 50 years; however, it was not proven to be of benefit in both primary and secondary prevention of stroke for patients with non-valvular atrial fibrillation (AF) until about a decade ago. Despite its efficacy in reducing the risk of stroke in patients with AF by about 60%, with an absolute reduction of about 3% per year, there have always been barriers to its use. These barriers have included the need for monitoring the degree of anticoagulation with blood tests to measure the international normalised ratio, frequent dose adjustments to maintain this ratio within quite a narrow therapeutic range, and the risk of bleeding should the upper limits of this range be exceeded. Aspirin has also been used but is less effective. Recent developments New oral drugs are being tested; these may be as effective at reducing stroke risk as warfarin in patients with AF. Direct thrombin inhibitors such as ximelagatran are not inferior to warfarin and, based on results from the SPORTIF III and V trials, are perhaps safer, with no need for long-term monitoring and dose adjustment. However, the side-effect of raised amounts of the liver enzyme alanine amino-transferase in 6% of patients needs to be resolved. In the ACTIVE trial, the efficacy of a combination of antiplatelet drugs (aspirin plus clopidogrel) is being tested against dose-adjusted warfarin; and in AMADEUS, the factor-Xa inhibitor and pentasaccharide idraparinux is being assessed in a similar way. Several surgical procedures and devices are also being developed to control AF rhythm and prevent stroke. Where next? The place of these new drugs in the management of AF needs to be established. In the short term, it seems that ximelagatran will replace warfarin in patients for whom there is evidence of a favourable risk-to-benefit ratio. The SPORTIF population consists of patients with AF plus at least one risk factor. More information about the effect of raised liver enzymes will probably not be available until phase IV studies are completed. Combination antiplatelet drugs need to be tested further- perhaps even triple therapy with aspirin, clopidogrel, and dipyridamole-if the results of ACTIVE are encouraging. The place of surgical procedures and devices to control rhythm and prevent stroke is unclear. Whatever happens, there is a high probability that the days of warfarin are numbered.

Doran, N. E., J. Balmer, M. Driessen, R. Bashford, S. Grove, A. M. M. Richardson, J. Griggs and D. Ziegeler (2003). "Moving with the times: baseline data to gauge future shifts in vegetation and invertebrate altitudinal assemblages due to environmental change." Organisms Diversity & Evolution **3**(2): 127-149.
<Go to ISI>://000184292200008

A long-term monitoring program has been established in Tasmania, Australia, as a Satellite Project for the International Biodiversity Observation Year (IBOY). This program aims to monitor distributional change in vegetation and fauna assemblages along an altitudinal gradient (70-1300 m) in response to climate change and other environmental events. Baseline data collected over a two-year period will be available for comparison with data collected in future decades. The vegetation varies with altitude and fire history. The rate of change in vegetation is not continuous along the altitudinal gradient, but is most rapid above 700 m and below the treeline at 1000-1100 m. Most vascular plant species reach the limit of their distribution within this zone. Despite their preliminary nature, the invertebrate data also display altitudinal and seasonal patterns. The treeline and the 700-1000 m zone again appear to be notable in terms of invertebrate distribution. While the composition of ground-based taxa may be closely related to the floristic composition of the vegetation (or its environmental drivers), the airborne invertebrate fauna appears to be more closely related to structural characteristics such as height and density. Of all taxa, the Coleoptera appear to be the best potential indicators across most altitudes and times. Although the current data provide a wealth of inventory and distributional information over altitude, their greatest potential value lies in long-term comparative information. Future sampling should focus not only on changes at and above the treeline, but also on the zone below this where many species are at their altitudinal limits and may be particularly sensitive to climate change.

Dufumier, M. (1993). "[Agriculture, ecology and development]." Revue tiers-monde **34**(134): 245-61.
<Go to ISI>://MEDLINE:12286676

This work is based in part on the papers concerning agriculture, ecology, and development contained in this issue of the Revue Tiers-Monde. It provides an overview of changing international attitudes toward environmental damage, examines 3 specific types of damage affecting developing countries in particular, and discusses the shortcomings of existing environmental projects and the prerequisites for a lasting control over environmental damage. It has become increasingly evident that pollution and environmental damage cannot be the concern exclusively of developed countries. The 1992 UN Conference on the Environment and Development in rio de Janeiro focused most of its attention on problems evident at the planetary level such as the greenhouse effect and extinction of species. Problems resulting from the impact of harmful agricultural practices on developing country ecological environments were noted somewhat in passing. The examples of tropical deforestation, the degradation of savannahs and steppes, and cultivation of new fields on steep mountainsides demonstrate the complexity and gravity of environmental problems in developing countries. The poverty of peasants and their inability to obtain the inputs that would enable them to practice a more stable type of agriculture are important factors in the damage done. A common problem is that immediate production or consumption is favored with little regard for longterm consequences. Certain agricultural practices such as the use of cultivars selected for their high yields under optimal conditions contribute to the progressive disappearance of varieties with special properties such as resistance to disease or insects that may be needed in the future. Excessive use of herbicides, pesticides, or fertilizer may bring problems of pollution and toxicity. Numerous development projects sponsored by donors from the developed countries have been designed to pursue short term objectives with insufficient attention to longterm damage. Environmental protection projects have frequently fallen short of their goals because the local populations were not consulted or involved. Some used materials such as tree species that were not adapted to local conditions or that did not meet the needs of the people. The

sponsors of development projects may not be sufficiently aware of the difficulty of assuring day-to-day survival for some groups, who find the constraints imposed by the projects to be extremely burdensome. The author argues that peasants are always interested in reconciling their production objectives with protection of resources, and they are quite well informed of how to do so. Governments should ease their access to credit or the inputs that would enable them to practice a more productive agriculture with less environmental damage. A more equitable world economic order will be required before environmental protection can be assured in the poorest countries.

Dziak, R. P., D. R. Bohnenstiehl, H. Matsumoto, C. G. Fox, D. K. Smith, M. Tolstoy, T. K. Lau, J. H. Haxel and M. J. Fowler (2004). "P- and T-wave detection thresholds, Pn velocity estimate, and detection of lower mantle and core P-waves on ocean sound- channel hydrophones at the Mid-Atlantic Ridge." Bulletin of the Seismological Society of America **94**(2): 665-677.
<Go to ISI>://000221200900021

Since 1999 six Sound Fixing and Ranging (SOFAR) hydrophones have been moored along the Mid-Atlantic Ridge (MAR) (15degrees-35degrees N). These hydrophones (8-bit data resolution) are designed for long-term monitoring of MAR seismicity using the acoustic T waves of seafloor earthquakes. The completeness level of the MAR T-wave earthquake catalog estimated from size- frequency constraints is m(b) similar to 3.0, a significant improvement in detection compared to the m(b) 4.6 completeness level estimated from National Earthquake Information Center magnitude-frequency data. The hydrophones also detect the acoustic phase of converted upper mantle P arrivals from regional earthquakes at epicentral distances of 374-1771 km and from events as small as m(b) 3.6. These regional P waves are used to estimate a Pn velocity of 8.0 +/- 0.1 km sec(-1) along the east and west MAR flanks. An unexpected result was the identification of P arrivals from earthquakes outside the Atlantic Ocean basin. The hydrophones detected P waves from global earthquakes with magnitudes of 5.8-8.3 at epicentral distances ranging from 29.6degrees to 167.2degrees. Examination of travel times suggests these teleseismic P waves constitute the suite of body-wave arrivals from direct mantle P to outer- and inner-core reflected/refracted phases. The amplitudes of the teleseismic P waves also exhibit the typical solid-earth wave field phenomena of a P shadow zone and caustic at Delta similar to 144degrees. These instruments offer a long-term, relatively low-cost alternative to ocean-bottom seismometers that allows for observation of Pn velocities and mantle/core phases arriving at normally inaccessible deep-sea locations.

Ekenler, M. and M. A. Tabatabai (2003). "Effects of liming and tillage systems on microbial biomass and glycosidases in soils." Biology and Fertility of Soils **39**(1): 51-61.
<Go to ISI>://000186686800008

This study was undertaken to investigate the long-term influence of lime application and tillage systems (no-till, ridge-till and chisel plow) on soil microbial biomass C (C-mic) and N (N-mic) and the activities of glycosidases (alpha- and beta-glucosidases, alpha- and beta-galactosidases and beta- glucosaminidase) at their optimal pH values in soils at four agroecosystem sites [Southeast Research Center (SERC), Southwest Research Center (SWRC), Northwest Research Center (NWRC), and Northeast Research Center (NERC)] in Iowa, USA. Results showed that, in general, the C-mic and N-mic values were significantly (P <0.001) and positively correlated with soil pH. Each lime application and tillage system significantly (P <0.001) affected activities of the glycosidases. With the exception of alpha-glucosidase activity, there was no limextillage interaction effect. Simple correlation coefficients between the enzyme activities and soil pH values ranged from 0.51 (P <0.05) for the activity of alpha- glucosidase at the NWRC site (surface of the no-till) to 0.98 (P <0.001) at the SWRC site. To assess the sensitivity of the enzymes to changes in soil pH, the linear regression lines were expressed in Deltaactivity/DeltapH values. In general, their order of sensitivity to changes in soil pH was consistent across the study sites as follow: beta-glucosidase>beta- glucosaminidase>beta-galactosidase>alpha-galactosidase>alpha- glucosidase. Lime application did not significantly affect the specific activities (g p -nitrophenol released kg(-1) soil organic C h(-1)) of the enzymes. Among the glycosidases studied, beta-glucosidase and beta-glucosaminidase were the most sensitive to soil management practices. Therefore, the activities of these enzymes may provide reliable long-term monitoring tools as early indicators of changes in soil properties induced by liming and tillage systems.

Ellingson, A. R. and P. M. Lukacs (2003). "Improving methods for regional landbird monitoring: a reply to Hutto and Young." Wildlife Society Bulletin **31**(3): 896-902.
<Go to ISI>://000186012500038

Hutto and Young (2002) advocate an approach for regional-scale landbird monitoring that is based on convenience sampling and index values. We take issue with their methods and argue that convenience sampling and index values do not provide credible data from which to make inference about population dynamics. We clarify misconceptions of distance sampling from Hutto and Young used to dismiss the utility of the method. instead we propose that monitoring programs must address the issues of variable detectability and sound survey design, emphasizing rigor in all steps of the planning process.

Ellis, E. C., R. G. Li, L. Z. Yang and X. Cheng (2000). "Long-term change in village-scale ecosystems in China using landscape and statistical methods." Ecological Applications **10**(4): 1057-1073.
<Go to ISI>://WOS:000088496000010

Densely populated village ecosystems in subsistence agriculture regions cover a global area equivalent to two-thirds of that of tropical rainforests. Measuring longterm anthropogenic changes in these regions presents methodological challenges for ecologists, because ecosystem processes must be measured and compared under preindustrial vs. contemporary conditions within highly heterogeneous anthropogenic landscapes. In this study, we use landscape classification and observational uncertainty analysis to stratify, estimate, and compare changes in landscape structure caused by the transition from traditional to modern management within a single village in China's Tai Lake Region. Contemporary data were gathered on-site during 1993-1996 using aerial photography, field surveying, local knowledge, and household surveys, while traditional period estimates, similar to 1930, were obtained using interviews, back estimation, and historical sources. A hierarchical landscape classification scheme was used to stratify village landscapes into 35 fine-scale landscape components with relatively homogeneous ecosystem processes. Monte Carlo

simulation and data quality indexing were used to calculate and compare village and component areas and their changes. Using this approach, we observed significant longterm declines in the proportion of village area covered by paddy (-12%), fallow, and perennial areas (-8%), and increases in areas under buildings and infrastructure (+7%). Aquatic and wetland areas increased by nearly 40% from 1930 to 1994. Significant declines in fallow and perennial vegetation and increases in constructed and heavily trafficked areas indicate overall increases in human disturbance. Our methods for observational uncertainty analysis, anthropogenic landscape classification, and the linking of imagery with field, household, and other local data are powerful tools for detecting and monitoring long-term ecological changes within anthropogenic landscapes.

Ervin, D. E., R. Welsh, S. S. Batie and C. L. Carpentier (2003). "Towards an ecological systems approach in public research for environmental regulation of transgenic crops." Agriculture Ecosystems & Environment **99**(1-3): 1-14.
<Go to ISI>://000186022300001

A review of current research shows insufficient monitoring and testing have been conducted to reliably assess the degree of environmental risks posed by transgenic crops. The major risks include increased resistance to particular pesticides, gene flow into related plant species, and negative effects on non-target organisms. Significant gaps in knowledge, often stemming from missing markets for ecological services, warrant a cautious environmental regulatory approach for transgenic crops. The objective of this paper is to identify the types of ecological systems public research to implement effective biosafety controls. US biosafety regulatory processes tend to focus on controlling type I error, i.e. restricting the release of the crops when significant environmental risks do not exist, because the economic losses from denying commercialization can be estimated. However, the precautionary principle, which focuses on controlling type II errors, i.e. releasing the crops when serious ecosystem damage will occur, adds a necessary criterion given the current deficit in ecological science. The key challenge facing regulators is to find the appropriate balance of controlling type I versus type II errors. The research program should embed the lessons of evolutionary biology and ecological sciences. Viewing the plant as a production machine that can be "brute-force" reengineered for more efficiency is a poor analogy. Unanticipated and unintended results, positive and negative, will emerge from such engineering because plants are complex systems embedded in poorly understood, complex, and interacting ecosystems. An ideal public research program should capture the interconnectedness of ecological systems, the essential roles of ecosystem services, nonlinear and threshold responses to accumulating stresses, and global expansion of the technology. Basic elements of such a program include long-term studies of cumulative and synergistic pesticide resistance effects, potential gene flow problems for those transgenic crop trait-weed complexes with high probabilities of outcrossing and ecological disruption, and scientific protocols for assessing deleterious effects on non-target organisms. For all three effects, expanded ecosystem monitoring of the commercialized crops in varied settings is needed for improved type II error definitions and estimates. The development of improved risk analysis methodologies and protocols should also be a priority. Finally, scientific effort to stimulate precautionary research, such as the development of transgenic crops that mimic ecological systems functioning, could avert many risks. Creating information to avoid significant ecological damages and foster precautionary research and development for transgenic crops are neglected roles of public biotechnology research.

Farrell, A. C. and R. B. Scheckenberger (2003). "An assessment of long-term monitoring data for constructed wetlands for urban highway runoff control." Water Quality Research Journal of Canada **38**(2): 283-315.
<Go to ISI>://000183229700005

Constructed wetlands have gained acceptance as a means of treating stormwater runoff from urban developments. Much of the available data regarding the performance of these facilities is based upon monitoring conducted over the course of less than two years, and as such inherently assumes that the period of analysis represents the "typical" or "design" conditions under which these facilities are intended to operate. While this information has provided guidance regarding the mechanisms by which wetlands provide quality treatment of urban runoff, it does not fully reflect the variability of conditions under which the facilities operate over the fullness of time, which is of particular concern to designers and operators. The construction of the Dartnall Road Interchange, as part of Hamilton's Lincoln Alexander Parkway, required a monitoring program-which included five years of water quality sampling-as a condition of approval by the Department of Fisheries and Oceans. This paper reports on the quantitative and qualitative wetland water quality monitoring data (sediment, nutrients, metals) obtained over the course of a total seven-year program, and provides information regarding the operating conditions and estimates on contaminant removal efficiencies from the facilities.

Farrell, E. P., J. Aherne, G. M. Boyle and N. Nunan (2001). "Long-term monitoring of atmospheric deposition and the implications of ionic inputs for the sustainability of a coniferous forest ecosystem." Water Air and Soil Pollution **130**(1-4): 1055-1060.
<Go to ISI>://000172012000024

Ionic fluxes in a semi-mature stand of Sitka spruce (Picea sitchensis (Bong.) Carr.), on a spodosol in eastern Ireland, were monitored over an eight-year period, 1991-1998. The paper focuses on the long-term viability of forests in this region. Input-output balances, proton budgets and critical loads suggest that the long-term sustainability of forests in the region is threatened unless atmospheric emissions of anthropogenic substances can be controlled.

Felske, A. D. M., W. Fehr, B. V. Pauling, H. von Canstein and I. Wagner-Dobler (2003). "Functional profiling of mercuric reductase (mer A) genes in biofilm communities of a technical scale biocatalyzer." Bmc Microbiology **3**: art. no.-22.
<Go to ISI>://000186546200001

elemental mercury and has recently been demonstrated to be applicable for industrial wastewater clean-up. The long-term monitoring of such biocatalyser systems requires a cultivation independent functional community profiling method targeting the key enzyme of the process, the merA gene coding for the mercuric reductase. We report on the development of a profiling method for merA and its application to monitor changes in the functional diversity of the biofilm community of a technical scale biocatalyzer over 8 months of on-site operation. Results: Based on an alignment of 30 merA sequences from Gram negative bacteria, conserved primers were designed for amplification of merA fragments with an optimized PCR protocol. The resulting amplicons of

approximately 280 bp were separated by thermogradient gelelectrophoresis (TGGE), resulting in strain specific fingerprints for mercury resistant Gram negative isolates with different merA sequences. The merA profiling of the biofilm community from a technical biocatalyzer showed persistence of some and loss of other inoculum strains as well as the appearance of new bands, resulting in an overall increase of the functional diversity of the biofilm community. One predominant new band of the merA community profile was also detected in a biocatalyzer effluent isolate, which was identified as Pseudomonas aeruginosa. The isolated strain showed lower mercury reduction rates in liquid culture than the inoculum strains but was apparently highly competitive in the biofilm environment of the biocatalyzer where moderate mercury levels were prevailing. Conclusions: The merA profiling technique allowed to monitor the ongoing selection for better adapted strains during the operation of a biocatalyzer and to direct their subsequent isolation. In such a way, a predominant mercury reducing Ps. aeruginosa strain was identified by its unique mercuric reductase gene.

Filatova, L. P., N. S. Lapteva and V. A. Shevchenko (2004). "Long-term monitoring of the ecological situation in industrial sites of Moscow with a Drosophila melanogaster test strain." Russian Journal of Genetics **40**(3): 263-265.
<Go to ISI>://000220453700006
For 12 years, recombination rate was assessed in Drosophila melanogaster males exposed on a thermoelectric power station (TPS) of Moscow. In 1994, experiments were also carried out on another Moscow TPS for comparison. The recombination frequency in exposed males was two-or threefold higher than in the control sample. Recombination frequencies observed in different years did not significantly differ from each other. Likewise, no significant difference was observed for the results obtained on two TPSs. A dramatic increase in recombination frequency in flies exposed on TPS was considered as an adequate response to high concentrations of effective mutagens discharged by TPS.

Fish, S. K. and P. R. Fish (1992). "PREHISTORIC LANDSCAPES OF THE SONORAN DESERT HOHOKAM." Population and Environment **13**(4): 269-283.
<Go to ISI>://WOS:A1992HY68000005
The Hohokam of southern Arizona are noted for greater duration of settlement than other major agricultural traditions in the archaeological record of the southwestern United States, including the Anasazi and Mogollon. The 40,000 square mile area inhabited by the Hohokam is marked by low elevation desert basins, but encompasses a range of topographic and climatic variability that shaped opportunities for prehistoric farming technologies. Irrigation from rivers was frequently associated with the longterm persistence of individual sites, while floodwater farming along ephemeral drainages was more often correlated with continuous occupation of hydrologically favored zones. Renewal of fields by waterborne nutrients and efficient practices in the use of natural resources countered the limited mobility options afforded by the Hohokam environment. In spite of a restrictive agricultural setting and an essentially static suite of productive technologies over many centuries, relationships among population, settlement, and landuse were redefined in evolving social and economic configurations. An example from the Tucson Basin illustrates differentiated patterns of settlement and agriculture arising in conjunction with increased levels of population and territorial integration in the late prehistoric period. Community organization among interrelated settlements incorporated a diversity of topographic zones and agricultural technologies in this high-risk context for prehistoric cultivator's.

Flachowsky, G., I. Halle and K. Aulrich (2005). "Long term feeding of Bt-corn - a ten-generation study with quails." Archives of Animal Nutrition **59**(6): 449-451.
<Go to ISI>://000233641600008 AND http://www.ask-force.org/web/Feed/Flachowsky-Long-Term-Feedingstudy-2005.pdf
A ten-generation experiment with growing and laying quails were carried out to test diets with 40 (starter) or 50% (grower, layer) isogenic or transgenic (Bt 176) corn. Feeding of diets containing genetically-modified corn did not significantly influence health and performance of quails nor did it affect DNA-transfer and quality of meat and eggs of quails compared with the isogenic counterpart.

Flachowsky, G. and C. Wenk (2010). "The role of animal feeding trials for the nutritional and safety assessment of feeds from genetically modified plants - Present stage and future challenges." Journal of Animal and Feed Sciences **19**(2): 149-170.
<Go to ISI>://WOS:000278973200001 AND http://www.ask-force.org/web/Feed/Flachovsky-Role-Animal-Feeding-2010.pdf

Fliessbach, A., P. Mader, D. Dubois, L. Gunst, W. Stauffer, P. Fried, L. Pfiffner, T. Alföldi and U. Niggli (2000). Organic Farming enhances soil fertility and biodiversity. Fibl Dossier 1,. Fibl. Frick, Switzerland, Research Institute of Organic Agriculture, Federal Research Station for Agroecology and Agriculture**:** 16.
http://www.botanischergarten.ch/Organic/DOC_slim.pdf AND http://www.botanischergarten.ch/Organic/DOC-slim-Slides.ppt
Healthy ecosystems, well adapted to the site conditions, are distinguished by species diversity. The element cycles and foodweb structures are closed and the nutrients are bound biologically.
Ecosystem theory is in accordance with the principles of organic farming: the closed nutrient cycle on the farm level.
The DOK-trial is showing impressively, even without the intention to enhance species diversity, that organic land-management allows development of a relatively rich weed-flora as compared to conventional systems. In conventional farming, weeds are considered competitive to the crop and are eliminated by herbicides and dense crop stands. In organic systems, however, some of the «accompanying plants» of a crop are desired and considered useful.
The presence of a versatile flora attracts beneficial herbivores and other air-borne or above-ground organisms. Their presence improves the nourishment of the predatory arthropods. Populations of the very mobile ground beetles (carabids) in the DOK-trial not only differed in number and species composition.
Of a total of 39 species identified, some specialized and particularly demanding species were exclusively present in the bio-organic field plots.

Folster, J., L. Bringmark and L. Lundin (2003). "Temporal and spatial variations in soilwater chemistry at three acid forest sites." Water Air and Soil Pollution **146**(1-4): 171-195.

<Go to ISI>://000183108400011

As acid deposition declines, recovery from acidification is delayed by the fact that the soil processes that earlier buffered against acidification are now being reversed. Monitoring of within catchment processes is thus desirable. However, soil sampling is destructive and not suitable for long-term monitoring at a single site, whereas sampling of soil water with suction lysimeters may be more suitable. In this paper we evaluate 8-11 years of soil water chemistry from E- and B-horizons in three acid forest soil plots within monitored catchments. Five years of sampling also included the C-horizon. To our knowledge, this is the first long-term lysimeter study including the E-horizon showing recovery from acidification, and one of few studies including the B-horizon. Soil water concentrations of SO4 decreased significantly between -9.5 and -1.4 mueq L-1 yr(-1), with much higher rates of change at two southern sites compared to a northern site, where levels and changes of deposition were lower. The average annual bulk deposition of S ranged between 3 kg S ha(-1) at the northernmost site to 11 kg S ha(-1) at the southernmost site. The SO4 decline in E-horizons was smaller than the decline in deposition, which indicated leaching of SO4 from the O-horizon. At the two southern sites, a weaker decline in SO4 in the B- horizon compared to the E-horizon indicated desorption of SO4. The negative trends in SO4 were to a large extent balanced by decreases in base cations but there were also tendencies of recovery from acidification in soil solution at the southern sites by increasing pH and ANC. However, these were contradicted by increasing Al concentrations. A high influence of marine salts in the early 1990s may have delayed the recovery. Decreasing trends of the Ca/(H+)(2) ratio in the soil solution, most pronounced at one of the southern sites, suggested that the soils were becoming more acidic, although the soil solution tended to recover.

Fosang, A. J., H. Stanton, C. B. Little and L. M. Atley (2003). "Neoepitopes as biomarkers of cartilage catabolism." Inflammation Research **52**(7): 277-282.

<Go to ISI>://000184100500001

Progressive degradation of articular cartilage is a central feature of arthritis and a major determinant of long term joint dysfunction. There are no treatments able to halt the progression of cartilage destruction presently available, and monitoring the benefit of potential therapies is hampered by our inability to measure the "health" of articular cartilage. Serial radiographic assessment of joint space narrowing, the current gold standard, requires measurements over a prolonged time (1 - 5 years) and is prone to technical difficulties. Other strategies for evaluating cartilage degradation are needed to enable both short and long term monitoring of disease progression and response to therapy. One avenue that holds promise is the use of biomarkers that accurately reflect the degradative state of the articular cartilage. Antibodies that recognise terminal amino acid sequences generated by proteolysis at specific sites in the core protein of both aggrecan and type II collagen (neoepitope antibodies) have become available in recent years. These antibodies have been invaluable for identifying the proteinases responsible for cartilage breakdown both in vitro and in vivo. The presence of neoepitope sequences generated by specific metalloenzyme cleavage of aggrecan and type II collagen correlates well with the progression of cartilage degeneration, both in vitro and in mouse models of arthritis. Preliminary results with quantitative assays of type II collagen neoepitopes suggest that they may be useful markers of joint disease in humans. Long term studies correlating neoepitope concentration with clinical and radiographic disease are now required to validate the utility of neoepitopes as surrogate markers of cartilage degeneration and joint disease.

Framme, C. and J. Roider (2004). "Immediate and long-term changes of fundus autofluorescence in continuous wave laser lesions of the retina." Ophthalmic Surgery Lasers & Imaging **35**(2): 131-138.

<Go to ISI>://000220206100006

BACKGROUND AND OBJECTIVE: To determine whether fundus autofluorescence imaging is able to show changes in retinal pigment epithelium (RPE) fluorescence after thermal laser photocoagulation. PATIENTS AND METHODS: In vivo imaging of fundus autofluorescence was performed with a scanning laser ophthalmoscope. A laser with a wavelength of 488 nm was used for excitation of the tissue and autofluorescence was detected above 500 nm using a barrier filter. One hundred eight eyes of 87 patients who had had previous laser treatment were monitored. The appearance and size of the laser lesions were documented and correlated to the time of treatment. Immediate changes were observed prospectively in 13 eyes; long-term follow-up was studied retrospectively in 95 eyes. RESULTS: In all patients but one, autofluorescence was decreased in the area of laser lesions I hour after laser treatment. After 1 month, previously decreased autofluorescence in all lesions changed to significantly increased autofluorescence, which was stable up to 6 months after treatment. Mixed forms were present approximately 6 to 12 months after treatment, showing a central island of increased autofluorescence surrounded by a ring of decreased autofluorescence. After I to 2 years, lesions again changed to complete dark spots, enlarging later on. CONCLUSION: RPE destruction and subsequent proliferation after continuous wave laser photocoagulation can be visualized noninvasively by autofluorescence imaging. Immediate decreased autofluorescence may indicate acute damage of the RPE, subsequent increased autofluorescence seems to indicate proliferative behavior of the RPE, and final dark spots can indicate R-PE atrophy secondary to a denaturation of neurosensory retinal tissue. Thus, autofluorescence can be used in the long-term monitoring of R-PE changes after laser treatment. The enlargement of the laser atrophy zone demonstrates the potential risk of visual loss after central laser photocoagulation even years after treatment.

Freckleton, R. P., A. R. Watkinson, D. J. Webb and T. H. Thomas (1999). "Yield of sugar beet in relation to weather and nutrients." Agricultural and Forest Meteorology **93**(1): 39-51.

<Go to ISI>://000078582200004

Data on sugar beet yields from a long-term experiment (1965-1993) at IACR Broom's Barn are used, in conjunction with long-term weather data, to assess the degree to which weather affects yield and how this effect is modified by nutrient availability. Mean temperatures and rainfall during July and August were strongly correlated with sugar beet yields, as well as mean temperature during April and the length of time between sowing and harvest. The data from July and August were entered into a factor analysis to generate two factors describing how hot and dry weather conditions are during July and August. These two factors, as well as April temperature and the length of the growing season, were entered into a multiple regression. The regressions revealed strong effects of the principal axis factors on sugar beet yields across treatments, as well as strong effects of the length of the growing

season, but weaker effects of April temperatures. The strength of response to weather was dependent on the nutrient regime, and was, in particular, greater with increased application of nitrogen. There was, however, no effect of nutrient regime on the strength of response of yield to the length of the growing season. These results indicate that weather-induced year-to-year variability in sugar beet yields in unirrigated crops is primarily determined by conditions in July and August as well as the length of time between sowing and harvest, and imply that drought limits yields in well-fertilised crops. The practical implications of these results are that the risk of yield losses due to drought may be minimised by maximising the length of growing season, and that there is the potential for developing simple measures to forecast yields through monitoring of rainfall.

Frelich, J., M. Slachta and M. Kobes "Analysis of longterm trends in the performance of dairy cows on low-input mountain farms." Journal of Agrobiology **27**(1): 35-40.
<Go to ISI>://BIOSIS:PREV201000557067

The productive and reproductive performance of dairy cows was examined on thirty-four low-input farms in the Sumava Mts. between 2000 and 2007. Milk production increased by an average of 986 kg and 948 kg per lactation by Holstein and by Czech Fleckvieh cows, respectively ($P < 0.001$), while the mean number of lactations decreased from 2.7 to 2.5 in Holstein and from 3.4. to 3.0 in Czech Fleckvieh cows ($P < 0.001$) in the same period. The mean number of lactations decreased also in the culled cows - from 3.2 to 2.9 by Holstein and from 4.3 to 3.5 by Czech Fleckvieh cows ($P < 0.001$). A higher cow milk yield was accompanied by a deterioration in reproductive performance. Between the periods 2000-2003 and 2004-2007 the number of days open lengthened by an average of 6 and 4 days ($P < 0.01$) and the calving period by an average of 11 and 6 days ($P < 0.001$) in Holstein and Czech Fleckvieh cows respectively. The results indicated an increased replacement of cows in the herds examined as a coincidental feature of the steadily rising milk performance. This may have a negative impact on the rentability of low-input mountain dairy farming in the region.

Freschet, G. T., D. Masse, E. Hien, S. Sall and J. L. Chotte (2008). "Long-term changes in organic matter and microbial properties resulting from manuring practices in an and cultivated soil in Burkina Faso." Agriculture Ecosystems & Environment **123**(1-3): 175-184.
<Go to ISI>://WOS:000251149800019

Fallows and livestock manure are the main means for improving the fertility of agro-pastoral systems in West African Sahel. As the general shortage of cropland has led to shorter fallow periods, manure appears to be the only means of maintaining soil productivity. Several studies have focused on the general pattern of nutrient release from manure but, so far as we are aware, few studies have investigated the long-term changes of manure input to tropical soils. This research project was carried out on ferralic arenosol in north Burkina Faso to assess the longterm residual effect of organic matter (sheep and goat manure) on land where livestock had been corralled. Microbial activities, soil organic matter and vegetal production were evaluated and a soil organic matter model was then drawn up and fitted to the data. The residual effect decreased rapidly during the first 5 years after corralling but remained significant for up to 11 years. The duration and magnitude of the residual effect depended mainly on the amount of manure applied. The differences in soil organic matter recorded between plots that had not been corralled for many years might result from the different amounts of manure applied in the past. Vegetal production and denitrification potentials were negligible below a minimum soil organic matter threshold. The initial soil organic matter level, the soil organic matter threshold and the residual effect of corralling should be taken in account when advising on the management of ecosystem services such as vegetal production and control of greenhouse gas emissions. For these purposes, it could be useful to produce a more advanced model.

Fruget, J. F., M. Centofanti, J. Dessaix, J. M. Olivier, J. C. Druart and P. J. Martinez (2001). "Temporal and spatial dynamics in large rivers: example of a long-term monitoring of the middle Rhone River." Annales De Limnologie-International Journal of Limnology **37**(3): 237-251.
<Go to ISI>://000171361100008

In running water, the main natural factor of disturbance is hydraulic. Investigation of its biological impact is currently complicated by the increase of anthropogenic disturbances which tend to mask the natural functioning of rivers. Monitoring of the impacts of the artificial alterations undergone by the Middle Rhone River for some decades took place in the mid- 1980s. Discharge and temperature could constitute the major events controlling the biological dynamics in terms of variations in species richness, diversity, and abundance. The between-years changes of the structure and diversity of macroinvertebrate communities were connected with the amplitude of discharge fluctuations. This was in accordance with the disturbance-diversity concept and it seems to confirm the intermediate disturbance hypothesis. The fish community mainly depended on hydroclimatic factors that influenced breeding success. Variations in nutrient input played a secondary role in controlling changes in some communities (particularly the periphyton). Therefore it appears that the study of long-term changes in river systems, including the dynamics of their biological communities, requires continuous observations and data collection that only medium- to long-term studies can provide, implying the setting up of ecological monitoring centres for the natural environment such as the Long Term Ecological Research (LTER) sites in United States.

Gabelli, F. M., G. J. Fernandez, V. Ferretti, G. Posse, E. Coconier, H. J. Gavieiro, P. E. Llambias, P. I. Pelaez, M. L. Valles and P. L. Tubaro (2004). "Range contraction in the pampas meadowlark Sturnella defilippii in the southern pampas grasslands of Argentina." Oryx **38**(2): 164-170.
<Go to ISI>://000221639400017

The Vulnerable Pampas meadowlark Sturnella defilippii (Family Icteridae) is a Neotropical grassland bird that suffered a severe population reduction and range contraction during the 20th century. Formerly distributed across most of the pampas grasslands, it is now confined to the southern tip of its original range. There are small groups of wintering birds in southern Brazil, a small reproductive population in eastern Uruguay, and the main reproductive population occurs on the southern pampas grasslands of Argentina. In this paper we report the results of an extensive field survey of these southern pampas grasslands, carried out to estimate the pampas meadowlark's population size and to identify the factors potentially responsible for its range contraction. During the 1999 breeding season we surveyed a total of 296 sample locations (transects, randomly selected points, and sites

checked for nesting site reoccupation). We found 66 reproductive groups of pampas meadowlarks. The minimum population size and extent of occurrence were estimated to be 28,000 individuals and 4,810 km(2), respectively. This value represents a range contraction of c. 30% compared to that estimated in a study carried out between 1992 and 1996. Pampas meadowlarks reoccupied natural grassland sites for nesting that were used in previous breeding seasons when these sites remained undisturbed. Habitat transformation appears to be the main factor causing the range contraction of the pampas meadowlark. We suggest that long-term monitoring of this population and its preferred habitat, the natural grasslands, is required in order to ensure the conservation of this species.

Gaillard, J. M., P. Duncan, D. Delorme, G. van Laere, N. Pettorelli, D. Maillard and G. Renaud (2003). "Effects of hurricane Lothar on the population dynamics of European roe deer." Journal of Wildlife Management **67**(4): 767-773.
<Go to ISI>://000186216800012

Although extreme weather events-such as hurricanes-cause obvious changes in landscape and tree cover, the impact of such events on population dynamics of ungulates has not yet been measured accurately. We report a first quantification of the demographic consequences on roe deer (Capreolus capreolus) of the strongest hurricane (Lothar) that France has suffered in centuries. Based on long-term monitoring (>20 yr) of known-age individuals in 2 populations, We found that Lothar had no detectable negative effect on age-and sex-specific survival rates, except perhaps for old females. Likewise, although Lothar occurred during the time in the roe deer reproductive cycle when embryos are implanted, we found no evidence of a decrease in either the pregnancy rate or litter size. Our results show that roe deer populations are resistant to this kind of extreme weather event. The consequences for wildlife management are direct and important: (1) the hunting bag was low in 2000 due to restricted hunter access, and (2) the main effect of hurricane Lothar was to create openings within large forests that are good habitat for roe deer. We suggest that Lothar will paradoxally have a positive effect on roe deer population dynamics.

Gaillard, J. M., A. Loison, C. Toigo, D. Delorme and G. Van Laere (2003). "Cohort effects and deer population dynamics." Ecoscience **10**(4): 412-420.
<Go to ISI>://000187465200003

Among-individual variation of life history traits in a given population of deer has most often been accounted for by differences among sex and age classes and by current environmental variation (mostly changes in density and climatic conditions). However. among-individual differences in fitness can also be generated by differences in environmental conditions during the year of birth. Such cohort effects can be divided into two different components. First, among-year differences in environmental conditions at birth may produce large yearly variation in recruitment that generates a direct numerical effect (i.e., a high proportion of newborns are recruited in good years, whereas very low proportions are recruited when environmental conditions encountered by newborns during their first weeks of life are poor). Second, when recruited into the population, individuals born in a good year may reproduce earlier, reach a larger body mass, and have a higher reproductive success than individuals born in a poor year. We call the long-lasting influence on individual fitness of environmental conditions during the year of birth a delayed quality effect. Here, we first review briefly evidence of numerical and quality effects recently accumulated in deer populations. Then, by using long-term monitoring (> 20 y) of two contrasted roe deer (Capreolus capreolus) populations, we assess the influence of the among-cohort differences in reproductive traits, age- and sex-specific survival rates, and population growth rate. Results show that cohort effects (1) are widespread in deer populations and (2) may have a major influence on population dynamics, especially in low-performance populations. Cohort effects should therefore be accounted for in management plans of deer populations.

Gall, G. A. E. and M. Staton (1992). "INTEGRATING CONSERVATION BIOLOGY AND AGRICULTURAL PRODUCTION - CONCLUSIONS." Agriculture Ecosystems & Environment **42**(1-2): 217-230.
<Go to ISI>://WOS:A1992KA49700015

Cooperation between agricultural and conservation biologists is imperative to ensure continued production of high quality food and fiber for all the earth's peoples, and to protect biological diversity. This article outlines ideas and needs expressed by participants in the workshops on conservation biology and agriculture. In the areas of general biology, there is an enormous need for research in basic and applied genetics and related technologies. In the area of exploited lands, research is needed on a wide variety of topics relative to biodiversity and the management for biological diversity on rangelands, forested lands, and wetlands. Habitat requirements of native species need to be better understood as do the interrelationships of native communities and species with adjacent agricultural activities or urban centers. A series of questions on park design and management need to be researched and modeled. Research is needed on the effects of grazing systems on natural plant and animal diversity and changes in grazing practices as well as on natural grazing patterns by indigenous fauna and livestock grazing patterns in relation to biodiversity. Other areas where research is needed include restoration techniques and their effectiveness, the role of climatic change in plant/animal interactions and its relationship to agriculture, design of forest management systems, harvesting techniques, and mixed agroforestry systems. In the area of wetland biology and management, research is needed on the improvement of degraded wetlands and on longterm monitoring of regenerated wetlands. Government policies need to be examined with respect to biological, environmental and economic impacts. Traditional agricultural systems and the importance of traditional knowledge systems need to be linked to agricultural development programs. Research is needed in the design, implementation, monitoring, and effects of agricultural policies. Research priorities and longterm goals for sustainability need to be determined. Policy research is needed on how principles of conservation biology can contribute to sustainable agriculture.

Gallo, K., L. Ji, B. Reed, J. Dwyer and J. Eidenshink (2004). "Comparison of MODIS and AVHRR 16-day normalized difference vegetation index composite data." Geophysical Research Letters **31**(7): art. no.-L07502.
<Go to ISI>://000221075700005

Normalized difference vegetation index (NDVI) data derived from visible and near-infrared data acquired by the MODIS and AVHRR sensors were compared over the same time periods and a variety of land cover classes within the conterminous USA. The

relationship between the AVHRR derived NDVI values and those of future sensors is critical to continued long term monitoring of land surface properties. The results indicate that the 16-day composite values are quite similar over the 23 intervals of 2001 that were analyzed, and a linear relationship exists between the NDVI values from the two sensors. The composite AVHRR NDVI data were associated with over 90% of the variation in the MODIS NDVI values.

Gaston, L., M. Locke, J. McDonald, S. Dodla, L. Liao, L. Putnam and T. Udeigwe (2007). "Effects of tillage on norflurazon sorption, degradation and mobility in a mississippi delta soil." Soil Science **172**(7): 534-545.
<Go to ISI>://WOS:000248202200003

The fate of pesticides in agricultural systems and impact on water quality remain important environmental issues. Recent studies have found the herbicide norflurazon [4-chloro-5-(methylamino)-2-(3-(trifluoromethyl)phenyl)-3-(2H)-pyridiazo ne] in groundwater and surface water. Although there are data on the sorption, degradation, and mobility of this compound in different soils, none address effects of tillage on its fate. Also, the accuracy of independent sorption and degradation data for predicting norflurazon mobility has not been assessed. This study compared sorption, degradation, and mobility of norflurazon in Dundee (fine-silty, mixed, thermic, Aeric Ochraqualfs) soil from conventional-tillage (CT) and no-tillage (NT) plots of a longterm tillage experiment. Sorption was determined for the 0- to 10-, 10- to 20-, and 20- to 30-cm depths of these soils in a 24-h batch equilibration study. Sorption was well-described by the Freundlich model and related to soil organic C, being greater in surface NT than CT soil and generally decreasing with depth. Degradation was tracked in dosed (0.256 mu mol/25 g; C-14-labeled) soil samples for 14, 28, 56, and 112 days, followed by methanol extraction and high-performance liquid chromatography analysis. Norflurazon degraded with formation of desmethyl-norflurazon, nonextractable C-14 residue, and loss of (CO2)-C-14. Degradation rate was adequately described by first-order models and decreased with depth but was not affected by tillage. Rate constants ranged from 0.012 to 0.005 day(-1). Mobility in intact cores (similar to 30 cm long) of CT and NT soil showed less mass eluted from and greater retention in NT cores, consistent with greater sorption. Transport showed preferential flow (Br tracer) that was described by a mobile/immobile water model. Norflurazon mobility could be reasonably well described using the batch sorption and degradation data.

Gaudeul, M. and I. Till-Bottraud (2004). "Reproductive ecology of the endangered alpine species Eryngium alpinum L. (Apiaceae): Phenology, gene dispersal and reproductive success." Annals of Botany **93**(6): 711-721.
<Go to ISI>://000221871800009

Background and aims Eryngium alpinum (Apiaceae) is an endangered perennial, characteristic of the Alpine flora. Because the breeding system influences both demographic (reproductive success) and genetic (inbreeding depression. evolutionary potential) parameters that are crucial for population maintenance, the reproductive ecology of E. alpinum was investigated. Specifically, the aims of the study were (1) to determine the factors (resources and/or pollen) limiting plant fitness; and (2) to assess the potential for gene flow within a plant, within a patch of plants, and across a whole valley where the species is abundant. Methods Field experiments were performed at two sites in the Fournel valley, France, over three consecutive years. Studies included a phenological survey, observations of pollinators (visitation rates and flight distances), dispersal of a fluorescent powder used as a pollen analogue, the use of seed traps, determination of the pollen/ovule ratio. and an experiment to test whether seed production is limited by pollen and/or by resources. Key results E. alpinum is pollinated by generalist pollinators, visitation rates are very high and seed set is resource-rather than pollen-limited. The short flights of honeybees indicate a high potential for geitonogamy, and low pollen and seed dispersals suggest strong genetic structure over short distances. These results are interpreted in the light of previous molecular markers studies, which, in contrast, showed complete outcrossing and high genetic homogeneity. Conclusions. The study highlights the usefulness of adopting several complementary approaches to understanding the dynamic processes at work in natural populations. and the conservation implications for E. alpinum are emphasized. Although the studied populations do not seem threatened in the near future, long-term monitoring appears necessary to assess the impact of habitat fragmentation. Moreover, this study provides useful baseline data for future investigations in smaller and more isolated populations. (C) 2004 Annals of Botany Company.

Gibbard, R., N. Ravenscroft and J. Reeves (1999). "The popular culture of agricultural law reform." Journal of Rural Studies **15**(3): 269-278.
<Go to ISI>://WOS:000080065400003

This paper applies a reading of the wider theoretical understanding of rural restructuring to the reform of agricultural holdings legislation over the last century. In charting the shifting legal basis of agricultural tenancies in England and Wales, from 'black letter' positivism to a more cultural form and system of regulation, the paper theorises that the underlying political imperative has been allied to the changing significance of property ownership and use. Rather than reflecting a longterm desire to maintain the let sector in British agriculture, however, the paper argues that this process has had other aims. In particular, it has been about an annexation of law to legitimise the retention of landowner power while presenting a 'democratisation' of farming, away from its plutocratic associations and towards a new narrative of 'depersonalised' business.

Gilreath, J. P., T. N. Motis, B. M. Santos, J. W. Noling, S. J. Locascio and D. O. Chellemi (2005). "Resurgence of soilborne pests in double-cropped cucumber after application of methyl bromide chemical alternatives solarization in tomato." Horttechnology **15**(4): 797-801.
<Go to ISI>://WOS:000232317600010

Field studies were conducted during four consecutive tomato (Lycopersicon esculentum) -cucumber (Cucumis sativus) rotations to examine the longterm residual effects of tomato methyl bromide (MBr) alternatives on soilborne pests in double-cropped cucumber. Four treatments were established in tomato fields: a) nontreated control; b) MBr + chloropicrin (Pie) (67:33 by weight) at a rate of 350 lb/acre; c) tank-mixed pebulate + napropamide at 4 and 2 lb/acre, respectively, followed by 1,3-dichloropropene (1,3-D) + Pic (83:17 by volume) at 40 gal/acre; and d) napropamide at 2 lb/acre followed by soil solarization for 7 to 8 weeks. Each of the following seasons, cucumber was planted in the same tomato plots without removing mulch films. For nutsedge [purple nutsedge (Cyperus rotundus) and yellow nutsedge (C. esculentus)] densities, napropamide followed by solarization plots had equal control (<= 15 plants/m(2)) as MBr + Pic during all four cropping seasons. However, nematode control with solarization was inconsistent.

Marketable yield data proved that fumigation in tomato fields with either MBr + Pic or pebulate + napropamide followed by 1,3-D + Pic had a long-term effect on double-cropped cucumber.

Glassley, W. E., J. J. Nitao, C. W. Grant, J. W. Johnson, C. I. Steefel and J. R. Kercher (2003). "The impact of climate change on vadose zone pore waters and its implication for long-term monitoring." Computers & Geosciences **29**(3): 399-411.
<Go to ISI>://000182951400013

Protecting groundwater is of growing interest as pressure on these resources grows. Recharge of groundwater takes place through the vadose zone, where complex interactions between thermal-hydrological-geochemical processes affect water quality. Monitoring processes in the vadose zone is an important means of evaluating the long-term health of aquifer systems. and has become an integral part of many subsurface engineering efforts. Monitoring such systems, however, may be affected by changes in climate that slowly propagate through vadose zone systems. We describe in this paper the use of NUFT- C, a reactive transport simulator designed to run on a high performance, massively parallel computer. to compare quantitatively the evolution of a deep vadose zone with changes expected from an engineered high-level nuclear waste repository. The results suggest that the impacts from waste emplacement are, in some instances, similar to those that would be observed as a result of climate change, whereas others are distinguishable from evolution of the natural system. Such simulations facilitate design of long-term monitoring programs that take account of these complex effect S. The results emphasize the importance of developing long-term baseline measurements and control sites, in order to enhance confidence in interpretations of complexly evolving data sets that will be obtained from multi-decade monitoring efforts. Published by Elsevier Science Ltd.

Gnanadesikan, A., J. L. Sarmiento and R. D. Slater (2003). "Effects of patchy ocean fertilization on atmospheric carbon dioxide and biological production." Global Biogeochemical Cycles **17**(2): art. no.-1050.
<Go to ISI>://000183102900006

Increasing oceanic productivity by fertilizing nutrient-rich regions with iron has been proposed as a mechanism to offset anthropogenic emissions of carbon dioxide. Earlier studies examined the impact of large-scale fertilization of vast reaches of the ocean for long periods of time. We use an ocean general circulation model to consider more realistic scenarios involving fertilizing small regions (a few hundred kilometers on a side) for limited periods of time (of order 1 month). A century after such a fertilization event, the reduction of atmospheric carbon dioxide is between 2% and 44% of the initial pulse of organic carbon export to the abyssal ocean. The fraction depends on how rapidly the surface nutrient and carbon fields recover from the fertilization event. The modeled recovery is very sensitive to the representation of biological productivity and remineralization. Direct verification of the uptake would be nearly impossible since changes in the air-sea flux due to fertilization would be much smaller than those resulting from natural spatial variability. Because of the sensitivity of the uptake to the long-term fate of the iron and organic matter, indirect verification by measurement of the organic matter flux would require high vertical resolution and long-term monitoring. Finally, the downward displacement of the nutrient profile resulting from an iron-induced productivity spurt may paradoxically lead to a long-term reduction in biological productivity. In the worst-case scenario, removing 1 ton of carbon from the atmosphere for a century is associated with a 30-ton reduction in biological export of carbon.

Goto, S., M. Kinoshita, O. Matsubayashi and R. P. Von Herzen (2002). "Geothermal constraints on the hydrological regime of the TAG active hydrothermal mound, inferred from long-term monitoring." Earth and Planetary Science Letters **203**(1): 149-163.
<Go to ISI>://000179078800012

During August 1994 to March 1995, a period that included ODP Leg 158 drilling, bottom-water and sub-bottom temperatures were continuously logged by a long-term temperature monitoring system 'Daibutsu' at the base of the central black-smoker complex (CBC) and within the low heat flow zone at the TAG hydrothermal mound on the Mid-Atlantic Ridge. The temperature of hydrothermal fluid at CBC was also measured with a small high-temperature probe 'Hobo'. Bottom-water temperature variations measured with Daibutsu at both sites have predominant semi-diurnal periods, causing the sub-bottom temperatures to fluctuate at these periods with reduced amplitudes and phase delays at sub-bottom depths. Seawater entrainment into the mound has been previously suggested at the low heat flow zone. We quantitatively evaluate the seawater entrainment rate at both sites from a one-dimensional numerical model, combined with a heat conduction model for the semi- diurnal variations. The entrainment rate of seawater at the base of CBC is estimated as 1.3 +/- 0.5 X 10(-5) m/s, at least from August 17 to 30, 1994. On the other hand, the seawater entrainment rate at the low heat flow zone was undetected by long-term temperature monitoring at shallow sub-bottom depth. Nevertheless an increase in heat flow observed at the low heat flow zone during ODP drilling can be interpreted as a decrease in the entrainment rate of seawater. Before ODP Leg 158, Daibutsu measured three sub-bottom temperature anomalies at the base of CBC not derived from bottom-water temperature variations and Hobo also detected a CBC fluid temperature anomaly, indicating some natural changes in fluid flow within the mound. Daibutsu and Hobo also measured temperature anomalies during and after drilling at the ODP TAG-1 area. The Hobo temperature anomalies are inferred to have occurred when the cold fluid entrained through the drill holes at TAG-1 site reached or cooled the main fluid path to CBC. The entrained seawater through the drill holes appears to have contributed to dissolution and precipitation of anhydrite within the mound and perhaps affected the local permeability structure inside the mound. The temperature anomalies measured with Daibutsu at the base of CBC may have been induced by the change in the fluid flow pattern as a result of such permeability changes within the mound.

Goto, S., M. Kinoshita, A. Schultz and R. P. Von Herzen (2003). "Estimate of heat flux and its temporal variation at the TAG hydrothermal mound, Mid-Atlantic Ridge 26 degrees N." Journal of Geophysical Research-Solid Earth **108**(B9): art. no.-2434.
<Go to ISI>://000187311900001

[1] From August 1994 to March 1995, three 50-m-high vertical thermistor arrays designated "Giant Kelps'' (GKs) were deployed around the central black smoker complex (CBC) at the TAG hydrothermal mound, Mid-Atlantic Ridge (26degrees08'N, 44degrees49'W). These were designed to monitor the temporal variability of the vertical temperature distribution in the

hydrothermal plume. One small high-temperature probe "Hobo'' was also deployed in one of the black smoker vents of CBC. Over the observation period, two typical characteristics are recognized in plume temperatures measured with GKs: (1) the amplitudes of temperature anomalies decrease with increasing height above the top of CBC; (2) maximum temperature anomalies on the upper thermistors occurred periodically and nearly simultaneously across the array about every 6 hours. Conversely, maximum temperature anomalies on the lower thermistors occurred periodically every 12 hours, indicating that the location of the plume discharged from CBC was forcibly moved by the change in direction of tidally modulated current flow. The heat flux from CBC was estimated from temperatures measured by GKs based on a model of buoyant hydrothermal fluid rising in a stable, stratified density environment. The estimated heat flux from CBC gradually decreases from about 86 to 55 MW over the similar to7 months of measurement, with a mean rate of decrease of 0.17 MW d(-1). Since the black smoker effluent temperature measured with Hobo was almost stable over the measurement period, a plausible cause of the decrease is a reduction in the volume of hydrothermal fluid provided to the CBC (in which case the estimated mean rate of decrease in volume flux of CBC is 8.9 m(3) d(-1)). Estimated heat flux, temperature anomalies observed by Hobo, and diffuse flow and subbottom temperature anomalies recorded by other long-term monitoring instruments before, during, and after ODP Leg 158 indicate that the drilling probably affected the fluid flow pattern within the mound but had little effect on the total heat flux from CBC.

Grassini, P., A. J. Hall and J. L. Mercau (2009). "Benchmarking sunflower water productivity in semiarid environments." Field Crops Research **110**(3): 251-262.
<Go to ISI>://WOS:000262969000010

Appropriate benchmarking is essential for evaluating the efficiency with which crops use water and for identifying constraints, other than water, to crop yield. No benchmark exists for sunflower. Boundary and Simulation analyses were used to quantify the water productivity of sunflower crops grown in the Western Pampas (semiarid central Argentina). The approach involved the use of a large database (n = 169) collected in farmers' fields over a period of 4 years, and the application of a crop simulation model in combination with actual weather and soil data. Using field data, an upper bound of 8 kg grain ha (1) mm (1) for water productivity, with an apparent seasonal soil evaporation of 75 mm, was defined. Seasonal water supply exceeded maximum expected seasonal crop requirements (ca.630 mm) for many crops, and a majority of crops with <630 mm of available water during the season had water productivities considerably lower than the upper bound. The field data-based upper bound was indistinguishable from that obtained using yields for a set of 47 simulations using observed initial values for soil water and nitrogen profiles. Simulation confirmed the main features of the boundary-analysis applied to field data, and many simulated crops had yields that fell below the boundary function, even when simulated yield was plotted against simulated seasonal evapotranspiration or transpiration. Longterm (33-year) simulation analyses for two sites showed that most sunflower crops in the area are subjected to episodes of transient and unavoidable water stress after floral initiation. High levels of available soil water at sowing moderate, but in most years do not eliminate, these exposures to water stress. Yield gaps with respect to the boundary function were associated with deficient or excessive rainfall during grain filling, and other, non-water related, factors such as inadequate crop nutrition, biotic stresses, low photothermal quotients during the interval close to anthesis, and lodging. A grain yield/ seasonal evapotranspiration plot for a large (n = 154) data set from experiments conducted by others in five separate environments suggests that the boundary function found for the Western Pampas is broadly applicable. Sunflower water productivity, corrected for oil-synthesis costs and seasonal vapour pressure deficit differences, approximates that of winter cereals grown in Mediterranean environments. (c) 2008 Elsevier B.V. All rights reserved.

Green, N. J. L., J. L. Jones, A. E. Johnston and K. C. Jones (2001). "Further evidence for the existence of PCDD/Fs in the environment prior as 1900." Environmental Science & Technology **35**(10): 1974-1981.
<Go to ISI>://000168759800011

PCDD/Fs and PCBs have been analyzed in a series of archived soil samples collected from various depths during the 1800s and early 1900s. PCBs were not found in soil samples collected before 1900, whereas PCDD/Fs were present in concentrations between 43 and 110 pg/g in surface soils, and between 9 and 150 pg/g in soils collected from below the surface. The PCDD/F homologue patterns of all surface soils were consistent with each other. The homologue pattern of deeper soils altered with depth to one that was dominated by highly chlorinated PCDDs. The highest Sigma (4-8)PCDD/F concentration (150pg/g) was found in the deepest soil analyzed (230-250 cm below the surface). The cork from one of the storage bottles contained considerable quantities of both PCBs and PCDD/Fs. However, contamination of the soils, either by diffusion through the cork or by cork particles, was discounted on the basis that no PCBs were evident in the soil, and that the PCDD/F homologue pattern in the cork was Very different to that found in the soil. Similar arguments were used to discount contamination of the soil by dust. A sample of ashed vegetation from the archive, that had no cork stopper, contained high concentrations of PCBs (78 ng/g), concentrations of mono- to tri-CDFs that were higher than in any of the soils (190 pg/g), but very low concentrations of Sigma (4-8)PCDD/F (12 pg/g). This pattern of analytes was considered to be representative of contamination from store room air and was completely different from the pattern observed in the soils. Taken together these observations indicate that contamination during storage, or subsequent handling, is unlikely to have occurred in archived soil samples that were stored with cork and wax seal intact. The results imply surface soil Sigma (4-8)PCDD/F concentrations of around 60 pg/g at Rothamsted (southeast England) in the late 1800s, compared with similar to 300 pg/g reported for rural UK soils in the 1990s.

Greenwood, P. L. and L. M. Cafe (2007). "Prenatal and pre-weaning growth and nutrition of cattle: Longterm consequences for beef production." Animal **1**(9): 1283-1296.
<Go to ISI>://WOS:000250857500007

Severe, chronic growth retardation of cattle early in life reduces growth potential, resulting in smaller animals at any given age. Capacity for long-term compensatory growth diminishes as the age of onset of nutritional restriction resulting in prolonged growth retardation declines. Hence, more extreme intrauterine growth retardation can result in slower growth throughout postnatal life. However, within the limits of beef production systems, neither severely restricted growth in utero nor from birth to weaning

influences efficiency of nutrient utilisation later in life. Retail yield from cattle severely restricted in growth during pregnancy or from birth to weaning is reduced compared with cattle well grown early in life, when compared at the same age later in life. However, retail yield and carcass composition of low- and high-birth-weight calves are similar at the same carcass weight. At equivalent carcass weights, cattle grown slowly from birth to weaning have carcasses of similar or leaner composition than those grown rapidly. However if high energy, concentrate feed is provided following severe growth restriction from birth to weaning, then at equivalent weights post-weaning the slowly-grown, small weaners may be fatter than their well-grown counterparts. Restricted prenatal and pre-weaning nutrition and growth do not adversely affect measures of beef quality. Similarly, bovine myofibre characteristics are little affected in the long term by growth in utero or from birth to weaning. Interactions were not evident between prenatal and pre-weaning growth for subsequent growth, efficiency, carcass, yield and beef-quality characteristics, within our pasture-based production systems. Furthermore, interactions between genotype and nutrition early in life, studied using offspring of Piedmontese and Wagyu sired cattle, were not evident for any growth, efficiency, carcass, yield and beef-quality parameters. We propose that within pasture-based production systems for beef cattle, the plasticity of the carcass tissues, particularly of muscle, allows animals that are growth-retarded early in life to attain normal composition at equivalent weights in the long term, albeit at older ages. However, the quality of nutrition during recovery from early life growth retardation may be important in determining the subsequent composition of young, light-weight cattle relative to their heavier counterparts. Finally, it should be emphasised that long-term consequences of more specific and/or acute environmental influences during specific stages of embryonic, foetal and neonatal calf development remain to be determined. This need for further research extends to consequences of nutrition and growth early in life for reproductive capacity.

Greven, M., S. Green, B. Robinson, B. Clothier, I. Vogeler, R. Agnew, S. Neal and S. Sivakumaran (2007). "The impact of CCA-treated posts in vineyards on soil and ground water." Water Science and Technology **56**(2): 161-168.
<Go to ISI>://BIOSIS:PREV200700572576

Grapes in Marlborough are typically grown on a vertical shoot positioned trellis system (VSP). For this purpose Pinus radiata posts are treated with CCA, a mixture of copper (Cu), chromium (Cr) and arsenic (As), giving a wood concentration of 1,730, 3,020 and 2,410 mg/kg, respectively on a dry matter basis. The CCA levels around the posts in different soils were investigated and assessed for the potential leaching of CCA into ground water. An initial survey showed leaching of all three heavy metals from the treated posts into the soil surrounding the posts (0.2% of the total vineyard area) compared with the control, depending on vineyard age and soil type. The rate of movement out of the posts was calculated from posts placed in lysimeters. HortResearch's Soil Plant Atmosphere Model (SPASMO) was used to predict the leaching rate of CCA. For As, leaching was found to be 5 mg/post/month, with the Cr rate being about twice that. Further modelling revealed a steady plume of As moving downwards after about 200-300 years. However, longterm hydrogeological modelling showed that sufficient aquifer water flow prevented the accumulation of CCA in the ground water. The modelling approaches are discussed.

Griffith, J. A., K. P. Price and E. A. Martinko (2001). "A multivariate analysis of biophysical parameters of tallgrass prairie among land management practices and years." Environmental Monitoring and Assessment **68**(3): 249-271.
<Go to ISI>://WOS:000168198100003

Six treatments of eastern Kansas tallgrass prairie - native prairie, hayed, mowed, grazed, burned and untreated - were studied to examine the biophysical effects of land management practices on grasslands. On each treatment, measurements of plant biomass, leaf area index, plant cover, leaf moisture and soil moisture were collected. In addition, measurements were taken of the Normalized Difference Vegetation Index (NDVI), which is derived from spectral reflectance measurements. Measurements were taken in mid-June, mid-July and late summer of 1990 and 1991. Multivariate analysis of variance was used to determine whether there were differences in the set of variables among treatments and years. Follow-up tests included univariate t-tests to determine which variables were contributing to any significant difference. Results showed a significant difference ($p < 0.0005$) among treatments in the composite of parameters during each of the months sampled. In most treatment types, there was a significant difference between years within each month. The univariate tests showed, however, that only some variables, primarily soil moisture, were contributing to this difference. We conclude that biomass and % plant cover show the best potential to serve as long-term indicators of grassland condition as they generally were sensitive to effects of different land management practices but not to yearly change in weather conditions. NDVI was insensitive to precipitation differences between years in July for most treatments, but was not in the native prairie. Choice of sampling time is important for these parameters to serve effectively as indicators.

Haas, H. L., E. C. Lamon, K. A. Rose and R. F. Shaw (2001). "Environmental and biological factors associated with the stage- specific abundance of brown shrimp (Penaeus aztecus) in Louisiana: applying a new combination of statistical techniques to long-term monitoring data." Canadian Journal of Fisheries and Aquatic Sciences **58**(11): 2258-2270.
<Go to ISI>://000172266700016

Several short-term and small-scale correlative studies have associated brown shrimp (Penaeus aztecus) recruitment with high densities of sub-adults, high salinity, warm temperature, low river flow, and low precipitation. In this paper, we address criticisms of traditional correlative studies by using a spatially and temporally extensive dataset, by comparing stepwise multiple regression (SMR) to Bayesian model averaging (BMA), and by investigating nonlinear relationships with generalized additive models (GAMs). We use this combination of statistical methods to examine relationships between annual, stage-specific abundance estimates and environmental factors. BMA and SMR resulted in models with similar explanatory power, but BMA suggested fewer linear predictors. GAMs did not suggest nonlinear relationships among stage-specific abundance estimates. Postlarval abundance was not well described by any model. Juvenile abundance was partially described by environmental variables such as temperature, water clarity, and water level. Adult abundance was well described by early- juvenile abundance, salinity, and temperature. These results suggest that juvenile abundance may be the critical component in determining year-class strength of brown shrimp. Identifying

mechanisms that regulate juvenile production within the estuary will be a critical step in effectively managing Louisiana's brown shrimp resource.

Hakansson, N. T. and M. Widgren (2007). "Labour and landscapes: The political economy of landesque capital in nineteenth century tanganyika." Geografiska Annaler Series B-Human Geography **89B**(3): 233-248.
<Go to ISI>://WOS:000248915400004

In a long-term and global perspective irrigated and terraced landscapes, landesque capital, have often been assumed to be closely associated with hierarchical political systems. However, research is accumulating that shows how kinship-based societies (including small chiefdoms) have also been responsible for constructing landesque capital without population pressure. We examine the political economy of landesque capital through the intersections of decentralized politics and regional economies. A crucial question guiding our research is why some kinship-based societies chose to invest their labour in landesque capital while others did not. Our analysis is based on a detailed examination of four relatively densely populated communities in late pre-colonial and early colonial Tanzania. By analysing labour processes as contingent and separate from political types of generalized economic systems over time we can identify the causal factors that direct labour and thus landscape formation as a process. The general conclusion of our investigation is that landesque investments occurred in cases where agriculture was the main source of longterm wealth flow irrespective of whether or not hierarchical political systems were present. However, while this factor may be a necessary condition it is nota sufficient cause. In the cases we examined, the configurations of world-systems connections and local social and economic circumstances combined to either produce investments in landesque capital or to pursue short-term strategies of extraction.

Hakkert, R. (1991). "[The demographic consequences of austerity in Latin America: methodological aspects]." Estudios demograficos y urbanos **6**(2): 391.
<Go to ISI>://MEDLINE:12317738

This work reviews evidence in the literature of possible demographic effects of the austerity programs imposed on Latin American countries in the 1980s. The work focuses on methodological problems involved in assessing demographic changes and ascertaining that they were indeed attributable to the economic crisis. An introductory section describes the recession of the 1980s in Latin America, the declines in employment and living standards, and the health and social consequences of the deepening poverty. But the author argues that evaluation of health conditions, levels of nutrition, and especially factors such as infant mortality, fertility, marriage patterns, and migration as indicators of the impact of the economic depression is full of pitfalls that are not always obvious. Few Latin American countries have civil registration systems capable of providing accurate and up-to-date mortality and fertility data. Indirect methods currently in use were intended to analyze longterm levels and trends and are of little use for short-term fluctuations. Data on internal migration are scarce even in developed countries. Even when recent data are available it is often difficult or impossible to obtain data for comparison. Infant mortality and malnutrition levels, for example, are serious problems in many parts of Latin America, but series of data capable of demonstrating that they are truly consequences of the economic crisis are lacking. Another challenge is to separate the demographic effects of the debt crisis from longterm structural processes. The possibility of time lags and of different time frames may increase confusion. Almost a year must pass before effects on birth rates can be expected, for example. Neutralizing mechanisms may obscure the effects sought. Thus, the most impoverished urban sectors may return to the countryside to seek refuge in subsistence agriculture; their departure would in some measure diminish the consequences of recession in the urban economy. The type of cross-sectional analysis of differential fertility and mortality that is currently stressed in demographic studies is of limited utility for understanding the demographic impact of economic oscillations, for which a longitudinal approach is required. The next section of the article compares evidence of the effects of the recession of the 1980s with the Great Depression of the 1930s and with historical crises, suggesting that contemporary economic recessions have little in common in terms of causes or demographic consequences with historic crises. Specific studies and available data are then examined in the areas of fertility and mortality, longterm consequences of the economic recession, and migration.

Halbach, M. D., U. Egert, J. Hescheler and K. Banach (2003). "Estimation of action potential changes from field potential recordings in multicellular mouse cardiac myocyte cultures." Cellular Physiology and Biochemistry **13**(5): 271-284.
<Go to ISI>://000186416600004

Background: Extracellular recordings of electrical activity with substrate-integrated microelectrode arrays (MEAs) enable non-invasive long-term monitoring of contracting multicellular cardiac preparations. However, to characterize not only the spread of excitation and the conduction velocity from field potential(FP)recordings, a more rigorous analysis of FPs is necessary. Therefore in this study we aim to characterize intrinsic action potential(AP)parameters by simultaneous recording of APs and FPs. Methods:A MEA consisting of 60 substrate-integrated electrodes is used to record the FP- waveform from multicellular preparations of isolated embryonic mouse cardiomyocytes. Simultaneous current clamp recordings in the vicinity of individual microelectrodes and pharmacological interventions allowed us to correlate FP and AP components and their time course. Results: The experiments revealed a linear relationship between AP rise time and FP rise time as well as a linear relationship between AP duration and FP duration. Furthermore a direct contribution of the voltage dependent Na+- and Ca2+ current to the FP could be identified. Conclusion: The characterization of the FP allows us for the first time to estimate AP changes and the contribution of individual current components to the AP by the help of non-invasive recording within a multicellular cardiac preparation during long-term culture. Copyright (C) 2003 S Karger AG Basel.

Halldin, S., H. Bergstrom, D. Gustafsson, L. Dahlgren, P. Hjelm, L. C. Lundin, P. E. Mellander, T. Nord, P. E. Jansson, J. Seibert, M. Stahli, A. S. Kishne and A. S. Smedman (1999). "Continuous long-term measurements of soil-plant-atmosphere variables at an agricultural site." Agricultural and Forest Meteorology **98-9**: 75-102.
<Go to ISI>://000085025900005

It is a major challenge in modem science to decrease the uncertainty in predictions of global climate change. One of the largest uncertainties in present-day global climate models resides with the understanding of processes in the soil-vegetation-atmosphere-

transfer (SVAT) system. Continuous, long-term data are needed to correctly quantify balances of water, energy and CO2 in this system and to correctly model them. It is the objective of this paper to demonstrate how a combined system of existing sensor, computer, and network technologies could be set up to provide continuous and reliable long-term SVAT-process data from an agricultural site under almost all weather conditions. A long-term climate-monitoring system within the framework of NOPEX was set up in 1993-1994 at the Marsta Meteorological Observatory (MMO). It is situated in a flat agricultural area where annual crops are cultivated on a heavy clay soil. It has successfully monitored relevant states and fluxes in the system, such as atmospheric fluxes of momentum, heat, water vapour and CO2, atmospheric profiles of wind speed, direction, and temperature, short- and long-wave radiation, soil temperature, soil-water contents, groundwater levels, and rainfall and snow depth. System uptime has been more than 90% for most of its components during the first 5 years of operation. Results from the first 5 years of operation has proven MMO to be an ideal site for intercomparison and intercalibration of radiometers and fast turbulence sensors, and for evaluation of other sensors, e.g., rain gauges. The long time series of radiation data have been valuable to establish numerical limits for a set of quality-control flags. MMO has served as a boundary-layer research station and results from NOPEX campaigns show how the dimensionless wind gradient depends not only on the traditional stability parameter z/L but also on the height of the convective boundary layer. Measurements at the observatory grounds and a neighbouring field show a considerable variability in surface properties, which must be accounted for when assessing budgets of heat and other scalars. Questions concerning long-term calibration plans, maintenance of sensors and data-collection system, and continuous development of the computer network to keep it up to date are, however, only partly of interest as a research project in itself. It is thus difficult to get it funded from usual research-funding agencies. The full value of data generated by the: MMO system can best be appreciated after a decade or more of continuous operation. Main uses of the data would be to evaluate how SVAT models handle the natural variability of climate conditions, quantification of water, carbon and energy budgets during various weather conditions, and development of new parameterisation schemes in global and regional climate models.

Hamalainen, H., H. Luotonen, E. Koskenniemi and P. Liljaniemi (2003). "Inter-annual variation in macroinvertebrate communities in a shallow forest lake in eastern Finland during 1990-2001." Hydrobiologia **506**(1-3): 389-397.
<Go to ISI>://000188455600052

As a part of the Integrated Monitoring (IM) Programme of Air Pollution Effects on Ecosystems, the macroinvertebrate community of a pristine forest lake was monitored from 1990 up to the present. Lake Iso Hietajarvi is a small and shallow, weakly stratified oligotrophic headwater lake situated in Patvinsuo National Park, eastern Finland. Benthic macroinvertebrates were sampled annually, once in autumn at depths of 3 - 4 m (sublittoral zone) and at 7 in (profundal zone). The water quality of the lake and meteorological characteristics in the area were monitored during the same period. The inter-annual variation in macroinvertebrate abundance and taxonomic composition in the lake unaffected by human activities is described, compared across depth zones and related to environmental variation. The annual variation in density and taxa richness was relatively small, being proportionately greater in the profundal zone. There was a considerable year-to-year variation in the abundance of common and dominant taxa. Most taxa were always few in number and occurred only occasionally - in 1 or 2 years - in both depth zones. The inter-annual community persistence (constancy of taxa occurrences) and stability (consistency of relative abundance of taxa) as measured by the Sorensen distance, were however, relatively high and generally greater in the sublittoral zone. The patterns of variation in density, taxa richness, abundance of dominant taxa and community persistence and stability were generally different in the two zones compared, and few correlations with the measured environmental variables were found. Inter-annual stability and persistence, however, closely traced the course of wintertime North Atlantic Oscillation index, suggesting that the rate of local community change may be linked with large-scale climatic variation in a subtle way. The implications of the results are discussed in the context of biomonitoring.

Handy, R. D., T. S. Galloway and M. H. Depledge (2003). "A proposal for the use of biomarkers for the assessment of chronic pollution and in regulatory toxicology." Ecotoxicology **12**(1-4): 331-343.
<Go to ISI>://000181129000028

Despite a wealth of information on biomarkers, they are not routinely used for regulatory purposes, even though the potential benefits of biomarkers to rationalise complex exposure-response relationships are clear. Biomarkers can be inappropriately applied or misinterpreted, because the fundamental assumptions in exposure-response relations have not been considered. Factors causing temporal and spatial variability in biomarker responses are reviewed. These include numerous geochemical and biotic variables. The variation can be minimised by appropriate study site selection, experimental replication, multivariate epidemiological approaches, normalised controls, and temporal calibration of responses; so that the regulatory use of biomarkers for biomonitoring and tracking pollution events, including chronic or multiple exposures to complex mixtures is possible. We propose and define the characteristics of biomarkers of chronic exposure or effect, which must measure changes in pollution/effect against long-term changes in other general stresses (disease, nutrition, environmental quality), relate to cumulative injury, and remain responsive over months or years. Neuroendocrine, immunological, and histological biomarkers are suggested for chronic pollution. We propose a regulatory framework for biomarkers based on a weight of evidence approach that can integrate biomarkers in risk assessment and long-term monitoring programmes.

Hao, X.-h., R.-g. Hu, J.-s. Wu, S.-r. Tang and X.-q. Luo "Effects of long-term fertilization on paddy soils organic nitrogen, microbial biomass, and microbial functional diversity." Yingyong Shengtai Xuebao **21**(6): 1477-1484.
<Go to ISI>://BIOSIS:PREV201000438481

Soil samples were collected from the plow layers at two long-term experiment sites in Xinhua and Ningxiang counties of Hunan Province, China to study the effects of long-term fertilization on organic nitrogen, microbial biomass, and microbial functional diversity of paddy soils. Longterm fertilization showed great effects on the soil N content. Compared with CK, treatments NPK plus manure or straw increased the contents of soil total acid-hydrolysable N and its fractions amino sugar N, amino acid N, and ammonium N. Treatment NPK had no significant effects on soil microbial biomass C and N, but treatments NPK plus manure

increased the contents of soil microbial biomass C and N significantly. BIOLOG test showed that treatments NPK plus manure enhanced the carbon utilization efficiency of soil microbes, and improved the functional diversity of soil microbial communities, compared with CK. Long-term different fertilizer treatments resulted in the differences of carbon substrate utilization patterns of soil microbial communities.

Harman, I. T. and V. A. Drake (2004). "Insect monitoring radar: analytical time-domain algorithm for retrieving trajectory and target parameters." Computers and Electronics in Agriculture **43**(1): 23-41.
<Go to ISI>://000220445100002

Automated radars employing the zenith-pointing linear-polarized conical-scan (ZLC) configuration are proving effective for long-term monitoring observations of the migratory activity of a number of insect pests of agriculture. An insect passing over one of these radars produces a signal with a rather complex time variation, which is recorded and subsequently analyzed to retrieve parameters indicative of the target's trajectory (speed, direction), its orientation, and its character (size, shape). As an alternative to earlier algorithms for retrieving these parameters, we present here a relatively straightforward analytical method that uses the form of the ZLC scan to isolate signal components in the time-domain and that allows the parameters to be estimated by a sequence of least-squares fits. Validation tests that indicate the algorithm's precision and accuracy are also described. While the algorithm can be used to determine a starting point for a subsequent overall fit of all parameters, its retrievals are of sufficient quality for this final stage to be unnecessary in the envisaged applications. The algorithm has been adapted successfully for routine processing of data from two insect monitoring radars (IMRs) deployed in inland eastern Australia; implemented in the C++ language and running on a modem microcomputer, it processes the similar to50,000 echoes recorded on the nights of most intense migration in similar to4 min. (C) 2003 Elsevier B.V. All rights reserved.

Hassanin, A., A. E. Johnston, G. O. Thomas and K. C. Jones (2005). "Time trends of atmospheric PBDEs inferred from archived UK herbage." Environmental Science & Technology **39**(8): 2436-2441.
<Go to ISI>://000228428900009

Aerial portions of vegetation receive the bulk of their burden of persistent organic pollutants (POPS) from the atmosphere. Vegetation can therefore be a useful indicator of the changing atmospheric burden of POPS. Samples of archived pasture, collected from Rothamsted Experimental Station in the United Kingdom between 1930 and 2004, were analyzed for a range of polybrominated diphenyl ethers (PBDEs). PBDEs could not be routinely detected in the pre-1970 samples. Thereafter, the dominant congeners BDE 28, 47, 49, 99, 100, 153, 154, and 183 were frequently detected. The general trend was (a) a rise through the 1970s; (b) a minipeak in the mid-1980s, strongly influenced by one particularly high sample for 1984; (c) values remaining high through the late 1980s/1990s; (d) an indication of a more recent decline for all congeners (except BDE-28), consistent with recent restrictions on PBDE usage in Europe. These trends were compared to recent modeled estimates of U.K. PBDE emissions. The congener profiles of technical mixtures, U.K. air, soil, and pasture were compared and shown to be broadly similar. The implications for environmental release mechanisms are discussed.

Hauck, C. (2002). "Frozen ground monitoring using DC resistivity tomography." Geophysical Research Letters **29**(21): art. no.-2016.
<Go to ISI>://000180611900012

Time-lapse DC resistivity tomography is shown to be a useful method for permafrost and frozen ground monitoring in high-mountain areas. Resistivity changes are related to freezing and thawing processes and monitor the permafrost evolution over monthly to seasonal time scales. A fixed-electrode array allows measurements independent of the snow cover thickness. The 2-dimensional tomographic approach yields information about spatially variable transient processes, such as the advance and retreat of freezing fronts. In combination with borehole temperature data, differences in total water content at different depths could be estimated. In addition, the temporal evolution of the unfrozen water content was calculated showing a strong decrease during the winter months in the near-surface layer and a quasi-sinusoidal behaviour at greater depths. This approach seems promising for future long-term monitoring programmes of the permafrost evolution at low cost.

Havstad, K. M. and J. E. Herrick (2003). "Long-term ecological monitoring." Arid Land Research and Management **17**(4): 389-400.
<Go to ISI>://000185732900008

The intent of long-term ecological monitoring is to document changes in important properties of biological communities. At the least, a long-term monitoring system should be designed to detect long-term trends in three key attributes: soil and site stability, hydrologic function, and the biotic integrity of the system. There are four basic guidelines for developing integrated soil-vegetation monitoring systems for rangelands. These are: (1) identifying a suite of indicators which are consistently correlated with the functional status of one or more critical ecosystem processes and/or properties; (2) selecting base indicators on site specific objectives and resource concerns, and inherent soil and site characteristics; (3) using spatial variability in developing and interpreting indicators to make them more representative of ecological processes; and (4) interpreting indicators in the context of an understanding of dynamic, nonlinear ecological processes. To the extent possible, indicators should reflect early changes in ecological processes and indicate that a more significant change is likely to occur. In addition to these guidelines, measurements included in long-term monitoring systems should be rapidly applied, simple to understand, inexpensive to use, and quantitatively repeatable.

Hayes, J., M. Roth and L. Zepeda (1997). "Tenure security, investment and productivity in Gambian agriculture: A generalized probit analysis." American Journal of Agricultural Economics **79**(2): 369-382.
<Go to ISI>://WOS:A1997YG25900007

The determinants of investment, input use, and productivity are investigated under customary tenure in peri-urban areas of the Gambia. A structural model is specified to investigate the role of tenure security on farm investments and input use and thereby on yield. Testing of the structural form hypotheses requires simultaneous equation estimation. Containing both continuous and discrete

endogenous variables, the model is estimated as a feasible generalized least squares Amemiya's generalized probit. Some of the positive relationships hypothesized between tenure security, investment, and yields are corroborated. In particular, tenure security is found to enhance longterm investments, which in turn enhance yields.

Haygarth, P. M., A. I. Cooke, K. C. Jones, A. F. Harrison and A. E. Johnston (1993). "Long-Term Change in the Biogeochemical Cycling of Atmospheric Selenium - Deposition to Plants and Soil." Journal of Geophysical Research-Atmospheres **98**(D9): 16769-16776.
<Go to ISI>://A1993LY33000016

Retrospective analysis of archived soil and herbage samples from Rothamsted Experimental Station, southeast England, has determined the long-term changes in selenium deposition over the last century. Three out of four soils (those under permanent grassland, or growing wheat and barley) accumulated Se at a rate of circa 0.15% y(r)-1 (rate based on Se concentration, normalized to the earliest date circa 100 years earlier), with a net flux in the order 60-90 mug m-2 yr-1. The increase in soil growing root crops was smaller, with an increase of only 0.07% yr-1, possibly reflecting larger volatilization losses from this soil. Herbage samples were sensitive to changes in air composition. In the earlier half of the twentieth century there was an increase in the selenium content of herbage, probably from increased atmospheric deposition following increased use of fossil fuels. However, following the Clean Air Act (1956) the atmospheric loading of Se at this UK site appears to have declined, with contemporary Se concentrations in herbage considerably lower than they were in the 1970s, probably reflecting a change in fossil fuel usage from coal to oil and gas. The atmosphere has been a significant source of Se to plants and therefore grazing livestock. If the decline in the atmospheric input of selenium to herbage continues, selenium deficiency in livestock may become more prevalent in areas where soil concentrations are marginal.

Head, G., M. Moar, M. Eubanks, B. Freeman, J. Ruberson, A. Hagerty and S. Turnipseed (2005). "A multiyear, large-scale comparison of arthropod populations on commercially managed Bt and non-Bt cotton fields." Environmental Entomology **34**(5): 1257-1266.
<Go to ISI>://000232405800031AND http://www.botanischergarten.ch/Bt/Head-Multiyear-Nontarget-2005.pdf

Field studies were conducted in 2000-2002 to compare foliage-dwelling arthropod populations on Bacillus thuringiensis Berliner (Bt) (Bollgard) cotton and non-Bt (conventional) cotton season-long in South Carolina, Georgia, northern Alabama, and southern Alabama. For each of these four regions, three or four paired fields were sampled weekly in each of the 3 yr. Each pair,of fields consisted of a Bt and a non-Bt cotton field, both at least 5 ha in size. The dominant arthropod taxa collected included target pests (heliothine moths and Spodoptera spp.), nontarget pests (stink bugs and plant bugs), and generalist natural enemies [Geocorqs spp., Orius spp., Solenopsis invicta (Buren), ladybeetles, and spiders]. Where target pests were present, particularly Helicoverpa zea (Boddie), their numbers were consistently significantly lower in the Bt cotton fields. Natural enemy populations generally were not significantly different between the Bt and the non-Bt cotton fields (50% of all comparisons) and, where significant differences were present, natural enemy abundance usually was higher in the Bt than the non-Bt cotton fields. These differences were correlated with lower insecticide use on the Bt than the non-Bt cotton fields, particularly in South Carolina, where target pest pressure was heaviest. When presented with insect eggs or larvae as prey items, the larger natural enemy populations in Bt cotton fields exhibited significantly higher predation rates. These results show that Bt cotton has no significant adverse impacts on the nontarget arthropod populations studied and, compared with insecticide-treated non-Bt cotton, Bt cotton supports higher natural enemy populations with significant positive impacts on biological control.

Hegg, O. (1984). "Longterm-Influence of Fertilization on Some Species of the Nardetum at the Schynige Platte above Interlaken." Angewandte Botanik **58**(2): 141-145.
<Go to ISI>://A1984TV09300004

Hendrix, P. F., D. C. Coleman and D. A. Crossley (1992). "USING KNOWLEDGE OF SOIL NUTRIENT CYCLING PROCESSES TO DESIGN SUSTAINABLE AGRICULTURE." Journal of Sustainable Agriculture **2**(3): 63-82.
<Go to ISI>://WOS:A1992JQ02700007

Perspectives from different but complementary schools of thought in ecology are being applied to sustainable agriculture-population and community ecology on one hand and ecosystem ecology on the other. These perspectives intersect in the study of mechanisms and controls of processes in ecosystems. Increased understanding of these processes in agroecosystems will contribute to development of sustainable agriculture. Current models of nutrient cycling in soil suggest that active or readily mineralizable fractions of soil organic matter (SOM) are coupled to plant-available nutrient pools through the processes of mineralization and immobilization. Factors that control these processes (soil temperature, water, and texture; and resource quality of organic inputs) are influenced by management practices and represent potential controlling points for managing nutrient cycles in agroecosystems. Organic inputs present different problems for nutrient management than do synthetic fertilizers, because most nutrients must be mineralized before they are available to plants. This extra link in the nutrient flow pathway adds uncertainty to nutrient management. However, this may reflect more our lack of understanding of processes involved than an inherent unmanageability of organic fertilizers. Further research is needed to determine longterm trends in organic-matter processes in agroecosystems; to improve predictive capabilities of nutrient-cycling process models and linkages with landscape-scale models; and to determine relationships between biodiversity of soil biota and nutrient cycling processes in agroecosystems.

Hengeveld, R. (1995). Assessing Invasion Risk. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, Council of Europe Press.

Hiltbrunner, J., C. Scherrer, B. Streit, P. Jeanneret, U. Zihlmann and R. Tschachtli (2008). "Long-term weed community dynamics in Swiss organic and integrated farming systems." Weed Research **48**(4): 360-369.
<Go to ISI>://WOS:000258286100008

In 1991, a farming-system comparison was established on Burgrain Farm (Alberswil) to investigate the longterm sustainability of farming systems in Switzerland. In this study, the impacts of the three farming systems [organic (ORG), and integrated (IF) with an extensive (IFext) and an intensive (IFint) variant] on weed dynamics and diversity in six fields planted with winter wheat, maize, summer/winter barley, potatoes/oilseed rape and temporary grassland are examined. Altogether, 51 plant species were recorded from 1999 to 2006 in the maize and winter wheat crop. Total weed ground cover prior to harvest was seven times higher for wheat and 15 times higher for maize in ORG than in IFint, but grain yields were not negatively affected. Weed diversity was higher for ORG than for IF. In the temporary grassland, Taraxacum officinale and Rumex obtusifolius increased with time and dominated the weed community in the maize which followed. Chenopodium and Polygonum species dominated in the wheat, especially in ORG. We conclude from this study that an optimal combination of direct and indirect means for controlling weeds would allow organic farming at this site, provided that problematic weeds (e.g. Elytrigia repens) can be kept at the low level observed at the end of 2006.

Holmes, M. D., A. N. Miles, C. B. Dodrill, G. A. Ojemann and A. J. Wilensky (2003). "Identifying potential surgical candidates in patients with evidence of bitemporal epilepsy." Epilepsia **44**(8): 1075-1079.
<Go to ISI>://000184590000011

Purpose: To determine which patients with evidence of medically refractory bitemporal epilepsy are potentially good candidates for surgical therapy. Methods: We reviewed 42 adults with intractable seizures who were found to have bitemporal ictal onsets, based on scalp video-EEG long-term monitoring (LTM). All underwent invasive LTM before surgery. Surgical outcomes were classified as seizure free, >75% reduction in seizures, or <75% reduction in seizures, greater than or equal to 1 year after resection. We related the following factors to outcome: (a) > 75% preponderance of interictal scalp EEG discharges to one temporal region; (b) magnetic resonance imaging (MRI) findings; (c) lateralizing deficits on verbal or visual reproduction memory testing; and (d) memory failure with injection contralateral to side of surgery on Wada testing. Results: Twenty-six (62%) of 42 patients had unilateral ictal onsets based on intracranial studies. Seizure freedom (occurring in 64% of this group), or >75% seizure reduction (found in 12% of subjects) occurred only when at least one of the following three factors was concordant with the side of surgery: preponderance of interictal scalp EEG discharges, unilateral temporal lesion on MRI, or lateralizing verbal or visual reproduction memory deficits on neuropsychological tests ($p = 0.004$). Seven subjects with bilateral ictal onsets based on intracranial studies had resections based on preponderance of seizures to one side, or other lateralizing noninvasive abnormality. Five of these (all of whom had greater than or equal to 80% of seizures originating from one side) had >75% reduction in seizures. Conclusions: Invasive monitoring to pursue possible surgical therapy for patients with surface EEG evidence of bitemporal epilepsy may be justified only when some lateralizing feature is found in other noninvasive assessments. Key Words: Temporal lobe epilepsy-Epilepsy surgery-Intractable seizures-Longterm monitoring.

Hommel, B. and B. Pallutt (2002). "Evaluation of herbicide resistance against glufosinate in oilseed rape and maize in view of integrated plant protection - results of a long-term field experiment started in 1996 with a special view on field flora." Zeitschrift Fur Pflanzenkrankheiten Und Pflanzenschutz-Journal of Plant Diseases and Protection: 985-994.
<Go to ISI>://000202836900128 AND http://www.ask-force.org/web/Longterm/Hommel-Bewertung-Herbizidresistenz-2002.pdf

With the cultivation of herbicide resistant crops and the application of relevant herbicides, changes in the field flora are controversially discussed. From that, parameters for the monitoring of transgenic herbicide resistant crops have been derived. Present results have shown as expected that the use of the relevant herbicide LIBERTY has not yet reduced biodiversity in the field flora. New emerged weeds in maize after herbicide application have been evaluated as an ecological relevant aspect. For statements about the selection of less sensitive weeds, the experimental period is still too short, although herbicide resistant crops were grown every second year. Control of volunteer rape in glufosinate resistant maize was not necessary so far. The problem with volunteers should be prevented by avoiding further herbicide resistant crops grown in a crop rotation with the same herbicide resistance like rape. Case specific parameters for the monitoring are proposed.

Horlacher, D. E. and J. B. Scholvinck (1984). "Demographic trends and their socioeconomic significance." Managing international development : MID **1**(5): 45-60.
<Go to ISI>://MEDLINE:12266705

This article asserts that world population can be expected to continue its rapid growth in the years ahead, with its ultimate size dependent upon the speed at which replacement levels of fertility can be achieved in developing countries. Longterm demographic trends can be influenced by development planners and policymakers. However, there remain many unsolved questions concerning the impact of population growth on the pace and pattern of development, the adequacy or the resource base, and the quality of the environment. Rapid population growth may inhibit savings and divert resources from investments in equipment and human resources that are essential for generating employment opportunities to lift poor families out of poverty. Improvements in the educational level and health of the labor force can also serve to improve its employment potential. Sound policies in the fields of agriculture, employment, education, health care for the elderly, urban development, and rural resource management can bring about significant improvements in the standard of living in developing countries, even in the face of rapid population growth and concomitant changes in the age structure and the rural-urban distribution. Mortality and fertility can be reduced by developmental strategies and programs that emphasize nutrition, sanitation, health care, and employment. Although not a necessary condition, a deceleration of population growth rates would provide decision makers with more options for achieving the goals of development.

Hostert, P., A. Roder and J. Hill (2003). "Coupling spectral unmixing and trend analysis for monitoring of long-term vegetation dynamics in Mediterranean rangelands." Remote Sensing of Environment **87**(2-3): 183-197.
<Go to ISI>://000186447400006

The development of vegetation cover is one of the primary indicators for land degradation, stability, or regeneration in regions threatened by overgrazing. This paper addresses the problem how spatially explicit information about degradation processes in European Mediterranean rangelands can be derived from long time series of satellite data. The selected test site in central Crete,

Greece, is considered to be representative for the highly heterogeneous character of such landscapes. The monitoring approach comprises the time period between 1977 and 1996, covered by nine Landsat TM and four Landsat MSS images. Special emphasis has hence been put on the evaluation of potentials and drawbacks when coupling Landsat TM and MSS based results. The data sets were geometrically and radiometrically pre-processed in a rigorous fashion, followed by a linear spectral unmixing approach and a time series analysis of vegetation fraction images. Based on the resulting map, the spatio-temporal patterns of vegetation cover changes are explained. Even a test site such as central Crete, with its limited spatial extend, exhibits heterogeneous patterns of change, supporting the hypothesis that long time series of EOS data from Landsat-like sensors are mandatory to identify the relevant changes at landscape level. (C) 2003 Elsevier Inc. All rights reserved.

Huddleston, B. (1983). "Confronting world hunger." CARE briefs on development issues(3): 1-8.
<Go to ISI>://MEDLINE:12266156

In 1980, per capita food supplies were less than adequate in 53 developing countries. More than half of these were the predominantly rural, low income countries of South Asia, China, and Sub-Saharan Africa. Finding the proper balance between satisfying immediate human needs and building political and economic systems in which individuals can in the future acquire the means to satisfy their own requirements is the central issue facing those in the fight against world hunger. At the international level, developed countries have responded to world hunger by raising the minimum level of food aid provided when supplies are scarce and by creating a financing facility for cereal imports. The food and agriculture sector is receiving a highe priority than before in the allocation of international development assistance, and more attention is being given to the effects of both general food subsidies and targeted nutrition programs on future agricultural output. At the national level, over 40 developing countries have requested assistance from the World Food Council for the preparation of food sector strategies. Although such measures are important, they do not directly address local problems and individual needs. For example, dietary intake tends to be lower in urban than in rural households in Latin America at the same level of income. These urban groups require health and nutrition interventions that simultaneously address their immediate need for food, clean water, and health care and their more longterm need for employment. Longterm economic development that provides adequate income to all segments of the population is the best means to combat hunger, and income security also reduces incentives for large family size. The contribution of the international community should remain the transfer of resources and the provision of technical assistance. At the individual level, the need for targeted food distribution programs continues. Greater benefit can be obtained from directing such programs to groups with seriously inadequate levels of food consumption rather than targeting broadly on low income groups. New initiatives should be undertaken as a true collaboration between donors and recipients and should be focused on eradicating the conditions that give rise to hunger as well as on meeting immediate needs.

Hunt, B. P. V. and G. W. Hosie (2003). "The Continuous Plankton Recorder in the Southern Ocean: a comparative analysis of zooplankton communities sampled by the CPR and vertical net hauls along 140 degrees E." Journal of Plankton Research **25**(12): 1561-1579.
<Go to ISI>://000187232500010

A repeat transect was run south of Tasmania, along similar to140degreesE, during November and December 2001. NORPAC nets were deployed during a CTD transect on the southern leg, sampling four depth zones at each of 19 stations: 0-20, 20-50, 50-100 and 100-150 m. A Continuous Plankton Recorder (CPR) was deployed on the northern leg (average sampling depth = 10.5 m). Both net systems were harnessed with 270 mum mesh and all sampling was conducted between 47degreesS and the Southern Polar Front (S-PF) at similar to61degreesS. Zooplankton in the top 150 m of the water column demonstrated strong, small-scale, vertical distribution patterns. Species richness and diversity increased with depth, and were lowest for CPR samples. Conversely, dominance decreased with depth and was highest for CPR samples. Evenness was similar for all sample groups, indicating that all communities had a similar distribution of abundance amongst species. There was little variation in abundance between NORPAC depth zones (average = 82 +/- 47 individuals m(-3)), while abundance was substantially higher in the CPR samples (average = 144 +/- 103 individuals m(-3)), despite it under-sampling fast-moving and delicate components of the plankton community. The higher CPR abundance was due to significantly higher abundance levels of Appendicularia, Oithona similis and Rhincalanus gigas nauplii. The NORPAC samples showed that these three taxa were most abundant in the surface waters. The significant increase in abundance in the CPR samples was attributed to the growth in size during the period between the NORPAC and CPR surveys (minimum 15 days) increasing their catchability. Both the NORPAC nets and CPR surveys identified distinct communities to the north and south of the Southern Sub-Antarctic Front. Owing to its shallow towing depth, the CPR focuses on species with surface distributions. Despite under-sampling some components of the zooplankton, the CPR provided sufficient taxonomic resolution to identify biogeographic zones in the Southern Ocean. The utility of the CPR as a long-term monitoring tool in the Southern Ocean is discussed.

Hussein, A. H., M. C. Rabenhorst and M. L. Tucker (2004). "Modeling of carbon sequestration in coastal marsh soils." Soil Science Society of America Journal **68**(5): 1786-1795.
<Go to ISI>://WOS:000223817500037

Two transects were established across submerging coastal landscapes in Dorchester County, Maryland. Extensive sampling protocol was performed along the submerging upland tidal marsh soils to model C sequestration. Coastal marsh soils are accreting vertically and migrating laterally over the low-lying forest soils to keep pace with sealevel rise. The predictive C sequestration model was a two-step linear function. Therefore, C sequestration will continue to occur by accumulation in the organic horizons and sea-level rise is the driving force. During the last 150 yr, the rate of C sequestration averaged 83.5 +/- 23 g m(-2) yr(-1). Before the last few hundred years, the predicted longterm rate of C sequestration averaged 29.2 +/- 5.35 g m(-2) yr(-1). Sampling protocol and model validation ascertain the validity of the model and placed 80% confidence and 10% accuracy on rates of C sequestration and the predictive model. The model indicated that coastal marsh soils have higher C storage capacity than upland forest soils, and soils in the Cumulic subgroup of Mollisols. In general, C storage in mineral soils tends to reach a steady-state condition, whereas C sequestration in coastal marsh soils is a continuous phenomenon. During the next century, future C sequestration in the newly

formed coastal marsh soils averaged 400 +/- 162 g m(-2) yr(-1). Modeling C sequestration in coastal marsh ecosystems indicated that C storage under positive accretionary balance acts as a negative feedback mechanism to global warming.

Impson, N. D., M. S. Marriott, I. R. Bills and P. H. Skelton (2007). "Conservation biology and management of a critically endangered cyprinid, the twee river redfin, Barbus erubescens (Teleostei : Cyprinidae), of the cape floristic region, south Africa." African Journal of Aquatic Science **32**(1): 27-33.
<Go to ISI>://BIOSIS:PREV200800409380

The Twee River redfin Barbus erubescens is a critically endangered small cyprinid endemic to the Twee River System, a subcatchment of the Olifants-Doring River System of South Africa. It is currently the most threatened freshwater fish in both the Cape Floristic Region and South Africa. It inhabits deep pools in perennial rivers that have an abundance of instream and marginal vegetation and rock cover. Key threats include four introduced invasive fish species and habitat degradation due to increasing intensive agriculture in the Twee River catchment. Unless appropriate management action is taken, it may become the first freshwater fish species in South Africa to become extinct. The purchase of key riparian properties, the eradication of invasive species from part of the river system, the promotion of land- owner awareness, and the establishment of a conservancy as part of a longterm recovery programme are recommended to conserve B. erubescens effectively.

Isensee, A. R. and A. M. Sadeghi (1995). "Long-Term Effect of Tillage and Rainfall on Herbicide Leaching to Shallow Groundwater." Chemosphere **30**(4): 671-685.
<Go to ISI>://A1995QK01600007

The interaction of conventional tillage (CT) and no-tillage (NT) crop production practices with rainfall on the movement of three herbicides into shallow groundwater was evaluated over 4 yr. Groundwater was sampled from unconfined (<1.5m deep) and confined (<3 m and 4.5 to 11 m deep) monitoring wells in 1989-1992 and analyzed for atrazine, alachlor, and cyanazine. Pesticide concentrations were cyclical: residues were highest soon after application, declined during the growing season, then increased during winter recharge. Alachlor and cyanazine were at nondetectable levels within 3 mo after application. Atrazine residues, present in confined groundwater all year, ranged in concentration between 0.03 to 1.9 and 0.16 to 3.7 ug L(-1) for the CT and NT plots, respectively. Herbicide residues were higher in unconfined (<1.5 m deep) than confined (<3 m deep) groundwater. Atrazine was sporadically detected in groundwater to 4.6 m, but not deeper. Lateral transport in confined groundwater to untreated areas was evident. The rapid movement of herbicides to groundwater with the first major rain after application suggest that preferential transport may be common. Results of this study also indicate that timing, amount and intensity of rainfall relative to pesticide application may be the primary factors governing pesticide leaching.

Ivarsson, K. (1990). "The Long-Term Soil Fertility Experiments in Southern Sweden." Acta Agriculturae Scandinavica **40**: 205-215.
http://dx.doi.org/10.1080/00015129009438553 AND NEBIS 20120919

Abstract Ten cuttings of perennial ryegrass were taken from a pot trial with soils from the Long-Term Soil Fertility Experiments in the county of MalmÃ¶hus in south-western Sweden. The soils are from four fields in these experiments, two crop rotations, and four PK levels. Before and after the pot trial, soil samples were extracted according to a sequential fractionation method developed from the ?Hedley procedure?. During the pot trial there was a large decrease in the resin P fraction. There were also decreases in the bicarbonate-Pi, NaOH-Pi, acid P and residue P fractions, but an increase in the NaOH-Po fraction. Resin P and NaOH-Pi seemed to be the most important fractions for explaining the P uptake by plants.

Jamison, D. T. (1978). "Radio for formal education and for development communication." Development communication report(24): 1-2.
<Go to ISI>://MEDLINE:12341469

A substantial body of literature documents the successful use of open radio broadcasting, radio campaigns, and radio-listening groups in nonformal education and other aspects of development communication. The 4 alternative strategies for using radio in formal education -- using radio to enrich learning, direct instruction, extending in-school education, and distance learning -- need to be assessed in terms of users' needs. The use of radio to enrich in-school education holds little promise for major improvements, but the potential for the use of radio in direct instruction in 1 or more subjects is promising and presents a strong challenge to educators. Case studies of 2 Mexican projects to extend school in order to expand the rural population's access to information and schools were disappointing. Both projects showed that radio could teach about as effectively as traditional elementary school teachers, but neither expanded beyond the pilot stage. Better financing and a firmer government commitment might have made a difference. The use of radio in formal education as a component of a distance-learning system has been successful in Kenya and the Dominican Republic, among other places. The best use of open broadcast is to transmit an interesting message; the most appropriate use of listening-group strategies -- radio schools, farm forums, and radio animation -- are to promote more complex and longterm changes. Communication planners need to be aware that radio can be used in numerous ways in response to a variety of goals. 4 projects are reviewed to illustrate instances in which radio has realized its goals with special success -- the Kenyan health broadcasts, the radio program that used nutrition "ads," the Guatemalan agricultural information programs, and the Tanzania radio campaigns. These projects show that the development goals being promoted and the special characteristics of the project determine the strategy, its effects, and its transferability.

Jamu, D. M. and R. H. Piedrahita (2001). "Ten-year simulations of organic matter concentrations in tropical aquaculture ponds using the multiple pool modeling approach." Aquacultural Engineering **25**(3): 187-201.
<Go to ISI>://WOS:000171111600005

The accumulation rate of organic matter has been used to develop guidelines on sediment management in tropical aquaculture ponds. However, there is conflicting evidence as to the rate of sediment organic matter accumulation and whether steady state concentrations are achieved in the short term (< 10 years) in aquaculture ponds. A simulation study using the multiple pool modeling approach (Multi-G model) was conducted to determine the longterm dynamics of sediment organic matter and to

establish whether steady state concentrations could be achieved in tropical aquaculture ponds. The Mufti-G model, which recognizes the existence of different organic matter pools, each with its own decay rate constant was run as a sub-model of an integrated aquaculture-agriculture system (IAAS) model. The simulation study was conducted for representative management scenarios for new integrated ponds receiving artificial feed, chicken manure, or a combination of chicken manure and crop wastes. The model was run for 10 years using a 0.125 day time step, and each year's simulation consisted of a wet and a dry season, and fallow periods between crops that totalled 121 days for the year. Pond sediment organic matter concentrations increased over time for all input regimes in the following order: chicken manure x plant waste > chicken manure > artificial feed. Simulated organic matter concentration decreased in the first 4-5 years in ponds receiving chicken manure and artificial feed. Contrary to predictions of models that used a single decay rate constant for the organic matter, steady state sediment organic matter were not achieved within the first 5 years of production. These results were consistent with those obtained from long term sediment organic matter experiments in tropical aquaculture ponds. The results show that the multiple pool modeling approach may be more applicable to the simulation of pond sediment organic matter dynamics than those that assume organic matter to consist of a single pool decaying at a single rate. (C) 2001 Published by Elsevier Science B.V.

Jauffret, S. and S. Lavorel (2003). "Are plant functional types relevant to describe degradation in arid, southern Tunisian steppes?" Journal of Vegetation Science **14**(3): 399-408.
<Go to ISI>://000184495400010

In the Tunisian and zone disturbances (e.g. overgrazing and agriculture) and stresses (e.g. aridity, low fertility) drive changes in the structure and functioning of rangelands, with a decrease in perennial plant cover, changes in floristic composition and erosion. Long-term monitoring requires (1) an understanding of the dynamics of vegetation change and associated ecological processes and (2) identification of relevant indicators. Using data from the and zone of southern Tunisia we tested the hypothesis that plant functional response types could be used to address these two goals. We identified plant functional response types in response to a gradient of soil and vegetation types characterized by changes in perennial plant cover, dominant species and associated soil types. Vegetation samples were stratified by contrasted vegetation patch types with varying perennial plant cover (1.6 to 22%). We focused our analysis of trait responses within dwarf-shrubs, which are the dominants in typical steppe ecosystems of south Tunisia. Available trait data concerned morphology (plant height, leaf type), regeneration (dispersal mode, phenology and regeneration mode) and grazing value. Although we found it difficult to recognize 'indicator response types' that could be used directly to monitor changes in community composition, we were able to identify plant response syndromes that are relevant to long-term vegetation changes, and in particular degradation processes, in the region. Two main response types were identified: the decreaser type, made up of small or medium chamaephytes with high grazing palatability and the increaser type with medium to tall chamaephytes and low grazing palatability. These response types are proposed as key elements in a state-and-transition model of vegetation dynamics in the context of agropastoral disturbances and climatic and edaphic stresses.

Jha, S. G. (2003). "Linkages between biological and cultural diversity for participatory management: Nepal's experiences with Makalu-Barun National Park and Buffer Zone." Journal of the National Science Foundation of Sri Lanka **31**(1-2): 41-56.
<Go to ISI>://BIOSIS:PREV200400357098

The Makalu-Barun National Park and Buffer Zone (MBNP & BZ) of eastern Nepal cover an area of 2,330 km2. The Park shares its borders with Sagarmatha National Park in the west and with the Qomolangma Nature Preserve of Tibet Autonomous Region of the Republic of China in the north. This protected area of Nepal and Tibet cover over 40,000 km2 of the most threatened but significant greater Mt. Everest ecosystem of the South Asian Region. The Park area has rich cultural diversity complete with many diverse ethnic groups. Most of the households are economically poor and depend on subsistence agriculture, animal husbandry and diverse natural resources for livelihood. The threats to biodiversity in MBNP and BZ area are slash and burn cultivation on steep slopes, poaching, hunting, over-grazing, high dependency on natural resources, poverty and food deficits. In response to all this, the Makalu-Barun Conservation Area Project was first initiated in 1988 as a joint endeavour of HMG of Nepal, INGO - the Mountain Institute, local organizations and communities with the aim of promoting participatory approaches towards sustaining conservation efforts for longterm benefits. This project ultimately established the Makalu-Barun National Park in 1992 and the area surrounding the Park was declared as the Buffer Zone in 1999. The basic underlying approach of protection and management of the Park and Buffer Zone is biodiversity conservation through people participation without relying on military force. This paper highlights the implementation of the biodiversity conservation and management approaches through people participation in the MBNP and Buffer Zone. The paper also explores notable achievements and the effectiveness of partnerships of the HMG of Nepal, INGO and local communities in sustaining conservation efforts as well as in improving the livelihood of the local people.

Johnson, K. S. and L. J. Coletti (2002). "In situ ultraviolet spectrophotometry for high resolution and long-term monitoring of nitrate, bromide and bisulfide in the ocean." Deep-Sea Research Part I-Oceanographic Research Papers **49**(7): 1291-1305.
<Go to ISI>://000177777900010

The design for an in situ ultraviolet spectrophotometer (ISUS) that can operate while submerged to depths of at least 2000 m is reported. We show that the ISUS can be used to make high resolution (similar to 1/s and 0.5 cm) and long-term (> 3 months) measurements of the concentration of nitrate, bisulfide and bromide in seawater using the distinctive, ultraviolet absorption spectra of these chemical species. The precision, accuracy and stability of the chemical concentrations derived with the ISUS are sufficient for many biogeochemical studies. One standard deviation of the nitrate concentration in seawater is similar to 0.5 muM and the limit of detection (3 SD) for one observation would be similar to 1.5 muM. However, the noise is nearly random and significant reductions in the detection limit are possible by averaging multiple observations. The 95% confidence interval for a 30s scan is 0.2 muM. Low temperatures appear to produce a bias (similar to10% at 400 m depth in the ocean) in the nitrate concentration and in the salinity estimated from the bromide concentration. If an independent estimate of salinity is available, then the bias in nitrate can be eliminated by correcting nitrate concentrations by the same amount that the optical estimate of salinity is in error. The instrument has been deployed on a mooring in the equatorial Pacific for a 6-month period with no apparent degradation in

performance during the first 3 months. Measurements of UV spectra at a height of I cm over the bottom in a cold seep at 960 m depth demonstrate the capability to detect bisulfide ion within the benthic boundary layer. (C) 2002 Elsevier Science Ltd. All rights reserved.

Johnston, A. E. (1976). "Some Factors Affecting Crop Response to Soil-Phosphorus." Journal of the Science of Food and Agriculture **27**(6): 590-590.
<Go to ISI>://A1976BV45300014

Johnston, A. E., K. W. T. Goulding and P. R. Poulton (1986). "Soil Acidification During More Than 100 Years under Permanent Grassland and Woodland at Rothamsted." Soil Use and Management **2**(1): 3-10.
<Go to ISI>://A1986A775400001

Johnston, A. E., P. W. Lane, G. E. G. Mattingly, P. R. Poulton and M. V. Hewitt (1986). "Effects of Soil and Fertilizer-P on Yields of Potatoes, Sugar-Beet, Barley and Winter-Wheat on a Sandy Clay Loam Soil at Saxmundham, Suffolk." Journal of Agricultural Science **106**: 155-167.
<Go to ISI>://A1986A234900024

Johnston, A. E. and G. E. G. Mattingly (1976). "Experiments on Continuous Growth of Arable Crops at Rothamsted and Woburn-Experimental-Stations - Effects of Treatments on Crop Yields and Soil Analyses and Recent Modifications in Purpose and Design." Annales Agronomiques **27**(5-6): 927-956.
<Go to ISI>://A1976DN70300024

Johnston, A. E., P. R. Poulton and K. Coleman (2009). SOIL ORGANIC MATTER: ITS IMPORTANCE IN SUSTAINABLE AGRICULTURE AND CARBON DIOXIDE FLUXES. Advances in Agronomy, Vol 101. D. L. Sparks. **101:** 1-57.
<Go to ISI>://WOS:000264638100001

Soil organic matter is important in relation to soil fertility, sustainable agricultural systems, and crop productivity, and there is concern about the level of organic matter in many soils, particularly with respect to global warming. Longterm experiments since 1843 at Rothamsted provide the longest data sets on the effect of soil, crop, manuring, and management on changes in soil organic matter under temperate climatic conditions. The amount of organic matter in soil depends on the input of organic material, its rate of decomposition, the rate at which existing soil organic matter is mineralized, soil texture, and climate. All four factors interact so that the amount of soil organic matter changes, often slowly, toward an equilibrium value specific to the soil type and farming system. For any one cropping system, the equilibrium level of soil organic matter in a clay soil will be larger than that in a sandy soil, and for any one soil type the value will be larger with permanent grass than with continuous arable cropping. Trends in long-term crop yields show that as yield potential has increased, yields are often larger on soils with more organic matter compared to those on soils with less. The effects of nitrogen, improvements in soil phosphorus availability, and other factors are discussed. Benefits from building up soil organic matter are bought at a cost with large losses of both carbon and nitrogen from added organic material. Models for the buildup and decline of soil organic matter, the source and sink of carbon dioxide in soil, are presented.

Johnston, A. E., P. R. Poulton and P. Lane (1986). "Modeling the Long-Term Residual Effects of Phosphorus Residues in Soil." Journal of the Science of Food and Agriculture **37**(1): 8-8.
<Go to ISI>://A1986AZF4300002

Jonathan, M. P., V. Ram-Mohan and S. Srinivasalu (2004). "Geochemical variations of major and trace elements in recent sediments, off the Gulf of Mannar, the southeast coast of India." Environmental Geology **45**(4): 466-480.
<Go to ISI>://000188493500004

The Gulf of Mannar along the Tuticorin coast is a coral base of the southeast coast of India. To obtain a preliminary view of its environmental conditions, geochemical distribution of major elements (Si, Al, Fe, Ca, Mg, Na, K, P), trace elements (Mn, Cr, Cu, Ni, Co, Pb, Zn, Cd) and acid leachable elements (Fe, Mn, Cr, Cu, Ni, Co, Pb, Zn, Cd) were analyzed in surface sediment samples from two seasons. Geochemical fractionation confirmed the lithogenic origin of metals, which were mainly associated with the detrital phase. The sediments in the gulf are sandy with abundant calcareous debris, which controls the distribution of total and acid leachable elements. Enrichment factors relative to crust vary by a magnitude of two to three and the presence of trace metals indicates the input of Cr, Pb, Cd, Cu and Zn in both forms through industrial activities. Factor analysis supports the above observation with higher loadings on acid leachable elements and its association with CaCO3. The increase in concentration of trace metals (Cr, Pb, Cd, Cu, Co, Ni, Zn) along the Gulf of Mannar indicates that the area has been contaminated by the input from riverine sources and the industries nearby. The present study indicates that other sources should be evaluated in the long-term monitoring program.

Jones, K. C., A. Jackson and A. E. Johnston (1992). "Evidence for an Increase in the Cadmium Content of Herbage since the 1860s." Environmental Science & Technology **26**(4): 834-836.
<Go to ISI>://A1992HL93600033

Jones, K. C., A. E. Johnston and S. P. McGrath (1995). "The Importance of Long-Term and Short-Term Air Soil Exchanges of Organic Contaminants." International Journal of Environmental Analytical Chemistry **59**(2-4): 167-178.
<Go to ISI>://A1995QZ41200008

Retrospective analysis of archived soil samples collected and stored from long-term agricultural experiments in the UK has shown how soil organic chemical composition has changed over time. High molecular weight polycyclic aromatic hydrocarbons (e.g. benzo[a]pyrene) and polychlorinated dibenzo-p-dioxins and -furans have increased in concentration through this century as a result of cumulative atmospheric depositional inputs. Concentrations of polychlorinated biphenyls and low molecular weight hydrocarbons

(e.g. phenanthrene) peaked in the late 1960s/early 1970s, but have declined subsequently. This reflects declining atmospheric inputs of these compounds and losses from surface soils by volatilisation back to the atmosphere and biodegradation. PCBs and low molecular weight PAHs exist predominantly in the vapour phase in air, whilst heavy PAHs and PCDD/Fs are predominantly particulate-bound. Outgassing from soils is probably the most important contemporary source of PCBs to the atmosphere in the UK. Future UK PCB air concentrations will presumably therefore be influenced (controlled) by the rate of desorption and outgassing, as soil and air concentrations move towards a condition of equilibrium partitioning. Archived soils collected and stored before the commercial manufacture of PCBs contain no PCBs indicating that there is no 'natural production' of these compounds. However, within a few hours of exposure to contemporary air these samples contain detectable quantities of PCBs. Short-term air-soil exchange, such as during soil drying in the laboratory, can lead to contamination of samples which contain low concentrations of PCBs and loss from samples which contain high concentrations.

Jones, K. C., G. Sanders, S. R. Wild, V. Burnett and A. E. Johnston (1992). "Evidence for a Decline of Pcbs and Pahs in Rural Vegetation and Air in the United-Kingdom." Nature **356**(6365): 137-140.
<Go to ISI>://A1992HH73100053

RELIABLE data on persistent organic contaminants in the environment are needed to evaluate strategies to limit their dispersal. Long-term data are often not available, however, because the chemicals in question were not routinely analysed in the past. Although attempts have been made to assess temporal trends by analysis of environmental samples deposited in discrete or identifiable layers (in sediment or peat cores) 1-3, these media may be disturbed in situ or give poor temporal resolution, or the contaminants may be subject to post-depositional changes. Polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs) are persistent and toxic 4-9 contaminants for which no long-term global ambient monitoring data exist. Plant foliage is a reliable monitor of ambient levels of vapour-phase compounds in air 10-16 and here we present an analysis of archived herbage samples (1965-89) which shows that air concentrations of lower chlorinated PCBs in rural England have decreased by up to a factor of 50 between 1965-69 and 1985-89. High-molecular-weight PCBs and PAHs have also decreased in concentration, but not to such a great extent.

Jones, K. C., C. Symon, P. J. L. Taylor, J. Walsh and A. E. Johnston (1991). "Evidence for a Decline in Rural Herbage Lead Levels in the Uk." Atmospheric Environment Part a-General Topics **25**(2): 361-369.
<Go to ISI>://A1991EZ97500017

Samples of herbage collected from field plots at Rothamsted Experimental Station in southeast England between 1956 and 1988 have been analyzed for Pb. Changes in atmospheric deposition of Pb, identified as the major source of foliar Pb, resulted in temporal trends in the Pb concentrations of the herbage. Annual herbage Pb concentrations at Rothamsted correlated with the trend in annual U.K. air Pb over the years for which air data were available (1972-1988). This study provides evidence for a gradual reduction in herbage Pb concentrations during the study period, and of a recent, sharper decline following the reduction of petrol Pb at the beginning of 1986.

Jones, M. J. and M. Singh (2000). "Long-term yield patterns in barley-based cropping systems in Northern Syria. 2. The role of feed legumes." Journal of Agricultural Science **135**: 237-249.
<Go to ISI>://000165454400003

Rotations of barley with feed legumes produce more biomass and crude protein than barley-fallow and continuous barley sequences, but scope remains to improve the potential value to farmers of feed legume-based systems. This gaper summarizes B-year results from two sites from 2-year rotations of barley with: narbon vetch (Vicia narbonensis) and lathyrus (Lathyrus sativus), each harvested mature; and common vetch (Vicia sativa). harvested by simulated green-grazing and mature, all in factorial combination with four NP fertilizer regimes applied biennially to the barley. Mean yield differences between rotations were quite small. but at the drier site the narbon vetch rotation was significantly superior in both total biomass and crop total nitrogen. Other results implied yield compensation between barley and legume phases: barley performance was relatively depressed at the wetter site after high-yielding narbon vetch but was relatively enhanced at both sites after green-grazed common vetch. Evidence from year-round soil-water monitoring suggests that the benefit following green grazing may have arisen, in part, from a small carry-over of profile moisture between crops not much inferior to that residual from a fallow year. Both crop phases responded strongly to biennial P fertilizer; and barley responded strongly to three rates of N-fertilizer, but a sometimes significant curvilinear component to this response reflected a tendency for grain yields to be depressed by added nitrogen in the driest years. But interactions between N-rates and rotations were not significant. It was concluded that narbon vetch may have greater potential than common vetch and lathyrus for mature harvest in drier areas, but its unsuitability for grazing green is a limitation. Flexibility of utilization is important, to accommodate the needs of different farmers and the exigencies of different seasons. The green-graze option has major potential where there is a demand for high-quality spring grazing; and indications that barley may be as productive after green-grazed vetch as after a year of fallow suggest an alternative approach for farmers who have previously avoided legumes in order to maximize barley production.

Jonsson, U., U. Rosengren, B. Nihlgard and G. Thelin (2002). "A comparative study of two methods for determination of pH, exchangeable base cations, and aluminum." Communications in Soil Science and Plant Analysis **33**(19-20): 3809-3824.

The ability to compare soil chemical data achieved by different chemical extraction methods is a necessity for an efficient long-term monitoring of soils and for comparisons of results from regional soil surveys with differing standard methods. This study compares two common, methods for analysis of soil chemical properties, the combination of soil extraction in 1.0 M NH4Cl and 1.0 M KCl and the single extraction method using 0.1 M BaCl2. Results show that the two methods do not differ in extraction capability with regard to pH and exchangeable calcium (Ca) and magnesium (Mg). However, there is less agreement in extraction capability with regard. to potassium (K), sodium (Na), and aluminum (Al). For these elements, BaCl2 is less efficient than NH4Cl and KCl. Despite the

differences in extraction capability between BaCl2 and KCl/NH4Cl, regression analyses showed that the methods are well correlated (high regression coefficients for all, elements). Thus, transformation of data achieved by one method to estimated values of the other method are possible. Results from this study may be an important tool for comparisons of mineral soil data achieved by the two methods.

Kabubo-Mariara, J. (2007). "Land conservation and tenure security in Kenya: Boserup's hypothesis revisited." Ecological Economics **64**(1): 25-35.
<Go to ISI>://WOS:000250497800004

Land conservation technologies used by farmers are known to play an important role in improving farm incomes and household welfare in the long run. For this reason substantial investments have been made in research to improve agricultural technologies in various parts of the world, from the development of new crop varieties to new practices of land management. This paper explores the impact of land rights among other factors on adoption of soil and water conservation practices. The study further tests for Boserup's hypothesis (correlation between population density, land conservation and property rights) using panel survey data collected from farming households. The key findings of the paper are that property right regimes and population density affect both the decision to conserve land as well as the type of conservation practices used by farmers. The results further suggest a positive correlation between land tenure security and population density, thus supporting Boserup's hypothesis. The findings call for pursuit of both short-term and longterm policy measures that offer incentives for land conservation through government initiatives and participation of local communities. (c) 2007 Elsevier B.V. All rights reserved.

Kachur, A. N., V. S. Arzhanova, P. V. Yelpatyevsky, M. C. von Braun and I. H. von Lindern (2003). "Environmental conditions in the Rudnaya River watershed - a compilation of Soviet and post-Soviet era sampling around a lead smelter in the Russian Far East." Science of the Total Environment **303**(1-2): 171-185.
<Go to ISI>://000181482700011

The Rudnaya River valley in the Russian Far East contains a rich reserve of lead, zinc and boron and has been mined for nearly 100 years. Environmental contamination related to the area's mines and lead smelter was studied for over 30 years during the Soviet era, by members of the Pacific Geographic Institute (PGI). Due to government restrictions, much of the sampling focused on contamination of the river, the air, forests, vegetation, agricultural products and soil. Source- specific samples, such as stack emissions from the smelter, and blood lead levels from the residents and smelter workers could not be obtained or were classified as State secrets. However, the data do describe the extent and severity of the environmental contamination and related public health concerns. Water discharged from the smelter averages 2900 m(3)/day (containing 100 kg of lead (Pb) and 20 kg of arsenic (As)) and leachate from area mine dumps and other industrial processes contaminates the Rudnaya River. Annual air emissions include 85 tonnes of particulates (containing 50 tonnes of Pb and 0.5 tonnes of As) and 250 000 m(3) of gases high in sulfur dioxide (SO2) carbon monoxide (CO) and carbon dioxide (CO2). Vegetative stress is severe and much of this area is denuded. Pb and other metals in agricultural products suggest local produce may be dangerous for human consumption, although it is a major food source for the community. Public and occupational health indicators of basophilic stippling, respiratory disease and hair lead levels further suggest the severity of the problem. Although, descriptions of complete methodologies and procedures are often lacking, these data describe how sampling was conducted during the Soviet era and document a site with severe heavy metals contamination, especially lead, and the likelihood of related public health problems. They are relevant today as investigators employ state-of-the-art-sampling techniques and explore cleanup options under a new governmental system and challenging economic times. In the post-Soviet era, a Russian/US team sampled area soils and dusts and confirmed the severity of the environmental problems using commonly employed sampling and analysis techniques. Lead concentrations in residential gardens (476-4310 mg/kg, G (x) over bar =1626mg/kg) and in roadside soils (2020-22900 mg/kg, G (x) over bar= 4420 mg/kg) exceed USEPA guidance for remediation. Preliminary biokinetic estimates of mean blood levels (average 13-27 mug/dl) suggest pre-school children are at significant risk of lead poisoning from soil/dust ingestion. Today, the PGI, in cooperation with the industrial owners and the local health and environmental authorities, is attempting to establish long-term monitoring and pollution abatement within the constraints of their difficult economic situation. (C) 2002 Elsevier Science B.V. All rights reserved.

Kaushik, R., D. K. Sharma and H. C. Joshi (2006). "Impact on short term changes in soil microbial biomass, carbon and nitrogen dynamics due to irrigation with distillery effluent in rice-wheat cropping system." Indian Journal of Microbiology **46**(2): 139-145.
<Go to ISI>://BIOSIS:PREV200800046358

Utilization of anaerobically digested distillery effluent (DE) in agriculture represents a means to convert wastes to value added resource as it contains appreciable amount of N, K and other macro and micronutrients required for crop growth and does not posses any toxic elements. We studied the impact of its irrigation in conjunction with irrigation water in Rice-Wheat cropping system on short term changes in soil microbial biomass carbon and nitrogen dynamics, which is an indicator of longterm sustainability of any agricultural land. Application of DE at the rate of 60 m(3) ha(-1) in four split doses in conjunction with irrigation water increased soil microbial biomass carbon (C-mic) and nitrogen (N-mic), without causing any major shift in bacterial community structure. Although variation in soil organic carbon (C-org) due to DE application,was non significant but significant increase in soil C-mic to C-org ratio shows that the high carbon content of DE degraded rapidly in soil and. got incorporated in soil microbial biomass without affecting soil health. Application of DE at the rate of 60 m(3) ha(-1) seems to be promising as it increased soil microbial biomass and also improved the C-mic:C-org ratio by getting degraded without affecting soil health.

Keizer, J. P., K. T. B. MacQuarrie, P. H. Milburn, K. V. McCully, R. R. King and E. J. Embleton (2001). "Long-term ground water quality impacts from the use of hexazinone for the commercial production of lowbush blueberries." Ground Water Monitoring and Remediation **21**(3): 128-135.
<Go to ISI>://000170679500010

Lowbush blueberries, native to eastern Canada and Maine, are an important economic crop in these areas. Herbicides containing the active ingredient hexazinone are commonly applied to blueberry fields, and there is a high frequency of detection of relatively low

concentrations of hexazinone in domestic wells located close to areas of lowbush blueberry production. The objective of this study was to determine the long-term impacts from hexazinone-based herbicide use on ground water quality in the immediate growing areas. Physical and chemical hydrogeologic data were collected for an outwash sand and gravel aquifer in southwestern New Brunswick, Canada. The majority of the land overlying the aquifer is devoted to lowbush blueberry production. Twenty-one nested monitoring wells were sampled for hexazinone and hexazinone metabolites over a four-year period. Hexazinone was consistently detected at values of 1 to 8 parts per billion (ppb) in all but two of these wells, one that is upgradient of herbicide applications, and one that is downgradient with anoxic conditions. Hexazinone metabolites B and Al were also detected in all but two of the 21 wells at values ranging from 0.5 to 2.5 ppb. The hexazinone and metabolite data suggest both aerobic and anaerobic degradation of hexazinone. Complete degradation of hexazinone appears to occur only in the one downgradient well exhibiting anoxic ground water conditions. Concentrations of hexazinone and its metabolites in the ground water were essentially constant over the four-year period.

Kim, C. H. (2004). "Conservation status of the endemic fern Mankyua chejuense (Ophioglossaceae) on Cheju Island, Republic of Korea." Oryx **38**(2): 217-219.
<Go to ISI>://000221639400024

Mankyua chejuense, a fern endemic to Cheju Island, Republic of Korea, which lies 120 km south of the Korean Peninsula, appears to be restricted to five extant subpopulations in the north- east of the Island, with a total population of c. 1,300 individuals. Major threats to the existence of the species include shifting cultivation, plantation, overuse of basaltic rocks that are part of the species' microhabitat, farming and pasturage, and the construction of roads and golf courses in lowland areas. The information currently available for the species indicates that it should be categorized as Critically Endangered on the IUCN Red List. For conservation of the species it needs to be included on the national threatened species list, and its habitat designated as an ecological reserve. Intensive surveys are required in order to establish whether there are any other extant subpopulations of the species, and the presently known subpopulations require long- term monitoring and continuous protection.

Kim, S., C. S. An, Y. N. Hong and K. W. Lee (2004). "Cold-inducible transcription factor, CaCBF, is associated with a homeodomain leucine zipper protein in hot pepper (Capsicum annuum L.)." Molecules and Cells **18**(3): 300-308.
<Go to ISI>://WOS:000226042600004

C-Repeat/drought responsive element binding factor (CBF1/DREB1b) is a well known transcriptional activator that is induced at low temperature and in turn induces the CBF regulon (CBF-targeted genes). We have cloned and characterized two CBF1-like cDNAs, CaCBF1A and CaCBF1B, from hot pepper. CaCBF1A and CaCBF1B were not produced in response to mechanical wounding or abscisic acid but were induced by low-temperature stress at 4 C. When plants were returned to 25 C, their transcript levels of the CBF1-like genes decreased markedly within 40 min. Longterm exposure to chilling resulted in continuous expression of these genes. The critical temperature for induction of CaCBF1A was between 10 and 15 C. Low temperature led to its transcription in roots, stems, leaves, fruit without seeds, and apical meristems, and a monoclonal antibody against it revealed a significant increase in CaCBF1A protein by 4 h at 4 C. Two-hybrid screening led to the isolation of an homeodomain leucine zipper (HD-Zip) protein that interacts with CaCBF1B. Expression of HD-Zip was elevated by low temperature and drought.

Kimman, T. G. (1995). Potential long term ecological effects of the application of genetically engineered vaccines. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, Council of Europe Press.

Kirchmann, H., L. Bergstrom, T. Katterer, L. Mattsson and S. Gesslein (2007). "Comparison of long-term organic and conventional crop-livestock systems on a previously nutrient-depleted soil in Sweden." Agronomy Journal **99**(4): 960-972.
<Go to ISI>://WOS:000248022500009

An 18-yr field study was performed to compare organic and conventional cropping on a highly P and K depleted soil in southern Sweden that had not received any inorganic fertilizers (or pesticides) since the mid-1940s. The major management differences between the systems were (i) growth of legumes every second year and use of legumes as cover crops in the organic rotation; (ii) application of P in the organic system at higher rates than for the conventional system; (iii) exclusion of oilseed rape (Brassica napus L.) from the organic system but inclusion of potato (Solanum tuberosum L.); (iv) frequent mechanical weeding in the organic system; and (v) use of solid manure in the organic and liquid manure in the conventional system. Concentrations of soil-exchangeable P increased more after application of large amounts of basic slag and apatite in the organic system than after application of P fertilizers in the conventional system. Organic systems, which rely mainly on legumes for their N supply, will acidify soils faster than systems with fewer legumes in rotation. Crop yields were, on average, 50% less and weed biomass was greater (1-3 Mg dry matter ha(-1)) in the organic system than in the conventional system. Nitrogen was identified as the main yield-limiting nutrient for organically grown crops. Despite this, and even with use of cover crops, N leaching was not reduced by organic farming. Soil carbon (C) concentrations decreased in both systems, but less so in the organic system due to higher C inputs and lower soil pH values. Still, organic farming seems not be an option for sequestering C in soil in Sweden. After adjusting the two systems to the same boundary conditions for an unbiased modeling comparison, the C input is approximate to 60% higher in the conventional system than the organic system. The agronomic efficiency of N was 9 to 10 kg grain yield kg(-1) N in the organic system compared with 16-18 kg grain yield kg(-1) in the conventional system. The longterm use efficiency of P was lower in the organic system (7%) than in the conventional system (36%). These results show that yield and soil fertility are superior in conventional cropping systems under cold-temperate conditions.

Kitao, M. and T. T. Lei (2007). "Circumvention of over-excitation of PSII by maintaining electron transport rate in leaves of four cotton genotypes developed under long-term drought." Plant Biology **9**(1): 69-76.
<Go to ISI>://WOS:000243988100008

We investigated the patterns of response to a longterm drought in the field in cotton cultivars (genotypes) with known differences in their drought tolerance. Four cotton genotypes with varying physiological and morphological traits, suited to different cropping conditions, were grown in the field and subjected to along-term moderate drought. In general, cotton leaves developed under drought had significantly higher area-based leaf nitrogen content (N-area) than those under well irrigation. Droughted plants showed a lower light-saturated net photosynthetic rate (A(sat)) with lower stomatal conductance (g(s)) and intercellular CO2 concentration (C-i) than irrigated ones. Based on the responses of A(sat) to g(s) and C-i, there was no decreasing trend in A(sat) at a given g(s) and C-i in droughted leaves, suggesting that the decline in Asat in field-grown cotton plants under a longterm drought can be attributed mainly to stomatal closure, but not to nonstomatal limitations. There was little evidence of an increase in thermal energy dissipation as indicated by the lack of a decrease in the photochemical efficiency of open PSII (F-v'/F-m') in droughted plants. On the basis of electron transport (ETR) and photochemical quenching (q(p)), however, we found evidence indicating that droughted cotton plants can circumvent the risk of excessive excitation energy in photosystem (PS) II by maintaining higher electron transport rates associated with higher Narea, even while photosynthetic rates were reduced by stomatal closure.

Kitazato, H., T. Nakatsuka, M. Shimanaga, J. Kanda, W. Soh, Y. Kato, Y. Okada, A. Yamaoka, T. Masuzawa, K. Suzuki and Y. Shirayama (2003). "Long-term monitoring of the sedimentary processes in the central part of Sagami Bay, Japan: rationale, logistics and overview of results." Progress in Oceanography **57**(1): 3-16.
<Go to ISI>://000183595900002

Deep-sea benthic ecosystems are mainly sustained by sinking organic materials that are produced in the euphotic zone. "Benthic-pelagic coupling" is the key to understanding both material cycles and benthic ecology in deep-sea environments, in particular in topographically flat open oceanic settings. However, it remains unclear whether "benthic-pelagic coupling" exists in eutrophic deep-sea environments at the ocean margins where areas of undulating and steep bottom topography are partly closely surrounded by land. Land-locked deep-sea settings may be characterized by different particle behaviors both in the water column and in relation to submarine topography. Mechanisms of particle accumulation may be different from those found in open ocean sedimentary systems. An interdisciplinary programme, "Project Sagami", was carried out to understand seasonal carbon cycling in a eutrophic deep- sea environment (Sagami Bay) with steep bottom topography along the western margin of the Pacific, off central Japan. We collected data from ocean color photographs obtained using a sea observation satellite, surface water samples, hydrographic casts with turbidity sensor, sediment trap moorings and multiple core samplings at a permanent station in the central part of Sagami Bay between 1997 and 1998. Bottom nepheloid layers were also observed in video images recorded at a real- time, sea-floor observatory off Hatsushima in Sagami Bay. Distinct spring blooms were observed during mid-February through May in 1997. Mass flux deposited in sediment traps did not show a distinct spring bloom signal because of the influence of resuspended materials. However, dense clouds of suspended particles were observed only in the spring in the benthic nepheloid layer. This phenomenon corresponds well to the increased deposition of phytodetritus after the spring bloom. A phytodetrital layer started to form on the sediment surface about two weeks after the start of the spring bloom. Chlorophyll-a was detected in the top 2 cm of the sediment only when a phytodetritus layer was present. Protozoan and metazoan meiobenthos increased in density after phytodetritus deposition. Thus, "benthic-pelagic coupling" was certainly observed even in a marginal ocean environment with undulated bottom topography. Seasonal changes in features of the sediment-water interface were also documented.

Kjellander, P., A. J. M. Hewison, O. Liberg, J. M. Angibault, E. Bideau and B. Cargnelutti (2004). "Experimental evidence for density-dependence of home-range size in roe deer (Capreolus capreolus L.): a comparison of two long- term studies." Oecologia **139**(3): 478-485.
<Go to ISI>://000221056400019

The effect of experimental manipulation of population density on home-range size was investigated in two free-ranging roe deer (Capreolus capreolus) populations under contrasting environmental conditions. In these two long-term monitoring studies, one in Bogesund, Sweden (12 years) and one in Dourdan, France (10 years), deer density varied fourfold through varying culling pressure. Home-range data were collected by radio- tracking across the periods of contrasting density of the studies. We predicted that home-range size for females should vary in relation to the level of feeding competition, while for males, competition for mating opportunities should also influence range size, at least in summer when roe bucks are territorial. We found a highly consistent pattern over the two populations, with strong effects of deer density on home-range size, as well as significant differences between winter and summer ranges and between the sexes. Home ranges were consistently smaller at high density compared to low density. Males had larger ranges than females and this was particularly so during summer. Lastly, winter ranges were generally larger than summer ranges, particularly among females, although males at Dourdan had larger summer ranges compared to winter ranges. We suggest that the reduction of range size at high deer density during winter, as well as summer, is linked to the solitary behaviour and territorial social system of roe deer, with possible effects of dominance rank, even outside the mating season.

Kjeller, L. O., K. C. Jones, A. E. Johnston and C. Rappe (1996). "Evidence for a decline in atmospheric emissions of PCDD/Fs in the UK." Environmental Science & Technology **30**(4): 1398-1403.
<Go to ISI>://A1996UC41300068

Koerschens Martin, Bus Elke and Behrent Helga (1984). Uebersicht ueber wichtige Dauerversuche der Welt. Dauerfeldversuche der DDR, Berlin. Berlin**:** 217-230.
http://www.ask-force.org/web/Longterm/Koerschens_Bus_Beherendt_1984_Uebersicht.pdf

Komarkova, J., O. Komarek and J. Hejzlar (2003). "Evaluation of the long term monitoring of phytoplankton assemblages in a canyon-shape reservoir using multivariate statistical methods." Hydrobiologia **504**(1-3): 143-157.
<Go to ISI>://000188316100015

Long term monitoring of the Rimov Reservoir provided a data set for the analysis of phytoplankton composition and biomass in coincidence with physical, chemical, hydrological and biotic factors. Data from 15 years of monitoring (1984 and 1998) were statistically processed using the CANOCO software. The distribution of dominant species and whole assemblages among three ordination axes were analyzed indirectly by detrended correspondence analysis (DCA). The relationships between the species and the environmental factors were studied by canonical correspondence analysis (CCA) with special attention to the seasons. Statistical analysis specified only two types of phytoplankton assemblages interchanging each year: a cold assemblage in winter and spring and a warm assemblage in summer and fall. The transition period was a 'clear-water' period. Species composition and phytoplankton biomass of the warm assemblage are the most important variables for drinking water reservoirs, especially for the Rimov reservoir. The appearance of cyanobacteria of the potentially toxic genus Microcystis was related the highest water temperature, higher concentrations of Na+ and an undisturbed epilimnion. The appearance of the green desmid alga Staurastrum planctonicum and several species of the cyanobacterial genera Aphanizomenon and Anabaena were connected with lower summer temperature and an undisturbed epilimnion but higher water level. The third type of summer dominance, Fragilaria and/or dinoflagellates was typical for years with summer disturbances (high discharge from the epilimnion) irrespective of the temperature.

Krell, R. K., L. P. Pedigo, J. H. Hill and M. E. Rice (2003). "Potential primary inoculum sources of Bean pod mottle virus in Iowa." Plant Disease **87**(12): 1416-1422.
<Go to ISI>://000186712600003

A survey of Bean pod mottle virus (BPMV) in Iowa counties was conducted and the virus was found throughout the state. A long-term monitoring study (1989 to 2002) of the main BPMV vector, the bean leaf beetle, Cerotoma trifurcata, indicated that, in 2002, populations reached the highest abundance recorded in 14 years. Three potential sources for an early season primary inoculum source were found: (i) soybean (Glycine max) seed, (ii) overwintered bean leaf beetles, and (iii) alternate BPMV host plants. Examination of 5,804 and 8,064 soybean seedlings of two cultivars yielded 0 and 3 seedlings, respectively, infected with BPMV. In a separate test, BPMV was detected in mottled and nonmottled soybean seed. Some mottled seed did not contain BPMV, indicating that soybean seed coat mottling is an unreliable indicator for presence of the virus in seed. Of 194 naturally overwintered bean leaf beetles, only I transmitted BPMV to soybean. BPMV was detected serologically only in I alternate host, Desmodium canadense, out of 23 naturally occurring plant species collected from the field. The three inoculum sources discovered in Iowa in this study could be important primary sources when vector populations are high and indicate starting points for future epidemiological investigations.

Kwarteng, A. Y. and A. Al-Enezi (2004). "Assessment of Kuwait's Al-Qurain landfill using remotely sensed data." Journal of Environmental Science and Health Part a- Toxic/Hazardous Substances & Environmental Engineering **39**(2): 351-364.
<Go to ISI>://000189352000005

Kuwait's Al-Qurain landfill problem resulted from indiscriminate dumping of domestic and industrial waste in an abandoned quarry in the late 1970s and early 1980s. The landfill and surrounding areas were set aside for a government housing project without an environmental assessment of the impact of the landfill on the project. Inhabitants of the newly constructed housing area experienced persistent foul odor emanating from the landfill site. Since then, the issue has generated a lot of public interests, and several remediation measures have been adopted. In this preliminary study, several remotely sensed data consisting of Landsat Multispectral Scanner (MSS), Landsat Thematic Mapper (TM), IKONOS, and synthetic aperture radar (SAR) acquired between 1972 and 2000 were processed and assessed for their usefulness to study and monitor the landfill site. The imagery provided a historical perspective of how the areas had changed over the last 30 years. Other useful information of the landfill obtained from the satellite imagery included the spatial extent, spectral reflectance, surface temperature, and Surface roughness. The landfill site showed higher surface temperatures compared to the immediate surrounding areas-a process that could accelerate the biodegradation and the release of landfill gases. Such dataset could be incorporated into a GIS for the long-term monitoring of the site.

Kwiatkowski, J. and U. Wachowska (2005). "Communities of fungi in grain from several generations of triticale." Acta Agrobotanica **58**(1): 135-142.
<Go to ISI>://BIOSIS:PREV200600147102

An assessment of health status of winter triticale grain obtained from a longterm reproduction experiment was performed in 1993-1994. Grain from six generations of triticale was examined each year. In both years of the study, the most frequently isolated fungus was Alternaria alternata. The number of isolated pathogens as well as the total extent of grain infestation by fungi depended on the weather conditions during the vegetative growth of triticale plants. There was no correlation between the generations of triticale and fungal infestation of triticale grain.

LaBrecque, J. J. and P. R. Cordoves (2004). "Short- and long-term monitoring of radon, thoron and carbon dioxide in soil-gas at Altos de pipe, Venezuela." Journal of Radioanalytical and Nuclear Chemistry **260**(2): 255-264.
<Go to ISI>://000221331000003

We have measured radon and thoron activities in soil-gases since July 9, 1997 Cariaco earthquake (Mw=6.9) until the end of 2000. Carbon dioxide concentrations were also monitored between 1998-2000. The soil-gas was collected between 50-55 cm depths at two sampling points at Altos de pipe (Instituto Venezolano de Investigaciones Cientificas-IVIC) near Caracas, Venezuela. The radon and thoron measurements were performed daily employing radiation monitors with scintillation cells and the carbon dioxide was monitored with portable gas analyzers. Average weekly and monthly values were calculated and plotted for this three-four year period. In general, both the radon and carbon dioxide values showed sinusoidal trends due to seasonal changes. During the dry season the radon and carbon dioxide values decreased, while the radon activity was relative constant (flat) during the rainy season at one of the sampling points. Only two monthly radon values were seen to be anomalous in the graphs in respect to seven anomalous periods for the average weekly values. No anomalous periods were clearly seen for carbon dioxide. Finally, it was difficult to try to relate these radon anomalous periods with specific earthquakes due to the large number of minor earthquakes during

these years, but it seem that the minor earthquake (Mb=5.9) of October 4, 2000 could be associated with the radon anomalous period in September, when there were no other minor earthquakes (Mbgreater than or equal to4.0).

Lamberti, F., J. M. Waller and N. A. Van der Graaff (1983). Durable Resistance in Crops. Proceedings of a NATO Advanced Study Institute held September 30 October 1981. Martina Franca, Italy**:** 454.

Lampton, D. M. (1979). "ROOTS OF INTER-PROVINCIAL INEQUALITY IN EDUCATION AND HEALTH-SERVICES IN CHINA." American Political Science Review **73**(2): 459-477.
<Go to ISI>://WOS:A1979HB75600007

Latka, M., Z. Was, A. Kozik and B. J. West (2003). "Wavelet analysis of epileptic spikes." Physical Review E **67**(5): art. no.-052902.
<Go to ISI>://000183482200088

Interictal spikes and sharp waves in human EEG are characteristic signatures of epilepsy. These potentials originate as a result of synchronous pathological discharge of many neurons. The reliable detection of such potentials has been the long standing problem in EEG analysis, especially after long-term monitoring became common in investigation of epileptic patients. The traditional definition of a spike is based on its amplitude, duration, sharpness, and emergence from its background. However, spike detection systems built solely around this definition are not reliable due to the presence of numerous transients and artifacts. We use wavelet transform to analyze the properties of EEG manifestations of epilepsy. We demonstrate that the behavior of wavelet transform of epileptic spikes across scales can constitute the foundation of a relatively simple yet effective detection algorithm.

Lawson, H. M. (1994). "Changes in Pesticide Usage in the United-Kingdom - Policies, Results, and Long-Term Implications." Weed Technology **8**(2): 360-365.
<Go to ISI>://A1994NV58100031

Current United Kingdom (UK) government policy on pesticides is aimed at minimizing rather than arbitrarily reducing usage. It is to be achieved through a rigorous Approvals process, the setting of statutory maximum residue limits, regular monitoring, legislation on the safe use of pesticides on farms, and a core-funded research program on topics such as improved forecasting of pest infestations, more effective application techniques, alternative control strategies, integrated pest management and sustainable farming systems. Over the longer term these measures are expected to bring about substantial real decreases in pesticide usage, without the need to impose arbitrary reduction targets, such as have been implemented by several other European countries. Reductions in the usage of particular chemicals will also occur as a result of the implementation of European Community (EC) environmental legislation on pesticide levels in ground and drinking water and pesticide discharges into the North Sea. With herbicides, the tonnage of active ingredient applied in the UK declined substantially during the 1980s, due mainly to the increased use of products which were more biologically active at lower dosage rates than those they replaced. The actual percentage of crops sprayed remained at 95 to 100. Further reductions are likely in the 1990s, enhanced by factors such as dose-cutting by farmers in response to economic rather than environmental pressures and an increase in set-aside. Weed scientists are currently studying the long-term effects on weed population dynamics of reduced herbicide inputs in cereals, set-aside management, and more environmentally friendly, lower input rotations, as part of a wider program of research designed to provide government with scientifically based information upon which to decide future policies.

Leigh, R. A. and A. E. Johnston (1994). Long Term Experiments in Agricultural and Ecological Sciences. Conference to celebrate the 150th Anniversary of Rothamstead Experimental Station, Rothamstead, 14-17 July 1993, CAB International.
http://library.wur.nl/WebQuery/biola/lang/903288

Various long-term experiments in the USA, Australia, Eastern Europe and Africa are described. Also chapters on long-term studies of climate-vegetation relationships, tropical forest dynamics, bird populations and planktonic communities as monitors of marine environmental change are included. It illustrates that long-term experimentation and monitoring are vitally important in understanding changes that are occurring in the environment and the way they interact with agriculture and natural ecosystems

Lekht, E. E., V. A. Munitsyn and A. M. Tolmachev (2003). "Long-term monitoring of the water-vapor maser in NGC 7538: 1981-1992." Astronomy Reports **47**(10): 838-847.
<Go to ISI>://000186130000006

We report the results of monitoring the H2O maser in NGC 7538, which is associated with a star-forming region. The observations were carried out on the 22-meter telescope of the Pushchino Radio Astronomy Observatory. Two intervals of long- term variability of the integrated flux that reflect the cyclic activity of the maser have been distinguished (1981-1992 and 1993-2003); the data for the earlier activity cycle, 1981-1992, have been analyzed. The period of the long-time-scale variations is about 1314 years. Flares of individual spectral features and of two groups of features with mean radial velocities of -60 and -46.6 km/s have been observed. The flares lasted from 0.3 to I year. The emission features observed during the 1984-1985 flare at radial velocities between -62 and -58 km/s probably form a spatially compact group of Spots (< 10(15) cm) in NGC 7538 IRS1. The triplet structure of the spectra can be traced. The observed anticorrelations and correlations of the fluxes of the triplet components suggest that the maser spots may be located either in a protoplanetary disk or in a high-velocity gaseous outflow. (C) 2003 MAIK "Nauka/Interperiodica".

Lekht, E. E., V. A. Munitsyn and A. M. Tolmachev (2004). "Long-term monitoring of the water-vapor maser in NGC 7538: 1993-2003." Astronomy Reports **48**(3): 200-209.
<Go to ISI>://000220707700003

The paper presents the results of monitoring the H2O maser in NGC 7538, which is associated with a star-formation region, in 1993-2003. The observations were carried out on the 22-m radio telescope of the Pushchino Radio Astronomy Observatory (Russia). The

variability of the maser emission displays a cyclic character. Two cycles of the long-term variability of the total flux were detected over the entire monitoring period (1981-2003): 1981-1993 and 1994-2003. The period of the variability is about 13 years. An anticorrelation of the emission in lateral sections of the spectra is observed, as is characteristic of protoplanetary disks. A drift in the radial velocity of the central component is observed (V-LSR = -60 km/s) with a drift rate of about 0.09 km/s per year. The water-vapor maser is most likely associated with a protoplanetary disk. (C) 2004 MAIK "Nauka/Interperiodica".

Lekht, E. E., N. A. Silant'ev, J. E. Mendoza-Torres, M. I. Pashchenko and V. V. Krasnov (2001). "A study of the kinematics of the H2O maser sources S269 and W75S from long-term monitoring." Astronomy & Astrophysics **377**(3): 999-1006.
<Go to ISI>://000171457900024

It is shown that basic characteristics of turbulence can be derived from temporal behaviour, shape and radial-velocity drift of a spectral line. To perform this analysis, a 20-year monitoring of the H2O maser emission sources S269 and W75S was used. It is shown that the observed sinusoidal variation of the radial velocity of the main emission feature in S269 with a period of 26 years is not caused by Keplerian motion. Most likely, it results from rotation of a non-uniform turbulent vortex with a diameter of about 1 AU. Within the framework of this model, asymmetry of the emission feature at 20.1 km s(-1) and a jump of the linewidth, which took place after a strong are in 1991, are explained. In W75S anticorrelation between fluxes of several emission features with close radial velocities is found. This anticorrelation is explained by competition of spatial modes of the emission for pumping in a partially saturated maser. It is shown that in the model of a maser in an expanding envelope (which is, most likely, the case in W75S) the emission features with anticorrelated fluxes form a spatially compact group.

Levy, M. L., M. Wang, H. E. Aryan, K. Yoo and H. Meltzer (2003). "Microsurgical keyhole approach for middle fossa arachnoid cyst fenestration." Neurosurgery **53**(5): 1138-1144.
<Go to ISI>://000186524600027

OBJECTIVE: The optimal surgical treatment for symptomatic temporal arachnoid cysts is controversial. Therapeutic options include cyst shunting, endoscopic fenestration, and craniotomy for fenestration. We reviewed the results for patients who were treated primarily with craniotomy and fenestration at our institution, to provide a baseline for comparisons of the efficacies of other treatment modalities. METHODS: A retrospective review of data for 50 children who underwent keyhole craniotomy for fenestration of temporal arachnoid cysts between 1994 and 20011 was performed after institutional review board approval. During that period, the first-line treatment for all symptomatic middle fossa arachnoid cysts was, microcraniotomy for fenestration. Microsurgical dissection to create communications between the cyst cavity and basal cisterns was the goal. All patient records were reviewed and numerous variables related to presentation, cyst size, and classification, treatment, cyst resolution, symptom resolution, follow-up periods, and cyst outcomes, were recorded. RESULTS: Fifty temporal arachnoid cysts in 50 treated patients were identified. The average-age at the time of surgery was 68 +/- 57.2 months. The follow-up periods averaged 36 months. There were 34 male and 16 female patients in the series. Twenty-six, cysts were on the left side. Indications for surgery included intractable headaches (45%), increasing cyst size (21%), seizures (5%), and hemiparesis (8%). The, symptoms most likely to improve. were hemiparesis (100%) and abducens nerve palsies. Headaches (67%) and seizure disorders (50%) were less likely to improve. Nine patients exhibited progressive increases in cyst size in serial imaging studies mean of 40 +/- 21 months before intervention. In Those patients were monitored for a the entire series, 82% of patients demonstrated decreases in cyst size in serial imaging studies., Of those patients, 18% demonstrated complete cyst effacement. Overall, 83% of patients with Grade II cysts and 75% of patients with Grade III cysts exhibited evidence of decreases in cyst size in- long-term monitoring. Two patients required shunting after craniotomy (4%). Hospital stays averaged 3.4 days. Total surgical times averaged 115 minutes. No significant blood loss occurred (5-50 ml). Complications included spontaneously resolving pseudomeningocele (10%), transient Cranial Nerve III palsy (6%), cerebrospinal fluid leak (6%), subdural hematoma (4%), and wound infection (2%). CONCLUSION: A microsurgical keyhole approach to arachnoid cyst fenestration is a safe effective method for treating middle fossa cysts. This procedure can be performed with minimal morbidity via a minicraniotomy. Compared with an endoscopic approach, better control of hemostasis can be obtained, because of the ability to use bipolar forceps and other standard instruments. The operative time and length of hospital stay were not excessively increased.

Lim, D. S. S. and M. S. V. Douglas (2003). "Limnological characteristics of 22 lakes and ponds in the Haughton Crater region of Devon Island, Nunavut, Canadian High Arctic." Arctic Antarctic and Alpine Research **35**(4): 509-519.
<Go to ISI>://000189380400014

The physical and chemical limnological characteristics of 22 lakes and ponds in the remote region of Haughton Impact Crater, Devon Island, Nunavut, Canada, were explored. Our overall goals were to gather baseline information for use in climate and environmental change monitoring programs in the High Arctic as well as to compare these observations to other limnological surveys conducted in high-latitude regions. Study sites were alkaline (pH(mean) = 8.3), ultraoligotrophic (TPUmean = 3.7 mug L-1), and phosphorus limited. Major and minor ionic concentrations of most sites are comparable to other previously surveyed high arctic sites. Lakes and ponds in close contact with the impact-generated carbonate melt rocks associated with Haughton Crater were distinguished from the larger data set due to their elevated Mg2+, SO42-, Ba2+, Sr2+, and SiO2 concentrations. Selenite (CaSO4.2H(2)O) formations commonly associated with the lower levels of the carbonate melt sheets were identified as a likely source for the elevated SO42- concentrations in these sites. Principal Components Analysis separated sites along a conductivity and nutrient gradient on the primary and secondary axes, respectively. This study serves as a baseline for a long-term monitoring program in the Haughton Crater region.

Lintner, S. F. (1997). "Agriculture and environment in the Baltic Sea region: An agenda for action." Ambio **26**(7): 418-423.
<Go to ISI>://WOS:000071213200005

A major challenge in the restoration of the ecological balance of the Baltic Sea is the successful development and implementation of environmental management measures for the diverse and dynamic agricultural sector and rural settlements. This challenge exists throughout the Baltic Sea region; both the countries in economic transition and traditional market economies are involved with

significant changes in the structure of agriculture, with associated impacts on rural settlements. This process will be become more complex with the continued economic recovery of countries which have undertaken economic restructuring and anticipated expansion of membership in the European Union. Addressing these concerns is a longterm process which involves support for policy, financial, technical and educational interventions. Success could be accelerated by promoting regional partnerships, sharing experience, and regular assessment of performance. Adoption of participatory approaches which directly involve agricultural interests and rural communities is an important element of this process. Agriculturists and rural communities should be viewed as critical partners in environmental management and actively engaged in a program of actions cooperatively developed for their specific conditions.

Liston, A., B. L. Wilson, W. A. Robinson, P. S. Doescher, N. R. Harris and T. Svejcar (2003). "The relative importance of sexual reproduction versus clonal spread in an aridland bunchgrass." Oecologia **137**(2): 216-225.
<Go to ISI>://000185602300008

Festuca idahoensis (Idaho fescue) is a perennial caespitose grass, common in semi-arid rangelands of the Intermountain West. To determine how individuals are recruited into a population, we studied two long-term monitoring plots that were established in 1937 at the Northern Great Basin Experimental Range in southeastern Oregon. The plots measured 3.05x3.05 m, and were located approximately 30 m apart. One plot was ungrazed, the other was subject to moderate levels of cattle grazing. The number of F. idahoensis plants in both plots increased ten-fold between 1937 and 1996, but whether this was due primarily to reproduction by seed or clonal fragmentation was unknown. In 1996, we mapped and sampled 160 plants of F. idahoensis. We used dominant inter-simple sequence repeat (ISSR) markers and codominant allozyme markers in order to identify genetic individuals and measure genetic diversity. Both plots were characterized by high levels of genetic and clonal diversity. When information from ISSRs, allozymes and sample location were combined, 126 genets were recognized, each consisting of one to four samples (ramets). By measuring the diameter of clones surrounding plants that were present in 1937, we estimated that clonal spread occurred at a rate of approximately 3.7 cm per decade, and thus was of secondary importance in the maintenance and increase of F. idahoensis stands. Sexual reproduction, rather than clonal fragmentation, accounted for most of the recruitment of new plants into these plots. The grazed plot had fewer ramets, genotypes, and clones than the ungrazed plot, but the ramets were significantly larger. Levels of genetic diversity did not differ in the grazed and ungrazed plots, but there was some evidence for a small, but significant level of genetic differentiation between the two. The results also indicate that F. idahoensis has the potential to be a long-lived species with some individuals persisting in excess of 60 years. This study demonstrates how long-term monitoring can be supplemented by genetic analysis to obtain detailed information on the population dynamics of plants. In the case of this community dominant species, this provides essential information for understanding succession and developing management and restoration strategies.

Liu, D., H. P. Veit and D. M. Denbow (2004). "Effects of long-term dietary lipids on mature bone mineral content, collagen, crosslinks, and prostaglandin E-2 production in Japanese quail." Poultry Science **83**(11): 1876-1883.
<Go to ISI>://WOS:000224689400009

This study investigated the effects of longterm dietary lipids on mature bone mineral content, collagen concentration, crosslink levels, bone marrow and ex vivo prostaglandin E-2 (PGE(2)) biosynthesis, as well as the relationship of PGE2 production to these bone formation parameters. One-month-old male Japanese quail were given a basal diet containing 1 of 4 lipid sources: soybean oil (SBO), hydrogenated soybean oil (HSBO), chicken fat (CF), or menhaden fish oil (FO) at 50 g/kg of the diet. At 8 mo of age, lipid treatments did not affect bone length, diameter, or weight in quail. Quail fed SBO or CF had significantly lower levels of mineral content in tibial bones compared with those given FO. Bone collagen level was significantly higher in quail consuming SBO than those given HSBO or CF. Collagen crosslink concentration was markedly increased in birds provided FO or HSBO compared with those fed SBO or CF. Prostaglandin E-2 biosynthesis in bone organ culture and marrow were greatly increased in quail maintained on the SBO or CF diet compared with those given the FO or HSBO diet. Prostaglandin E-2 production in the bone microenvironment was negatively correlated with tibial ash and collagen crosslinks but had a positive correlation with tibial collagen levels. These results support our previous findings that long-term exposure to diets high in SBO or CF impaired mature bone mechanical properties and histological characteristics. Further, the results suggest that long-term supplementation of SBO or CF in the diet had a significant adverse effect on mature bone metabolism, and that dietary lipids altered bone metabolism, perhaps partially by controlling the production of local regulatory factor in bone.

Lobel, A., A. K. Dupree, R. P. Stefanik, G. Torres, G. Israelian, N. Morrison, C. de Jager, H. Nieuwenhuijzen, I. Ilyin and F. Musaev (2003). "High-resolution spectroscopy of the yellow hypergiant rho Cassiopeiae from 1993 through the outburst of 2000-2001." Astrophysical Journal **583**(2): 923-954.
<Go to ISI>://000180636300039

We present an overview of the spectral variability of the peculiar F-type hypergiant rho Cas, obtained from our long-term monitoring campaigns over the past 8.5 yr with four spectrographs in the northern hemisphere. Between 2000 June and September an exceptional variability phase occurred when the V brightness dimmed by about a full magnitude. The star recovered from this deep minimum by 2001 April. It is the third outburst of rho Cas on record in the last century. We observe TiO absorption bands in high-resolution near-IR spectra obtained with the Utrecht Echelle Spectrograph during the summer of 2000. TiO formation in the outer atmosphere occurred before the deep brightness minimum. Atmospheric models reveal that the effective temperature decreases by at least 3000 K, and the TiO shell is driven supersonically with (M) over dot similar or equal to 5.4 x 10(-2) M. yr(-1). Strong episodic mass loss and TiO have also been observed during the outbursts of 1945-1947 and 1985-1986. A detailed analysis of the exceptional outburst spectra is provided, by comparing with high-resolution optical spectra of the early M-type supergiants mu Cep (Ia) and Betelgeuse (Iab). During the outburst, central emission appears above the local continuum level in the split Na D lines. A prominent optical emission line spectrum appears in variability phases of fast wind expansion. The radial velocity curves of Halpha and of photospheric metal absorption lines signal a very extended and velocity-stratified dynamic atmosphere. The outburst spectra indicate the formation of a low-temperature, optically thick circumstellar gas shell of 3 x 10(2) M. during 200 days, caused by

dynamic instability of the upper atmosphere of this pulsating massive supergiant near the Eddington luminosity limit. We observe that the mass-loss rate during the outburst is of the same order of magnitude as has been proposed for the outbursts of eta Carinae. We present calculations that correctly predict the outburst timescale, whereby the shell ejection is driven by the release of hydrogen ionization recombination energy.

Lodge, G. M. and S. Harden (2007). "Evaluation of annual pasture legumes in northern New South Wales. 2. Trifolium and Medicago spp. and other legumes." Australian Journal of Experimental Agriculture **47**(5): 563-574.
<Go to ISI>://WOS:000245668000010

Two studies to evaluate annual pasture legumes were sown in replicated plots near Tamworth, New South Wales. In the first (experiment 1), 24 entries were sown in 1995 and in a second study (experiment 2) 33 entries were sown in 1996. Green herbage mass (kg DM/ha) was assessed in the year of sowing (spring) and thereafter four times per year until spring 2000. Limited data were also collected to estimate maturity grading, seed yield and seedling regeneration. For each experiment, green herbage mass data were examined using cubic smoothing splines and at the end of each study, green herbage mass values predicted from the model were used to assess the significance (P = 0.05) of differences between cultivars or lines. In spring 2000 (experiment 1), Trifolium subterraneum var. brachycalycinum cv. Clare had the highest rank of the cultivars and lines, and T. michelianum cv. Paradana the lowest (previously cultivated site). For the native pasture site, CPI 70056B subterranean clover had the highest rank and Ornithopus compressus cv. Paros the lowest. In experiment 2, Clare had the highest rank in spring 2000 and T. resupinatum cv. Bolta had the lowest ranking. Longterm green herbage mass appeared to be strongly influenced by maturity grading, but other factors may have affected the performance of annual Medicago spp., O. compressus, T. resupinatum, and T. michelianum. Results from the current study and previous reported research indicated that T. subterraneum var. subterraneum cvv. York (evaluated as CPI 89846B) and Junee and T. subterraneum var. brachycalycinum cv. Clare performed best in northern New South Wales.

London, L. (1998). "Use of a crop and job specific exposure matrix for retrospective assessment of long term exposure in studies of chronic neurotoxic effects of agrichemicals." Occupational and Environmental Medicine **55**(3): 194-201.
<Go to ISI>://000072107700008

Rationale-Job exposure matrices (JEMs) are widely used in occupational epidemiology, particularly when biological or environmental monitoring data are scanty. However, as with most exposure estimates, JEMs may be vulnerable to misclassification. Objectives-To estimate the long term exposure of farm workers based on a JEM developed for use in a study of the neurotoxic effects of organophosphates and to evaluate the repeatability and validity of the JEM. Methods-A JEM was constructed with secondary data from industry and expert opinion of the estimate of agrichemical exposure within every possible job activity in the JEM to weight job days for exposure to organophosphates. Cumulative lifetime and average intensity exposure of organophosphate exposure were calculated for 163 pesticide applicators and 84 controls. Repeat questionnaires were given to 29 participants three months later to test repeatability of measurements. The ability of JEM based exposure to predict a known marker of organophosphate exposure was used to validate the JEM. Results-Cumulative lifetime exposure as measured in kg organophosphate exposure, was significantly associated with erythrocyte cholinesterase concentrations (partial r(2)=5%; p < 0.01), controlled for a range of confounders. Repeatability in a subsample of 29 workers of the estimates of cumulative (Pearson's r=0.67; 95% confidence interval (95% CI) 0.41 to 0.83), and average lifetime intensity of exposure (Pearson's r=0.60 95% CI 0.31 to 0.79) was adequate. Conclusion-The JEM seems promising for farming settings, particularly in developing countries where data on chemical application and biological monitoring are unavailable.

Lowrance, R. (1992). "SUSTAINABLE AGRICULTURE RESEARCH AT THE WATERSHED SCALE." Journal of Sustainable Agriculture **2**(3): 105-111.
<Go to ISI>://WOS:A1992JQ02700009

Ecological sustainability, the ability of life-support systems to maintain the quality of the environment, is a necessary condition for longterm agricultural sustainability at the field, farm, or national level. Research is needed at the watershed/landscape level to address the effects of changes in inputs, land use, or management practices on the ecological sustainability of modern agriculture. This research should address the impact of perturbations on the responses of watersheds relative to objective indicators of sustainability, Ideally this research would be done within a set of managed landscapes that could be perturbed to change the watershed or landscape response. The perturbations could be to the inputs of materials, energy, and management; the structure of the landscape; or the desired production outputs. An existing set of watershed improvement projects, funded by Federal, State, local, and private sources, could provide the landscapes for this research. Projects funded through Clean Water Act Section 319 grants, USDA Water Quality Demonstration projects, and USDA Hydrologic Unit Area projects provide landscapes throughout the United States that are valuable resources for research on ecological sustainability. These landscapes should be used in research to determine ways to enhance the longterm sustainability of agriculture.

Lu, Y. X., H. Dang, B. Middleton, Z. Zhang, L. Washburn, M. Campbell-Thompson, M. A. Atkinson, S. S. Gambhir, J. Tian and D. L. Kaufman (2004). "Bioluminescent monitoring of islet graft survival after transplantation." Molecular Therapy **9**(3): 428-435.
<Go to ISI>://000220170100019

Islet transplantation offers a potential therapy to restore glucose homeostasis in type 1 diabetes patients. A method to image transplanted islets noninvasively and repeatedly would greatly assist studies of islet transplantation. Using recombinant adenovirus, we show that isolated rodent and human islets can be genetically engineered to express luciferase and then imaged after implantation into NOD-scid mice using a cooled charge-coupled device. The magnitude of the signal was dependent on the islet dose. Adenovirus-directed luciferase expression, however, rapidly attenuated. We next tested lentivirus vectors that should direct the long-term expression of reporter genes in transduced islets. Transplanted lentivirus-transduced islets restored euglycemia long term in streptozotocin-treated NOD-scid mice. The signal from implanted lentivirus-transduced islets was related directly to the implanted islet mass, and the signal did not attenuate over the observation period. Viral transduction, luciferase expression, and repeated imaging had no apparent long-term deleterious effects on islet function after implantation. These data demonstrate that

the introduction of reporter genes into an isolated tissue allows the long-term monitoring of its survival following implantation. Such imaging technologies may allow earlier detection of graft rejection and the adjustment of therapies to prolong graft survival posttransplantation.

Luciani, N., G. Nasso, M. Gaudino, A. Abbate, F. Glieca, F. Alessandrini, F. Girola, F. Santarelli and G. Possati (2003). "Coronary artery bypass grafting in type II diabetic patients: A comparison between insulin-dependent and non-insulin-dependent patients at short- and mid-term follow-up." Annals of Thoracic Surgery **76**(4): 1149-1154.
<Go to ISI>://000185717900042

Background. Diabetes is a well-established risk factor for coronary artery disease, and it is associated with an increased rate of early and late adverse events after myocardial revascularization by coronary artery bypass grafting. Methods. A prospective follow-up study was done to evaluate the short- term and mid-term outcomes of type II diabetic patients who had coronary artery bypass grafting at our institution between 1996 and May 1999. A total of 200 patients, 100 insulin-dependent diabetic patients (group I) and 100 non-insulin-dependent diabetic patients (group II), met the inclusion criteria of the study and were included in the clinical follow-up study. Results. The characteristics of the patients of the two groups were similar for baseline clinical angiographic and operative characteristics. In particular, no significant differences in cardiopulmonary bypass and aortic cross-clamping times were noted between the two groups. The number grafts per patient was similar between the two groups. There were no in-hospital deaths, but postoperative complications were different among the two series. In fact, 33% of patients in group I had at least one major complication compared with 20% in group II ($p = 0.037$). The cumulative number of complications was 148 in group I and 69 in group II, and the mean number of complications per patient was 4.5 and 3.5 in groups I and II, respectively. The major differences in perioperative complication rates were found in the need for prolonged (> 24 hours) ventilation, occurrence of respiratory or renal insufficiency, and mediastinitis. The mean length of stay in the intensive care unit and for total hospitalization were longer in group I than group II (4.3 +/- 2.8 days versus 2.8 +/- 2.7 days [$p = 0.010$] and 11.1 +/- 2.2 days versus 7.2 +/- 2.4 group II [$p < 0.05$], respectively). At long-term follow-up, group I patients had a significantly higher mortality rate (29% versus 10%, $p < 0.001$). Moreover, overall late cardiac and noncardiac complication rates were significantly higher in group I than II (37% versus 22%, $p = 0.02$). In the multivariate analysis including several preoperative and operative variables, treatment by insulin, advanced age (> 75 years), left ventricular dysfunction (left ventricular ejection fraction < 35%), and complex lesions at coronary angiography (American Heart Association lesion classification type C lesion) were found as independent predictors of increased mortality. Conclusions. Our data show that patients with insulin-dependent type II diabetes who had coronary artery bypass grafting have a significantly higher rate of major postoperative complications with an extremely unfavorable short- and long-term prognosis. Diabetic patients on insulin treatment should be considered high-risk candidates for coronary artery bypass grafting and require intense perioperative and long-term monitoring. Further studies will be necessary to investigate whether such conclusions may be appropriate for newer surgical strategies such as off-pump operation. (C) 2003 by The Society of Thoracic Surgeons.

Lunderstadt, J. (2002). "Long term research on the infestation dynamics of beech scale (Cryptococcus fagisuga LIND.) and on the formation of necroses in a mixed stand of beech and valuable broad leaved trees." Allgemeine Forst Und Jagdzeitung **173**(11-12): 193-200.
<Go to ISI>://000180012200001

In the Lower Saxonian billy region, Forest office Kattenbuhl, Forest district Brackenberg, the development of 55 to 73 year old beech trees after a mass propagation of beech scale (Cryptococcus fagisuga) in 1982/83 was followed for 15 years. In neighbouring mixed stands of beech and valuable broad leaved species from natural regeneration experimental twin plots (r = 15 m), each in valley-, side slope-, and plateau position were subjected to thinning of varied intensity at different time intervals. Irrespective of the treatment, scale infestation decreased from 1983 to 2001 on all plots. The relative share of infested trees as an average of the years 1985, 1988 and 1996 came to 15-20 % (fig 3). It remained similar in the individual classes of the 6 experimental plots with quantitative differences in the intensity of the attack by the scale (fig. 3). After 18 years the attack of the scale was stronger on the thinned plots, the necrosis causes by the scale remained similar in all cases (fig. 5). Maximum necrosis occured on the thinned side slope plot within the class of dominated trees, on the corresponding unthinned one within the class of dominating trees (fig. 4). The necroses caused by an unidentified pathogen, probably Nectria ditissima, was observed only on all unthinned plots, it decreased from valley to plateau (fig. 5). Regular thinning measures are most important in the control of infestations. The time and intensity of the procedure are strongly influenced by the water regime of the stands. Up to 5 years after a mass propagation of the scale a higher proportion of final crop trees changing their social position should be preserved. As well the monitoring and control of xylophagous insects should be intensified within this time span.

Lundquist, E. J., L. E. Jackson, K. M. Scow and C. Hsu (1999). "Changes in microbial biomass and community composition, and soil carbon and nitrogen pools after incorporation of rye into three California agricultural soils." Soil Biology & Biochemistry **31**(2): 221-236.
<Go to ISI>://WOS:000079006100007

The effects of long-term agricultural management on active soil organic matter (SOM) and short-term microbial C and N dynamics were investigated. Short-term changes in chemical and biological variables after incorporating fresh rye shoots were measured in intact soil cylinders from three contrasting agricultural systems. Two of the soils were from organic or conventional 4-yr rotations which had been in place for 6 yr as part of the University of California at Davis Sustainable Agriculture Farming Systems (SAFS) project and the third was from a double-cropped, intensive vegetable production system in the Salinas Valley of California, Microbial biomass (MB) and respiration, numbers of organisms in several trophic groups, soil inorganic N, dissolved organic C and recoverable rye were measured before and during the 6 weeks following rye incorporation. Active soil organic matter, expressed as the ratios of microbial biomass C or N to total soil C or N, respectively, appeared to be related to longterm management. These ratios increased in proportion to increased organic inputs and reduced tillage or periods of fallow. In all soils, MBC increased and decreased rapidly following rye incorporation, but MBN was fairly constant. Significant differences among the soils in MBC and MBN were maintained over the 6 week experiment. Following rye incorporation, fluorescein diacetate (FDA) active counts of bacteria and bacterial-feeding nematodes increased rapidly, whereas changes in FDA active fungal hyphal lengths and fungal-feeding nematodes were less

pronounced. The rates of rye decomposition, respiration and net N mineralization were highest the first week after incorporation, coincident with increases in MBC and numbers of active bacteria in all three soils. There were significant differences among soils in numbers of organisms in the trophic groups on some sample dates, but changes in soil respiration and inorganic N and the rate of rye decomposition remained similar in all three soils. The SAFS organic soil had a somewhat lower ratio of bacterial to fungal biomass and lower ratio of respiration to MBC throughout the experiment than the SAFS conventional soil. Despite long-term differences in agricultural management and differences in active SOM contents among the three soils, the rates of rye decomposition and C and N mineralization were similar. Rye incorporation produced a short-term burst of microbial growth and activity of similar magnitude in all three soils although the initial MB contents in the three soils were different. Variations among the soils in FDA active counts of fungi and numbers of bacterial- and fungal-feeding nematodes indicated that microbial community composition was more responsive to rye incorporation than were changes in soil C and N pools. (C) 1998 Elsevier Science Ltd. All rights reserved.

Luyssaert, S., J. Mertens and H. Raitio (2003). "Support, shape and number of replicate samples for tree foliage analysis." Journal of Environmental Monitoring **5**(3): 500-504.
<Go to ISI>://000183091600023

Many fundamental features of a sampling program are determined by the heterogeneity of the object under study and the settings for the error (alpha), the power (beta), the effect size (ES), the number of replicate samples, and sample support, which is a feature that is often overlooked. The number of replicates, alpha, beta, ES, and sample support are interconnected. The effect of the sample support and its shape on the required number of replicate samples was investigated by means of a resampling method. The method was applied to a simulated distribution of Cd in the crown of a Salix fragilis L. tree. Increasing the dimensions of the sample support results in a decrease in the variance of the element concentration under study. Analysis of the variance is often the foundation of statistical tests, therefore, valid statistical testing requires the use of a fixed sample support during the experiment. This requirement might be difficult to meet in time-series analyses and long-term monitoring programs. Sample supports have their largest dimension in the direction with the largest heterogeneity, i.e. the direction representing the crown height, and this will give more accurate results than supports with other shapes. Taking the relationships between the sample support and the variance of the element concentrations in tree crowns into account provides guidelines for sampling efficiency in terms of precision and costs. In terms of time, the optimal support to test whether the average Cd concentration of the crown exceeds a threshold value is 0.405 m(3) (alpha = 0.05, beta = 0.20, ES = 1.0 mg kg(-1) dry mass). The average weight of this support is 23 g dry mass, and 11 replicate samples need to be taken. It should be noted that in this case the optimal support applies to Cd under conditions similar to those of the simulation, but not necessarily all the examinations for this tree species, element, and hypothesis test.

Luyssaert, S., H. Raitio, P. Vervaeke, J. Mertens and N. Lust (2002). "Sampling procedure for the foliar analysis of deciduous trees." Journal of Environmental Monitoring **4**(6): 858-864.
<Go to ISI>://000180404300006

Sampling can be the source of the greatest errors in the overall results of foliar analysis. This paper reviews the variability in heavy metal concentrations in tree crowns, which is a feature that should be known and understood when designing a suitable leaf sampling procedure. The leaf sampling procedures applied in 75 articles were examined. Most of the environmental studies used a closely related form of the UN/ECE-EC leaf sampling procedure, which was developed for the long-term monitoring of forest condition. Studies with objectives outside the UN/ECE-EC field of application should utilize a sampling procedure that is in accordance with the objectives of the study and based on the observed variation in pilot and similar studies. The inherent sources of heavy metal variability inside the stand, i.e. the crown class, stand management, site properties, crown dimensions, infections, seasons, etc. were discussed, but the underlying causes of this variability are rarely understood. The inherent variability in tree crowns is the reason for using leaf sampling as a tool in pollution studies. The objectives of a pollution study determine which sources of variability are utilized by the researcher.

MacDonald, G. B. and D. J. Thompson (2003). "Responses of planted conifers and natural hardwood regeneration to harvesting, scalping, and weeding on a boreal mixedwood site." Forest Ecology and Management **182**(1-3): 213-230.
<Go to ISI>://000185054900015

Recent emphasis on ecosystem-based forest management has increased interest in promoting species mixtures to enhance stand-level diversity. However, there is little information on silvicultural approaches to regenerate mixtures of conifers and hardwoods in northern Ontario. This study tested fifth-year effects of harvest intensity (uncut, 50% partial cut with and without removal of residuals after 3 years, and clearcut), site preparation level (none and scalped), and chemical weeding frequency (none, single, and multiple) on survival and growth of planted white spruce (Picea glauca [Moench] Voss) and jack pine (Pinus banksiana Lamb.), height and density of hardwood regeneration, and cover of competing shrubs. The study is located in a hardwood-dominated mixedwood stand on a fertile, mesic, upland site in northeastern Ontario. Although throughfall precipitation, wind speed, and temperature were moderated by residual cover, only light level varied sufficiently among treatments to account for differences in regeneration success. Damage to regeneration by mammals, weather, or equipment was minor, but up to 17% of residual basal area was lost to windthrow in partial cuts. Scalping had no effect on the development of conifer seedlings, hardwood regeneration, or shrubs. Survival of conifer seedlings was enhanced by harvesting but not by weeding, and spruce survival exceeded pine survival at all harvest levels. Seedling height and diameter growth increased with harvest intensity and weeding frequency, and the beneficial effects of weeding increased with harvest intensity. Height and density of hardwood regeneration increased with harvest intensity and decreased with weeding frequency. Single weeding reduced but did not eliminate hardwoods. Harvesting slightly increased shrub cover and weeding sharply decreased it. Dense suckering of trembling aspen (Populus tremuloides Michx.) followed removal of residuals 3 years after the initial 50% partial cut. Thus, final removal cuts on mixedwood sites should be delayed until conifer seedlings are well established. Underplanting cannot be recommended for uncut mixedwood stands in Ontario because of unacceptably high seedling mortality. Compared to clearcutting, partial cutting without removal of residuals reduced fifth-year

hardwood density on unweeded plots. However, hardwoods on that treatment overtopped spruce seedlings by 90 cm and pine seedlings by 64 cm. Partial cutting with reduced weeding produced acceptable stocking of conifer and hardwood regeneration, but did not promote seedling growth. Weeding was required to maintain spruce as a viable understory component, to ensure pine codominance with hardwoods, and to reduce shrub cover below 50%. Separating species into alternating patches or corridors may be more productive than promoting integrated mixtures, since it allows silvicultural treatments to be adapted to the needs of each species. Long-term monitoring of crop trees and associated vegetation following mixedwood management options on a range of boreal. sites is required to advance the knowledge base and produce reliable operational guidelines.

Macdonald, R. H., G. A. Lawrence and T. P. Murphy (2004). "Operation and evaluation of hypolimnetic withdrawal in a shallow eutrophic lake." Lake and Reservoir Management **20**(1): 39-53.
<Go to ISI>://000220790600004

Chain Lake is a small (46 ha), shallow (z(mean) = 6 m, z(max) = 9 m) eutrophic lake in the interior of British Columbia, Canada. It suffers from severe blue-green algae blooms fed by internally loaded phosphorus. A hypolimnetic withdrawal system began operation in 1994, and is operated annually during the ice free period of the year. It is gravity driven (no mechanical pumps) and can operate at rates up to 80 L (.) s(- 1). A monitoring program implemented as part of the withdrawal installation evaluated total phosphorus export, take water quality effects, and downstream environmental impacts. The withdrawal does not accelerate hydraulic flushing of the lake (residence time 0.5 - 3 years) but preferentially drains the water column below 5 in every 100 days and drains the deepest region of the lake (6-9 in) approximately every two weeks. Total phosphorus export in the first year of operation was 30 kg, and optimization of the operation strategy should increase export to 60 kg per year, resulting in a net export of total phosphorus from the lake. Long term monitoring of water quality has been performed by resident volunteers for nine years (1994 - 2002) using Secchi measurements. Only a few data are available prior to the withdrawal operation. A non-parametric trend test found statistically significant increases of the monthly median Secchi depth for June ($p<0.05$)and August($p<0.10$). Optimization of the withdrawal operation to maximize phosphorus export can be done by earlier start-up after ice off and increasing flow rates during the most anoxic periods. Downstream concerns with respect to the withdrawal operation include: dissolved oxygen depletion observed at the withdrawal site and up to 500 in downstream; nutrient enrichment with elevated concentrations of phosphonis observed in the withdrawn water; and elevated levels of ammonia, iron, and manganese observed in the withdrawn water in the first year of monitoring. The effects of anoxic water discharge were partially mitigated by a fountain aerator at the discharge point which increased the dissolved oxygen in the withdrawal stream by up to 2.0 mg (.) L-1.

Machitani, Y., N. Kasai, Y. Fujinawa, H. Iitaka, N. Shirai, Y. Hatsukade, K. Nomura, K. Sugiura, A. Ishiyama and T. Nemoto (2003). "Vector HTS-SQUID system for ULF magnetic field monitoring." Ieee Transactions on Applied Superconductivity **13**(2): 763-766.
<Go to ISI>://000184241700170

Anomalous magnetic field variations in the ultra low frequency (ULF) band were observed as precursory phenomena of earthquakes. We constructed a portable monitoring system by using HTS-SQUIDs for measuring the ULF environmental vector magnetic field. The operation of the system was verified at Mt. Bandai, an active volcano. The system safely worked over 100 hours on batteries. We have achieved long term monitoring with the system at the National Institute of Advanced Industrial Science and Technology (AIST) from February 7 to March 22 of 2002 using AC power. The measured magnetic field variations were compared with groundwater level, electric field and geo- electric pulse current variations measured at AIST in order to investigate the source of magnetic field radiation found during the long term monitoring.

MacKenzie, D. I., J. D. Nichols, J. E. Hines, M. G. Knutson and A. B. Franklin (2003). "Estimating site occupancy, colonization, and local extinction when a species is detected imperfectly." Ecology **84**(8): 2200-2207.
<Go to ISI>://000185073100026

Few species are likely to be so evident that they will always be defected when present: Failing to allow for the possibility that a target species was present, but undetected at a site will lead to biased estimates of site occupancy, colonization,and local extinction probabilities. These population vital rates are often of interest in long-term monitoring programs and metapopulation studies. We present a model that enables direct estimation of these parameters when the probability of detecting the species is less than 1. The model does not require any assumptions-of process stationarity, as do some previous methods, but does require detection/nondetection data to be collected in a-manner similar to. Pollock's robust design as used-in mark-recapture studies. Via simulation, we,show that the model provides good estimates of parameters for most scenarios considered. We illustrate the method with data from monitoring programs of Northern Spotted Owls (Strix occidentalis caurina) in northern California and tiger salamanders (Ambystoma tigrinum) in Minnesota, USA.

Madulu, N. F. (2003). "Linking poverty levels to water resource use and conflicts in rural Tanzania." Physics and Chemistry of the Earth **28**(20-27): 911-917.
<Go to ISI>://WOS:000186219000017

Water scarcity is an important environmental constraint to development. Water availability is closely linked to human welfare and health by affecting nutrition status and quantity of drinking water especially for the poor. It has impacts on household labour because of the time and energy spent in obtaining it. These problems are more keenly felt among the poor households and in the agricultural subsistence economy. In many areas, the demand for water has been increasing due to rapid population growth, economic development, and climatic change. Water scarcity also stimulates social conflicts between various water users: individuals, communities, industries, livestock, wildlife, agriculture etc. Consequently, local communities have evolved strategies for coping with water stress and drought. These strategies include use of various sources of water, inaction to strict bye-laws regarding the use of water, crop diversification, wage labour, and possibly seasonal migration. The available strategies are likely to vary from one area to another. Some of these actions have measurable longterm demographic consequences, particularly if water stress is severe or

repetitive. Although most governments and donor organizations often put much emphasis on the provision of water for drinking purposes, there is clear evidence that the supply of water for other uses has equal importance especially among rural communities. This observation suggests that putting too much emphasis on drinking water needs, addresses a rather insignificant part of the problem of water resources and biases the range of solutions which are likely to be proposed for perceived shortages. The presence of other water uses necessitates the provision of multi purpose water sources that can serve a number of contrasting functions. This demand-responsive approach can enable the local communities and the poor households to choose the type of services they require on the basis of perceived needs and their ability to manage the water scheme. (C) 2003 Published by Elsevier Ltd.

Makela-Kurtto, R. and J. Sippola (2002). "Monitoring of Finnish arable land: changes in soil quality between 1987 and 1998." Agricultural and Food Science in Finland **11**(4): 273-284.
<Go to ISI>://000180234900003

This study is part of the long-term monitoring of Finnish arable land and it is based on soil analyses of 705 monitoring sites sampled in 1998. The same sites were sampled twice previously, in 1974 and 1987. We describe here the state of the Finnish cultivated soils in 1998 and changes in soil quality since 1987. The samples were analysed for organic C, volume weight, pH, P, K, Ca, S, Mg, Al, B, Cd, Co, Cr, Cu, Fe, Mn, Mo, Se and Zn. Macronutrients were extracted with 0.5 M ammonium acetate + 0.5 M acetic acid (pH 4.65) and most micronutrients, Al and heavy metals with the same solution + 0.02 M Na(2)EDTA. Hot water was used to extract B and Se. From 1987 to 1998, soil P, Ca, Mg, S, Cr, Cu,. Zn, volume weight and electrical conductivity increased and soil K, B, pH and organic C decreased. There was no change in soil Al, Cd, Mn and Ni. Between 1987 and 1998, the use of P, K, B and Cu in mineral fertilisers declined whereas that of Ca in liming agents and Zn in mineral fertilisers increased. With the exception of P and Cu, these changes affected the concentrations, of easily soluble macro- and micronutrients in the soil accordingly. The slight decrease in soil pH might be due to the increase in the use of fertliser N. The finding that soil Cd and Ni ceased to increase and that soil Cr increased only slightly was attributed to the dramatic reduction in. national emissions and bulk depositions of heavy metals.

Malmer, A. (2004). "Streamwater quality as affected by wild fires in natural and manmade vegetation in Malaysian Borneo." Hydrological Processes **18**(5): 853-864.
<Go to ISI>://000220457200001

In 1998 a wild fire struck a paired catchment research area under long-term monitoring of hydrological and nutrient budgets. Streamwater quality as concentrations of dissolved and suspended particulate matter was monitored during 1.5-2.5 years after the fire in streams from seven different catchments. As the catchments, due to earlier experimental treatments, had different vegetations, varying effects related to different fire intensities were observed. The highest, mean stormflow, suspended sediment concentrations resulted from intensive fire in secondary vegetation that had experienced severe soil disturbance in previous treatments (crawler tractor timber extraction 10 years earlier). Stormflow concentrations were typically still about 400 mg l(-1) in 1999 (10-21 months after the fire), which was about the maximum recorded concentration in streams during initial soil disturbance in 1988. Forest fire in natural forest resulted in less than half as high stormflow concentrations. For dissolved elements in streamwater there was a positive relation between fuel load (and fire intensity) and concentration and longevity of effects. Stream baseflow dissolved nutrient concentrations were high in the months following the fire. Mean baseflow K concentrations were 8-15 mg l(-1) in streams draining catchments with intensive fire in secondary vegetation with large amounts of fuel. After controlled fire for forest plantation establishment in 1988 corresponding concentrations were 3-5 mg l(-1), and after forest fire in natural forest in this study about 2 mg l(-1). This study shows differences in response from controlled fire for land management, forest fire in natural forests and wild fires in manmade vegetations. These differences relate to resistance and resilience to fire for the involved ecosystems. There is reason to believe that wild fires and repeated wild fires during or after droughts, in successions caused by human influence, may lead to larger losses of ecosystem nutrient capital from sites compared with forest fires in natural forests. As fire in the humid tropics becomes more common, in an increasingly spatially fragmented landscape, it will be important to be aware of these differences. Copyright (C) 2004 John Wiley Sons, Ltd.

Marker, L. L., A. J. Dickman, M. G. L. Mills and D. W. Macdonald (2003). "Aspects of the management of cheetahs, Acinonyx jubatus jubatus, trapped on Namibian farmlands." Biological Conservation **114**(3): 401-412.
<Go to ISI>://000185371200010

The Namibian cheetah population has recently undergone serious decline due to human-mediated removals, and investigating the rates and causes of such removals is an important aspect of the future management of cheetah populations outside protected areas. We examined cheetahs that were reported live-trapped or killed on Namibian farmlands between 1991 and 1999. A perceived threat to livestock or game led to the vast majority of live captures and to almost half of the cheetah deaths investigated. Despite this, livestock predation from cheetahs appeared to be minimal, and was usually perpetrated by cheetahs with injuries. Most of the cheetahs were trapped in groups, and cheetahs' relative sociality leads to the easy removal of entire social units. Long-term monitoring must include detailed consideration of these indiscriminate removals, as they involve many cheetahs, fluctuate between years, often go unreported, and are likely to have a serious impact on cheetah populations outside protected areas. (C) 2003 Elsevier Ltd. All rights reserved.

Markovic, R., D. Sefer, S. Radulovic and M. Speranda "PRESENCE AND IMPORTANCE OF MYCOTOXINS IN PIG FEED." Veterinarski Glasnik **64**(1-2): 83-92.
<Go to ISI>://BIOSIS:PREV201000527402

Mycotoxins present a significant problem in the diet of pigs. Secondary metabolites of fungi are toxic matter that have a negative effect on health and the performance of animals, as well as on the quality of their products. The creating of mycotosins is a complex process and it is difficult to predict which toxin will be produced and in which concentration. Food is most often contaminated by low concentrations of different mycotoxins (aflatoxins, ochratoxins, trichothecenes, fumonisinsi and zearalenone) which cause a series of undesired effects, depending on the amount that the animal has ingested into the organism. Mycotoxin interactions in the

organism are complex, and they can have antagonistic, synergistic or a joint effect, depending on the combination and quantity in which they appear. The pig is a domestic animal which is most sensitive to the effects of mycotoxins. Long-term consumption of feed contaminated with mycotoxins results in a decline in production, a deterioration of the general health and reproductive disorders One of the most important negative effects in pigs which receive low doses of mycotoxins in the longterm, is immunosuppression. Mycotoxins present very stable links that remain in raw materials and animal products for a long time and thus pose a major health risk for humans.

Marrs, R. H., J. D. P. Phillips, P. A. Todd, J. Ghorbani and M. G. Le Duc (2004). "Control of Molinia caerulea on upland moors." Journal of Applied Ecology **41**(2): 398-411.
<Go to ISI>://000220587800018

1. Molinia encroachment has been viewed as a major threat to moorland conservation in the UK and elsewhere in Europe. In England and Wales agri-environment schemes are in place that aim to reduce Molinia caerulea and encourage the development of dwarf shrub vegetation. We tested a range of management treatments to achieve these objectives in two regions (the North Peaks and Yorkshire Dales) in England. 2. Within each region, the same experiment was carried out on two types of moorland vegetation, Molinia-dominated 'white' moorland and a mixture of Molinia and Calluna vulgaris'grey' moorland. Burning, grazing and herbicide (glyphosate) treatments were applied in factorial combination at each of the four sites (two regions x two moor types). The responses of both vegetation and individual species were assessed. In addition, on the white moors two techniques for Calluna re-establishment were investigated, (i) removal of Molinia litter by raking and (ii) application of Calluna seed. 3. The data were analysed using a combination of univariate and multivariate analysis of variance to identify trends in this complex data set. 4. The only treatment that had consistent effects in the univariate analysis of variance was glyphosate application, which had similar effects on Molinia at all study sites. There was little difference between the use of low and high application rates (0.27 and 0.54 kg ai ha(-1)). There was little impact of herbicide use on other moorland species. Some species were affected on some sites in some years, but there were no consistent effects. Tentative identification of species that responded positively, negatively and erratically to glyphosate application was made. 5. Greater Calluna seedling densities were found in the plots where herbicide was applied, the Molinia litter was removed and seed was added. However, after initial colonization, there was a reduction in Calluna seedling densities as the Molinia recovered. This indicated that disturbance, seed addition and follow-up management are required for successful Calluna establishment. 6. There were significant differences in community response between both the regions and moorland types. The Dales had a relatively greater contribution of grassland species than the Peaks, where the grey site had a relatively greater dwarf shrub component. 7. Burning had little effect on community composition but both grazing and herbicide application had important effects. Grazing of the grey sites, even at the very low levels used in this study, tended to push the communities towards bog-moorland vegetation, but little effect was found at the white sites. Glyphosate treatment tended to push communities towards acidic grassland at the Dales grey site but not at the Peaks. Successional change was also noted, with marked change between the third and fourth year and again between the fifth and six year. Grey sites showed the greatest temporal change. 8. Synthesis and applications. In terms of Molinia control and subsequent restoration of dwarf shrubs, there was marked variability of response between 'apparently similar' vegetation types in different regions. There were abrupt temporal changes taking place some years after treatment application and a significant length of time was required for change to be detected. Managers need to obtain a greater knowledge of initial floristic composition before starting the restoration process, be prepared to accept multiple outcomes of response (acid grassland vs. dwarf shrubs), be prepared for a long-term monitoring process and perhaps the inclusion of additional treatments for continued Molinia control (application of selective graminicides) and dwarf shrub restoration (disturbance and seed addition treatments).

Mason, C. F. and S. M. Macdonald (2004). "Growth in otter (Lutra lutra) populations in the UK as shown by long-term monitoring." Ambio **33**(3): 148-152.
<Go to ISI>://000221132300006

European otters declined dramatically from the 1950s, disappearing from many rivers. We report here on long-term monitoring (from 1977) in 3 catchments in western Britain that were recolonized naturally and in 2 catchments in eastern England that were reinforced by captive-bred otters. A minimum of 16-years data was collected on each river until 2002. At a series of sites in each study river, the percentages which were positive for otters and the number of spraints per sprainting Site were recorded and combined to produce an annual index of population. One western river, naturally recolonized, showed rapid early population growth for 5 years, followed by slower growth, while growth was steadier in 2 catchments which already held some otters at the beginning of the study. Colonization on the eastern rivers was slower, with greater fluctuations over time. Annual population growth rates were estimated at 1-7%, higher in the earlier years. A strategy for annual monitoring of otters is recommended.

Mathie, M. J., A. C. F. Coster, N. H. Lovell, B. G. Celler, S. R. Lord and A. Tiedemann (2004). "A pilot study of long-term monitoring of human movements in the home using accelerometry." Journal of Telemedicine and Telecare **10**(3): 144-151.
<Go to ISI>://000222027100005

We assessed the feasibility of using a waist-mounted, wireless triaxial accelerometer (TA) to monitor human movements in an unsupervised home setting to detect changes in functional status. A pilot study was carried out with six healthy subjects aged 80-86 years. The subjects wore a TA unit every day for two to three months. Each morning they carried out a short routine of directed movements that included standing, sitting, lying and walking. important movement variables were measured. During the rest of the day, subjects were monitored for falls, and variables such as metabolic energy expenditure were measured. All subjects remained healthy; there was no overall change in functional status and there were only slight fluctuations in health status. No longitudinal changes were detected in any of the variables measured during the directed routine. There was a moderate correlation between weekly self-reported health status and energy expenditure: subjects reported a lower health status for weeks in which they expended less energy. The TA system was found to be practical for long-term, unsupervised home monitoring. All subjects found the

system simple to use and the TA unit unobtrusive and comfortable to wear. High compliance rates were achieved: the TA units were worn on 88% of the days in the study, for an average of 11.2 hours per day.

Matsuura, Y., M. Sanada, M. Takahashi, Y. Sakai and N. Tanaka (2001). "Long-term monitoring study on rain, throughfall, and stemflow chemistry in evergreen coniforous forests in Hokkaido, Northern Japan." Water Air and Soil Pollution **130**(1-4): 1661-1666.
<Go to ISI>://000172012000125

Long-term study on acid precipitation monitoring at suburban forests in Sapporo city showed that bulk precipitation pH were below 4.8 in recent years. Throughfall and stemflow chemistry for two main coniferous species (Abies sachalinensis and Picea jezoensis) showed different regime for pH and element deposition. The mean annual pH values of throughfall and stemflow in Picea stand were 1.0 to 1.3 units higher than that of rain collected outside the forest. In contrast, mean annual pH of throughfall and stemflow in Abies stand were 0.3 to 0.5 units higher than that of rain. Mean annual inorganic nitrogen input via throughfall and stemflow were estimated 0.41 +/- 0.11 gN/m(2)/yr in Abies stand, 0.44 +/- 0.13 gN/m(2)/yr in Picea stand. Cation input via throughfall, especially for K, in Picea stand was 1.4 times as large as that in Abies stand. Mean annual input of S in both stands was the same level. The possible effects on surface soil properties and nutrient cycling in northern evergreen conifers was discussed.

Mattingly, G. E. G. (1957). "Effects of radioactive phosphate fertilizers on yield and phosphorus uptake by ryegrass in pot experiments on calcareous soils from Rothamsted." The Journal of Agricultural Science **49**(02): 160-168.
http://dx.doi.org/10.1017/S0021859600036133 AND NEBIS 20120919

1. Two factorial pot experiments with ryegrass grown on calcareous soils from adjacent long-term experiments on Hoosfield, Rothamsted, are described. The effects of the method of application of phosphate, of the amounts of saP tested and of the level of phosphate applied are discussed with special reference to the manurial history of the soils.2. Yield and total phosphorus uptake by ryegrass were slightly greater in the early stages of growth when superphosphate was applied as a powder than when an equal amount of phosphate was applied in solution, but this effect disappeared in later cuts of grass. Total phosphorus uptake was not significantly altered by the levels of 32P tested, and yields were only significantly decreased at one sampling date in one experiment. Uptake of fertilizer phosphorus decreased and â€˜Aâ€™ values increased, however, in both experiments at the higher rates of application of 32P.3. The addition of fertilizer phosphorus, as superphosphate or monocalcium phosphate, increased the uptake of soil phosphorus by ryegrass on all soils on which there was a yield response to phosphate. The recovery of fertilizer phosphorus, estimated radiochemically, was less, therefore, than the increase in phosphorus uptake by the crop on the soils on which there was a yield response to phosphate fertilizers.4. â€˜Aâ€™ values were determined on all soils and were shown to be almost independent of two- and five-fold increases in the amount of labelled phosphate tested. â€˜Aâ€™ values were related to the previous phosphate manuring of the soils and increased by about one-third of the difference in phosphate content on soils that had received heavy applications of superphosphate or farmyard manure over 50 years ago. The â€˜Aâ€™ values of soils that had recently received superphosphate in the field decreased in 3 years by more than the amount of phosphate taken up by the crops. â€˜Aâ€™ values of soils that received rock phosphate in the field were lower and did not decrease with time.

Mattingly, G. E. G. and A. E. Johnston (1976). "Long-Term Rotation Experiments at Rothamsted and Saxmundham-Experimental-Stations - Effects of Treatments on Crop Yields and Soil Analyses and Recent Modifications in Purpose and Design." Annales Agronomiques **27**(5-6): 743-769.
<Go to ISI>://A1976DN70300014 AND NEBIS 20111201

Mc Dougall, A. (2004). "Assessing the use of sectioned otoliths and other methods to determine the age of the centropomid fish, barramundi (Lates calcarifer) (Bloch), using known-age fish." Fisheries Research **67**(2): 129-141.
<Go to ISI>://000220686600003

The use of stocked fish of a known age provide an opportunity to determine the practicality of use of otolith morphometrics and fish length to estimate the age of barramundi (Lates calcarifer) and determine accuracy of sectioned otolith age estimates. Otoliths were collected from 119 stocked barramundi and were compared against the known age of the fish (range: 0.75-8.64 years). The otoliths of barramundi appear to grow in three distinct phases when compared to the total length of the fish (TL), with a final change in otolith growth coinciding at the approximate size of sex change for this species (900 mm TL). Otolith growth is correlated linearly in all directions throughout to total growth of the otolith. Linear relationship of the sectioned otolith age estimates and known ages was highly significant (r(2) = 0.89), with nearly 88% of the fish assigned to the correct age class with an index of average percent error (IAPE) of 3.2%. The otolith weight-age relationship for the known-age fish described by the equation, age = 17.43 (otolith weight) + 0.981, accounted for more than 71% of the variability. The use of any of the three otolith dimensions (length, breadth, width), otolith weight or fish total length (TL) provided a similar population age structure to that of sectioned otoliths ages (P > 0.05). Because of significant time savings and costs associated with the techniques, use of otolith weight or even fish TL relationships with fish age offer a real alternative to reading sectioned otoliths, as long as enough samples are used to account for any bias from sampling error. Use of otolith weight alone could reduce laboratory costs by 96% when compared to sectioned otoliths, and has real utility for use in long-term monitoring. (C) 2003 Elsevier B.V. All rights reserved.

McDonald, T. L. (2003). "Review of environmental monitoring methods: Survey designs." Environmental Monitoring and Assessment **85**(3): 277-292.
<Go to ISI>://000183201400004

During the past decade and a half, environmental monitoring programs have increased in number and importance. Large scale environmental monitoring programs often present design difficulties because they tend to measure many (sometimes hundreds) of parameters through space and time. This paper reviewed and summarized one important component of environmental monitoring programs, the statistical survey design. Survey designs used for long-term monitoring programs lasting multiple (greater than or equal to3) occasions were reviewed, paying special attention to those published after 1985. During this review, two key components

of the overall survey design were identified. The first key component was the membership design. Groups of population units sampled the same occasion were called panels here, and the membership design specified which units were members of which panels. The second component was the revisit design that specified when panels were to be revisited. Membership designs varied, but some form of simple random or systematic design was popular. Among revisit designs, four basic patterns were found in the literature and their relative strengths and weaknesses were summarized. To efficiently discuss revisit designs, a new unified short-hand notation was proposed and adopted.

McEwen, J. and A. E. Johnston (1979). "Effects of Subsoiling and Deep Incorporation of P-Fertilizers and K-Fertilizers on the Yield and Nutrient-Uptake of Barley, Potatoes, Wheat and Sugar-Beet Grown in Rotation." Journal of Agricultural Science **92**(JUN): 695-702.
<Go to ISI>://A1979GZ96400020

McWhorter, S., K. Powell and S. M. Serkiz (2002). "Development of a down-well TCE sensor for long-term monitoring applications." Abstracts of Papers of the American Chemical Society **223**: 061-ANYL.
<Go to ISI>://000176296700320

Michel, J. (2004). "Regional management strategies for federal offshore borrow areas, US East and Gulf of Mexico coasts." Journal of Coastal Research **20**(1): 149-154.
<Go to ISI>://000220549900012

With the increased demand for Federal sand and gravel resources on the outer continental shelf, the Minerals Management Service (MMS) is developing strategies for environmentally sound and fiscally responsible management of the resource. A process is needed for planning, decisionmaking, and coordination among stakeholders. Two workshops were conducted in Texas and New Jersey to solicit input from Federal, State, and local government representatives, university researchers, and private companies on key issues. Based on the results of the workshop, it was recommended that sand management task forces be established in each state, starting with those states that can provide a strong technical and administrative lead and have a high level of interest in accessing Federal borrow sites. Sand management task forces would be responsible for planning, coordinating, and facilitating the use of OCS sand for beach nourishment and coastal restoration projects. MMS's responsibilities include taking the lead in the design and funding of long-term monitoring studies of the impacts of dredging OCS sand, sponsoring workshops on technical and policy issues, and providing a clearinghouse for dissemination of studies and findings on actual environmental impacts, focusing on key issues such as cumulative impacts.

Mihaescu, M. and B. A. Malow (2003). "Sleep disorders: a sometimes forgotten cause of nonepileptic spells." Epilepsy & Behavior **4**(6): 784-787.
<Go to ISI>://000187243300032

We present a patient with spells of loss of awareness in which the initial diagnostic consideration was partial epilepsy. The patient underwent video-EEG long-term monitoring which raised suspicion of nonepileptic events, but could not exclude simple partial seizures. A failed therapeutic trial with antiepileptic medication and adverse events prompted reevaluation of the case. Sleep studies, including polysomnography and multiple sleep latency testing (MSLT), confirmed a sleep disorder, i.e., narcolepsy, which responded to specific therapy with resolution of the spells.

Mikati, M. A., Y. Comair, R. Ismail, R. Faour and A. C. Rahi (2004). "Effects of epilepsy surgery on quality of life: a controlled study in a Middle Eastern population." Epilepsy & Behavior **5**(1): 72-80.
<Go to ISI>://000188814900012

The purpose of this study was to investigate which areas of quality of life (QOL) change after epilepsy surgery and generate QOL data specific to the Lebanese population. The QOL of 20 consecutive patients 1 year after surgery was compared (using the ESI-55 scale) with that of 20 matched patients who underwent the same presurgical evaluation, but no surgery. Overall QOL improved in both groups, but was greater in the surgery group (85% seizure free as compared to 0% in nonsurgery group). Significant differences were noted within the "well- being" domain including health perception (5/9 items), energy- fatigue (2/4), and emotional well-being (2/5). Differences were less common in the "functioning" domain including physical (1/10 items), social (1/2), and cognitive (0/5) functioning scales, and in the role limitation domain (1/17 items). Our patients experienced, I year after epilepsy surgery, improvements similar to those reported in Western populations after a similar period: they had marked improvements in overall QOL, health perception, well-being, and cognitive functioning areas. They had less remarkable improvements in social functioning and role limitation areas.

Miller, M. W. (2000). "Modeling annual mallard production in the prairie-parkland region." Journal of Wildlife Management **64**(2): 561-575.
<Go to ISI>://WOS:000086543100025

Biologists have proposed several environmental factors that might influence production of mallards (Anas platyrhynchos) nesting in the prairie-parkland region of the United States and Canada. These factors include precipitation, cold spring temperatures, wetland abundance, and upland breeding habitat. I used longterm historical data sets of climate, wetland numbers, agricultural land use, and size of breeding mallard populations in multiple regression analyses to model annual indices of mallard production. Models were constructed at 2 scales: a continental scale that encompassed most of the mid-continental breeding range of mallards and a stratum-level scale that included 23 portions of that same breeding range. The production index at the continental scale was the estimated age ratio of mid-continental mallards in early fall; at the stratum scale my production index was the estimated number of broods of all duck species within an aerial survey stratum. Size of breeding mallard populations in May, and pond numbers in May and July, best modeled production at the continental scale. Variables that best modeled production at the stratum scale differed by region. Crop variables tended to appear more in models for western Canadian strata; pond variables predominated in models for United States strata; and spring temperature and pond variables dominated models for eastern Canadian strata. An index of cold spring temperatures appeared in 4 of 6 models for aspen parkland strata, and in only 1 of 11 models for strata dominated by prairie,

Stratum level models suggest that regional factors influencing mallard production are not evident at a larger scale. Testing these potential factors in a manipulative fashion would improve our understanding of mallard population dynamics, improving our ability to manage the mid-continental mallard population.

Misra, A. K., H. Daniel, R. Till and G. J. Blair (1999). "Effect of long term crop rotations and rewetting of soil on stability." Soil Use and Management **15**(4): 254-255.
<Go to ISI>://000085736900010

Soils, of clay texture, were taken from two crop rotations in a long term trial, (i) maize - spring oats maize, (ii) maize - spring oats - autumn oats - red clover, and from an adjacent uncropped fenceline. Wet sieving was preceded by wetting under vacuum, wetting under tension or by direct immersion. The undisturbed soil was the most stable; the inclusion of clover in the rotation improved aggregate stability Direct immersion was most disruptive in disintegrating aggregates followed by vacuum and pre-wetting under tension.

Moehrle, M., B. Dennenmoser and C. Garbe (2003). "Continuous long-term monitoring of UV radiation in professional mountain guides reveals extremely high exposure." International Journal of Cancer **103**(6): 775-778.
<Go to ISI>://000180639400011

Ultraviolet radiation (UVR) is estimated to be one of the most important risk factors for nonmelanoma and melanoma skin cancers. High occupational UV exposure is assumed to be associated with skin cancer. Mountain guides receive considerable UV doses due to altitude-related increase of UVR and reflection from snow- and ice-covered surfaces. The aim of our study was to assess the annual occupational UV exposure of mountain guides. Spore film test chambers containing spores of Bacillus subtilis (VioSpor) were used as UV dosimeters with a spectral sensitivity profile similar to erythema-weighted data calculated from spectro-radiometric measurements. Nine mountain guide instructors carried dosimeters on the sides of their heads on a total of 1,406 working days during one year (July 1999-June 2000). Dosimeters were changed monthly. Measurements of 92 months could be evaluated (4-12 months/mountain guide). The mean individual monthly UV exposure was 107 standard erythema doses (SED) (median 71 SED; range 10-505 SED). The mean annual cumulative UV exposure was 1,097 SED (median 1,273 SED; range 312-1,770 SED) per mountain guide. The mean UV dose per day (4-10 hr) was 6.6 SED (median 5.7 SED; range 0.6-24.2 SED). This is the second study of continuous annual UV dosimetry in a cohort of outdoor workers. Our study showed that it is not sufficient to interpolate annual UV exposure from a few days' measurements. Only long-term dosimetry can give reliable yearly information of UVR load. Median daily UV exposure exceeded limits for UV radiation (e.g., ACGIH effective dose 30 J/m(2) per 8 hr period corresponding to 1.08 SED/day) 6-fold; maximal exposure exceeded these limits 23- fold. These extremely high exposure values are suggestive for an increased risk of skin cancer and thorough epidemiologic studies in the collectives of professional and recreational mountaineering are required. (C) 2002 Wiley-Liss, Inc.

Molnar, A. (1987). "Forest conservation in Nepal: encouraging women's participation." Seeds (New York, N.Y.)(10): 1-20.
<Go to ISI>://MEDLINE:12282684

The deforestation in Nepal is upsetting the delicate ecological balance and effecting the lives of many of the people, especially the hill women, who use these resources in their household. The deforestation increases erosion, causing landslides, and raises the silt in rivers, changing their course and flooding the southern plains. The majority of Nepal's population is rural and they depend on agriculture for their livelihood. It is estimated that 95% of the wood taken in deforestation is used for fuel primarily used in cooking. The farmers developed a complicated system of land preparation and terracing, but this has not stopped erosion on the steeper slopes. Since women are the ones who get the wood for fuel and other products they must become an integral part of any conservation plan. With the Nationalization Act of 1957, the forest land became the property of the government and therefore managed under the Ministry of Forests through the department officers. Later legislation involved the communities in replanting and longterm care and transfer of tracts for protection and management. In addition nurseries were created for seedlings and the improved wood burning stoves were distributed. Women were not initially involved in these programs because of their traditional role, but through training programs involving local communities, the importance of women in forestry conservation was recognized. Women were first employed in nursery labor and then as supervisors and now more are involved in project activities and forestry staff. They have been most helpful in training others in using the new fuel-efficient stoves.

Morel, T., S. V. Marchenko, A. K. Pati, K. Kuppuswamy, M. T. Carini, E. Wood and R. Zimmerman (2004). "Large-scale wind structures in OB supergiants: a search for rotationally modulated H alpha variability." Monthly Notices of the Royal Astronomical Society **351**(2): 552-568.
<Go to ISI>://000221976900017

We present the results of a long-term monitoring campaign of the Halpha line in a sample of bright OB supergiants (O7.5-B9) which aims at detecting rotationally modulated changes potentially related to the existence of large-scale wind structures. A total of 22 objects were monitored during 36 nights spread over six months in 2001-2002. Coordinated broad- band photometric observations were also obtained for some targets. Conspicuous evidence for variability in Halpha is found for the stars displaying a feature contaminated by wind emission. Most changes take place on a daily time-scale, although hourly variations are also occasionally detected. Convincing evidence for a cyclical pattern of variability in Halpha has been found in two stars: HD 14134 and HD 42087. Periodic signals are also detected in other stars, but independent confirmation is required. Rotational modulation is suggested from the similarity between the observed recurrence time-scales (in the range 13-25 d) and estimated periods of stellar rotation. We call attention to the atypical case of HD 14134, which exhibits a clear 12.8-d periodicity, both in the photometric and in the spectroscopic data sets. This places this object among a handful of early-type stars where one may observe a clear link between extended wind structures and photospheric disturbances. Further modelling may test the hypothesis that azimuthally-extended wind streams are responsible for the patterns of spectral variability in our target stars.

Morin, S., S. Henderson, J. A. Fabrick, Y. Carriere, T. J. Dennehy, J. K. Brown and B. E. Tabashnik (2004). "DNA-based detection of Bt resistance alleles in pink bollworm." Insect Biochemistry and Molecular Biology **34**(11): 1225-1233.
<Go to ISI>://000225209200009

Evolution of resistance by pests is the main threat to long-term insect control by transgenic crops that produce Bacillus thuringiensis (Bt) toxins. We previously identified three mutant alleles (r1, r2, r3) of a cadherin gene in pink bollworm (Pectinophora gossypiella) linked with recessive resistance to Bt toxin Cry1Ac and survival on transgenic Bt cotton. Here we describe a polymerase chain reaction (PCR)-based method that detects the mutation in genomic DNA of each of the three resistant alletes. Using primers that distinguish between resistant and susceptible (s) alleles, this method enables identification of 10 genotypes (r1r1, r1r2,r1r3, r2r2, r2r3, r3r3, r1s, r2s, r3s, and ss) at the cadherin locus. For each of the three resistant alleles, the method detected the resistance allele in a single heterozygote (r1s, r2s, or r3s) pooled with DNA from the equivalent of 19 susceptible (ss) individuals. The results suggest that the DNA-based detection method described here could greatly increase the efficiency of monitoring for resistance to Cry1Ac compared to bioassays that detect rare individuals with homozygous resistance. (C) 2004 Elsevier Ltd. All rights reserved.

Morlese, J., I. A. Teo, J. W. Choi, B. Gazzard and S. Shaunak (2003). "Identification of two mutually exclusive groups after long-term monitoring of HIV DNA 2-LTR circle copy number in patients on HAART." Aids **17**(5): 679-683.
<Go to ISI>://000182566700005

Background: Anti-retroviral drug therapy reduces but does not abolish HIV transmission and replication throughout the body. HIV DNA 2-long terminal repeat (2-LTR) circles have been shown in point-based studies to persist in some patients whose plasma HIV RNA was undetectable. However, the degree of fluctuation of circle copy number over time has not been determined. Methods: A reliable, reproducible and robust quantitative LightCycler (LC qPCR)-based assay for HIV DNA 2-LTR circles in peripheral blood mononuclear (PBMN) cells was established. A prospective, longitudinal study of these circles was undertaken in HIV-1- positive patients on anti-retroviral therapy whose plasma HIV RNA was undetectable at <50 copies/ml. Patients starting therapy for the first time were also monitored. Results: A cohort of 60 patients whose plasma HIV RNA was undetectable for 32 2 months were monitored for circles for 15 2 months. The circle copy number ranged from <10 to 620 copies/10(6) PBMN cells. The circle-negative (<10 copies/1x10(6) PBMN) cells group of 36 patients and the circle-positive (>10 copies/10(6) PBMN cells) group of 24 patients were mutually exclusive (P<0.0001). The mean circle half-life in seven of the 10 patients starting anti-retroviral therapy for the first time was 5.7 days. Conclusion: The circle assay is useful for identifying those patients in whom transmission of infectious virus continues despite prolonged periods of time during which plasma HIV RNA is undetectable. New drug combinations and new therapeutic approaches should be aimed at those patients whose plasma HIV RNA is undetectable but who remain positive for 2-LTR circles. (C) 2003 Lippincott Williams & Wilkins.

Morrell, M. J. (2002). "Antiepileptic medications for the treatment of epilepsy." Seminars in Neurology **22**(3): 247-258.
<Go to ISI>://000180122600004

Epilepsy, is one of the most common neurological conditions encountered worldwide. The development of newer antiepileptic drugs (AEDs) has expanded over recent years, and the use of such drugs for indications other than epilepsy has also broadened. These factors insure that the majority of health care providers will be using an increasing number of AEDs in the care of their patients. Contained herein is a review of the mechanism of action of AEDs, individual drugs and their potential drug interactions, and general principles to guide the clinician in selection, implementation, and long-term monitoring of AEDs.

Morris, J. W. F., N. C. Vasuki, J. A. Baker and C. H. Pendleton (2003). "Findings from long-term monitoring studies at MSW landfill facilities with leachate recirculation." Waste Management **23**(7): 653-666.
<Go to ISI>://000185292500011

This paper presents findings from long-term monitoring studies performed at full-scale municipal solid waste landfill facilities with leachate recirculation. Data from two facilities at a landfill site in Delaware, USA were evaluated as part of this study: (1) Area A/B landfill cells; and (2) two test cells (one with leachate recirculation and one control cell). Data from Area A/B were compared with proposed waste stability criteria for leachate quality, landfill gas production, and landfill settlement. Data from the test cells were directly compared with each other. Overall, the trends at Area A/B pointed to the positive effects (i.e.. more rapid waste degradation) that may be realized through increasing moisture availability in a landfill relative to the reported behavior of more traditionally operated (i.e., drier) landfills. Some significant behavioral differences between the two test cells were evident, including dissimilarities in total landfill gas production quantity and the extent of waste degradation observed in recovered time capsules. Differences in leachate quality were not as dramatic as anticipated, probably because the efficiency of the leachate recirculation system at distributing leachate throughout the waste body in the recirculation cell was low. (C) 2003 Elsevier Ltd. All rights reserved.

Motta, R. (2002). "Old-growth forests and silviculture in the Italian Alps: the case-study of the strict reserve of Paneveggio (TN)." Plant Biosystems **136**(2): 223-231.
<Go to ISI>://000182500200011

All forests in the Italian Alps have been affected by humans in some way, either through direct periodic destruction of the forest or by more subtle forms of management and habitat manipulation. For this reason it is very difficult to find stands with "old-growth properties". However, in the last century there has been a noticeable reduction in many human activities in the mountains and, as a result, many forest stands have developed naturally over the past few decades, even if their composition and structure still reflect past human activity. This makes it particularly Important to study the unmanaged parts of previously managed forests: the past history, present structures and long-term monitoring of these forest stands are fundamental steps for increasing our knowledge of the natural forest stand dynamics. Knowledge of this sort is an important reference tool for the present and future development of near-natural silviculture aimed at producing commodities as well as maintaining environmental values. In this paper, a case study in the forest of Paneveggio is presented. In this forest a strict forest reserve of about 100 ha was established, and a long-term forest

dynamics study was set up in four 1-ha plots. The main results of the study of the stand histories of these plots are presented, and their current naturalness status is discussed.

Mulder, C., D. De Zwart, H. J. Van Wijnen, A. J. Schouten and A. M. Breure (2003). "Observational and simulated evidence of ecological shifts within the soil nematode community of agroecosystems under conventional and organic farming." Functional Ecology **17**(4): 516-525.
<Go to ISI>://000184573900012

1. Soil sustainability implies a sufficient diversity and abundance of organisms to perform soil functions and to resist environmental stress. Previous studies have shown the importance of functional biodiversity for soil organisms. 2. Soil samples have been collected within the framework of a long-term monitoring programme in the Netherlands. Nematological and microbiological techniques were combined to facilitate a more comprehensive understanding of possible below-ground effects of land management. 3. A possible bias due to stochastic circumstances was investigated. The Mantel test showed that the diversity at species level is largely related to air temperature, but at genus level the effect of temperature disappears. No direct influence of rainfall on the soil biodiversity was found in our model. 4. To extrapolate our data to a national level, habitat-response relationships for soil organisms have been derived. Generalized linear models (GLMs) and Monte Carlo simulation allowed the estimation of the probability of occurrence at a given abundance for 95 nematode genera. 5. Our study describes the influence of abiotic conditions and land use intensity on the composition of nematode communities in grasslands on sand. The results obtained reveal a major influence of pH and livestock density on the diversity of the nematode community at both taxonomic levels as well as at different trophic levels (feeding habits). The presence and abundance of soil nematodes decrease with cattle pressure. 6. Functional diversity decreases with increasing management intensity. It is shown that the Shannon diversities of bacterial feeding nematodes and fungal feeding nematodes are strictly related to cattle pressure, whereas the bacterial biomass occurring under organic farming scores higher than in other farming systems.

Mustafic, P., M. Mrakovocic, M. Caleta, I. Radic, D. Zanella, Z. Mihaljevic and I. Ternjej (2003). "Loaches in a long term study of the Drava River in Croatia." Folia Biologica-Krakow **51**: 143-146.
<Go to ISI>://000188922200024

The diversity, species composition and structure of the fish community were studied in the vicinity of three power plant reservoirs in the middle part of the Drava River in Croatia. Over a period of twenty years in a collection of 25,913 fishes, 56 different fish species belonging to 16 families were recorded. The family Cobitidae is represented by two species: Cobitis elongatoides and Misgurnus fossilis, while the family Balitoridae is represented by only one species, Barbatula barbatula. The presence of the Cobitidae family was recorded in eleven of seventeen investigated localities, while Balitoridae was found in six localities. In the studied fish community, the percentage of C. elongatoides is 1.41% of the total number of individuals, and B. barbatula is 1.02%. M. fossilis is a rare species (0.03 %). Both C. elongatoides and B. barbatula were not caught at the beginning of investigation. C. elongatoides and R. barbatula were first caught in 1985, while M. fossilis was first caught in 1996. The proportion of C. elongatoides in the entire community increased, while the proportion of B. barbatula decreased in later years.

Najafi, B., K. Aminian, A. Paraschiv-Ionescu, F. Loew, C. J. Bula and P. Robert (2003). "Ambulatory system for human motion analysis using a kinematic sensor: Monitoring of daily physical activity in the elderly." Ieee Transactions on Biomedical Engineering **50**(6): 711-723.
<Go to ISI>://000183413100008

A new method of physical activity monitoring is presented, which is able to detect body postures (sitting, standing, and lying) and periods of walking in elderly persons using only one kinematic sensor attached to the chest. The wavelet transform, in conjunction with a simple kinematics model, was used to detect different postural transitions (PTs) and walking periods during daily physical activity. To evaluate the system, three studies were performed. The method was first tested on 11 community-dwelling elderly subjects in a gait laboratory where, an optical motion system (Vicon) was used as a reference system. In the second study, the system was tested for classifying PTs (i.e., lying-to-sitting, sitting-to-lying, and turning the body in bed) in 24 hospitalized elderly persons. Finally, in a third study monitoring was performed on nine elderly, persons for 45-60 min during their daily physical activity. Moreover, the possibility-to-perform long-term monitoring over 12 h has been shown. The first. study revealed a close concordance between the ambulatory and reference systems. Overall, subjects performed 349 PTs during this study. Compared with the reference system, the ambulatory system had an overall sensitivity of 99% for detection of the different PTs. Sensitivities and specificities were 93% and 82% in sit- to-stand, and 82% and 94% in stand-to-sit, respectively. In both first and second studies, the ambulatory system also showed a very high accuracy (> 99%) in identifying the 62 transfers or rolling out of bed, As well as 144 different posture changes to the back, ventral, right and left sides. Relatively high sensitivity (> 90%) was obtained for the classification of usual physical activities in the third study in comparison with visual observation. Sensitivities and specificities were, respectively, 90.2% and 93.4% in sitting, 92.2% and 92.1% in "standing + walking," and, finally, 98.4% and 99.7% in lying. Overall detection errors (as percent of range) were 3.9% for "standing.+ walking," 4.1% for sitting, and 0.3% for lying. Finally, overall symmetric mean average errors were 12% for "standing + walking," 8.2% for sitting, and. 1.3% for lying.

Nakahara, D., M. Nakamura, M. Iigo and H. Okamura (2003). "Bimodal circadian secretion of melatonin from the pineal gland in a living CBA mouse." Proceedings of the National Academy of Sciences of the United States of America **100**(16): 9584-9589.
<Go to ISI>://000184620000086

Circadian melatonin secretion is the best-known output signal from the circadian pacemaker in the suprachiasmatic nucleus that indicates internal conditions of the body. We have established a system that enables long-term monitoring of melatonin secretion by implanting a transverse microdialysis probe in or near the pineal gland in a freely moving mouse. This in vivo method enabled continuous measurement of melatonin secretion over a period of >20 days in individual CBA mice, with simultaneous recording of the locomotor activity. Pineal melatonin secretion was completely matched to the circadian change of locomotor activity, and for the light-induced phase shift, the shift of melatonin secretion was clearer than the shift of locomotor rhythm. This analysis allowed us to detect rhythm with a high sensitivity: two peaks of daily secretion were observed, with the first small peak at the day-night

transition time and the second large peak at midnight. The large nighttime peak was suppressed by tetrodotoxin, a Na+ channel blocker, and enhanced by both phenylephrine and isoproterenol, alpha- and beta-adrenergic agonists, whereas daytime melatonin levels were not affected by tetrodotoxin infusion. This finding suggests that, in CBA mice, melatonin release at night is activated by adrenergic signaling from the superior cervical ganglion, but the enhancement of melatonin during daytime is not mediated by neuronal signaling.

Nakos, T., E. O. Ofek, P. Boumis, J. Cuypers, D. Sinachopoulos, E. van Dessel, A. Gal-Yam and J. Papamastorakis (2003). "A catalog of secondary photometric standard stars around gravitational lenses." Astronomy & Astrophysics **402**(3): 1157-1158.
<Go to ISI>://000182452000042

We present a catalog of secondary photometric standard stars in the neighborhood of 14 gravitationally lensed quasars. These stars were verified to be non variable using long-term monitoring. The instrumental magnitudes of the new standard stars have been transformed to the Johnson-Cousins BV(RI)(c) photometric system. For ten gravitational lenses (GLs) we also provide the BV(RI)(c) mean magnitudes of the integrated flux of all the lens components, for the epochs of the photometric calibration.

Narayana, D. L. (1984). "Population growth and economic growth." The Indian economic journal : the quarterly journal of the Indian Economic Association **32**(2): 1-40.
<Go to ISI>://MEDLINE:12314595

This discussion of the issues relating to the problem posed by population explosion in the developing countries and economic growth in the contemporary world covers the following: predictions of economic and social trends; the Malthusian theory of population; the classical or stationary theory of population; the medical triage model; ecological disaster; the Global 2000 study; the limits to growth; critiques of the Limits to Growth model; nonrenewable resources; food and agriculture; population explosion and stabilization; space and ocean colonization; and the limits perspective. The Limits to Growth model, a general equilibrium anti-growth model, is the gloomiest economic model ever constructed. None of the doomsday models, the Malthusian theory, the classical stationary state, the neo-Malthusian medical triage model, the Global 2000 study, are so far reaching in their consequences. The course of events that followed the publication of the "Limits to Growth" in 1972 in the form of 2 oil shocks, food shock, pollution shock, and price shock seemed to bear out formally the gloomy predictions of the thesis with a remarkable speed. The 12 years of economic experience and the knowledge of resource trends postulate that even if the economic pressures visualized by the model are at work they are neither far reaching nor so drastic. Appropriate action can solve them. There are several limitations to the Limits to Growth model. The central theme of the model, which is overshoot and collapse, is unlikely to be the course of events. The model is too aggregative to be realistic. It exaggerates the ecological disaster arising out of the exponential growth of population and industry. The gross underestimation of renewable resources is a basic flaw of the model. The most critical weakness of the model is its gross underestimation of the historical trend of technological progress and the technological possiblities within industry and agriculture. The model does correctly emphasize the exponential growth of population as the source of several complications for economic growth and human welfare. Stabilization of population by reducing fertility is conducive for improving the quality of population and also advances the longterm management of the population growth and work force utilization. The perspective of longterm economic management involves populatio n planning, control of environmental pollution, conservation of scarce resources, exploration of resources, realization of technological possibilities in agriculture and industry and in farm and factory, and achievement of economic growth and its equitable distribution.

Narita, T., J. E. Grindlay, P. F. Bloser and Y. Chou (2003). "X-ray dip monitoring of XB 1916-053." Astrophysical Journal **593**(2): 1007-1012.
<Go to ISI>://000184823400031

We report on the long-term monitoring of X-ray dips from the ultracompact low-mass X-ray binary (LMXB) XB 1916-053. Roughly one-month interval observations were carried out with the Rossi X-ray Timing Explorer (RXTE) during 1996, during which the source varied between dim, hard states and more luminous, soft states. The dip spectra and dip light curves were compared against both the broadband luminosity and the derived mass accretion rate ((M)over dot). The dips spectra could be fitted by an absorbed blackbody plus cutoff power-law nondip spectral model, with additional absorption ranging from 0 to > 100 x 10(22) cm(-2). The amount of additional blackbody absorption was found to vary with the source luminosity. Our results are consistent with an obscuration of the inner disk region by a partially ionized outer disk. The size of the corona, derived from the dip ingress times, was found to be similar to10(9) cm. The corona size did not correlate with the coronal temperature, but seemed to increase when (M)over dot also increased. We discuss our. ndings in the context of an evaporated accretion disk corona model and an ADAF-type model.

Neal, C. (2002). "From determinism to fractal processing, structural uncertainty, and the need for continued long-term monitoring of the environment: The case of acidification." Hydrological Processes **16**(12): 2481-2484.
<Go to ISI>://000177662600012

Neilson, M. A., D. S. Painter, G. Warren, R. A. Hites, I. Basu, D. V. C. Weseloh, D. M. Whittle, G. Christie, R. Barbiero, M. Tuchman, O. E. Johansson, T. F. Nalepa, T. A. Edsall, G. Fleischer, C. Bronte, S. B. Smith and P. C. Baumann (2003). "Ecological monitoring for assessing the state of the nearshore and openwaters of the Great Lakes." Environmental Monitoring and Assessment **88**(1-3): 103-117.
<Go to ISI>://000185100800005

The Great Lakes Water Quality Agreement stipulates that the Governments of Canada and the United States are responsible for restoring and maintaining the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem. Due to varying mandates and areas of expertise, monitoring to assess progress towards this objective is conducted by a multitude of Canadian and U. S. federal and provincial/state agencies, in cooperation with academia and regional authorities. This paper highlights selected long-term monitoring programs and discusses a number of documented ecological changes that indicate the present state of the open and nearshore waters of the Great Lakes.

Nichols, F. H. (2003). "Interdecadal change in the deep Puget Sound benthos." Hydrobiologia **493**(1-3): 95-114.
<Go to ISI>://000184957700009

Data from quantitative samples of the benthos at a 200-m site in central Puget Sound, collected twice yearly in most years between 1963 and 1992, were evaluated to determine the extent to which species composition in a continental-shelf depth community exhibits long-term persistence. Study results showed that the most abundant species were consistently present over the 30-year period. However, measures of species composition (e. g., similarity, diversity) reveal a subtle, gradual change in the community over time. Among the changes are (1) multi- year periods of greatly increased abundance of the common species; (2) an overall increase in the total abundance of the benthic community beginning in the mid-1970s; (3) periods of increased abundance, during the late 1970s and early 1980s, of two species that are tolerant of organic enrichment; and (4) the steady decline in abundance of the large burrowing echinoderm, Brisaster latifrons as a consequence of the lack of recruitment to the site since 1970. Despite the conspicuousness of these changes, there are no observed environmental factors that readily explain them. Circumstantial evidence suggests that climate-related change in Puget Sound circulation beginning in the mid-1970s, organic enrichment associated with a nearby large source of primary-treated sewage, and the influence of changes in the abundance of the large echinoderms on the smaller species are potential agents of change. The principle reasons for our inability to identify causes of long- term change in the Puget Sound benthos are (a) inconsistent long-term monitoring of environmental variables, (b) the lack of quantitative information about long-term changes in plankton and fish populations, (c) lack of knowledge of specific predator/prey and competitive interactions in soft bottom benthos, (d) unknown influence of moderate levels of contamination on biota; and (e) lack of understanding of possible linkages between climate regime shifts and fluctuations in local biological populations.

Nickson, T. E. and G. P. Head (1999). "Environmental monitoring of genetically modified crops." Journal of Environmental Monitoring **1**(6): 101N-105N.
<Go to ISI>://000084230600002 AND http://www.botanischergarten.ch/Longterm/Nickson-Head-Monitoring.pdf

Genetically modified (GM) crops are now approved for commercial use in several world areas. In terms of commercial acreage, the majority of these products possess either herbicide tolerance or insect protection traits. Prior to commercialization, each product underwent a country specific review of environmental safety data by independent regulatory authorities. Registration was granted after review of the data allowed authorities to conclude that the risks were minimal or manageable when balanced with the benefits. As a condition of registration, insect resistance management (IRM) has been imposed for insect protected products in most countries. Other world areas have reviewed similar data packages and have not yet been able to grant registration for commercial release. Post-registration environmental monitoring of GM crops is viewed in some world areas as a means of enabling approvals by addressing uncertainty that exists with this technology Questions such as, who should monitor and who should pay for it, how should monitoring be conducted, what information is necessary to collect and how long should a given product be monitored are yet to be answered. Monitoring methods could be general (surveys and questionaires) or specific (scientific studies to address specific questions). Independent research currently underway in countries where GM crops are commercial involves monitoring the benefits as well as the risks of these products. Experience with other products has shown that monitoring of GM crops will be of value only if the questions are clearly defined, the methods are appropriate and the end points (data collected) are interpretable.

Nicolini, A., A. Carpi, P. Ferrari, G. Tartarelli, L. Anselmi, M. R. Metelli, I. Gorini, C. Spinelli, P. Miccoli and R. Giardino (2002). "Long-term monitoring of cell-mediated immunity in disease-free breast cancer patients: a preliminary retrospective study." Biomedicine & Pharmacotherapy **56**(7): 339-344.
<Go to ISI>://000178575100004

In 102 N- and 44 N+ disease-free breast cancer patients, lymphocytic populations and skin reaction of delayed hypersensitivity (SRDH) were monitored up to 266 months after mastectomy to find out whether they were similar or different from control values. In two selected groups of 34 N- and 11 N+ breast cancer patients, the whole 10 year follow-up was divided into three subintervals, each of them lasting 40 months and the time course of lymphocytic populations was evaluated. In the 102 N- patients, mean CD4+, CD8+, CD3+ values were lower ($P < 0.01$, $P < 0.001$, $P < 0.01$, respectively) while CD4+/CD8+ ratio was higher ($P < 0.05$) than in controls. Fifteen N- breast cancer patients (16%) were anergic compared to 30 (32%) of controls ($P < 0.05$). In the 34 selected N- breast cancer patients soon after mastectomy the mean value of CD4+, CD8+, CD3+ T subpopulations was lower ($P < 0.01$, $P < 0.001$, $P < 0.01$, respectively) than in controls. Successively their mean value increased so that in the last subinterval they were not or were only slightly lower (P n.s., $P < 0.05$, $P < 0.05$, respectively) than in controls. In the 44 N+ patients, mean CD4+, CD8+, CD3+ values were lower ($P < 0.001$, $v < 0.05$, $P < 0.01$, respectively) and CD19+ lymphocytes higher ($P < 0.001$) than in controls. Five N+ breast cancer patients (13%) were anergic compared to 32% of controls ($P < 0.05$). In the 11 selected N+ breast cancer patients soon after mastectomy, the mean value of CD4+, CD8+ T subpopulations and CD16+56+ cells was significantly lower ($P < 0.001$, $P < 0.001$, $P < 0.01$, respectively) than in controls. Successively their mean value constantly increased so that in the last subinterval, no or slight (P n.s., $P < 0.05$, P n.s., respectively) significant difference compared to controls occurred. The mean CD4+/CD8+ ratio value of N- patients was significantly higher than in controls. However in the last subinterval, the significance was lower than in the first one ($P < 0.05$ and $P < 0.01$, respectively). In the N+ patients, the mean value of CD4+/CD8+ ratio was constant, although not significantly, lower than in controls; however it progressively increased from the first to the last subinterval. Therefore the significance of the difference of the mean CD4+/CD8+ ratio between N- and N+ patients strongly decreased from the first to the last subinterval ($P < 0.001$ and $P < 0.05$, respectively). These data indicate that in breast cancer patients, following mastectomy, a significant activation of memory and CD4+ T cells and long-term decrease of the circulating immunocompetent CD4+, CD8+ and CD 16+56+ cells occurs. The prolonged disease-free interval observed in the 34 N- and 11 N+ breast cancer patients can be correlated with the restoration of the normal state of cell-mediated immunity.

Ning, S. K. and N. B. Chang (2004). "Optimal expansion of water quality monitoring network by fuzzy optimization approach." Environmental Monitoring and Assessment **91**(1-3): 145-170.

<Go to ISI>://000187353700007

River reaches are frequently classified with respect to various mode of water utilization depending on the quantity and quality of water resources available at different location. Monitoring of water quality in a river system must collect both temporal and spatial information for comparison with respect to the preferred situation of a water body based on different scenarios. Designing a technically sound monitoring network, however, needs to identify a suite of significant planning objectives and consider a series of inherent limitations simultaneously. It would rely on applying an advanced systems analysis technique via an integrated simulation-optimization approach to meet the ultimate goal. This article presents an optimal expansion strategy of water quality monitoring stations for fulfilling a long-term monitoring mission under an uncertain environment. The planning objectives considered in this analysis are to increase the protection degree in the proximity of the river system with higher population density, to enhance the detection capability for lower compliance areas, to promote the detection sensitivity by better deployment and installation of monitoring stations, to reflect the levels of utilization potential of water body at different locations, and to monitor the essential water quality in the upper stream areas of all water intakes. The constraint set contains the limitations of budget, equity implication, and the detection sensitivity in the water environment. A fuzzy multi-objective evaluation framework that reflects the uncertainty embedded in decision making is designed for postulating and analyzing the underlying principles of optimal expansion strategy of monitoring network. The case study being organized in South Taiwan demonstrates a set of more robust and flexible expansion alternatives in terms of spatial priority. Such an approach uniquely indicates the preference order of each candidate site to be expanded step-wise whenever the budget limitation is sensitive in the government agencies.

Noges, T., L. Tuvikene and P. Noges "Contemporary trends of temperature, nutrient loading, and water quality in large Lakes Peipsi and Vortsjarv, Estonia." Aquatic Ecosystem Health & Management **13**(2): 143-153.
<Go to ISI>://WOS:000278571700005

From 1961-2004, surface water temperature in large and shallow Lakes Peipsi and Vortsjarv in Estonia increased significantly in April and August; respectively 0.37-0.75 and 0.32-0.42 degrees per decade reflecting the changes in air temperature. The average annual amount of precipitation in the catchment increased significantly. Reflecting practices in agriculture and wastewater treatment, nutrient loadings to the lakes increased rapidly in the 1980s and decreased again in the early 1990s. As total nitrogen (TN) loading decreased faster than total phosphorus (TP) loading, the TN/TP ratio in the loadings decreased. Both the increased temperature and low TN/TP ratio favoured the development of cyanobacteria blooms in Lake Peipsi. In Vortsjarv, where the TN/TP mass ratio is about two times higher than in Peipsi, blooms did not occur. Recently, the TN/TP ratio has shown a tendency of increase in both lakes suggesting a certain reduction of blooms to be expected also in Lake Peipsi. Nutrient dynamics in the lakes followed the changes in loadings, showing the ability of shallow lake ecosystems to react sensitively to changes in catchment management as well as in climate.

Nosko, B. S., V. I. Babynin, T. A. Yunakova and L. N. Burlakova (2003). "Dynamics of the fractional composition of mineral phosphates in typical chernozem under longterm fertilization." Agrokhimiya(3): 27-34.
<Go to ISI>://BIOSIS:PREV200300392606

In a station-based experiment lasting many years, the dynamics of the fractional composition of mineral phosphates were studied during the reserve and systematic use of fertilizers for five rotations with six fields (pulse crops, grains). The transformation of the fractional composition of mineral phosphates occurred primarily in the 0-60-cm layer. The amount of the fractions of newly formed phosphates during the introduction of fertilizers increased in the series Al-P > Fe-P > Ca-P. The content and ratio of fractions of residual phosphates were stable under the created agrochemical backgrounds (without additional application of fertilizers) for 15-18 years, which indicates their low deterioration rate in typical chernozem.

Oakley, K. L., L. P. Thomas and S. G. Fancy (2003). "Guidelines for long-term monitoring protocols." Wildlife Society Bulletin **31**(4): 1000-1003.
<Go to ISI>://000188299100009

Monitoring protocols are detailed study plans that explain how data are to be collected, managed, analyzed, and reported, and are a key component of quality assurance for natural resource monitoring programs. Protocols are necessary to ensure that changes detected by monitoring actually are occurring in nature and not simply a result of measurements taken by different people or in slightly different ways. We developed and present here guidelines for the recommended content and format of monitoring protocols. The National Park Service and United States Geological Survey have adopted these guidelines to assist scientists developing protocols for more than 270 national park units.

O'Donnell, C. F. J. (2002). "Variability in numbers of long-tailed bats (Chalinolobus tuberculatus) roosting in Grand Canyon Cave, New Zealand: implications for monitoring population trends." New Zealand Journal of Zoology **29**(4): 273-284.
<Go to ISI>://000180313400001

Counts of roosting bats undertaken within caves are used frequently as indicators of population size, long-term indices of population trends, and as measures of response to management. Numbers of New Zealand long-tailed bats (Chalinolobus tuberculatus Forster 1844) using Grand Canyon Cave were monitored over 8 years. Grand Canyon Cave is a focal point for one of the largest known populations. Its has been used by long-tailed bats consistently for >40 years. The aims of this study were to examine the utility of cave-roost counts for long-term monitoring of population trends in this threatened species, and to establish a baseline for future monitoring. Two population indices, number of bats counted roosting inside the cave during the day and net number emerging at dusk, were not significantly different. Monthly and daily counts were characterised by high variability. Indices varied significantly through the year but not between years. Distribution of bats within the cave was not random. Bats avoided roosting within 30 in of each entrance and larger groups were always concentrated along two 50 in stretches of cave ceiling. Large groups occurred when cave temperatures ranged from 10-13degreesC, suggesting an optimum temperature range. Maximum counts of 250 (day roosting) and 358 (night roosting) bats confirm that Grand Canyon Cave is significant as a site for C. tuberculatus. Counts can be used as a baseline against which to judge future trends in the population of C. tuberculatus at Grand Canyon Cave and contribute to national

monitoring of bat populations. Effects of variation can be overcome with standardisation of repeat counts, adopting a sampling frequency that provides sufficient power to detect changes, and use of statistical models that separate sampling effects from variance in bat activity. Recommendations for future monitoring are made.

Ogutu, Z. A. (1993). "Responding to population pressure in the rural Kenya." GeoJournal **30**(4): 409-19.
<Go to ISI>://MEDLINE:12289873

Population pressure in Kenya evolved out of colonial policies and was present in early periods because of soil erosion and degradation, declining crop yields, changes in farming systems, use of marginal lands, shortages of fuelwood and food, and landlessness. Between 1900 and 1910, colonists made room for European settlers by seizing control of "empty lands." These schemes failed to account for pastoral or shifting land use patterns, failed to balance African land use with resources, and failed to recognize individual title to land based on continuous use. The result was loss of pastoral lands and confinement to other unused lands, a change in the spatial economy of Africans, and disruption of equitable access to natural resources. Population concentration in areas with high potential resulted in small plots and the necessity to migrate to marginal lands. The African Land Commission was formed during the 1920s and 1930s. Rehabilitation programs and protected areas were established during the early 1940s. Agricultural development focused on high potential areas and ecological potential rather than on sociocultural factors or population pressure on drier lands. The presence of privileged classes exacerbated inequalities in land distribution. Only 17-18% of Kenyan lands were high potential areas, and, by 1963, it was recognized that there was an imbalance between resources and population numbers. Reliance on land for survival further contributed to land congestion. The land entitlement strategies of the 1940s and 1950s contributed to buy-outs and increasing landlessness. Technological innovation contributed to greater use of marginal or semiarid lands. Policies and strategies were introduced in the colonial period to reduce environmental degradation. These included intensive farming, zero grazing, intercropping, agroforestry, development of roadside reserves, and industrialization. Recommendations were made to address poverty and to invest in longterm agricultural development and in access to technological knowledge and purchasing power.

Ohtsuka, R. (1994). "SUBSISTENCE ECOLOGY AND CARRYING-CAPACITY IN 2 PAPUA-NEW-GUINEA POPULATIONS." Journal of Biosocial Science **26**(3): 395-407.
<Go to ISI>://WOS:A1994NV90700011

This article examines the mechanisms of subsistence adaptation of two Papua New Guinea populations, the Metroxylon sago-depending lowland Gidra and the taro-monoculture Mountain Ok, surviving in low population densities of 0.5 and 1.4 persons per km2. Observation of the groups' land use systems strongly suggests that their population densities have not been far below the carrying capacity, although the territory of each population is markedly heterogeneous. Both groups have maintained their sustainable food production not only for resource management but also for survival at a population level, either expanding their territory or changing the sustainable level in tandem with changes of subsistence system.

Ohtsuka, R., T. Inaoka, M. Umezaki, N. Nakada and T. Abe (1995). "LONG-TERM SUBSISTENCE ADAPTATION TO THE DIVERSIFIED PAPUA-NEW-GUINEA ENVIRONMENT - HUMAN ECOLOGICAL ASSESSMENTS AND PROSPECTS." Global Environmental Change-Human and Policy Dimensions **5**(4): 347-353.
<Go to ISI>://WOS:A1995TB62700009

Adaptive diversity of Papua New Guinea peoples, represented by population densities varying from less than 1 person to more than 100 persons/km(2), is mostly attributable to their agricultural systems in accordance with the natural and sociocultural environment. Comparison of longterm adaptation among several populations selected for highland/lowland status and degree of modernization is expected to clarify the causal relationships and to predict future potential, This article discusses relationships between productivity and sustainability of agriculture and population dynamics in the agrodiversified environment in Papua New Guinea.

Ong, K. G., M. Paulose and C. A. Grimes (2003). "A wireless, passive, magnetically-soft harmonic sensor for monitoring sodium hypochlorite concentrations in water." Sensors **3**(1): 11-18.
<Go to ISI>://000182272800002

A wireless, passive, remote-query sensor for monitoring sodium hypochlorite (bleach) solutions is reported. The sensor is comprised of a magnetically-soft ferromagnetic ribbon, coated with a layer of polyurethane and alumina, having a large and nonlinear permeability that supports higher-order harmonics in response to a time varying magnetic field. The hypochlorite ions induce swelling in the coating, with the resultant stress altering the harmonic signature of the sensor from which the sodium hypochlorite concentration can be determined. The wireless, passive nature of the sensor platform enables long- term monitoring of bleach concentrations in the environment. The sensor platform can be extended to other chemical analytes of interest as desired.

Orlova, O. V., S. I. Tarasov and I. A. Arkhipchenko (2006). "Size of active pool of soil carbon in longterm experiment with application of litter free manure." Doklady Rossiiskoi Akademii Sel'skokhozyaistvennykh Nauk(1): 26-28.
<Go to ISI>://BIOSIS:PREV200600390785

Effect of high dose (300 and 700 kg N/ha) of litter-free pig manure on size of active pool of soil carbon in longterm field experiment with perennial grasses was studied. It was shown that adding of manure increased the content Of carbon available for microorganisms in 3.6-4.4 times, but mobility of organic matter did not change. Mineral fertilizers, on the opposite, increased the mobility of organic matter in 1,3-1,7 times and its mineralization intensity.

Orsini, A. N., T. J. Kolias, K. R. Strelich and W. F. Armstrong (2003). "Feasibility of transesophageal echocardiography with a ten- French monoplane probe." Journal of the American Society of Echocardiography **16**(6): 682-687.
<Go to ISI>://000183510500012

Objectives. We examined the feasibility of transesophageal echocardiography (TEE) using a 10F monoplane probe developed for intracardiac ultrasound (AcuNav, Acuson/Siemens, Mountain View, Calif). Background: Traditional TEE uses a 10- to 12-mm-diameter probe, and conscious sedation is customary to minimize patient discomfort. Because of its small size (3.2-mm diameter), the 10F monoplane probe can be inserted into the esophagus using only topical anesthesia. This provides the potential for a more easily tolerated examination. Methods. A total of 20 patients underwent a comprehensive TEE using an adult multiplane probe. Immediately afterward, the 10F monoplane probe was inserted into the esophagus and a targeted examination completed. The 1OF monoplane studies were blindly reviewed by 3 observers for the study indication and for 16 diagnostic elements. These were graded against an expert's review of standard TEE. Results. The 10F monoplane probe was well tolerated in all patients. Observers A, B, and C answered the clinical question in 80%, 85%, and 100%, respectively, with the 10F probe. The percentage of clinical elements deemed evaluable was 71%, 78%, and 80%, respectively. Limitations included incomplete visualization of the mitral valve and a systematic underestimation of the severity of valve regurgitation. Conclusions: The 10F monoplane probe is safe, well-tolerated, and capable of evaluating many clinical questions. Because of its small size, conscious sedation may not be necessary. It may be useful for targeted evaluations, for monitoring invasive procedures, or for intermediate or long-term monitoring in an intensive care department. (J Am Soc Echocardiogr 2003;16:682-7.).

Orvik, K. A. and O. Skagseth (2003). "Monitoring the Norwegian Atlantic slope current using a single moored current meter." Continental Shelf Research **23**(2): 159-176.
<Go to ISI>://000180761600002

Monitoring the Atlantic inflow (AI) of warm and saline water into the Nordic Seas (Norwegian, Greenland and Iceland Seas) is of great importance becauce of its impact on climate and ecology in Northern Europe and Arctic. In this study, an observation system for establishment of simple, robust and cost effective monitoring of the AI is validated in the Svinoy section, cutting through the AI just to the north of the Faroe- Shetland Channel. We concentrate on the eastern branch of the AI, the Norwegian Atlantic Slope Current (NwASC), an about 40 km wide flow along the steep Norwegian slope. The database is an array of 15 current meters on 4 moorings covering the NwASC over a 2-year period 1998-2000. We test the hypothesis that long-term monitoring of the NwASC can be performed by using one single current meter suitable placed in the flow. The volume flux can then be estimated by construction of simple regression models using the single current meter record as the independent variable. For validation of statistical properties as stability, confidence and stationarity, the time series is split into two 1-year segments: a model period and a test period. Gridded correlation fields between currents and volume transport show correlation maxima in the core of the NwASC, ranging from 0.84 on a daily timescale to 0.97 on a monthly timescale. A more comprehensive correlation/ coherence analysis for each current meter record against volume transport on 7-day timescales, enable us to choose the optimal current meter for a linear regression model with (correlation, slope) coefficients of (0.87, 0.13) for the model period and (0.80, 0.13) for the test period. The similarity of the statistical properties for the model and test periods substantiates the stationarity, stability and robustness of the model. A linear regression model underestimates large fluxes and is thus extended to a second degree polynomia. This improves the curve fitting for strong currents with a minor increase in overall correlation, but is more sensistive and less stable. Overall, we find a linear regression model to be more robust and applicable for monitoring the NwASC. The applicability of a linear regression model as an estimator for volume flux of the NwASC is demonstrated using a 2-year time series, and validated against calculated transport. The calculated transport agrees with the statistical analysis and reveals a noisy fit on daily timescale, while the curves coincide well on both 7- and 30-day timescales with correlation coefficients of 0.84 and 0.86, respectively. On all timescales, the calculated and model transport give an overall mean flow of 4.4 Sv and show fluctuations on timescales of days to months, with the seasonal cycle being the most prominent. (C) 2002 Elsevier Science Ltd. All rights reserved.

Oteiza, E. (1989). "HUMAN-RESOURCES IN LATIN-AMERICA - A HISTORICAL OVERVIEW OF THE RELATIONSHIP AMONG POPULATION, EDUCATION AND EMPLOYMENT." Trimestre Economico **56**(224): 799-830.
<Go to ISI>://WOS:A1989CE10300003

Pan, G., S. Jiao, L. Li, X. Xu, D. Qiu, X. Xu, Q. Chu and H. Zhao (2003). "Effect of longterm fertilization practices on mobility of phosphorus in a Huangnitu paddy soil receiving low P input in the Taihu Lake region, Jiangsu Province." Huanjing Kexue **24**(3): 91-95.
<Go to ISI>://BIOSIS:PREV200300378517

Analysis of mobile forms of phosphorus of a Huangnitu, a typical paddy soil in the Taihu Lake region, Jiangsu was conducted. The soil has been put into a scheme of longterm fertilization treatments for 13 years. Total P content vaired in arrange of 0.3apprx0.5gcntdotkg-1 under a range of total P fertilizer input of 0apprx53 kg/(hm2cntdota). As estimated from the total P pool values by mass balance principle, the soil had been subjected to water loss of P 2apprx8 kg/(hm2cntdota), with that under chemical fertilizers only being the biggest. The ratio of soluble P to the total was in a range of 0.2%apprx0.4%, without significant influence by the different fertilization schemes. While chemical fertilizer plus pig slurry manure applications had remarkably enhanced the resin-P pool by 20apprx40 mgcntdotkg-1, P mobilization was not observed due to combined application of chemical fertilizers and straw amendments despite of the increase of the SOM. Therefore, P water loss in paddy soils might have active under continuous chemical fertilization alone in agriculture of this region and could not be accounted for by dissolution in water and subsequent runoff migration. For reducing the present prominent non point source pollution of N and P in the region, it is suggested that chemical fertilizers are applied in combination with an appropriate amount of manure or straw return for reducing soil P loss and, in turn, the non-point source pollution loading.

Papadakis, N., N. Veranis and N. D. Arvanitidis (2007). "Sustainable development of natural resources in Northern Greece, focusing on water supply reliability and public health protection." Desalination **213**(1-3): 199-204.
<Go to ISI>://WOS:000248636500027

The rapid and almost uncontrolled growth of population has a result a continuously increasing water demand in agriculture needs, industrial uses and domestic services. This has a dramatic impact on the available water resources and at the same time put the

basic infrastructure facilities under severe pressure. As a result, significant deficiencies have emerged such as service discontinuity and interruption in distribution and delivery. This most of the times leads to contamination of potable water or at least affects the quality of it. Research has shown that water resources in Northern Greece is well above the current, the mid- and the longterm needs of its local communities. Although only 79% of the municipalities which correspond to 61% of the population of the area is provided with uninterrupted water flow. This is due to unwise strategies used in water management at a national, regional and local level along with lack and bad quality of infrastructures concerning water reservoirs and water networks. There is a critical need for advance actions to be taken and arrangement of integrated strategies which will ensure both water sufficiency and protection of the public health.

Park, J. C., Y. H. Kim, H. J. Jung, H. K. Moon, O. S. Kwon and B. D. Lee (2005). "Effects of dietary supplementation of conjugated linoleic acid (CLA) on piglets' growth and reproductive performance in sows." Asian-Australasian Journal of Animal Sciences **18**(2): 249-254. <Go to ISI>://WOS:000225379500017

The objective of this study was to investigate effects of dietary level of CLA and the duration of feeding CLA-containing diets on reproductive performance in sows and piglet growth rate. Tallow (3% in gestation diet and 5% in lactation diet, respectively) was incorporated as a fat source in control diet, and each 50% (dietary CLA level of 0.75% in gestation diet, and 1.50% in lactation diet, respectively) or 100% (dietary CLA level of 1.50% in gestation diet, and 2.50% in lactation diet, respectively) of tallow was replaced by a commercial CLA preparation containing 50% CLA isomers. Diets containing CLA were fed either from d 15 pre-mating to weaning or d 74 post-mating to weaning. The level of dietary CLA and feeding duration did not affect litter size. High dietary level of CLA, however, decreased piglet weights at birth ($p < 0.01$) and tended to decrease backfat thickness of sows at weaning. Longterm feeding of CLA-containing diets decreased piglet weights at weaning ($p < 0.05$) and backfat thickness of sows at weaning ($p < 0.05$). CLA supplemented in sow diet was transferred to fetus and piglets during pregnancy and nursing period, respectively. CLA contents of femoral muscle of piglets were 2.08 to 2.57 mg per g of fat at birth, and 2.36 to 4.47 mg at 10 days of age in CLA groups, while CLA was not detected in the control group. In conclusion, dietary supplementation of CLA tended to lower backfat thickness of sow and piglets' weight at birth or weaning, but did not affect total litter size. Dietary CLA was transferred efficiently during prenatal and postnatal periods of time through the placenta and milk, respectively.

Park, J. H., M. J. Mitchell, P. J. McHale, S. F. Christopher and T. P. Meyers (2003). "Impacts of changing climate and atmospheric deposition on N and S drainage losses from a forested watershed of the Adirondack Mountains, New York State." Global Change Biology **9**(11): 1602-1619. <Go to ISI>://000186387400008

Biogeochemical responses to changing climate and atmospheric deposition were investigated using nitrogen (N) and sulfur (S) mass balances, including dry deposition and organic solutes in the Arbutus Lake watershed in the Adirondack Mountains, New York State. Long-term monitoring of wet-only precipitation (NADP/NTN, 1983-2001) and dry deposition (AIRMoN, 1990-2001) at sites adjacent to the watershed showed that concentrations of SO42- in precipitation, SO42- in particles,and SO2 vapor all declined substantially ($P<0.005$) in contrast to no marked temporal changes observed for most N constituents (NH4+ in precipitation, HNO3 vapor, and particulate NO3-), except for NO3- in precipitation, which showed a small decrease in the late 1990s. From 1983 to 2001, concentrations of SO42- in the lake outlet significantly decreased (-2.1 mueq L-1 yr(-1), $P<0.0001$), whereas NO3- and dissolved organic N (DON) concentrations showed no consistent temporal trends. With the inclusion of dry deposition and DON fluxes into the mass balance, the retained portion of atmospheric N inputs within the main subcatchment increased from 37% to 60%. Sulfur outputs greatly exceeded inputs even with the inclusion of dry S deposition, while organic S flux represented another source of S output, implying substantial internal S sources. A significant relationship between the annual mean concentrations of SO42- in lake discharge and wet deposition over the last two decades ($r=0.64$, $P<0.01$) suggested a considerable influence of declining S deposition on surface water SO42- concentrations, despite substantial internal S sources. By contrast, interannual variations in both NO3- concentrations and fluxes in lake discharge were significantly related to year-to-year changes in air temperature and runoff. Snowmelt responses to winter temperature fluctuations were crucial in explaining large portions of interannual variations in watershed NO3- export during the months preceding spring snowmelt (especially, January-March). Distinctive response patterns of monthly mean concentrations of NO3- and DON in the major lake inlet to seasonal changes in air temperature also suggested climatic regulation of seasonal patterns in watershed release of both N forms. The sensitive response of N drainage losses to climatic variability might explain the synchronous patterns of decadal variations in watershed NO3- export across the northeastern USA.

Parsons, B. C., J. C. Short and J. D. Roberts (2008). "Contraction in the range of Malleefowl (Leipoa ocellata) in Western Australia: a comparative assessment using presence-only and presence-absence datasets." Emu **108**(3): 221-231. <Go to ISI>://WOS:000258869400003

As human impacts on habitat increase in their intensity and scale it is increasingly important that we are able to characterise and monitor changes in the distribution of threatened species. The Malleefowl (Leipoa ocellata) is listed as vulnerable in Australia and the National Recovery Plan suggests that its range has contracted by 45% in Western Australia (WA). We quantified changes in the range of Malleefowl in WA and determined the relative influence that various threatening processes, such as land clearing and agricultural development, may have had on its range. We also investigated whether presence-only data (from existing survey and reporting) could reliably assess the status of Malleefowl by comparing presence-only data with presence-absence data. To obtain a presence-absence dataset we interviewed longterm residents within our study area of 64000 km(2) about the occurrence of Malleefowl. The range of Malleefowl has contracted in WA but this contraction is less substantial than previously claimed. The contraction in range within the agricultural landscapes of south-western WA is associated with the extent of land clearing, the number of years since commencement of agricultural activity, and the number of sheep within a landscape. To conserve Malleefowl, we believe landscapes developed for agriculture in recent decades must be protected to ensure they do not develop attributes found in landscapes that have been heavily cleared and occupied since the early 1900s.

Pastoret, P. P., D. Boulanger and B. Brochier (1995). Potential long term ecological impacts of the release of a recombinant vaccinia-rabies virus for wildlife caccination against rabies. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, Council of Europe Press.

Paterson, A. M., B. F. Cumming, J. P. Smol and R. I. Hall (2004). "Marked recent increases of colonial scaled chrysophytes in boreal lakes: implications for the management of taste and odour events." Freshwater Biology **49**(2): 199-207.
<Go to ISI>://000188224600007

1. Lake managers suspect that taste and odour-causing algal blooms are increasing in frequency and intensity, although long-term monitoring records are scarce, and a number of critical scientific and management questions remain unanswered. 2. In nutrient-poor lakes and reservoirs, these events are caused primarily by sporadic outbreaks of some chrysophyte algae, which leave identifiable markers in lake sediments. We examine the siliceous remains of these organisms in more than fifty boreal lakes at broad temporal and spatial scales. 3. Colonial scaled chrysophytes, including the taste and odour- causing Synura petersenii, have increased markedly in more that 90% of the lakes examined since pre-industrial times. 4. Detailed stratigraphic analyses of two lakes show a rise in the abundance of colonial taxa in the 1930s to 1950s, with a sharp increase over the past two decades. 5. An examination of biogenic silica and biological ratios in Crosson Lake, Ontario, Canada, indicate that these changes represent true increases in the absolute abundance of colonial chrysophytes. 6. Rapid increases over the past two decades indicate that these trends are the result of one or more anthropogenic stressors that are operating at a broad, regional scale.

Pearce, P., W. Parker and P. Van Geel (2002). "Long term monitoring of hydrocarbon contamination using multi- level vapor phase piezometers." Environmental Forensics **3**(2): 163-177.
<Go to ISI>://000178697300007

This study evaluated the feasibility of supplementing groundwater monitoring protocols by assessing the vadose zone for the extent of residual subsurface contamination. The study also characterized the response of the soil gas signatures with respect to different soil types and degrees of contamination. A field study was conducted at a former gasoline vending station located in Ottawa, Canada. The current state of contamination was determined by analysis of soil samples taken from boreholes. A series of 10 nested soil gas wells with monitoring depths of 0.75, 1.5, 2.25 and 3.0 m were then installed. Using these wells, soil gas surveys were performed at regular intervals over an extended period to quantify Gaseous TPH (TPHg), oxygen and carbon dioxide concentrations in the soil gas. Results indicate that soil gas wells located near the source term exhibited characteristic soil gas signatures and significant fluctuations in TPHg, oxygen and carbon dioxide concentrations with time. Soil gas wells located beyond the soil contamination demonstrated limited correlation between TPH oxygen and carbon dioxide concentrations and decreased seasonal variability. (C) 2002 AEHS. Published by Elsevier Science Ltd. All rights reserved.

Pelto, M. S. and P. Hartzell (2004). "Change in longitudinal profile on three North Cascades glaciers during the last 100 years." Hydrological Processes **18**(6): 1139-1146.
<Go to ISI>://000220735100008

Centreline surface elevation longitudinal profiles have been completed for three different points in time from historic photographs (similar to1900), US Geological Survey maps (1964 and 1985), and field measurements (annually between 1984 and the present) for three North Cascade glaciers. Comparison of thinning and terminus behaviour over this time period indicates substantial overall volume loss during this century for each glacier. Mean thickness changes along the longitudinal profile of Easton Glacier are losses of 46 m (0.68 m year(-1)) of ice thickness between 1916 and 1994 and 13 m (0(.)72 m year(-1)) between 1984 and 2002. Its terminus has retreated a net distance of 2123 m. Lower Curtis Glacier lost an average of 45 m (0(.)60 m year(-1)) thickness from 1908 to 1984 and 6 m (0(.)33 m year(-1)) from 1984 to 2002, with a net terminus retreat of 522 m. On Columbia Glacier, ice thickness loss was 57 m (0(.)78 m year(-1)) from 1911 to 1984 and 8 m (0(.)44 m year(-1)) from 1984 to 2002. The net terminus retreat for Columbia was 640 m. Thickness changes are approximately equal in the accumulation zone of the Columbia and Lower Curtis Glacier during the 20th century and from 1984 to 2002. This suggests that there is no position to which the glacier can retreat and achieve equilibrium. The changes on each glacier, which today average less than 75 m in thickness, represent the loss of 35-50% in their volume since the turn of the century, and 10-15% of this volume since 1984. Their ongoing thinning indicates that these three glaciers will continue to retreat in the foreseeable future, the Columbia Glacier likely disappearing. Long-term monitoring of these glaciers should continue in order to assess the impact on downstream flow, which is utilized for hydropower on Easton and Lower Curtis Glaciers and a salmon hatchery on Columbia Glacier. Copyright (C) 2004 John Wiley Sons, Ltd.

Pesaro, M. and F. Widmer (2006). "Identification and specific detection of a novel Pseudomonadaceae cluster associated with soils from winter wheat plots of a long-term agricultural field experiment." Applied and Environmental Microbiology **72**(1): 37-43.
<Go to ISI>://000234662800003 AND http://www.ask-force.org/web/Longterm/Pesaro-Identification-Detection-Longterm-2006.pdf

The genus Pseudomonas (sensu stricto) represents a group of microorganisms directly involved in functions conferring plant health. We performed a study in the DOK long-term agricultural field experiment on the basis of previously published Pseudomonas-selective PCR primers in order to investigate the community structure of the microbial groups defined by the target range of these primers. Three different agricultural management systems, i.e., conventional, biodynamic, and bio-organic, along with mineral and unfertilized controls were investigated, with each system planted with either winter wheat or a grass-clover ley. Amplified small-subunit rRNA gene fragments were analyzed using the genetic profiling techniques restriction fragment length polymorphism (RFLP) and denaturing gradient gel electrophoresis (DGGE), revealing distinct differences between soils planted with winter wheat and grass clover but only minor differences between the management systems. Phylogenetic analyses of 59 clone sequences retrieved from bio-organic and unfertilized systems identified sequences related to Pseudomonas fluorescens and a novel cluster termed Cellvibrio-related Pseudonionadaceae (CRP). The CRP clones were exclusively isolated from winter wheat soil samples and were responsible for the crop-specific differences observed in RFLP and DGGE profiles. New primers were designed for the amplification

of CRP targets directly from soil DNA, yielding strong signals exclusively for winter wheat soils. We concluded that crop-associated CRP exist in agricultural soils and that genetic profiling followed by specific probe design represents a valuable approach for identification as well as sensitive and rapid monitoring of novel microbial groups in the environment.

Peschke, H. (1997). "Long-term experiments with N-15 in crop research." Isotopes in Environmental and Health Studies **33**(1-2): 3-11.
<Go to ISI>://000072536800002

The nitrogen research contributes significantly in different ways to crop sciences. By the application of the N-15 tracer technique additional informations are obtained, especially during long-term trials. Three models are represented: 1. N-15 utilization and N-15 after-effects 2. N-15 enrichment and N-15 depletion in one system 3. Monitoring a N-15 chain over several compartments.

Pfafferott, J., S. Herkel and M. Jaschke (2003). "Design of passive cooling by night ventilation: evaluation of a parametric model and building simulation with measurements." Energy and Buildings **35**(11): 1129-1143.
<Go to ISI>://000187782200006

At the new institute building of Fraunhofer ISE, both mechanical and free night ventilation is used for passive cooling of the offices. The results from a long-term monitoring show, that room temperatures are comfortable even at high ambient air temperatures. In two offices, experiments were carried out in order to determine the efficiency of night ventilation dependent on air change rate, solar and internal heat gains. The aim is to identify characteristic building parameters and to determine the night ventilation effect with these parameters. The experiments (one room with and one without night ventilation) are evaluated by using both a parametric model and the ESP-r building simulation programme. Both models are merged in order to develop a method for data evaluation in office buildings with night ventilation and to provide a simple model for integration in a building management system. (C) 2003 Elsevier B.V. All rights reserved.

Pla, C. (1995). Ecological effects of genetically modified fish: an overview. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, Council of Europe Press.

Ponti, L. (2005). "Transgenic Crops and Sustainable Agriculture in the European Context." Bulletin of Science Technology Society %R 10.1177/0270467605277292 **25**(4): 289-305.
http://bst.sagepub.com/cgi/content/abstract/25/4/289 AND http://www.botanischergarten.ch/Longterm/Ponti-Sustainable-2005.pdf AND http://www.botanischergarten.ch/Longterm/Ponti-Sustainable-2005-alpha.pdf

The rapid adoption of transgenic crops in the United States, Argentina, and Canada stands in strong contrast to the situation in the European Union (EU), where a de facto moratorium has been in place since 1998. This article reviews recent scientific literature relevant to the problematic introduction of transgenic crops in the EU to assess if there are specific reasons why transgenic crops have a potentially greater adverse impact on sustainable agriculture in the EU context than elsewhere. Sustainable agriculture integrates three main goals: environmental health, economic profitability, and socioeconomic equity. Transgenic crops do not appear a suitable tool for sustainable agriculture in the EU due to specific environmental, economic, and socioeconomic reasons. Therefore, a moratorium on transgenic crops based on the precautionary principle should be officially adopted until proper risk assessment. In addition, agroecological alternatives to transgenic crops fit better the EU vision of agriculture.

Popa, M. V., E. Vasilescu, P. Drob, I. Demetrescu, B. Popescu, D. Ionescu and C. Vasilescu (2003). "In vitro assessment and monitoring of the implant titanium materials - physiological environment interactions." Materials and Corrosion-Werkstoffe Und Korrosion **54**(4): 215-221.
<Go to ISI>://000182695200001

Long-term monitoring (for 8000 exposure hours) of titanium and its implant alloys (Ti-5Al-4V, Ti-6Al-4Fe) interactions with Ringer's solutions of different pH-values (2.5, 4.35, 6.98), simulating various conditions that can appear at the contact between implant and tissues was carried out in this paper. All data were statistics treated using Medcalc program. In vitro electrochemical behaviour of titanium and its alloys reveals their self-passivation in Ringer's solutions. Monitoring of the open circuit potentials with time and pH have shown that the passive films on the implant materials studied were very stable for all tested periods. Interactions due to the non-uniformity of the physiological electrolyte pH can not produce any form of local corrosion. The tested materials present low corrosion rates which attest their very good stability for 8000 exposure hours in simulated biological environment. Surface topography characterisation using atomic force microscopy (AFM) data, correlated with the electrochemical parameters, were arguments for the stability of the samples in studied bioliquids.

Porter, J. H., M. L. Parry and T. R. Carter (1991). "The Potential Effects of Climatic-Change on Agricultural Insect Pests." Agricultural and Forest Meteorology **57**(1-3): 221-240.
<Go to ISI>://A1991GW14400015

Climate and weather can substantially influence the development and distribution of insects. Anthropogenically induced climatic change arising from increasing levels of atmospheric greenhouse gases would, therefore, be likely to have a significant effect on agricultural insect pests. Current best estimates of changes in climate indicate an increase in global mean annual temperatures of 1-degrees-C by 2025 and 3-degrees-C by the end of the next century. Such increases in temperature have a number of implications for temperature-dependent insect pests in mid-latitude regions. Changes in climate may result in changes in geographical distribution, increased overwintering, changes in population growth rates, increases in the number of generations, extension of the development season, changes in crop-pest synchrony, changes in interspecific interactions and increased risk of invasion by migrant pests. To illustrate some of these effects, results of a study investigating the impact of climatic change on the European corn borer (Ostrinia nubilalis) in Europe are shown. Under the climatic changes projected by the Goddard Institute for Space Studies general circulation model, northward shifts in the potential distribution of the European corn borer of up to 1220 km are estimated to occur, with an additional generation found in nearly all regions where it is currently known to occur. A number of priorities for future research into

the effects of climatic changes on agricultural insect pests can be identified. These include: examination of the influence of climatic variables on insect pests, long-term monitoring of pest population levels and insect behaviour, consideration of possible climatic changes in research into pest management systems and identification of potential migrants.

Possee, R. D. (1995). Risk Assessment and Field Trial with a Genetically Modified Baculovirus Insecticide. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, Council of Europe Press.

Poulton, P. R. (1996). "The Rothamsted long-term experiments: Are they still relevant?" Canadian Journal of Plant Science **76**(4): 559-571. http://dx.doi.org/10.4141/cjps96-103 AND http://www.ask-force.org/web/Longterm/Poulton-Rothamstead-longterm-Relevant-1996.pdf

Powell, G. L., J. Matsumoto and D. A. Brock (2002). "Methods for determining minimum freshwater inflow needs of Texas Bays and estuaries." Estuaries **25**(6B): 1262-1274.
<Go to ISI>://000180611400003

In response to legislative directives beginning in 1975, the Texas Water Development Board (TWDB) and the Texas Parks and Wildlife Department (TPWD) jointly established and currently maintain a data collection and analytical study program focused on determining the effects of and needs for freshwater inflows into the state's 10 bay and estuary systems. Study elements include hydrographic surveys, hydrodynamic modeling of circulation and salinity patterns, sediment analyses, nutrient analyses, fisheries analyses, freshwater inflow optimization modeling, and verification of needs. For determining the needs, statistical regression models are developed among freshwater inflows, salinities, and coastal fisheries. Results from the models and analyses are placed into the Texas Estuarine Mathematical Programming (TxEMP) model, along with information on salinity viability limits, nutrient budgets, fishery biomass ratios, and inflow bounds. The numerical relationships are solved within the constraints and limits, and optimized to meet state management objectives for maintenance of biological productivity and overall ecological health. Solution curves from the TxEMP model are verified by TWDB's hydrodynamic simulation of estuarine circulation and salinity structure, which is evaluated against TPWD's analysis of species abundance and distribution patterns in each bay and estuary system. An adequate system-wide match initially verifies the inflow solution. Long-term monitoring is recommended in order to verify that implementation of future water management strategies maintain ecological health of the estuaries and to provide an early warning of needs for adaptive management strategies.

Powlson, D. S. and P. R. Poulton (1998). "Using the longâ€term experiments at rothamsted to address current agricultural and environmental issues." Archives of Agronomy and Soil Science **42**(6): 455-478.
http://dx.doi.org/10.1080/03650349809385747 AND NEBIS 20120919

In the Broadbalk Experiment at Rothamsted winter wheat has been grown in monoculture since 1843; wheat in rotation and additional treatments have been introduced during the course of the experiment. Since 1968, when new crop varieties and fungicides were introduced, yields have averaged over 6 t ha?1with either inorganic fertilizers or farmyard manure. With high?yielding varieties of winter wheat on Boardbalk, or spring barley on the Hoosfield experiment, maximum yields are currently achieved with a combination of inorganic and organic inputs. The long?term experiments have provided much information on the losses of nitrate and phosphate to water from different treatments and also on the impact of recent decreases of sulphur deposition on soil S dynamics and crop composition. Archived samples of soils and crops from the Park Grass Experiment (continuous cut pasture) and experiments in which arable land has reverted to forest have provided information on soil acidification. This has resulted mainly from acid deposition, previously SO2 but now dominated by oxides of nitrogen. Acidification has caused the mobilization of toxic metals including Al, Mn and Zn and their increased uptake in herbage. Archived samples have also made it possible to study the deposition and accumulation of metals and organic pollutants in soils and crops and the changes in soil organic carbon and nitrogen content resulting from different management practices. Such data has been used to construct models of soil C and N dynamics. The on?going sites provide experimental material for biological studies including fertilizer and management impacts on nitrous oxide fluxes and for testing hypotheses on soil biodiversity and quality.

Pozzi, C. and F. Salamini (2007). Genomics of wheat domestication.
<Go to ISI>://BIOSIS:PREV200800525339

The review covers several issues concerning the state of molecular knowledge of the effects induced by domestication and breeding on the wheat crop. Genes at the root of the domestication syndrome are currently the focus of an active research which frequently uses comparative genomics approaches. Conclusions drawn on available data indicate that the domestication syndrome is originated by "sudden" genetic events, controlled by few major pleiotropic genes. These events were followed by the accumulation of a larger set of minor mutations, having a multifactorial mode of inheritance. Moreover the organization of nucleotide variability enables the detection of domestication-related molecular footprints, suggesting that the genomic regions more responsible for genetic variation and more related to domestication are reduced when compared to the whole genome size. The polyploidy history of the domesticated wheats is presented, making a specific mention to the origin of the wheat A, B, D and G genomes and to the molecular control of chromosome pairing in polyploids. A general presentation is also provided on the genomic changes which have accompanied the emergence of domesticated wheats. What follows is a molecular information on: i) the wheat adaptation to the environment (genomics of photoperiod, vernalization, heading date, plant height, and erect plant type); ii) the effect of domestication on seed-related yield components (genomics of seed size, grain hardness, and tillering); iii) modification of traits affecting harvestability (emergence of free-threshing seeds, rachis toughness, and presence of ear awns). Genetic bottlenecks which have been associated to wheat domestication and breeding are considered in a final section. The relatively young history of the wheat crop, the presumably small founder population of this gene pool, and the intensive longterm selection for agronomic traits did set the basis for a reduced genetic variability of the genus.

Pretzsch, H. (2003). "Strategic planning of sustainable development on the estate level - Contributions from forest growth and yield science." Forstwissenschaftliches Centralblatt **122**(4): 231-249.
<Go to ISI>://000185203400003

At the beginning of regular forestry and systematic forest science the focus of sustainable management was on wood production (v. CARLOWITZ 1713, COTTA 1828, HARTIG 1804, HUNDESHAGEN 1826). Subsequently more and more forest functions were considered in management and planning (V. HAGEN 1867, DIETRICH 1957). Our current understanding of multifunctional forest development is reflected in the six Pan-European criteria and corresponding indicators for sustainable forestry (MCPFE 2000). The present paper Outlines how these criteria and indicators can he applied for certification and strategic planning of sustainable development on the level of operational forests and how forest growth and yield science might Support this intention. Forestry in Germany, is blessed with an excellent database gathered during forest inventories and long- term monitoring. For example, we demonstrate how additional use can he made of the database for more efficient extraction Of relevant pan-European criteria and indicators. An important Field of application of this database is monitoring and certification of forest development. The creative power of these criteria and indicators can he unfolded by integrating them in strategic forest planning. For the purpose of strategic planning growth models, simulators and decision support systems are available. If these tools cover the relevant criteria and indicators the they enable multicriteria scenario analysis and optimisation of management options on estate level. Concepts and tools for multicriteria oriented strategic planning are available (v. GADOW 2003, HANEWINKEL 2001, PRETZSCH et al. 1998, SPELLMANN et al. 2001), their transfer into forest management would trigger considerable innovation.

Prokopov, V. A., S. B. Tarabarova, O. P. Dan'ko and V. I. Kikot (1995). "[The effect of the multiyear agricultural use of animal husbandry wastes on the infectious morbidity of the local population]." Likars'ka sprava / Ministerstvo okhorony zdorov'ia Ukrainy(3-4): 127-32.
<Go to ISI>://MEDLINE:8819943

The report presents results of study of relationship between the longterm practice of utilization of waste matter from livestock industry (solid, liquid portions of manure, redundant active silt) in the crop-growing of the steppe, forest-steppe zones as well as of those of woodlands in Ukraine, on the incidence of acute infective diseases of the intestine in the community. The soil of farm lands was found out to be affected by an extensive bacterial contamination due to the above wastes being utilized on a wide scale. The degrees of risk of acute intestinal infection morbility in population areas located in those zones having utilization fields, are significantly higher than beyond their bounderies. Significant direct relationship between the size of the utilization fields and the incidence of acute intestinal infection in the community was established.

Putzer, M., W. J. Barry, J. R. Moringlane, G. Fuss, J. Spiegel, U. Dillmann and H. Sittinger (2003). "Effect of deep brain stimulation on glottal phonation in patients with Parkinson's disease and multiple sclerosis." Folia Phoniatrica Et Logopaedica **55**(5): 220-232.
<Go to ISI>://000185199900002

The present study examines the effect of neurostimulatory operations on glottal phonation of 3 parkinsonian patients and 3 patients with multiple sclerosis. With the help of two voice analysis programs (MDVP from Kay Elemetrics and EEG Program by Marasek) for the acoustic and electroglottographic definition of voice characteristics, vowel productions of the patients, which were recorded under two conditions (with and without stimulation), were analysed. In a first step, significantly different intrasubject means in the two conditions indicate the effect of neurostimulation. The strength of the effect differs among subjects, particularly in the case of patients with Parkinson's disease. In a second step, a gender-differentiated comparison of the individual patient's data (recorded with and without stimulation) with a group of normal voice speakers (150 male and 150 female speakers) is carried out. This intersubject comparison proves useful in that it relativizes the results from the intrasubject comparison. It is shown for the parkinsonian patients that stimulation causes a relative deterioration of the glottal cycle, while for the patients with multiple sclerosis a tendency for hyperfunctional phonation is observed. In the latter case, the results suggest the need for long-term monitoring of phonation behaviour during chronic electrical stimulation. Copyright (C) 2003 S. Karger AG, Basel.

Raber, E., T. M. Carlsen, K. J. Folks, R. D. Kirvel, J. I. Daniels and K. T. Bogen (2004). "How clean is clean enough? Recent developments in response to threats posed by chemical and biological warfare agents." International Journal of Environmental Health Research **14**(1): 31-41.
<Go to ISI>://000186923700003

Recent terrorist events underscore the urgent need to develop a comprehensive set of health-protective cleanup standards and effective decontamination technologies for use in the restoration of civilian facilities. Accurate scientific information remains limited in the area of biological warfare agents. However, new guidelines and calculated cleanup values are emerging for initial re-entry and long-term reoccupation following use of chemical warfare agents. This article addresses airborne, soil, and surface exposures following release of G-type chemical warfare agents and VX. Cleanup goals should be tailored to the type of population that may be exposed, potential exposure times, and other scenario-specific considerations. Three different airborne concentrations are proposed for cleanup of public sector facilities. One value is recommended for initial re-entry; a more conservative value is recommended for long-term monitoring and increased public confidence; and a third, even more conservative concentration represents essentially a no-effect level for round-the-clock airborne exposure. Health-based cleanup levels are provided for contaminated residential and industrial soil. Results are presented on the outcome of a preliminary risk assessment to determine safe surface levels (e.g., walls, floors, and handrails) for cleanup after exposure to the G agents and VX. Because specific cleanup criteria for most biological warfare agents remain problematic, recommendations are made for filling the knowledge gaps.

Ragauskas, A., G. Daubaris, V. Ragaisis and V. Petkusa (2003). "Implementation of non-invasive brain physiological monitoring concepts." Medical Engineering & Physics **25**(8): 667-678.
<Go to ISI>://000185379200006

The paper presents innovative methods and technology for non- invasive intracranial hemodynamics monitoring based on the measurement of brain parenchyma acoustic properties. The clinical investigation of new technology shows the similarity between the invasively recorded intracranial pressure (ICP) and non-invasively recorded intracranial blood volume (IBV) pulse waves, slow

waves and slow trends under intensive care unit (ICU) conditions. Also, the applicability of the non-invasive IBV slow wave monitoring technique for cerebrovascular autoregulation non-invasive long-term monitoring is demonstrated by theoretical and experimental studies. (C) 2003 IPEM. Published by Elsevier Ltd. All rights reserved.

Raman, T. R. S. and D. Mudappa (2003). "Correlates of hornbill distribution and abundance in rainforest fragments in the southern Western Ghats, India." Bird Conservation International **13**(3): 199-212.
<Go to ISI>://000186097500003

The distribution and abundance patterns of Malabar Grey Hornbill Ocyceros griseus and Great Hornbill Buceros bicornis were studied in one undisturbed and one heavily altered rainforest landscape in the southern Western Ghats, India. The Agasthyamalai hills (Kalakad-Mundanthurai Tiger Reserve, KMTR) contained over 400 km(2) of continuous rainforest, whereas the Anamalai hills (now Indira Gandhi Wildlife Sanctuary, IGWS) contained fragments of rainforest in a matrix of tea and coffee plantations. A comparison of point-count and line transect census techniques for Malabar Grey Hornbill at one site indicated much higher density estimates in point-counts (118.4/km(2)) than in line transects (51.5/km(2)), probably due to cumulative count over time in the former technique. Although line transects appeared more suitable for long-term monitoring of hornbill populations, point-counts may be useful for large- scale surveys, especially where forests are fragmented and terrain is unsuitable for line transects. A standard fixed radius point-count method was used to sample different altitude zones (600-1,500 m) in the undisturbed site (342 point-counts) and fragments ranging in size from 0.5 to 2,500 ha in the Anamalais (389 point-counts). In the fragmented landscape, Malabar Grey Hornbill was found in higher altitudes than in KMTR, extending to nearly all the disturbed fragments at mid- elevations (1,000-1,200 m). Great Hornbill persisted in the fragmented landscape using all three large fragments (> 200 ha). It was also recorded in four of five medium-sized fragments (25-200 ha) and one of five small fragments (< 25 ha), which was adjacent to shade coffee plantations. Abundance of Malabar Grey Hornbill declined with altitude and increased with food-tree species richness. Great Hornbill abundance increased with food-tree species richness, suggesting that maintenance of high diversity of hornbill food species in fragments is important for their persistence. It is likely that the smaller and less specialized Malabar Grey Hornbill will survive in disturbed and fragmented forest landscapes, while Great Hornbill is more vulnerable to habitat alteration. Protection and restoration of rainforest fragments and food- tree resources, besides protection of existing large fragments, will aid the conservation of hornbills in the region.

Ramirez, S. P. B., S. I. H. Hsu and W. McClellan (2003). "Taking a public health approach to the prevention of end-stage renal disease: The NKF Singapore Program." Kidney International **63**: 61-65.
<Go to ISI>://000180419700013

The National Kidney Foundation Singapore (NKFS) provides subsidized dialysis care to approximately 70% of the country's total end-stage renal disease (ESRD) population, based entirely on charitable donations. Because of the exponential increase in prevalent dialysis patients receiving care through the NKFS' chronic dialysis program, and with the anticipated epidemic rise in incident ESRD patients, an accelerated comprehensive strategy for the prevention of renal and its associated chronic diseases was developed. Presented is the NKFS' public health plan, which incorporates primary, secondary and tertiary approaches to the prevention of chronic kidney disease. Components of this comprehensive strategy include: screening populations at risk for the development and progression of renal disease, the documentation of existing standards of care for chronic diseases associated with renal disease, and the institution of disease management programs that facilitate the systematic management of patients with chronic diseases that lead to ESRD, including the development of community-based "Prevention Centers." Finally, longitudinal follow-up of the participating population is being performed in order to provide benchmarks for improvement and to determine future directions of the program. Such long-term monitoring also will facilitate the establishment of its efficacy in improving clinical outcomes, reducing the cost of care, and delaying the development and progression of chronic kidney disease.

Rao, C. S., A. S. Rao, A. Swarup, S. K. Bansal and V. Rajagopal (2000). "Monitoring the changes in soil potassium by extraction procedures and electroultrafiltration (EUF) in a Tropaquept under twenty years of rice-rice cropping." Nutrient Cycling in Agroecosystems **56**(3): 277-282.
<Go to ISI>://000086648500008

Chemical extraction procedures and electroultrafiltration (EUF) fractions were evaluated for measuring the changes in soil K in a Tropaquept as a consequence of continuous fertilizer use and rice-rice cropping for 20 years in a long-term fertilizer experiment. During the course of 20 years the gap in total K uptake by crops in treatments receiving K and those without an external K supply widened, indicating a stress on soil K reserves in the latter treatments. Readily available forms, i.e. water-soluble, 0.01 M CaCl2, citric acid and ammonium acetate extractable K did not undergo much change. On the contrary, there was a conspicuous decrease in strongly held 3 M H2SO4 and 1 M boiling HNO3 K (nonexchangeable K), as these forms replenished the soil solution K removed by the crop plants. Similarly, considerable decrease was noticed in EUF 30-35 K obtained at higher temperature and voltage, as it also represents nonexchangeable K in soils. NPK and NPK plus FYM arrested, to a greater extent, the depletion in soil K. Huge K removals, from 1000 to 3550 kg K ha(-1), by the rice crop in 20 years were not reflected in NH4OAc K which is commonly used as a criterion for fertilizer K recommendations by the soil testing laboratories in India. The total K uptake by the rice crop during 20 years corresponded closely to the changes in nonexchangeable K as measured by 3 M H2SO4 and 1 M HNO3. This suggests the need for including nonexchangeable K in soil test calibration for better K fertilizer recommendations in long-term operations.

Rao, M., G. Fan, J. Thomas, G. Cherian, V. Chudiwale and M. Awawdeh (2007). "A web-based GIS decision support system for managing and planning USDA's Conservation Reserve Program (CRP)." Environmental Modelling & Software **22**(9): 1270-1280.
<Go to ISI>://WOS:000246747000005

The Conservation Reserve Program (CRP) is one of the largest programs of the U.S. Department of Agriculture (USDA) aimed at encouraging farmers and ranchers to address soil, water, and related natural resource issues on their lands in an environmentally sustainable manner. This paper outlines the design and development of a prototype web-GIS Decision Support System (DSS), CRP-DSS, for use in resource management and assessment of environmental quality. Specifically, the DSS is targeted toward aiding USDA

to better manage and plan CRP enrollments. The DSS is based on the emerging industry-standard ArcIMS GIS platform and integrates a mapping component AFIRS (Automated Feature Information Retrieval System) and a modeling component SWAT (Soil and Water Assessment Tool). Our novel integrated web-GIS DSS is implemented using web server and Java Servlet technology over an ArcIMS platform to support data access and processing in a distributed environment. AFIRS functions as a feature extraction protocol that uses multisource geospatial data sets and SWAT serves to simulate longterm trends of soil and water quality. The prototype DSS was applied to simulate the sediment and nutrient dynamics of a small watershed in the Oklahoma Panhandle. We intend to develop the prototype CRP-DSS into a full-fledged tool geared to enable USDA better manage and plan future CRP enrollments. (C) 2006 Elsevier Ltd. All rights reserved.

Rao, M. R. and R. D. Coe (1991). "Measuring Crop Yields in on-Farm Agroforestry Studies." Agroforestry Systems **15**(2-3): 275-289.
<Go to ISI>://A1991GR11200012

The paper describes the agronomic and statistical principles that form the basis for measuring crop yields in on-farm agroforestry studies. Agroforestry systems differ from agricultural systems because of the presence of tree/crop interfaces and the need for large plots, large borders and long-term monitoring. These differences accentuate the varibility of crop performance on farms. Crop yield estimation per unit area in any agroforestry system involves essentially i) stratification of the plot into different, clearly distinguishable crop zones such as those under and free from the influence of trees, those on sloping and flat areas, and those on areas affected by pests, ii) drawing representative samples from each stratum, and iii) weighting the sample yields with weights proportional to the stratum area. The tree/crop interface areas may require further stratification and determination of yields of individual crop rows at different distances away from trees based on the nature and extent of tree/crop competition. The precision of yield estimation depends on how well one is able to define the strata as well as the variance of crop yields in space and time in each stratum. Studies that provide this information are urgently needed for developing practical recommendations for crop-yield measurements on farms.

Raucoules, D., C. Maisons, C. Camec, S. Le Mouelic, C. King and S. Hosford (2003). "Monitoring of slow ground deformation by ERS radar interferometry on the Vauvert salt mine (France) - Comparison with ground-based measurement." Remote Sensing of Environment **88**(4): 468-478.
<Go to ISI>://000187347100009

The differential SAR Interferometry (DInSAR) technique has been applied to a test site near Vauvert (France) to detect and monitor ground deformation. This site corresponds to the location of an industrial exploitation of underground salt using the solution mining technique. An area of subsidence has been observed using in situ measurements. Despite conditions unfavorable for InSAR because of the vegetal cover, we show that radar remote sensing observations provide valuable information which substantially improves our knowledge of the phenomenon. An adaptive phase filtering process has been used to improve the coherence level. In particular, our study shows that the geometry of the subsidence bowl is different to that previously assumed using ground-based techniques only. The size of the subsidence bowl (8 km) is larger than expected. This information will be useful for further modeling of the deformation and to improve the coverage of the in situ measurement networks. It also shows that radar interferometry can be used for the long-term monitoring of such sites and to predict potential environmental issues. (C) 2003 Elsevier Inc. All rights reserved.

Raymond, J., F. Guilbert, A. Weill, S. A. Georganos, L. Juravsky, A. Lambert, J. Lamoureux, M. Chagnon and D. Roy (2003). "Long-term angiographic recurrences after selective endovascular treatment of aneurysms with detachable coils." Stroke **34**(6): 1398-1403.
<Go to ISI>://000183348300012

Background and Purpose - Our aim in this study was to assess the incidence and determining factors of angiographic recurrences after endovascular treatment of aneurysms. Methods - A retrospective analysis of all patients with selective endosaccular coil occlusion of intracranial aneurysms prospectively collected from 1992 to 2002 was performed. There were 501 aneurysms in 466 patients (mean +/- SD age, 54.20 +/- 12.54 years; 74% female). Aneurysms were acutely ruptured (54.1%) or unruptured (45.9%). Mean +/- SD aneurysm size was 9.67 +/- 5.91 mm with a 4.31 +/- 1.97- mm neck. The most frequent sites were basilar bifurcation (27.7%) and carotid ophthalmic (18.0%) aneurysms. Recurrences were subjectively divided into minor and major (ideally necessitating re- treatment). The most significant predictors of angiographic recurrence were determined by logistic regression. These results were confirmed by chi(2), t tests, or ANOVAs followed, when appropriate, by Tukey's contrasts. Results - Short-term (less than or equal to1 year) follow-up angiograms were available in 353 aneurysms (70.5%) and long-term (>1 year) follow-up angiograms, in 277 (55%), for a total of 383 (76.5%) followed up. Recurrences were found in 33.6% of treated aneurysms that were followed up and that appeared at a mean +/- SD time of 12.31 +/- 11.33 months after treatment. Major recurrences presented in 20.7% and appeared at a mean of 16.49 +/- 15.93 months. Three patients (0.8%) bled during a mean clinical follow-up period of 31.32 +/- 24.96 months. Variables determined to be significant predictors (P < 0.05) of a recurrence included aneurysm size &GE;10 mm, treatment during the acute phase of rupture, incomplete initial occlusions, and duration of follow-up. Conclusions - Long-term monitoring of patients treated by endosaccular coiling is mandatory.

Rebstock, G. A. (2002). "An analysis of a zooplankton sampling-gear change in the CalCOFI long-term monitoring program, with implications for copepod population abundance trends." Progress in Oceanography **53**(2-4): 215-230.
<Go to ISI>://000176900500006

The California Cooperative Oceanic Fisheries Investigations (CalCOFI) program has been systematically sampling zooplankton off the west coast of North America since 1949. In 1978, the 1- m diameter ring net used by the program was replaced with a bongo net, which consists of two 0.71-m diameter nets on a single frame. This study compares paired zooplankton samples taken with a ring net and a 0.71-m or 0.6-m bongo net to determine the relative performances of the two net types for catching calanoid copepods. Thirty-one species and stages were enumerated, along with the category 'total female calanoids'. Twenty-one categories of calanoid copepods were abundant enough to test for effects of changes in net type. No significant differences between the nets were found after correcting for multiple testing. Statistical power was then estimated for a range of potential net effects equivalent to ratios of

copepod densities between the nets of 1.1-3.0. The probability of detecting differences greater than a factor of 1.5-3.0 was high (greater than or equal to80%) for total female calanoids, Metridia pacifica, Pleuromamma abdominalis edentata, P. borealis, Calanus pacificus, Eucalanus californicus and Rhincalanus nasutus. For these categories of copepods, any population changes greater than a factor of 1.5-3.0 that might be found from the CalCOFI data set can be assumed to be the result of factors other than the change in net type. (C) 2002 Elsevier Science Ltd. All rights reserved.

Reda, A. A., M. A. Arafa, A. A. Youssry, E. H. Wandan, M. Ab de Ati and H. Daebees (2003). "Epidemiologic evaluation of the immunity against hepatitis B in Alexandria, Egypt." European Journal of Epidemiology **18**(10): 1007-1011.
<Go to ISI>://000185514600012

Background: Hepatitis B (HB) vaccine represents one of the major achievements in the 20th century. The most important epidemiologic factor affecting the chronic carrier rate is age of infection. The earlier in life an infection occurs, the higher the probability that this infection will result in chronic carriage. Methods: A seroepidemiologic study was conducted to examine the impact of HB vaccination on the carrier state among a vaccinated group of children (1000) compared to a non-vaccinated group (500) aged 6 years in Alexandria, Egypt. Results: The rate of HbsAg positivity among the vaccinated group was found to be 0.8% compared to 2.2% among the non-vaccinated group. The study showed that the efficacy of HB vaccine in preventing the carriage of HbsAg, 5 years after full course vaccination, was estimated to be around 67%. However, long-term monitoring should continue to confirm the efficacy of the vaccine in preventing chronic carrier state. On the other hand, studying the exposure to some risk factors associated with hepatitis B virus (HBV) infection revealed more or less a similar pattern of exposure among both vaccinated and unvaccinated children. Conclusion: It can be concluded that the significantly lower rate of HbsAg positivity among the vaccinated compared to the rate among the non- vaccinated is attributed to the preventive effect of the vaccine.

Reed, P. M. and B. S. Minsker (2004). "Striking the balance: Long-term groundwater monitoring design for conflicting objectives." Journal of Water Resources Planning and Management-Asce **130**(2): 140-149.
<Go to ISI>://000220046600006

This study demonstrates the use of high-order Pareto optimization (i.e., optimizing a system for more than two objectives) on a long-term monitoring (LTM) application. The LTM application combines' quantile kriging and the nondominated sorted genetic algorithm-II (NSGA-II) to successfully balance four objectives: (1) minimizing sampling costs, (2) maximizing the accuracy of interpolated plume maps, (3) maximizing the relative accuracy of contaminant mass estimates, and (4) minimizing estimation uncertainty. Optimizing the LTM application with respect to these objectives reduced the decision space of the problem from a total of 500 million designs to a set of 1,156 designs identified on the Pareto surface. Visualization of a total of eight designs aided in understanding and balancing the objectives of the application en route to a single compromise solution. This study shows that high-order Pareto optimization holds significant potential as a tool that can be used in the balanced design of water resources systems.

Reith, C. C. and M. J. Guidry (2003). "Eco-efficiency analysis of an agricultural research complex." Journal of Environmental Management **68**(3): 219-229.
<Go to ISI>://000184236500001

The Model Sustainable Agricultural Complex (MSAC) is a 600-acre experimental farm in south-central Louisiana, in the very southern reaches of the United States, approximately 40 km north of the Gulf of Mexico. The MSAC consists of many land uses and facilities, including a dairy, crawfish center, beef herd, sugarcane crop, and equestrian center, as well as numerous features and programs for research, education, and residence. The mission of the MSAC, which is operated by the Department of Renewable Resources at the University of Louisiana at Lafayette, has been to accommodate research and education in production agriculture, while generating revenues through the delivery of food products into the local economy. In recent years, environmental conservation has been increasingly important at the MSAC. Best management practices (BMPs) were implemented to reduce soil loss and mitigate nonpoint source pollution. Research was initiated to quantify the effectiveness of these BMPs, and workshops were conducted to explain preliminary results to local farmers. However, environmental improvements at the MSAC had until 2000 been piecemeal, which may be said as well for agriculture overall. What is needed is a comprehensive integrated approach to analyzing and improving environmental performance, as is possible when implementing an environmental management system (EMS). This manuscript describes our efforts to integrate piecemeal environmental improvements into a farm-wide program of systematic improvement. This process began with a qualitative ranking of the MSAC's inputs and outputs, followed by a quantification of certain key parameters related to the consumption of resources and provision of services at the Complex. Certain measures related to the Complex's eco-efficiency were combined into a ratio that provides a useful target for management and continuous improvement. Eco-efficiency, which is defined as 'the efficiency with which receivables are converted into deliverables', is a good way to apply the lessons of industry to the agricultural sector, for instance, by monitoring and managing resource efficiency as an aspect in an EMS such as prescribed by ISO 14000. This will require disciplined recordkeeping and managed conservation, and will promote long-term environmental improvement. (C) 2003 Elsevier Science Ltd. All rights reserved.

Rendon, T. and C. Salas (1987). "[The evolution of employment in Mexico: 1895-1980]." Estudios demograficos y urbanos **2**(2): 189-381.
<Go to ISI>://MEDLINE:12314997

Employment figures from the Mexican national census are the basis for this analysis of employment changes in Mexico between 1895-1980. The work identifies longterm trends in the volume and composition of employment and distinguishes 3 main periods in the evolution of employment. The first period, from 1895-1930, marked the end of a stage of development lasting until about 1907 in which sufficient internal stability was achieved to support Mexico's entrance into the world market. Export of agricultural products and metals was the principal focus of economic growth. Construction of roads and railroads was a central element of progress. But economic and social problems manifested in regional disparities, concentration of wealth, conflicts between economic sectors, low pay for agricultural workers, and fierce social and political control characterized the period and culminated in the Mexican Revolution. After the first decade of the 20th century the ability of the economy to absorb new workers began to decline,

and the falling of crude activity rates was not reversed until the 1940s. During the 1920s, total employment increased less than 6%, reflecting a net increase of 403,000 male workers and a decrease of 110,000 female workers. The second major period of employment from 1930-1970 saw the change from an economy based on export of primary products to one based on manufacturing for the internal market. There were 2 subperiods, a stage of transition from 1930-50, the economy registered marked fluctuations, but by the 1940s the consolidation of state power and important reforms permitting expansion of the internal market were factors in an accelerated growth of employment relative to the preceding intercensal period. Despite considerable increases in agricultural employment, the relative share of the agricultural sector in total employment was beginning a decline. Employment registered the highest growth rates of the century in the 1940s and exceeded population growth. The increased employment was explained by accelerated growth and accumulation in manufacturing along with increases in commerce, services, construction, and agriculture. From 1950-70, industrial development was consolidated, and there was a generalized expansion in employment in manufacturing as well as in the secondary and tertiary sectors. The economy was less able to absorb new labor, primarily because the agricultural sector had reached the limits of expansion in both the commercial and peasant sector by 1965, at just the time that population growth was most rapid. During the 1970s, manufacturing employment grew less rapidly because of modernization, almost exclusive orientation to the internal market which limited expansion, and scarcity of funds for importing capital goods. A new model of growth will be needed if Mexico is to escape its present stagnation, and a significant share of economic activity will need to be oriented to export. Until this process is consolidated, the national economy is unlikely to show signs of sustained recuperation.

Rennie, J. M., G. Chorley, G. B. Boylan, R. Pressler, Y. Nguyen and R. Hooper (2004). "Non-expert use of the cerebral function monitor for neonatal seizure detection." Archives of Disease in Childhood **89**(1): F37-F40.
<Go to ISI>://000188213500012

Background: The cerebral function monitor (CFM) is widely used to detect neonatal seizures, but there are very few studies comparing it with simultaneous electroencephalography (EEG). Objective: To determine the accuracy of non-expert use of the CFM and to assess interobserver agreement of CFM seizure detection. Patients: Babies admitted to the neonatal intensive care unit at King's College Hospital who were at high risk of seizure and had video-EEG monitoring. Methods: Video-EEG was used to detect seizures. Each baby had CFM recordings at speeds of 6, 15, and 30 cm/h during the EEG. Four neonatologists, trained in CFM seizure recognition, independently rated one hour CFM samples at three speeds from each baby. Interobserver agreement was quantified using Cohen's kappa. Results: CFM traces from 19 babies with EEG seizures and 21 babies without EEG seizures were analysed. Overall non-expert interpretation of the CFM performed poorly as a seizure detector compared with simultaneous EEG (sensitivities 38% at 6 cm/h; 54% at 15 cm/h; 55% at 30 cm/h). Although babies with seizures were more likely to be correctly classified at higher speeds ($p = 0.02$), babies without seizures were also more likely to be misclassified ($p < 0.001$). Agreement between observers was not good at any speed (κ values from 0.01 to 0.39). The observers usually detected generalised seizures but often missed seizures that were focal, low amplitude, or lasted less than one minute. Conclusion: Approximately half of all neonatal seizures may be missed using CFM alone. Neonatal seizures need to be diagnosed, characterised, and quantified first using EEG. The CFM may then be useful for long term monitoring.

Ringel, M. D. and P. W. Ladenson (2004). "Controversies in the follow-up and management of well- differentiated thyroid cancer." Endocrine-Related Cancer **11**(1): 97-116.
<Go to ISI>://000220540000007

Thyroid cancer is a common malignancy with an apparent increasing incidence and a wide spectrum of clinical behavior and therapeutic responsiveness. Recent advances in diagnosis, primary treatment, and long-term monitoring have led to enhanced detection of primary and recurrent disease and improvements in therapy. Controversy still surrounds several issues: the most accurate predictive staging system and histological subclassification scheme, optimal preoperative assessment and surgical extent, appropriate use of radioiodine for remnant ablation, goal for thyrotropin-suppressive thyroid hormone therapy, best practices in immediate postoperative and long-term monitoring, and approach to the patient with thyroglobulin evidence of residual disease. In this paper, recent data related to these controversial issues are critically reviewed.

Rizzo, V. and M. Leggeri (2004). "Slope instability and sagging reactivation at Maratea (Potenza, Basilicata, Italy)." Engineering Geology **71**(3-4): 181-198.
<Go to ISI>://000188461700001

The present work shows results collected, through a long-term monitoring, on slope movements in the Maratea Valley (Potenza, Italy). The investigated area shows large-scale gravitational phenomena and sagging type morphology that have been well-described in previous works. Electronic Distance Meter (EDM) measurements were first taken in 1983 and from these it would appear that since about 1991 there has been an acceleration in the movement occurring in the upper part of the valley, where sagging is located and which was previously motionless. Seismic and rainfall series for the last 20 years have been examined. The data collected show that this sagging destabilisation could not be related to rainfall and recent seismic activity; the latter reactivating later, in 1998. Global Positioning System (GPS) data on a network including benchmarks located outside of the landslide area, and comparison with EDM data indicate that movement affected the surrounding mountain slopes, widening the valley and destabilising the sagging: thus suggesting a relationship between the sagging and tectonic activity.

Roberts, D. A., M. Keller and J. V. Soares (2003). "Studies of land-cover, land-use, and biophysical properties of vegetation in the Large Scale Biosphere Atmosphere experiment in Amazonia." Remote Sensing of Environment **87**(4): 377-388.
<Go to ISI>://000186827400001

We summarize early research on land-cover, land-use, and biophysical properties of vegetation from the Large Scale Biosphere Atmosphere (LBA) experiment in Amazonia. LBA is an international research program developed to evaluate regional function and to determine how land-use and climate modify biological, chemical and physical processes there. Remote sensing has played a

fundamental role in LBA in research planning, land-cover mapping and in long-term monitoring of changes in land-cover and land-use at multiple scales. This special issue includes 12 papers that cover a range in spatial scales from regional mapping to local scales that cover only a portion of a Landsat scene. Several themes dominate, including land-cover mapping with an emphasis on wetlands and second- growth forest, evaluation of pasture sustainability and forest degradation and the impact of land-cover change on stream chemistry. New techniques introduced include automated Monte Carlo unmixing (AutoMCU) and several new approaches for mapping land-cover. A diversity of sensors are utilized, including ETM+, IKONOS, SPOT-4, Airborne P-band synthetic aperture radar (SAR), and L-band SAR. Census data are fused with an existing land-cover map to generate spatially explicit estimates of land-use from historical data. Several papers include important, new field measures of species composition, forest structure and biomass in mature forest and secondary succession. (C) 2003 Elsevier Inc. All rights reserved.

Rodriguez-Robles, J. A. (2003). "Home ranges of gopher snakes (Pituophis catenifer, Colubridae) in central California." Copeia(2): 391-396.
<Go to ISI>://000183817700019

Knowledge of the home range of an animal can provide insights for studies of behavioral interactions among individuals, and long-term monitoring of particular animals is necessary to determine whether they exhibit seasonal variation in space-use patterns. I radio-tracked four adult male Pituophis catenifer (gopher snake) in central California for 14 consecutive months to investigate spatial and seasonal movement patterns. Using the fixed kernel density estimator to produce a probability contour, the 95% home ranges of R catenifer ranged from 0.89- 1.78 ha, whereas their core areas (50% polygons), the most heavily used areas of their home ranges, ranged from 0.1-0.29 ha. Movements of male P catenifer were similar in spring and summer and decreased in autumn and winter. The telemetered snakes were close to marshes and Eucalyptus woodlands but were routinely found in grassland areas, perhaps because this habitat type may provide abundant food resources and partial protection from predators. Despite their proximity, the estimated home ranges of males 2, 3, and 4 did not overlap. These findings, and those of a previous investigation of activity patterns of P catenifer in eastern Nebraska, suggest that syntopic gopher snakes occupy exclusive home ranges during at least part of their active season.

Roots, O. and V. Zitko (2004). "Chlorinated dibenzo-p-dioxins and dibenzofurans in the Baltic herring and sprat of Estonian coastal waters." Environmental Science and Pollution Research **11**(3): 186-193.
<Go to ISI>://000221826800009

Background, Aims and Scope. The concentration of chlorinated dibenzo-p-dioxins and dibenzofurans in many fish from the Baltic requires monitoring, since it approaches or exceeds the European Union threshold limit value of 4 pg TEQ/g wet weight of fish for human consumption. The concentrations, expressed in TEQs, are important for toxicology and regulations, but hide the concentrations of the individual congeners, which are important for other environmental sciences, source allocation, and for the detection of measurement errors. This report evaluates the results of a survey reported earlier only in the terms of the TEQ concentrations. Methods. Principal Component Analysis (PCA) was used to reduce the dimensions of the data (17 = 7 chlorinated dibenzo-p-dioxin and 10 chlorinated dibenzofuran congeners) to three principal components. This facilitated the interpretation of the congener profiles. Slopes of the congener concentrations as a function of age of the fish were estimated by least squares regression. The results were compared with a large set of data for lake trout from Lake Ontario. Results and Discussion. The congener profiles of Baltic herring are less scattered than those of sprat. The profiles of herring from the central Baltic differ from those of herring from the Gulf of Riga and both appear to be affected relatively minimally by the age of the fish. The congener profiles of herring from the western Gulf of Finland are similar to those from the central Baltic, those from middle Gulf of Finland are similar to those from the Gulf of Riga. Both seem to be more affected by age of the fish than the profiles of the first two groups. The concentrations of several pentachloro- and hexachloro-dibenzo-p-dioxins and dibenzofurans increase with the age of the fish. Conclusion. PCA is a good technique for the evaluation of the congener profiles. The resulting loading and score plots provide a good graphic summary of the multidimensional data. Additional analyses are needed to confirm the observed profile patterns. A comparison with the results of a long-term monitoring from another area shows that the age of the fish is a more important factor than the year of capture. Recommendation and Outlook. The surveys should continue for a number of years and the results should be presented and evaluated both in terms of the TEQs as well as in terms of weight concentrations. Since the concentrations do not appear to change very much from year to year, it would be better to carry out surveys only every 3-4 years and, instead, stratify the sampling according to age and gender of the fish, and to analyze replicate extracts by replicate measurements. The inclusion of unmarked replicate samples would be a good quality assurance measure. It would be desirable to analyze additional parts of the food chain in order to understand the fate of the compounds in the ecosystem.

Rossignol, N., A. Bonis and J.-B. Bouzille "Impact of selective grazing on plant production and quality through floristic contrasts and current-year defoliation in a wet grassland." Plant Ecology **212**(10): 1589-1600.
<Go to ISI>://WOS:000295983700002

Grazing impacts the structure and functional properties of vegetation through floristic changes (i.e., long-term effect) and current defoliation (i.e., short-term effect). The aim of this study was to assess the relative importance of these two grazing effects on productivity (ANPP) and plant quality (C/N ratio) among plant patches submitted to a variety of grazing intensity for several years. Longterm grazing effect was measured by comparing ANPP and C/N ratio among plant patches with contrasting floristic composition. Short-term impact of grazing was measured by comparing ANPP and C/N in plant patches, with and without defoliation. Floristic contrasts led to a lower ANPP in highly grazed patches than in lightly grazed ones. This result may be related to the increasing proportion of grazing-tolerant and grazing-avoiding species with increasing grazing intensity. Vegetation C/N contrasts were recorded among grazed patches but did not linearly relate to grazing intensity. Short-term effect of current-year defoliation on ANPP was limited as vegetation compensated for biomass removal. No evidence for grazing-enhancement of ANPP was found even at moderate grazing intensity. Long-term floristic changes with grazing thus appeared to be the main driving factor of variations in ANPP. In contrast, C/N ratio showed no general and consistent variation along the grazing gradient but varied consistently depending on the community investigated, thus suggesting an effect of the species pool available.

Rothamsted Research (2006). Guide to the classical and other long term experiments, dataset and sample archive. Harpenden, Herts, AL5 2JQ, UK, Printed by Premier Printers Ltd, Bury St Edmunds, Suffolk. © Lawes Agricultural Trust Co. Ltd.
http://www.rothamsted.ac.uk/resources/LongTermExperiments.pdf

Rothbaum, H. P., R. L. Goguel, A. E. Johnston and G. E. G. Mattingly (1986). "Cadmium Accumulation in Soils from Long-Continued Applications of Superphosphate." Journal of Soil Science **37**(1): 99-107.
<Go to ISI>://A1986A390700011

Rothbaum, H. P., D. A. McGaveston, T. Wall, A. E. Johnston and G. E. G. Mattingly (1979). "Uranium Accumulation in Soils from Long-Continued Applications of Super-Phosphate." Journal of Soil Science **30**(1): 147-153.
<Go to ISI>://A1979GY45700013

Rotz, C. A., F. Montes and D. S. Chianese "The carbon footprint of dairy production systems through partial life cycle assessment." Journal of Dairy Science **93**(3): 1266-1282.
<Go to ISI>://WOS:000275056100045
Greenhouse gas (GHG) emissions and their potential effect on the environment has become an important national and international issue. Dairy production, along with all other types of animal agriculture, is a recognized source of GHG emissions, but little information exists on the net emissions from dairy farms. Component models for predicting all important sources and sinks of CH(4), N(2)O, and CO(2) from primary and secondary sources in dairy production were integrated in a software tool called the Dairy Greenhouse Gas model, or DairyGHG. This tool calculates the carbon footprint of a dairy production system as the net exchange of all GHG in CO(2) equivalent units per unit of energy-corrected milk produced. Primary emission sources include enteric fermentation, manure, cropland used in feed production, and the combustion of fuel in machinery used to produce feed and handle manure. Secondary emissions are those occurring during the production of resources used on the farm, which can include fuel, electricity, machinery, fertilizer, pesticides, plastic, and purchased replacement animals. A longterm C balance is assumed for the production system, which does not account for potential depletion or sequestration of soil carbon. An evaluation of dairy farms of various sizes and production strategies gave carbon footprints of 0.37 to 0.69 kg of CO(2) equivalent units/kg of energy-corrected milk, depending upon milk production level and the feeding and manure handling strategies used. In a comparison with previous studies, DairyGHG predicted C footprints similar to those reported when similar assumptions were made for feeding strategy, milk production, allocation method between milk and animal coproducts, and sources of CO(2) and secondary emissions. DairyGHG provides a relatively simple tool for evaluating management effects on net GHG emissions and the overall carbon footprint of dairy production systems.

Rubaek, G. H. and E. Sibbesen (1995). "Soil phosphorus dynamics in a long-term field experiment at Askov." Biology and Fertility of Soils **20**(1): 86-92.
http://dx.doi.org/10.1007/BF00307847 AND NEBIS 20120919
Inorganic and organic soil P (P i , P o) fractions were followed monthly for 15 months in a 100-year-old, fertilization and crop-rotation experiment with the Rubaek-Sibbesen, macroporous resin method, the Olsen method, and the Hedley fractionation method. Resin P, and Olsen P had similar levels and variation patterns. They increased in spring after fertilization, decreased during summer and autumn, and increased again in winter after repeated slurry applications. Resin P o decreased in spring and peaked in summer. The variation in time of the Hedley P i and P o fractions was relatively smaller and was neither related to season nor to fertilization. Unmanured soil contained much less total P than NPK and slurry-treated soils, but the differences in total P i were greater than those in total P o . Neither total P i nor total P o concentrations differed between NPK and slurry treatments, indicating that P o in animal manure is quickly mineralized. All P i and P o fractions were smaller in unmanured than in fertilized treatments. These differences were relatively largest for resin P i and resin P o , i.e., the most labile fractions, and decreased for the medium and less labile P i and P o fractions. The reactions by resin P i , Olsen P, and resin P o to seasons and treatments indicate that these fractions are estimates of the most labile pools of P i and P o in soil, which make them relevant for shortterm studies. The medium and less labile P i and P o fractions of the Hedley fractionation method seem more relevant for long-term studies.

Ruehlmann, J. and S. Ruppel (2005). "Effects of organic amendments on soil carbon content and microbial biomass - results of the long-term box plot experiment in Grossbeeren." Archives of Agronomy and Soil Science **51**(2): 163-170.
<Go to ISI>://BIOSIS:PREV200600092764
The Box Plot Experiment in Grossbeeren was set up in 1972 to investigate diverse fertilization strategies within an irrigated vegetable crop rotation system for three different soils. Here we report on the longterm effects of applying different organic amendments and mineral N fertilizer levels to soils on the content of: (1) microbially decomposable carbon (C-dec); and (2) microbial biomass carbon (C-mic). We determined the C-dec content of soils that were covered with a vegetable crop rotation, and established that the differences between treatments with and without organic amendments corresponded very well to those found under arable crop rotations. Under the given experimental conditions, leaving the crop residues on the field generated an optimum level of soil organic matter content. When we compared the Cdec content of the soils after applying different organic amendments as based on the C input, we found them to be similar. 10 t ha(-1) yr(-1) farmyard manure (FYM) has been reported to be sufficient to generate an optimum level of organic matter in arable soils. Here we show that this effect can also be transferable to other organic amendments if the C input is used as the reference base. Regarding C-mic content, we obtained a linear relationship for the differences of C-dec between treated plots which were influenced by different C input and the controls. This relationship did not differ with soil type. Therefore, we assumed that C-dec may be regarded as a permanently present substrate for the nutrition of microorganisms regardless of soil type.

Ruysschaert, G., J. Poesen, G. Verstraeten and G. Govers (2005). "Interannual variation of soil losses due to sugar beet harvesting in West Europe." Agriculture Ecosystems & Environment **107**(4): 317-329.
<Go to ISI>://WOS:000228955400002

Soil erosion studies on cropland usually only consider water, wind and tillage erosion. However, significant amounts of soil may also be lost from the field during the harvest of crops such as sugar beet, potato, carrot and chicory root. During the harvest, soil adhering to the crop, loose soil or soil clods and stones are exported from the field together with these crops. This process of soil erosion is called soil losses due to crop harvesting or SLCH. In this study, interannual variability of SLCH for sugar beet in four west European countries, i.e., France, Belgium, the Netherlands and Germany, was investigated for the last decades. Longterm (1978-2000) average SLCH values ranged between 5.2 Mg ha(-1) harvest(-1) (Germany) and 13.8 Mg ha(-1) harvest(-1) (France), while the minimum and maximum observed annual average SLCH values were 2.0 and 20.5 Mg ha(-1) harvest, respectively. A large part of the temporal variability of annual average SLCH for sugar beet within a given country could be explained by the rainfall depth recorded during the harvesting season. However, due to efforts made by farmers and the processing industry SLCH appeared also to decrease over time during the last decade. Furthermore, significant differences in SLCH were found between the countries studied, which could only be partly explained by rainfall depth during the harvesting season. Other determining factors may be differences in soil types, harvesting technique, agronomic practices and crop yield. As SLCH values were derived from soil tare data measured in sugar factories, differences could also be attributed to differences in post-harvesting cleaning, that lowers soil tare but that does not have an effect on the true soil loss at the field plot where sugar beet was harvested. Given that SLCH contributes significantly to overall soil loss on cropland, more research is needed to fully understand the temporal and spatial variability of SLCH. © 2005 Elsevier B.V. All rights reserved.

Sailer, M. and B. Kallenbach-Herbert (2003). "Long-term aspects of fuel element interim storage." Atw-International Journal for Nuclear Power **48**(8-9): 537-+.
<Go to ISI>://000188435700005

Interim storage in casks of spent fuel elements over prolonged periods of time requires safety-related components to be available and functional throughout the entire period of operation or else to be beefed up to that condition by the appropriate backfitting measures. Even on an international scale, there is little practical experience over long periods of operation, and what is available is limited to fuel elements with comparatively low burnups. To ensure that there are no safety-related deviations from the specified status, a long- term monitoring program should be set up for all fuel element interim stores, which should include regular monitoring measures and a reporting phase every ten years covering all findings and results. As inspections of the inside of casks, of the gas atmosphere, and of the behavior of cladding tubes entail higher expenses, these inspections, supplemented by a monitoring program to determine the development of the leakage rate, should be run in an accompanying program incorporating all plants, the results of which would then be included in plant-specific evaluations. As the first German interim stores will complete their first decade of operation in a foreseeable period of time, measures should be taken there at short notice even if it is not to be expected at the present point in time that safety-related long-term effects will be discovered after the first decade of operation.

Salvidio, S., M. Mori, A. Lattes, L. Galli and A. Arillo (2002). "The freshwater crayfish Austropotamobius pallipes (Lereboullet, 1858) in Liguria, NW Italy: Implications for management at the regional level." Bulletin Francais De La Peche Et De La Pisciculture(367): 663-670.
<Go to ISI>://000180910600005

Since 1990, field surveys have been undertaken in Liguria to assess the distribution and status of Austropotamobius pallipes populations. In this region, crayfish stocks were found in three bioclimatic regions: Alpine, Mediterranean and Continental. Although epidemic diseases and invasive alien crayfish have been recorded, modifications of freshwater habitats have to be considered as the most significant threats to native crayfish stocks. Regarding management, the Regional Administration of Liguria proposed 18 Sites of Community Importance (SCI) containing crayfish populations, in the framework of the Habitats Directive (92/43/EEC). Since public managers need to take informed decisions in land-use management and conservation a numeric biodiversity map, composed by a georeferred database connected to a geographic information system (GIS), has been implemented. This regional system is composed by 22 different layers containing all the available information about the location of species and habitats of conservation interest. This system is now routinely used by regional administrators in environmental impact assessment. Finally, emphasis is placed on the need of promoting research programmes on the long-term monitoring of crayfish populations.

Salwicka, K. and S. Rakusa-Suszczewski (2002). "Long-term monitoring of Antarctic pinnipeds in Admiralty Bay (South Shetlands, Antarctica)." Acta Theriologica **47**(4): 443-457.
<Go to ISI>://000180049800007

Year-round monitoring of five Antarctic pinnipeds was conducted in Admiralty Bay from 1988 up to 2000. Two breeding species: southern elephant seals Mirounga leonina (Linnaeus, 1758) and Weddell seals Leptonychotes weddellii (Lesson, 1826), were present throughout the year, Three other species: crabeater seals Lobodon carcinophagus (Hobron and Jacquinot, 1842), leopard seals Hydrurga leptonyx (Blainville, 1820), and Antarctic fur seals Arctocephalus gazella (Peters, 1875) visited the area only for short periods. During this study, the abundance of elephant seals was stable, whereas those of Weddell and crabeater seals declined. Leopard seals numbers fluctuated irregularly. We detected a possible immigration from South Georgia: of a stable magnitude for elephant seals, and of variable magnitude, depending on food accessibility, for Antarctic fur seals. We found a strong recurrence of the spatial distributions of elephant, Weddell, and Antarctic fur seals in the 13 oases on the shore of Admiralty Bay. Annual distribution patterns were characteristic for each species. The innermost beaches were used predominantly by the animals during their annual fasts: the breeding and the moulting seasons.

Samake, D. (1993). "[Africa and the environment. Desertification and the phenomenon of drought. Deforestation and reforestation]." Famille et developpement(64): 15-24.
<Go to ISI>://MEDLINE:12286687

Awareness is growing throughout the world of the grave environmental damage that has been caused by human activities ad of the disastrous consequences such damage may pose for human survival. The 1992 "Earth Summit" in Rio de Janeiro marked the culmination of a series of preliminary ministerial conferences in Africa and elsewhere that called attention to practices menacing the environment. Africa's underdevelopment is at the basis of practices leading to desertification, deforestation, and pollution. The summit was of great relevance for Africa because of its recognition of the links between the environment, development, and poverty. The phenomena of drought and desertification in the Sahel are insufficiently understood. The drought began in the 1960s and has persisted irregularly into later decades. Scant rainfall may cause the useful growing season to be shorter than the minimum of 2.5-3 months needed to assure harvests. Meager vegetation, drying of domestic water sources, and the danger of erosion from violent rainstorms are among the consequences of drought. Desertification occurs when the natural vegetation is exploited excessively, when agriculture is extended into marginal lands, and when inappropriate agricultural and herding practices make the land vulnerable to erosion. Populations beset by poverty and drought engage in practices for short-term survival whose longterm consequences may be very harmful. The Sahel Institute in Bamako has outlined a regional strategy to combat desertification that calls for improving collection and conservation of surface and subsoil water, reforestation and more careful management of land and other resources, motivating local populations to assist in preventing deforestation, fertility control to lessen population pressure, and development of a database to monitor the dynamics of desertification. The European Economic community and some conservation associations have also developed conservation programs for the Sahel. Degradation of the tropical forests must be considered irreversible because of climatic factors, erosion, and loss of fertility. Abusive exploitation of the tropical forests is a principal socioeconomic phenomenon of contemporary Africa. Forest policies must end the degradation, repair the decision making. 56% of the total energy consumed in Africa is from wood and charcoal. But the collection of firewood and deforestation are complexly linked. Deforestation results from numerous factors including imbalance between population growth and the system of natural resources, the need for new lands, and the expansion of cities. Several African countries are attempting to subsidize firewood needs through management of forests and reforestation with the collaboration of the rich countries.

Samparipanish, P., S. Ruangkhum and C. Tongcumpou (2008). Effect of phosphorus in commercial fertilizers on phytoavailability cadmium and zinc uptake by sugarcane. Waste Management and the Environment IV. M. B. C. A. K. A. P. V. I. H. Zamorano. **109:** 739-749.
<Go to ISI>://BIOSIS:PREV200800556033

The effects of phosphorus in commercial fertilizers on concentrations of total cadmium (Cd) and zinc (Zn), plant-available Cd and Zn and sugarcane uptake of Cd and Zn were studied. A single rate (312.5 kg/ ha) of 16-16-8 NPK fertilizer was applied on three levels (0-3, 3-20 and >20 mg) of Cd contaminated sugarcane cultivated field in Mae Sot district, Tak province. In order to investigate the effects of different rates of fertilizer application, 16-16-8 NPK fertilizer at the rate of 312.5, 625 and 1,250 kg fertilizer/ ha was applied to soils in a pot experiment and planted with a piece of mature cane stem. The pot experiment was conducted in a randomized block design with three replications. Repeat applications of fertilizer were made at the same rate in the fifth month of the cultivation for both field and pot experiments. Soil and sugarcane samples were collected at the end of the second and the sixth month respectively. After harvesting, sugarcanes were divided into five components: underground stems, roots, bagasses, juice and leaves. Chemical analysis of the field experiments showed that total Cd and Zn in sugarcane increased with Cd concentration in cultivated field and found that Cd and Zn mostly accumulated in roots. Longterm effects of fertilizer application was expected to be a concern although there was no higher Cd and Zn concentrations in soil after repeat fertilization in the fifth month of the cultivation. For the pot experiment, the results showed that higher P can make more Cd available and ease take up and accumulation in different parts of the sugarcane. Moderate P application rate reduced phytoavailability of Zn at the end of the second month because of the P-Zn mineral precipitation. However, the ability of sugarcane to uptake Zn increased again at the end of the sixth month of the cultivation at which time total P in the soil decreased. Total Cd and Zn in sugarcane were significantly increased with increasing 16-16-8 NPK fertilizer application rates and we found that Cd and Zn accumulated in sugarcane according to the following sequence: roots> underground stems (setts)> bagasses> leaves> juice.

Sanchez, J. E., T. C. Willson, K. Kizilkaya, E. Parker and R. R. Harwood (2001). "Enhancing the mineralizable nitrogen pool through substrate diversity in long term cropping systems." Soil Science Society of America Journal **65**(5): 1442-1447.
<Go to ISI>://000172918500014

The development of sustainable N management systems requires a better understanding of the contribution of on-farm resources to the active N pool size and its mineralization. This study explores the effect of substrate diversity on improving N supply through mineralization. A "diverse system", consisting of a corn (Zea mays L.)-cornsoybean (Glycine max L.)-wheat (Triticum aestivum L.) rotation with cover crops and fertilized with composted manure was compared with a corn monoculture with conventional fertilizers. Nitrogen mineralization was measured in situ and in laboratory incubations as was the ability of each soil to mineralize added compost and red clover (Trifolium pratense) residue in the 6th and 7th yr of rotation. Net mineralized N in the diverse system was 90 and 40% higher than that in the monoculture at 70 and 150 d of laboratory incubations respectively. Comparable response was found in situ where a 70% higher net mineralization was observed in the diverse system at 70 d. The 70 and 150-d mineralizable N pools increased over time, but the ability of soil organisms to break down additional substrate did not change as a result of system diversity. At 150 d of laboratory incubation, a synergistic effect was observed when 5 Mg ha(-1) of compost plus 5 Mg ha (1) of clover was added to either soil. The combination of the two organic materials mineralized more N than the sum of their individual mineralization results. A more diverse cropping system may increase the soil's capacity to supply N to a growing crop while maintaining desirable levels of soil organic matter. This is essential for the overall long-term productivity and sustainability of agricultural systems.

Sandlund, O. T. and K. Aagaard (2004). "Long term monitoring and research in an alpine-boreal watershed: Atndalen in perspective." Hydrobiologia **521**(1-3): 203-208.
<Go to ISI>://000221177900016

Sandstrom, M., E. Lyskov, R. Hornsten, K. H. Mild, U. Wiklund, P. Rask, V. Klucharev, B. Stenberg and P. Bjerle (2003). "Holter ECG monitoring in patients with perceived electrical hypersensitivity." International Journal of Psychophysiology **49**(3): 227-235.
<Go to ISI>://000185820800005

Earlier studies have indicated that patients claiming to be sensitive to electromagnetic fields, so-called electrical hypersensitivity (EHS), have a dysbalance of the autonomic nervous system (ANS) regulation. This paper focuses on a possible dysbalance in the ANS among EHS patients by the use of long-term monitoring of electrocardiogram (ECG) in both a patient and a matched control group. At the same time, the environmental power frequency magnetic field was recorded for both groups in order to see if there was any difference in exposure between the groups. ECG, heart rate (HR) and heart rate variability (HRV) as well as the magnetic field exposure were monitored for 24 h. Fourteen patients with perceived EHS symptoms were selected from the University Hospital, Umea, Sweden. Symptoms indicating autonomic nervous dysregulation were not part of the inclusion criteria of the. patient group. Age and sex matched healthy subjects were used as controls. No differences were found between the groups regarding magnetic field exposure or the mean HR for 24 h. The HRV analyses showed that the high-frequency (HF) component did not have the expected increase with sleep onset and during nighttime in the EHS group. When separating the sleeping and awake time even less differences between the two conditions in the EHS patients, both for the low-frequency and HF components in the HRV spectrum, were seen. EHS patients had a disturbed pattern of circadian rhythms of HRV and showed a relatively 'flat' representation of hourly-recorded spectral power of the HF component of HRV (C) 2003 Elsevier B.V. All rights reserved.

Sarwar, A., W. G. M. Bastiaanssen and R. A. Feddes (2001). "Irrigation water distribution and long-term effects on crop and environment." Agricultural Water Management **50**(2): 125-140.
<Go to ISI>://000170367000004

The response of three water delivery schedules, representing various levels of flexibility, on crop production, water saving, soil salinization, drainage volumes and watertable behavior was examined. A physical-based transient soil water and solute transfer model, Soil-Water-Atmosphere-Plant (SWAP), was used as a tool. The evaluations were made for un-restricted and restricted water supply situations considering three different watertable conditions prevailing in the fourth drainage project (FDP) of the Punjab, Pakistan. From the simulation results it is apparent that on average the effect of irrigation schedule flexibility on crop yields is not very significant. However, compared to a fixed schedule provided un-restricted canal water supplies are available, the Productivity of irrigation water supply (Y-act/I-IT), is up to 30% higher for the on-demand schedule. The on-demand schedule capable of complying with the temporal variations in climate is also more effective in water saving, reducing drainage volumes and controlling rising water-tables if fanners follow guidelines and do not over-irrigate. In the present water deficient environment of the Indus basin, the benefits of the on-demand schedule and a fixed schedule are comparable. In the absence of sufficient canal water supplies, infrastructure and a well-designed and effective monitoring and communication system, moving towards the on-demand system will be un-productive. For the longterm sustainability of the irrigation system, improvements in the performance of the present water allocations and on-farm water management practices seems to be more necessary. (C) 2001 Elsevier Science B.V. All rights reserved.

Sasada, Y., K. T. Win, R. Nonaka, A. T. Win, K. Toyota, T. Motobayashi, M. Hosomi, C. Dingjiang and J. Lu "Methane and N2O emissions, nitrate concentrations of drainage water, and zinc and copper uptake by rice fertilized with anaerobically digested cattle or pig slurry." Biology and Fertility of Soils **47**(8): 949-956.
<Go to ISI>://WOS:000298650200010

We have examined the effects of different types of slurry on CH4 and N2O emissions, Zn and Cu contents of rice, and nitrate content of the drainage water. The experiment included four treatments: (1) anaerobically digested cattle slurry (ADCS), (2) ADCS filtered to remove the coarse organic matter fraction, (3) anaerobically digested pig slurry (ADPS), and (4) chemical fertilizer (CF). The application rate was 30 gNH(4)-N m(-2). Different amounts of C were incorporated with fertilization: 725 gC m(-2) in ADCS, 352 gm(-2) in filtered ADCS, and 75 gm(-2) in ADPS. The average CH4 emissions during a growing period were 304, 359, 452, and 579 mg m(-2) day(-1) in the CF, ADPS, filtered ADCS, and ADCS treatments, respectively. The CH4 emission was significantly higher in ADCS than in CF and ADPS. Negligible N2O emissions were observed during the growing period. Comparable concentrations of Zn and Cu were observed in the rice grain among the treatments. In contrast, their concentrations in the stems and leaves were significantly higher in ADPS than in CF treated rice, although the values were lower than the upper limit of feed additives. Nitrate concentrations in the drainage water were consistently low (0.5 mg NL-1). The present study suggested that ADPS, containing a lower amount of C than ADCS, might be an organic fertilizer in paddy field with comparable environmental impacts to chemical fertilizers (CF), but longterm field studies are needed to better understand the effects of these organic fertilizers.

Scharer, L. O., V. Hartweg, M. Hoern, Y. Graesslin, N. Strobl, S. Frey, C. Biedermann, S. Walser and J. Walden (2003). "Electronic diary for bipolar patients." Neuroradiology **46**: 10-12.
<Go to ISI>://000181391200003

Long-term monitoring methods providing an overview of the course of bipolar disorder of individual patients are a clinical necessity at least for patients who require a combination therapy with drugs that have only proven their efficacy for monotherapy. The Life Chart Method (LCM) of the NIMH is an adequate method for this purpose. Unfortunately, due to data entry and management requirements, it is too expensive for everyday clinical use. The 'electronic diary for patients with bipolar disorder' is meant to provide a method to minimize the effort for detailed long-term monitoring of patients with bipolar affective disorder and thus make it available for the everyday clinical use for every bipolar patient. Copyright (C) 2003 S. Karger AG, Basel.

Schmidt, O. (2001). "Time-limited soil sorting for long-term monitoring of earthworm populations." Pedobiologia **45**(1): 69-83.
<Go to ISI>://000167065800007

Hand sorting of soil blocks is a reliable but very labour intensive and tedious method for estimating earthworm population sizes. A standardised, time-limited, intensive sorting procedure was adopted for a long-term earthworm field population study and the error in population estimates resulting from the use of this procedure was quantified during monthly sampling over one cropping cycle of

conventional wheat and direct-drilling wheat-clover fields. Compared to full soil sorting without time restriction, time-limited sorting achieved mean relative recoveries of 81-87 % of earthworm numbers and 94-97 % of earthworm biomass, but required only 36 % of the actual sorting time needed for full sorting. The earthworms which were missed during time-limited sorting were mainly unpigmented juveniles, accounting for 90 % of the numbers and 70 % of the biomass, and their mean individual biomass was 31-38 mg. It is concluded that validated time-limited soil sorting is a useful, time-saving and also ergonomically advantageous approach for long-term studies of earthworm population dynamics.

Schmidt, W. (1994). "PRODUCTION, MARKETING AND CONSUMPTION OF ANIMAL PRODUCTS IN FRANCE." Berichte Uber Landwirtschaft **72**(2): 265-294.
<Go to ISI>://WOS:A1994NT99100007

The share of french agriculture employing about 6 per cent of total working population, on gross net product lies by about 3.3 per cent. With a share of 43 per cent animal production in France has a considerable part on total agricultural production. During the last decades significant regional centres (Bretagne, Pays de la Loire) have been developed in the different parts of animal production. Since 1970 in almost all branches of animal production a clear increase of the average herd size can be observed, mainly caused by decreasing farm numbers combined with growing or at least constant herd population. Especially in poultry and porc production the degree of farm concentration has reached a significant level. Also in the backward linked agribusiness considerable structural changes have taken place. In the dairy sector, which is heterogenous in the different regions, a lot of small dairies stopped their activities, while the number and importance of big enterprises increased. In the slaughterhouse sector further processing is mainly done within specialized family enterprises and big meat processing industries. Selling of animal products to the consumers is mainly done by big trade enterprises (super- and hypermarkets), though butchers have an important place in the selling of sausages to consumers. The total demand for animal products increased significantly since 1970 (esp. yogurt, cheese) and the French have with 111.2 kg (1991) the highest per capita consumption of meat with in the European community. External trade with animal products is of great importance for France to reduce the total trade balance deficit. The longterm aims of the national agricultural policy are based on the orientation law (1960). During the 70s the policy aims changed, but still rural social policy contains the biggest part of the total agricutural budget.

Schott, W. (2001). "Nitrogen in agriculture as affected by the kind of fertilizer. II. Nitrogen in soil and plant." Phyton-Annales Rei Botanicae **41**(3): 159-167.
<Go to ISI>://WOS:000174284100015

Since nitrogen is a main nutrient of plants thus representing a limiting factor to yield, an analytical method should be contrived to determine the adequate amount of fertilizer to be added to optimize production without harming the environment. A plot-trial was established on an existing farming-site located near Vienna in an area called ,,Obere Lobau" to compare variants treated with compost, mineral-fertilizer and controls. Different forms of nitrogen in soil and plants (i.e. rye) were investigated. Samples were taken from 21/05/1997 to 02/07/1997 about every two weeks. The N-min-method is of little avail when organic manure is concerned due to the quick uptake of nitrate by the plants and the slow mineralization rate of the manure. An analytical method to estimate SRNH (soil-nitrogen soluble in hot dinatriumhydrogenphosphatebuffer) was established, which is believed to represent the potential amount of nitrogen available during the vegetation period. The investigations proved this farming-site to be well supplied with nitrogen, which entailed a luxurious consumption of nitrogen by the plants, especially in the plots with mineral fertilization. Compost showed a slow and longterm mineralization rate thus enabling the uptake of nitrogen according to need only in contrast to ,,force feeding" in conventional systems. Compost-manuring resulted in a higher content of total nitrogen and SRNH in the soil.

Schratzberger, M., P. Whomersley, R. Kilbride and H. L. Rees (2004). "Structure and taxonomic composition of subtidal nematode and macrofauna assemblages at four stations around the UK coast." Journal of the Marine Biological Association of the United Kingdom **84**(2): 315-322.
<Go to ISI>://000221139600003

The diversity and structure of meiobenthic nematodes and macrobenthic infauna were studied at four widely spaced subtidal sites around the UK coast in relation to a number of measured environmental variables. The stations were situated on soft sediments at water depths of 53 to 95 in and are intended as long-term monitoring locations as part of the UK National Marine Monitoring Programme. Similar benthic assemblages were encountered in comparable environmental conditions. The distribution of nematode and macrofauna species was mainly governed by the geographical location of the habitat and the granulometric composition of the substrate. There was no evidence of any adverse effect on the measures of benthic assemblage structure arising from trace metal concentrations in the sediment, indicating the relatively unpolluted nature of the offshore locations under investigation. Nematode and macrofauna assemblages exhibited stable patterns over time periods of three years.

Scott, W. A. and R. Anderson (2003). "Temporal and spatial variation in carabid assemblages from the United Kingdom Environmental Change Network." Biological Conservation **110**(2): 197-210.
<Go to ISI>://000180818400004

This paper presents analyses of the data from the first 7 years of the UK Environmental Change Network (ECN) carabid monitoring programme. The 10 ECN terrestrial sites for which results are available represent a wide range of habitats, from lowland arable farmland to upland moorland, and correspondence analysis reveals the strong association between habitat and species composition. At all sites carabid assemblages are dominated by a small proportion of the species found at the site. There are strong year-to-year fluctuations in the proportions of individual species and a large percentage of species are observed only sporadically. This has major implications for the conservation and monitoring of carabids. Simple summary statistics, such as species richness or diversity do not adequately reflect variation in species composition and are unlikely to respond quickly to environmental change. The considerable annual variation makes the detection of relationships with sources of environmental change a difficult task, particularly for the rarer

species of primary conservation interest. Analysis should therefore include measures based on the dominant species to provide an early warning system for environmental change. (C) 2002 Elsevier Science Ltd. All rights reserved.

Sear, D. A. and M. D. Newson (2003). "Environmental change in river channels: a neglected element. Towards geomorphological typologies, standards and monitoring." Science of the Total Environment **310**(1-3): 17-23.
<Go to ISI>://000183883300003

Rivers integrate the impacts of change in atmospheric and terrestrial systems; they then deliver these to the coast. En route geomorphological processes create dynamic and diverse habitats, both in-stream and in riparian/floodplain ecotones. The dynamics of channel change conflict with human resource development, the outcome is that many river and riparian environments have been significantly modified, complicating the interpretation of change. Collection of geomorphological data on both form and process has to date been overwhelmingly an academic pursuit; standard measurement networks and long-term monitoring have, as a result been largely absent-as in the Environmental Change Network (ECN), despite the emerging requirements of legislation such as the EU Water Framework Directive. In this paper, we utilise a unique set of repeat channel surveys and long-term bed-load sediment yields to provide guidance on both definitions of change and those variables and survey techniques which might form the basis, in future, of improved national-scale monitoring. The Environment Agency's River Habitat Surveys suggest the basis for channel typologies that could structure a sampling framework and rationalise the variables to be monitored. We also point to the value of more detailed geomorphological procedures in use at the catchment/project scale-Catchment Baseline Surveys and Fluvial Audits-as a standardised basis for monitoring the detail of change in the fluvial sediment system. A perfect opportunity to lay foundations for such monitoring activity has been provided in England and Wales by the winter floods of 2000/2001. (C) 2002 Elsevier Science B.V. All rights reserved.

Seguin, B., J. P. Lagouarde and M. Savane (1991). "The Assessment of Regional Crop Water Conditions from Meteorological Satellite Thermal Infrared Data." Remote Sensing of Environment **35**(2-3): 141-148.
<Go to ISI>://A1991FR68300006

Meteorological satellites (mainly NOAA AVHRR) have been extensively used these last years to monitor vegetation and crop conditions on a regional scale, using vegetation index NDVI data. Recent work with Nimbus-7 passive microwave measurements has also shown the complementary potential of that spectral domain. On the other hand, the thermal infrared channels, in spite of their well-known ability to detect water stress (as established by ground studies at a local scale), are less studied for the same purpose of long-term monitoring. This paper intends to demonstrate their capabilities in assessing crop water conditions on a regional scale and estimating the actual evapotranspiration (ET) to be used in agrometerological models. A brief analysis of past studies justifies the use of the cumulative SIGMA-(T(s) - T(a)) (difference between the midafternoon surface temperature by satellite and the maximum air temperature obtained from the meterological ground network), named stress-degree-day by Jackson et al. (1977) which may be related to ET by a simplified linear relationship. This criterion, already tested in Sahelian regions (Seguin et al., 1989), is applied to France on a large scale, corresponding to the entire country, using 5-day syntheses from Meteosat, calibrated by NOAA AVHRR on selected dates, for 3 years (1985-1987). Values of SIGMA-(T(s) - T(a)) may be considered as climatological data. They reveal both spatial differences in regional climates and the main features of each year. The use of the linear relationship, derived from ET values computed from a coupled energy budget-water balance model, allows one to estimate and map regional evaporation on a monthly to 6-month time basis. The variations obtained along a latitudinal transect display the relations between ET and potential evapotranspiration (PET), also leading to an indirect estimation of PET from remote sensing data. SIGMA-(T(s) - T(a)) / R(n) is proposed as an index of regional water stress, which may be derived from satellite data and appears as complementary to the intergrated NDVI, with the advantage of a more physically established relationship with ET.

Sehlen, S., M. Lenk, P. Herschbach, U. Aydemir, M. Dellian, B. Schymura, H. Hollenhorst and E. Duhmke (2003). "Depressive symptoms during and after radiotherapy for head and neck cancer." Head and Neck-Journal for the Sciences and Specialties of the Head and Neck **25**(12): 1004-1018.
<Go to ISI>://000186886400004

Background. Patients with head and neck cancer are extraordinarily susceptible to depressive traits. Thus, a general screening of these patients at their first admission to the ital is desirable. Methods. From 1997-2001, 133 patients with head and neck tumors filled in the Self-Rating-Depression- Scale (SDS) at the beginning and end of radiotherapy (ti1/ti2), 6 weeks, and 6 months after radiotherapy (ti3/ti4). Results. The SIDS index increased significantly from 46.44 (ti1) to 48.91 (ti2) ($p = .025$) and then remained stable. The subdomain "somatic-eating-related symptoms" at ti1 was significantly lower than ti2 ($p < .001$). In contrast to inpatients, outpatients and those with conventional instead of hyperfractionated-accelerated radiotherapy were less impaired by eating-related symptoms. Patients with higher education showed a lower SIDS index and cognitive scale. Marital status, tumor stage, histologic grading, and substance abuse had no influence. Conclusions. Patients with a higher risk of depression should receive long-term monitoring during and after the end of radiotherapy, and Prompt intervention strategies should be applied. (C) 2003 Wiley Periodicals, Inc.

Seoane, S. and M. C. Leiros (2001). "Acidification-neutralization processes in a lignite mine spoil amended with fly ash or limestone." Journal of Environmental Quality **30**(4): 1420-1431.
<Go to ISI>://WOS:000174863000035

A laboratory experiment was conducted to investigate the long-term effects of amending sulfide-rich lignite mine spoil with fly ash (originating from a coal-fired power station and largely comprised of aluminosilicates) and/or agricultural limestone. The experiment was carried out with soil moisture maintained at field capacity or alternate cycles of wetting and drying. Results obtained suggest that the principal acidification processes were oxidation of sulfide and formation of hydroxysulfate (FeOHSO4), whereas the main neutralization processes were weathering of aluminosilicates in fly ash-treated samples and dissolution of calcium carbonate in limestone-treated samples. The highest dose of limestone rapidly raised the pH of the spoil, but this increase was not maintained

throughout the one-year experiment. In contrast, fly ash-treated samples showed a more sustained increase in pit, attributable to the gradual weathering of aluminosilicates. The best results (i.e., good short- and long-term neutralization) were obtained in samples treated with both fly ash and limestone. The low timing capacity of the fly ash (47.85 cmol kg(-1)) means that it must be used in large quantities, an advantage in achieving the further aim of disposing of the fly ash.

Shao, X. (1991). "Rural community development in China and the industrial shift of the rural population: summary of an international symposium." Chinese journal of population science **3**(1): 11-5.
<Go to ISI>://MEDLINE:12343678

As a summary of an international symposium on rural community development in China, commentary on China's rural reform, the industrial development of the rural population, and urbanization of the rural population and rural population control is provided. The successful reform that has occurred since the Party's 3rd Plenary session of the 11th Central Committee has been the implementation of the household joint production contract responsibility system. Farmers are enthusiastic about their right to land management. Recent focus on the declines and fluctuations in agricultural output has raised many questions. Suggestions have been made to raise agricultural prices and increase investment. Public ownership should remain with household management. The security of longterm ownership of land by individuals is not available, hence individuals are unwilling to make longterm investment. Another opinion was that the stagnation in production was temporary and a course of development; the cause was population pressure. Suggested future development after reforms should involve development of the village social structure. Communities already have a stable social system of blood ties and an administrative system organized by the party, government, and the economy. Communities with these characteristics could invest in the large-scale farming equipment which smaller households cannot afford, and take responsibility for land allocation and management and financial transactions. The role of the community would be a difficult one in balancing income distribution and expanding community benefits. The 2nd major influence on rural development has been growth in rural nonindustrial production in the small town enterprise. The urban policies of household registration and employment limit growth to rural enterprises which may use backward production technology and produce second-rate products. Eventually, rural industry will become both complementary and supplementary to the national effort. Problems remain since 1989 with the tide of laborers and rural unemployed. This may reflect a transitional phase in labor force shifts. Administrative measures to reduce the flow to nonagricultural industry and cities may not recognize the gaps in income between agriculture and industry, and that population and labor force growth is too high and natural resources for agriculture low. Urban policies are suggested as well as economic countermeasures to fertility control, such as rewards and penalties and old age security.

Sharma, K. D., P. Kumar, L. P. Gough and J. R. Sanfilipo (2004). "Rehabilitation of a lignite mine-disturbed area in the Indian Desert." Land Degradation & Development **15**(2): 163-176.
<Go to ISI>://000220799400007

Extensive lignite mining in the Indian (Thar) Desert commenced within the past decade. Accompanying extraction of this valuable resource there have been visible, important environmental impacts. The resultant land degradation has prompted concern from both public and regulatory bodies. This research assesses the success of rehabilitation plans implemented to revegetate a lignite mine-disturbed area, near the village of Giral in western Rajasthan State. Rehabilitation success was achieved within the environmental constraints of this northwest Indian hot-desert ecosystem using a combination of: (1) backfilling (abandoned pits) with minespoil and of covering the backfilled-surfaces with fresh topsoil to a thickness of about 0-30 m; (2) use of micro-catchment rainwater harvesting (MCWH) technique; (3) soil profile modification approaches; (4) plant establishment methodologies; and (5) the selection of appropriate germplasm material (trees, shrubs and grasses). Preliminary results indicate that the resulting vegetative cover will be capable of self-perpetuation under natural conditions while at the same time meeting the land-use requirements of the local people. The minespoil is alkaline in nature and has high electrical conductance. The average content of organic carbon, N, P and K is lower than in the regional topsoil. However, the concentration of Ca, Mg, Na and total S in the minespoil is much higher than in the topsoil. Further, the spoil material has no biological activity. Enhanced plant growth was achieved in MCWH plots, compared to control plots, where minespoil moisture storage was improved by 18-43 per cent. The rehabilitation protocol used at the site appears to have been successful because, in addition to the planted species, desirable native invasive species have become established. This study developed methods for the rehabilitation of lignite mine-disturbed areas and has also resulted in an understanding of rehabilitation processes in and regions with an emphasis on the long-term monitoring of rehabilitation success. Copyright (C) 2004 John Wiley Sons, Ltd.

Shinohara, N., K. Kumagai, N. Yamamoto, Y. Yanagisawa, M. Fujii and A. Yamasaki (2004). "Field validation of an active sampling cartridge as a passive sampler for long-term carbonyl monitoring." Journal of the Air & Waste Management Association **54**(4): 419-424.
<Go to ISI>://000220643300006

A carbonyl sampler originally designed for the active sampling method (Sep-Pak XPoSure) was used for long-term passive sampling, and its applicability as a passive sampler was examined through field experiments. The uptake rates of passive sampling were determined experimentally from collocated passive and active samplings for various sampling periods. The obtained uptake rates of formaldehyde, acetaldehyde, and acetone were 1.48, 1.23, and 1.08 mL/min, respectively. These uptake rates were consistent for a wide range of the sampling term (12 hr-2 weeks). Uptake rates of each carbonyl were proportional to the diffusion coefficients of each. Therefore, the ratios of diffusion coefficients were used to calculate the uptake rates of carbonyls for which the rates were not determined experimentally. Lower limits of determination were 2.16-17.5 mug/m(3) for 2-week sampling. It was confirmed that 2-week monitoring of carbonyl concentrations up to 118229 mug/m(3) was possible. Relative standard deviations of the passive method generated from the repeatability test were 2-12.3% error for five samplings, and the recovery efficiencies were larger than 90%. Thus, the passive sampler was found to be highly suitable for long-term monitoring of carbonyl compounds.

Shirokov, I. A. and K. M. Anokhina (2003). "Possibilities of short-range prediction of strong earthquakes from data of high-precision tilt measurements." Izvestiya-Physics of the Solid Earth **39**(10): 785-793.

<Go to ISI>://000186192300001

An attempt to predict near strong earthquakes from tilt variations is made on the basis of long-term monitoring, observations in the seismically active Alma-Ata region (the North Tien Shan). Retrospective analysis of data of continuous tilt measurements at the Talgar station revealed anomalous tilts preceding near strong earthquakes and characterized by a set of common kinematic features, which can be considered, under certain conditions, as precursors. Seventeen earthquakes with M greater than or equal to 4 and epicentral distances Delta less than or equal to 400 km occurred during the time of observations. Anomalous tilts were recorded prior to 14 of the 17 earthquakes. In the remaining three cases, no anomalous tilts were recorded. The inferred precursors had a baylike shape and a lifetime of 10-30 days. The elastic anisotropy and block structure of the North Tien Shan are shown to affect the magnitude and azimuth of recorded anomalous tilts, which significantly hampers the prediction of the magnitude and coordinates of a forthcoming earthquake.

Shochat, E., C. T. Robbins, S. M. Parish, P. B. Young, T. R. Stephenson and A. Tamayo (1997). "Nutritional investigations and management of captive moose." Zoo Biology **16**(6): 479-494.
<Go to ISI>://WOS:A1997YJ32000002

Historically, moose have been difficult to maintain in captivity when on diets of grass or legume hays and grain due to enteritis that frequently leads to chronic diarrhea/wasting disease. The development of wood-fiber diets has increased the lifespan of moose in captivity, but these diets do not completely prevent chronic wasting. Purina Mills (St. Louis, MO) hypothesized that captive moose are unable to digest starch that escapes the rumen, and therefore abnormal bacterial fermentation in the hindgut causes chronic diarrhea. An earlier study found no evidence of a digestive problem, so we tested the hypothesis that moose have difficulty metabolizing excess propionate produced from the fermentation of starch found in traditional cervid rations and high-grain wood-fiber diets. When challenged with an i.v. propionate load, moose metabolized propionate similar to healthy mule deer and domestic livestock. We then tested the hypothesis that grass forage is an initiating factor to chronic diarrhea/wasting and further hypothesized that grass, alfalfa, and other agriculture-based forages in association with an anaerobic bacteria produce inflammatory bowel disease (IBD) in moose. Captive moose that had ad libitum access to a wood-fiber pelleted moose diet and grazed in grass pastures developed chronic wasting symptoms at 2-4 years of age and died at 4.7 +/- 0.3 years unless restricted from grass before the development of advanced symptoms. We isolated Bacteroides vulgatus in the feces and successfully treated a moose with chronic diarrhea/wasting disease with longterm metronidazole therapy, suggesting that the chronic enteritis causing wasting disease arises from a bacteria-associated defective immunosuppressive response similar to IBD in other species. Further support for the IBD cause of wasting in moose is that this animal will relapse within hours if the metronidazole treatment is discontinued even after many months. We developed a highly palatable high-fiber, low-starch moose ration that can he fed as the sole source of nourishment, although additional research and dietary improvements are required. (C) 1997 Wiley-Liss, Inc.

Shrobe, H. (2002). "Computational vulnerability analysis for information survivability." Ai Magazine **23**(4): 81-91.
<Go to ISI>://000180288700007

The infrastructure of modern society is controlled by software systems. These systems are vulnerable to attacks; several such attacks, launched by "recreation hackers," have already led to severe disruption. However, a concerted and planned attack whose goal is to reap harm could lead to catastrophic results (for example, by disabling the computers that control the electrical power grid for, a sustained period of time). The survivability of such information systems in the face of attacks is therefore an area of extreme importance to society. This article is set in the context of self-adaptive survivable systems: software that judges the trustworthiness of the computational resources in its environment and that chooses how to achieve its goals in light of this trust model. Each self-adaptive survivable system detects and diagnoses compromises of its resources, taking whatever actions are necessary to recover from attack. In addition, a long-term monitoring system collects evidence from intrusion detectors, firewalls and all the self-adaptive components, building a composite trust model used by each component. Self-adaptive survivable systems contain models of their intended behavior; models of the required computational resources; models of the ways in which these resources can be compromised; and finally, models of the ways in which a system can be attacked and how such attacks can lead to compromises of the computational resources. In this article, I focus on computational vulnerability analysis: a system that, given a description of a. computational environment, deduces all the attacks that are possible. In particular, its goal is to develop multistage attack models in which the compromise of one resource is used to facilitate the compromise of other, more valuable resources. Although the ultimate aim is to use these models online as part of a self- adaptive system, there are other offline uses as well that we are deploying first to help system administrators assess the vulnerabilities of their computing environment.

Shugaeva, N. A., E. I. Vyskrebentseva, S. O. Orekhova and A. G. Shugaev (2007). "Effect of water deficit on respiration of conducting bundles in leaf petioles of sugar beet." Russian Journal of Plant Physiology **54**(3): 329-335.
<Go to ISI>://WOS:000247240200006

Isolated fibrovascular bundles from source leaf petioles of sugar beet (Beta vulgaris L.) and hogweed (Heracleum sosnovskyi L.) were used to study the influence of long-term drought on the oxygen uptake rate and activities of mitochondrial oxidases, i.e., cytochrome oxidase and salicylhydroxamic acid-sensitive alternative oxidase (AO). Under normal soil moisture content (70% of full water-retaining capacity, WRC, the oxygen uptake by sugar beet conducting bundles was characterized by a high rate (> 700 mu l O-2/(g fr wt h)) and by distinct cytochrome oxidase-dependent manner of terminal oxidation (up to 80% inhibition of respiration in the presence of 0.5 mM KCN). After long-term water deficit (40% of WRC, the bundle respiration proceeded at nearly the same rate but featured an elevated resistance to cyanide. At early drought stage (10 days), a decrease in the activity of cytochrome-mediated oxidation pathway was largely counterbalanced by activation of mitochondrial AO, whereas long-term dehydration of plants was accompanied by activation of additional oxidative systems insensitive to both KCN and SHAM. Similar but even more pronounced changes in activities of terminal oxidases were discovered in conducting bundles of wild-grown hogweed plants exposed to longterm natural drought. It is supposed that the suppression of cytochrome-mediated oxidation coupled with ATP synthesis in the cells of

sugar beet source leaves impedes the translocation of assimilates and their accumulation in the taproot, which represents an important factor of drastic decrease in the yield of this agricultural crop under conditions of water deficit.

Siegrist, S., D. Schaub, L. Pfiffner and P. Mader (1998). "Does organic agriculture reduce soil erodibility? The results of a long-term field study on loess in Switzerland." Agriculture Ecosystems & Environment **69**(3): 253-264.
<Go to ISI>://000074584600007

In a long-term field trial in northwestern Switzerland, the effects of organic and conventional land-use management on earthworm populations and on soil erodibility were investigated. A silt loam soil which had developed in deep deposits of alluvial loess characterised the study site. Three methods were applied to analyse soil erodibility, at three different periods between autumn 1992 and 1993: aggregate stability (measured in the laboratory by a high energy rainfall simulation and by percolation) and soil particle detachment (measured in the field by splash erosion). Earthworm biomass and density, as well as the population diversity, were significantly greater on the organic plots than on the conventional plots. Likewise, the aggregate stability of the organic plots, when determined by means of percolation, was significantly better. Therefore, erosion susceptibility is greater on plots farmed conventionally. On the other hand, splash erosion monitoring and simulated rainfall experiments only partially highlight differences in erodibility between the two main land-management methods. Future comparisons between the farming systems should also include farmer managed fields with greater differentiation in crop rotations and cultural practices like tillage, fertilisation and pesticide use.

Silver, S. C., L. E. T. Ostro, L. K. Marsh, L. Maffei, A. J. Noss, M. J. Kelly, R. B. Wallace, H. Gomez and G. Ayala (2004). "The use of camera traps for estimating jaguar Panthera onca abundance and density using capture/recapture analysis." Oryx **38**(2): 148-154.
<Go to ISI>://000221639400015

Across their range jaguars Panthera onca are important conservation icons for several reasons: their important role in ecosystems as top carnivores, their cultural and economic value, and their potential conflicts with livestock. However, jaguars have historically been difficult to monitor. This paper outlines the first application of a systematic camera trapping methodology for abundance estimation of jaguars. The methodology was initially developed to estimate tiger abundance in India. We used a grid of camera traps deployed for 2 months, identified individual animals from their pelage patterns, and estimated population abundance using capture-recapture statistical models. We applied this methodology in a total of five study sites in the Mayan rainforest of Belize, the Chaco dry forest of Bolivia, and the Amazonian rainforest of Bolivia. Densities were 2.4-8.8 adult individuals per 100 km(2), based on 7-11 observed animals, 16-37 combined 'captures' and 'recaptures', 486-2,280 trap nights, and sample areas of 107- 458 km(2). The sampling technique will be used to continue long-term monitoring of jaguar populations at the same sites, to compare with further sites, and to develop population models. This method is currently the only systematic population survey technique for jaguars, and has the potential to be applied to other species with individually recognizable markings.

Sims, J. T., E. Igo and Y. Skeans (1991). "Comparison of Routine Soil Tests and Epa Method 3050 as Extractants for Heavy-Metals in Delaware Soils." Communications in Soil Science and Plant Analysis **22**(11-12): 1031-1045.
<Go to ISI>://A1991GF15700001

Agricultural use of sewage sludges can be limited by heavy metal accumulations in soils and crops. Information on background levels of total heavy metals in soils and changes in soil metal content due to sludge application are, therefore, critical aspects of long-term sludge monitoring programs. As soil testing laboratories routinely, and rapidly, determine, in a wide variety of agricultural soils, the levels of some heavy metals and soil properties related to plant availability of these metals (e.g. Cu, Fe, Mn, Zn, pH, organic matter, texture), these labs could participate actively in the development and monitoring of environmentally sound sludge application programs. Consequently, the objective of this study was to compare three soil tests (Mehlich 1, Mehlich 3, and DTPA) and an USEPA approved method for measuring heavy metals in soils (EPA Method 3050), as extractants for Cd, Cu, Ni, Pb and Zn in representative agricultural soils of Delaware and in soils from five sites involved in a state-monitored sludge application program. Soil tests extracted less than 30% of total (EPA 3050) metals from most soils, with average percentages of total metal extracted (across all soils and metals) of 15%, 32%, and 11% for the Mehlich 1, Mehlich 3, and DTPA, respectively. Statistically significant correlations between total and soil test extractable metal content were obtained with all extractants for Cu, Pb, and Zn, but not Cd and Ni. The Mehlich 1 soil test was best correlated with total Cu and Zn (r = 0.78***, 0.60***, respectively), while the chelate-based extractants (DTPA and Mehlich 3) were better correlated with total Pb (r = 0.85***, 0.63***). Multiple regression equations for the prediction of total Cu, Ni, Pb, and Zn, from soil test extractable metal in combination with easily measured soil properties (pH, organic matter by loss on ignition, soil volume weight) had R2 values ranging from 0.41*** to 0.85***, suggesting that it may be possible to monitor, with reasonable success, heavy metal accumulations in soils using the results of a routine soil test.

Sinclair, R. (2004). "Persistence of dead trees and fallen timber in the arid zone: 76 years of data from the TGB Osborn Vegetation Reserve, Koonamore, South Australia." Rangeland Journal **26**(1): 111-122.
<Go to ISI>://000222148400008

Very little information is available about how long dead trees remain standing, or fallen logs persist, in the Australian and zone. Data on dead timber longevity were extracted from records of both permanent quadrats and photopoints on the T.G.B. Osborn Vegetation Reserve on Koonamore Station, South Australia. Two species were examined, Acacia aneura (mulga) and Myoporum platycarpum (false sandalwood, sugarwood). Some individuals of mulga are capable of standing dead for over 75 years, while dead M. platycarpum may stand for over 60 years. Dead Myoporum trees remained standing for an average of 31.2 +/- 5.7 years, fallen trunks persisted for 38.4 +/- 3.7 years. Standing dead A. aneura persisted on average for 40.0 +/- 3.7 years, fallen trunks for 22.4 +/- 6.3 years. These figures are almost certainly underestimates. The reasons why are discussed and some comparisons made with temperate forests and tropical mangroves.

Sirageldin, I. (1983). "Some issues in Middle Eastern international migration." Pakistan development review **22**(4): 217-37.

<Go to ISI>://MEDLINE:12339615

2 controversial issues related to the consequences of Middle Eastern international migration were examined: its effect on the development policies of the labor importing countries with a special reference to the case of Kuwait; and its effect on the growth potential of the labor exporting countries with special reference to recent development in Egypt's agricultural reproductivity. A preliminary note comments on the analytical nature of international labor migration in the Middle East and on the public view of emigrants as export commodities. The basic parameters of a desired population parity are interrelated. It is possible to influence the labor ratio (R2) as well as the nonKuwait crude labor participation rate (R3) through a migration policy. Thus, given a policy objective of some desired balance stated in trms of 1 or more of the identified parameters, it is possible to analyze the consequences of alternative migration strategies. It is important to consider the role of relative productivity (R6). An attempt to change R6 has implications for both the design of a migration policy and a national policy of human capital formation. Other factors may not be immediately related to a migration policy. The question then is whether these ratios are sensitive to policy intervention. In a simulation exercise it was assumed that the Kuwaiti crude labor force participation rate (R4) will increase by 13% during a period of 10 years. R4 increases if relatively more people work. Women are 1 segment of the labor force that is not adequately represented, partly because of traditions, lack of skills, and the presence of high fertility. None of these can change in the short run without an active policy of social reform. Yet, the assumption seems to be in the right direction. A policy that attempts to reduce R4 through increasing fertility in Kuwait is clearly against the tide. In sum, the labor importing countries faced with recent unfavorable demographic realities will actively develop population policies that are consistent with their socioeconomic plans. The flow of labor immigration is a tool that can be manipulated on relatively short notice, and the economic cost of such a policy is relatively simple to estimate. In examining labor exporting countries, the focus is narrowed to 1 sector (agriculture) and with 1 issue their emigration behavior are being blamed simultaneously for the decline of the agricultural sector. Some hypotheses are offered. Clearly, emigration in the case of Egyptian agriculture must be evaluated in terms of the gross benefit of remittances and in terms of their effect on local production in the short-and longterm. It seems that population and development policies must take care of the effect of emigration on agricultural productivity through 2 channels: the effect of remittances on expenditure and labor market behavior; and its effect on fertility behavior.

Slater, L. and A. Binley (2003). "Evaluation of permeable reactive barrier (PRB) integrity using electrical imaging methods." Geophysics **68**(3): 911-921.

<Go to ISI>://000220836200013

The permeable reactive barrier (PRB) is a promising in-situ technology for treatment of hydrocarbon-contaminated groundwater. A PRB is typically composed of granular iron which degrades chlorinated organics into potentially nontoxic dehalogenated organic compounds and inorganic chloride. Geophysical methods may assist assessment of in-situ barrier integrity and evaluation of long-term barrier performance. The highly conductive granular iron makes the PRB an excellent target for conductivity imaging methods. In addition, electrochemical storage of charge at the iron-solution interface generates an impedance that decreases with frequency. The PRB is thus a potential induced polarization (IP) target. Surface and cross-borehole electrical imaging (conductivity and IP) was conducted at a PRB installed at the U.S. Department of Energy's Kansas City plant. Poor signal strength (25% of measurements exceeding 89% reciprocal error) and insensitivity at depth, which results from current channeling in the highly conductive iron, limited surface imaging. Crosshole 2D and 3D electrical measurements were highly effective at defining art accurate, approximately 0.3-m resolution, cross-sectional image of the barrier in-situ. Both the conductivity and IP images reveal the barrier geometry. Crosshole images obtained for seven panels along the barrier suggest Variability in iron emplacement along the installation. On five panels the PRB structure is imaged as a conductive feature exceeding 1 S/m. However, on two panels the conductivity in the assumed vicinity of the PRB is less than 1 S/m. ne images also suggest variability,in the integrity of the contact between the PRB and bedrock. This noninvasive, in-situ evaluation of barrier geometry using conductivity/IP has broad implications for the long-term monitoring of PRB performance as a method of hydrocarbon removal.

Smaling, E. M. A. and L. O. Fresco (1993). "A Decision-Support Model for Monitoring Nutrient Balances under Agricultural Land-Use (Nutmon)." Geoderma **60**(1-4): 235-256.

<Go to ISI>://A1993MR14800016

A quantitative model of the balance between inputs and outputs of nitrogen, phosphorus and potassium in African land use systems (NUTBAL) was recently developed at two scales: supra-national (38 sub-Saharan African countries) and regional (Kisii District, Kenya). Calculating inputs (mineral fertilizer, organic manure, wet and dry deposition, biological nitrogen fixation, sedimentation) and outputs (removal of above-ground crop parts, leaching, denitrification, water erosion) led to the conclusion that there are considerable net fertility losses in each growing period. In this paper, NUTBAL is elaborated into a decision-support model (NUTMON) to monitor the effects of changing land use, and suggest interventions that improve the nutrient balance. As input and output determinants cannot all be quantified equally well, the model recognizes primary data, estimates, and assumptions. The NUTMON determinants are mostly scale-neutral and can therefore be used to monitor nutrient balances at farm, regional, national and supra-national level. This is essential since the hierarchical levels interact. A number of recent interventions at the regional level (Kisii District, Kenya) are elaborated, including national fertilizer and produce price policies, fertilizer supply in small packages, zero-grazing, agroforestry, soil conservation measures, and increasing fertilizer use efficiency. It is shown that a major nutrient conservation effort in Kisii reduces nutrient depletion by approximately 50%, but does not entirely redress the N and K balance. To achieve the latter without reducing crop production, 75% of the district would have to be converted to a rotation system of maize and green manure cover crops, whereas 25% can remain under tea. NUTMON has the potential to become a dynamic tool for land use policies, geared towards a balanced nutrient status in African land use systems. It can assist decision makers in determining the effects of cuffent and alternative land use scenarios, taking account of both the productivity as well as the long-term sustainability of agro-ecosystems.

Smith, E. G., T. L. Peters, R. E. Blackshaw, C. W. Lindwall and F. J. Larney (1996). "Economics of reduced tillage fallow-crop systems in the dark brown soil zone of Alberta." Canadian Journal of Soil Science **76**(3): 411-416.
<Go to ISI>://WOS:A1996VG59100019

The use of conservation tillage management in fallow cropping systems reduces soil erosion and improves soil quality. The economic benefits of these alternate tillage methods are less certain. This study examined the economic returns from reduced tillage methods on fallow using yield and input data from two experiments at the Agriculture and Agri-Food Canada Research Centre at Lethbridge, Alberta. One experiment was a longterm study initiated in 1955 with eight treatments, the second was a 5-yr study with 15 treatments. Results from the 5-yr study indicated no difference in net returns between conventional and reduced tillage fallow systems. In contrast, the long-ten study net returns were highest for tilled systems and lowest for herbicide-only systems. The long-term study had a build-up of weeds that are difficult to control with herbicides alone. The resulting lower average yield and higher herbicide costs of the herbicide-only treatments in the long-term study accounted for most of the contrasting results between the two experiments. An economic evaluation of tillage practices requires the entire system to be evaluated, not just the tillage component.

Smith, P., D. Powlson, M. Glendining and J. O. Smith (1997). "Potential for carbon sequestration in European soils: preliminary estimates for five scenarios using results from long-term experiments." Global Change Biology **3**(1): 67-79.
http://dx.doi.org/10.1046/j.1365-2486.1997.00055.x AND http://www.ask-force.org/web/Longterm/Smith-Potential-CarbonSequestration-Longterm-1997.pdf

One of the main options for carbon mitigation identified by the IPCC is the sequestration of carbon in soils. In this paper we use statistical relationships derived from European long-term experiments to explore the potential for carbon sequestration in soils in the European Union. We examine five scenarios, namely (a) the amendment of arable soils with animal manure, (b) the amendment of arable soils with sewage sludge, (c) the incorporation of cereal straw into the soils in which it was grown, (d) the afforestation of surplus arable land through natural woodland regeneration, and (e) extensification of agriculture through ley-arable farming. Our calculations suggest only limited potential to increase soil carbon stocks over the next century by addition of animal manure, sewage sludge or straw (15 Tg C y–1), but greater potential through extensification of agriculture (≈ 40 Tg C y–1) or through the afforestation of surplus arable land (≈ 50 Tg C y–1). We estimate that extensification could increase the total soil carbon stock of the European Union by 17%. Afforestation of 30% of present arable land would increase soil carbon stocks by about 8% over a century and would substitute up to 30 Tg C y–1 of fossil fuel carbon if the wood were used as biofuel. However, even the afforestation scenario, with the greatest potential for carbon mitigation, can sequester only 0.8% of annual global anthropogenic CO2-carbon. Our figures suggest that, although efforts in temperate agriculture can contribute to global carbon mitigation, the potential is small compared to that available through reducing anthropogenic CO2 emissions by halting tropical and sub-tropical deforestation or by reducing fossil fuel burning.

Snell, C., A. Bernheim, J.-B. Berge, M. Kuntz, G. Pascal, A. Paris and A. E. Ricroch (2012). "Assessment of the health impact of GM plant diets in long-term and multigenerational animal feeding trials: A literature review." Food and Chemical Toxicology **50**(3â€“4): 1134-1148.
http://www.sciencedirect.com/science/article/pii/S0278691511006399 AND http://www.ask-force.org/web/Food/Snell-Assessment-Health-Impct-GM-2012.pdf

The aim of this systematic review was to collect data concerning the effects of diets containing GM maize, potato, soybean, rice, or triticale on animal health. We examined 12 long-term studies (of more than 90 days, up to 2 years in duration) and 12 multigenerational studies (from 2 to 5 generations). We referenced the 90-day studies on GM feed for which long-term or multigenerational study data were available. Many parameters have been examined using biochemical analyses, histological examination of specific organs, hematology and the detection of transgenic DNA. The statistical findings and methods have been considered from each study. Results from all the 24 studies do not suggest any health hazards and, in general, there were no statistically significant differences within parameters observed. However, some small differences were observed, though these fell within the normal variation range of the considered parameter and thus had no biological or toxicological significance. If required, a 90-day feeding study performed in rodents, according to the OECD Test Guideline, is generally considered sufficient in order to evaluate the health effects of GM feed. The studies reviewed present evidence to show that GM plants are nutritionally equivalent to their non-GM counterparts and can be safely used in food and feed.

Snell Chelsea, Aude Bernheim, Jean-Baptiste Berge, Marcel Kuntz, Gerard Pascal, Alain Paris and Ricroch Agnes E. (2011). "Assessment of the health impact of GM plant diets in long-term and multigenerational animal feeding trials: A literature review." Food and Chemical Toxicology(0).
http://www.sciencedirect.com/science/article/pii/S0278691511006399 AND http://www.ask-force.org/web/Longterm/Chelsea-Assessment-Health-Longterm-2011.pdf

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Song, K. and J. F. Stone (2005). "Shirt designs for sun protection." Journal of Environmental Health **67**(10): 50-56.

<Go to ISI>://WOS:000229366900005

The objectives of the study reported here were to document consumer attitudes, risk understanding, and behaviors with respect to sun safety and to define consumer preferences for protective shirt design and labeling. A sample of 1,508 adults was surveyed at the 2002 Farm Progress Show sun-safety exhibit. Results showed that people generally understood the long-term risk from exposure to ultraviolet radiation, but did not routinely use sun-protective clothing to avoid it. Design features preferred by consumers for sun-safe shirts were significantly related to demographic characteristics, including age, education, sex, occupation, and employment status, Overall, the sun-safe shirt design most preferred can be summarized as a casual-style, solid-color, knit shirt with a crew neck or collar. Over 80 percent of participants favored Ultraviolet Protective Factor labeling as well as other consumer labeling such as information on care, fiber content, colorfastness, and finishes applied to shirts. Industrial and educational implications are provided.

Sparling, G. and L. Schipper (2004). "Soil quality monitoring in New Zealand: trends and issues arising from a broad-scale survey." Agriculture Ecosystems & Environment **104**(3): 545-552.

<Go to ISI>://000225747400015

Interpretation of national-scale surveys is needed to determine long term impacts of land use on soil quality. We report the findings of a survey of soil quality in New Zealand conducted 1995-2001. The survey covered 511 sites representative of 98% of New Zealand's land area. Land uses included: arable cropping and horticulture, mixed cropping. drystock pasture (sheep, beef or deer), dairy pasture, tussock grassland, plantation forestry. and indigenous forest, occurring on 12 soil orders. At each site, land-use and soil profile were described. and the topsoil (0-10 cm depth) analyzed for total C, total N, anaerobically mineralisable N, pH, Olsen P, bulk density and macroporosity. Pastoral land and indigenous forests had similar total C contents (56-67 mg cm(-3)). Mean N contents under pastures were 4.3-5.9 ma cm(-3), whereas all other land uses were <3.5 mg cm(-3). Olsen P was much greater under pastures and cropping (44-49 ma cm(-3)) than under plantation and indigenous forests (ca. 10 mg cm(-3)). Indigenous and plantation forest soils were the most acidic (mean pH 5.4), and cropping soils the most alkaline (mean pH 6.2). Indigenous forests had the lowest bulk density, (0.76 Mg m(-3)). and mixed cropping soils the highest (1.22 Mg m(-3)). Macroporosity was variable (9.3-25.6% (v/v)). Overall, 80% of the soil properties fell within target ranges identified as desirable to maintain soil quality for production and environmental objectives. There was widespread but moderate compaction under pastures and cropping. depletion of total C tinder cropping, and nutrient imbalance (usually excess P) under cropping and dairy pastures. The study identified soil. land use and management combinations of concern for loss of soil quality, and provided benchmark data against which to measure change. (C) 2004 Elsevier B.V. All rights reserved.

Spurny, F. and T. Dachev (2003). Long-term monitoring of the onboard aircraft exposure level with a Si-diode based spectrometer. Space Life Sciences: Structure and Dynamics of the Global Space Radiation Field at Aircraft Altitiudes. Kidlington, PERGAMON-ELSEVIER SCIENCE LTD. **32:** 53-58.

<Go to ISI>://000185946800007

The radiation fields onboard aircraft are complex (EURADOS, 1996), and several methods are used to characterise them for radiation protection. We have tested a spectrometer based on Si-diode at different sources and accelerator facilities. The energy deposited in the diode is analysed to estimate the contribution of different radiations to dosimetry quantities. The spectrum of energy deposition events onboard aircraft is similar to that registered in the CERN high-energy reference field. We used this similarity to determine the correction factors to appreciate radiation protection quantities from the results of onboard measurements. During 2001-2002, the spectrometer was used to acquire measurements onboard commercial aircraft during five long-term exposures. All necessary flight parameters were acquired; thus permitting calculations of the onboard effective dose and/or ambient dose equivalent by means of both the CAR16 and the EPCARD codes and comparison with the results of the measurements. It was found that the apparent ambient dose equivalent values from measured data are in reasonable agreement with the results of calculations. Quantitative analysis of this agreement as a function of flight parameters (geomagnetic position, solar activity variations, etc.) is presented. During one flight, an important solar event (GLE 60 on 15 April 2001) was recorded by the spectrometer. In some other cases the measurements during a Forbush decreases were acquired. These extremes were well registered by the equipment and the data obtained are analyzed. (C) 2003 COSPAR. Published by Elsevier Ltd. All rights reserved.

Steiner, M., J. A. Smith and R. Uijlenhoet (2004). "A microphysical interpretation of radar reflectivity-rain rate relationships." Journal of the Atmospheric Sciences **61**(10): 1114-1131.

<Go to ISI>://000221380800002

The microphysical aspects of the relationship between radar reflectivity Z and rainfall rate R are examined. Various concepts discussed in the literature are integrated into a coherent analytical framework and discussed with a focus on the interpretability of Z - R relations from a microphysical point of view. The forward problem of analytically characterizing the Z - R relationship based on exponential, gamma, and monodisperse raindrop size distributions is highlighted as well as the inverse problem of a microphysical interpretation of empirically obtained Z - R relation coefficients. Three special modes that a Z - R relationship may attain are revealed, depending on whether the variability of the raindrop size distribution is governed by variations of drop number density, drop size, or a coordinated combination thereof with constant ratio of mean drop size and number density. A rain parameter diagram is presented that assists in diagnosing these microphysical modes. The number-controlled case results in linear Z - R relations that have been observed for steady and statistically homogeneous or equilibrium rainfall conditions. Most rainfall situations, however, exhibit a variability of drop spectra that is facilitated by a mix of variations of drop size and number density, which results in the well-known power- law Z - R relationships. Significant uncertainties are found to be associated with the retrieval of microphysical information from the Z - R relation coefficients, but even more so with shortcomings of the measurement of rainfall information and the subsequent processing of that data to obtain a Z - R relation. Given a proper consideration of the uncertainties, however, valuable microphysical information may be obtained, particularly as a result of long-term monitoring of rainfall for fixed observational settings but also through comparisons among different climatic rainfall regimes.

Steven, M. D., T. J. Malthus, F. Baret, H. Xu and M. J. Chopping (2003). "Intercalibration of vegetation indices from different sensor systems." Remote Sensing of Environment **88**(4): 412-422.
<Go to ISI>://000187347100005

Spectroradiometric measurements were made over a range of crop canopy densities, soil backgrounds and foliage colour. The reflected spectral radiances were convoluted with the spectral response functions of a range of satellite instruments to simulate their responses. When Normalised Difference Vegetation Indices (NDVI) from the different instruments were compared, they varied by a few percent, but the values were strongly linearly related, allowing vegetation indices from one instrument to be intercalibrated against another. A table of conversion coefficents is presented for AVHRR, ATSR-2, Landsat MSS, TM and ETM+, SPOT-2 and SPOT-4 HRV, IRS, IKONOS, SEAWIFS, MISR, MODIS, POLDER, Quickbird and MERI S (see Appendix A for glossary of acronyms). The same set of coefficients was found to apply, within the margin of error of the analysis, for the Soil Adjusted Vegetation Index SAVI. The relationships for SPOT vs. TM and for ATSR-2 vs. AVHRR were directly validated by comparison of atmospherically corrected image data. The results indicate that vegetation indices can be interconverted to a precision of 1-2%. This result offers improved opportunities for monitoring crops through the growing season and the prospects of better continuity of long-term monitoring of vegetation responses to environmental change. (C) 2003 Elsevier Inc. All rights reserved.

Stevens, W. B., R. G. Hoeft and R. L. Mulvaney (2005). "Fate of nitrogen-15 in a long-term nitrogen rate study: I. Interactions with soil nitrogen." Agronomy Journal **97**(4): 1037-1045.
<Go to ISI>://WOS:000231038100001

A better understanding of how N management practices affect transformations and movement of fertilizer N may lead to more efficient N management. The objectives of this work were to determine how long-term N fertilizer history in a continuous corn (Zea mays L.) production system affects (i) movement of fertilizer N through the soil profile and (ii) cycling of fertilizer N between available and nonavailable soil forms. Nitrogen-15-labeled ammonium nitrate ((NH4NO3)-N-15-N-15) was applied at 0, 67, 134, 201, or 268 kg N ha(-1) to subplots of longterm N rate plots. Twenty to 55% of labeled N was converted into either organic or clay-fixed forms during the first growing season, with the percentage decreasing with increasing N application rate. Significantly more N was released from nonavailable forms in plots where the historical N application rate had exceeded the long-term optimum (186 kg ha(-1)) than in plots that received lower rates. Little fertilizer-derived N leached from the profile during the first growing season, but losses did occur during the off-season and subsequent growing season when N application rate was higher than the optimum. It was concluded that a history of excessive N application may decrease response of subsequent crops to fertilizer N due to greater release from nonavailable N forms, most likely as a result of increased mineralization of crop residues and recently formed soil organic N.

Strang, I. and M. Dienst (2004). "Effects of water level at Lake Constance on the Deschampsietum rhenanae from 1989 to 2003." Limnologica **34**(1-2): 22-28.
<Go to ISI>://000222030800004

The Deschampsietum rhenanae is an endemic. and endangered lakeshore community growing in the upper littoral of Lake Constance, the occurrence of which has been reduced dramatically during the last 100 years. The existence of this community depends on the seasonal water level changes of the unregulated, prealpine Lake Constance. Long-term monitoring indicates that the typical species of the Deschampsietum rhenanae and their competitors may be strongly affected by extreme water levels. An earlier onset of the water level increase in spring could potentially pose a threat to the Deschampsietum rhenanae, especially if the water level rises before seed ripening in the Deschampsietum rhenanae.

Suess, O., T. Kombos, O. Ciklatekerlio, R. Stendel, S. Suess and M. Brock (2002). "Impact of brain shift on intraoperative neurophysiological monitoring with cortical strip electrodes." Acta Neurochirurgica **144**(12): 1279-1289.
<Go to ISI>://000180203300008

Background. Intraoperative neurophysiological monitoring has become the standard procedure for locating eloquent regions of the brain. Such continuous electrical stimulation of motor pathways is usually applied by means of flat silicon-embedded electrodes placed directly on the motor cortex. However, shifting of the silicon strip on the cortical surface as well as electrode displacement due to brain shift underneath the electrode can lead to inaccurate recordings not directly caused by intraoperative impairment of the motor cortex or the motor pathways. Method. This prospective study was conducted to quantify cortical brain shift during open cranial surgery and to assess its impact on electrode positioning in 31 procedures near the precentral gyrus. Three groups of different lesion volumes were distinguished. Movement of the cortex between opening of the dura and completion of tumor removal as well as cortical electrode shifting were digitally measured and analyzed. Findings. Cortical surface structures evidenced a significantly larger shift (up to 23.4 mm) in comparison to the electrode strips (up to 4.2 mm) in lesions with a volume of over 20 ml. Cortex shifting highly correlated with lesion volume, whereas strip electrode movement was almost unidirectional and did not differ significantly among the three groups. However, the way they were placed (completely on the cortex vs. partly underlying or overlapping the craniotomy borders) affected the magnitude of their intraoperative displacement. As a consequence, 3 of the 31 cases (9.3%) showed a significant change in the recorded motor responses due to intraoperative dislocation of the stimulating electrode. Interpretation. Changes in the location of cerebral structures due to intraoperative brain shift may exert a marked influence on intraoperative neurophysiological monitoring if cortical strip electrodes are used. Therefore, long-term monitoring of the central region requires continuous checking of the position of stimulating electrodes and, if necessary, correction of their location.

Suman, A., M. Lal, A. K. Singh and A. Gaur (2006). "Microbial biomass turnover in Indian subtropical soils under different sugarcane intercropping systems." Agronomy Journal **98**(3): 698-704.
<Go to ISI>://WOS:000237867600033

Changes in soil organic C (C(org)), total N (N(t)), available nutrients, soil microbial biomass C (C(mic)) and N (N(mic)), and mineralizable C and N in the sugarcane (Saccharum officinarum L.) rhizosphere were evaluated under intensive sugarcane cropping

systems with intercrops including wheat (Triticum aestivum L.), maize (Zea mays L.), rajmash (Phaseolus vulgaris L.), green gram [Vigna radiata (L.) R. Wilczek var. radiata], cowpea [Vign aunguiculata (L.) Walp.], lentil (Lens culinaris Medik.), mustard (Brassica rapa L.), potato (Solanum tuberosum L.), and sesbania (Sesbania rostrata Bremek. & Oberm.) in subtropical soils of India. Organic C increased significantly when maize (25%), wheat (24%), mustard (19%), potato (17%), and rak mash (13%) were intercropped with sugarcane, while legume intercrops substantially increased Nt and available N. Increase in microbial respiration was greater where maize (42%), wheat (37%), or mustard (31%) were intercropped compared with pulse crops. Soil microbial biomass C accounted for 2.7 to 3.3% of C(org) content and N(mic) accounted for 2.6 to 3.7% of N(t) under different intercropping conditions. A higher CO(2) evolution rate and wider C(mic)/N(mic) ratios were recorded with cereal and mustard intercrops, whereas higher N mineralization was recorded with pulse intercrops. Results indicate that intercropping with pulse crops and incorporation of their labile C substrate improved N mineralization. The build up of the C pool and C(mic) in the case of cereals, mustard, and potato intercropping should promote longterm stability.

Sun, P., P. Blanchard, K. Brice and R. A. Hites (2006). "Atmospheric organochlorine pesticide concentrations near the Great Lakes: Temporal and spatial trends." Environmental Science & Technology **40**(21): 6587-6593.
<Go to ISI>://WOS:000241628800017

As a part of the Integrated Atmospheric Deposition Network, atmospheric organochlorine pesticide concentrations were measured in both the gas and particle phases at seven sites near the Great Lakes. Much higher organochlorine pesticide concentrations were found in the gas phase compared to that in the particle phase. Longterm decreasing trends were observed for most pesticides in both phases. Two different seasonal trends were observed in the particle phase: (a) in-use pesticides, such as endosulfan, showed higher concentrations in the summer, a time corresponding to their agriculture use, and (b) restricted organochlorine pesticides, such as lindane, showed higher particle-phase concentrations in the winter, presumably due to their enhanced partitioning from the gas phase to particles. Generally, Chicago had the highest concentrations of chlordanes, dieldrin, and Sigma DDT, suggesting that urban areas could be sources of these compounds to atmosphere. Point Petre had the highest concentrations of endosulfan, likely due to its agricultural application in Southern Ontario.

Sutton, M. A., B. Miners, Y. S. Tang, C. Milford, G. P. Wyers, J. H. Duyzer and D. Fowler (2001). "Comparison of low cost measurement techniques for long-term monitoring of atmospheric ammonia." Journal of Environmental Monitoring **3**(5): 446-453.
<Go to ISI>://000171794600004

An inter-comparison of techniques for long-term sampling of atmospheric ammonia (NH3) was conducted with a view to establishing a national network with > 50 sites. Key requirements were for: a low cost system, simplicity and durability to enable a postal exchange with local site operators, a precision of < +/- 20% for monthly sampling at expected NH3 concentrations of 1-2 <mu>g m(-3), a detection limit sufficient to resolve the small NH3 concentrations (<0.2 <mu>g m(-3)) expected in remote parts of the UK, and a quantitative means to establish quality control. Five sampling methods were compared: A, a commercially available membrane diffusion tube (exposed in triplicate). with membranes removed immediately after sampling; B. the above method, with the membranes left in place until analysis; C, open-ended diffusion tubes (exposed with 4 replicates); D, a new active sampling diffusion denuder system, and E, an active sampling bubbler system. Method D consisted of two 0.1 in acid coated glass denuders in series with sampling at approximate to0.31 min(-1). These methods were deployed at 6 locations in the UK and the Netherlands and compared against reference estimates. Method D was the most precise and sensitive of the techniques compared, with a detection limit of < 0.1 <mu>g m(-3). The bubbler provided a less precise estimate of NH3 concentration, and also suffered several practical drawbacks. The diffusion tubes were found to correlate with the reference at high concentrations (> 3 mug m(-3)), but were less precise and overestimated NH3 at smaller concentrations. Of the passive methods, A was the most precise and C the least precise. On the basis of the results, method D has been implemented in the national network, together with application of method A to explore spatial variability in regions with expected high NH3 concentrations.

Suyehiro, K., H. Mikada and K. Asakawa (2003). "Japanese seafloor observing systems: Present and future." Marine Technology Society Journal **37**(3): 102-114.
<Go to ISI>://000187402800017

We describe in this article Japanese efforts toward building and operating long-term seafloor observing systems. Greater details are given to those systems in which the authors have been involved. The main impetus for obtaining long-term time- series from the ocean floor in Japan has been earthquake monitoring for risk assessment and hazard mitigation. Most of the earthquake energy is released near and along the oceanic trenches offshore Japan, and large inter-plate earthquakes recur at decades to 100-year intervals, which are a great threat to the society. The first cabled observatory was laid in 1978 by the Japan Meteorological Agency to monitor seismicity in an area where a M-8 earthquake has been expected to occur. Since then, national agencies and universities established more cabled observing systems (8 systems as of 2003). The very reason of seismic activity is the plate subduction, which causes numerous geophysically interesting activities including fluid vents, biological communities, and magma movements. Realizing all these processes require long-term monitoring to lead to eventual understanding of their dynamics, efforts were made particularly at JAMSTEC to establish multiple-sensor observing systems. There are now certain directions towards the future. One is establishing monitoring systems in deep ocean boreholes, which will become possible by the new Integrated Ocean Drilling Program (2003-). Another is enabling many sensors to be deployed at an appropriate spatial density so that networks realized on land can be extended over the surrounding oceans. Me third is establishing observatories as components of global networks.

Switalski, T. A., J. A. Bissonette, T. H. DeLuca, C. H. Luce and M. A. Madej (2004). "Benefits and impacts of road removal." Frontiers in Ecology and the Environment **2**(1): 21-28.
<Go to ISI>://000221791800018

Road removal is being used to mitigate the physical and ecological impacts of roads and to restore both public and private lands. Although many federal and state agencies and private landowners have created protocols for road removal and priorities for

restoration, research has not kept pace with the rate of removal. Some research has been conducted on hydrologic and geomorphic restoration following road removal, but no studies have directly addressed restoring wildlife habitat. Road removal creates a short-term disturbance which may temporarily increase sediment loss. However, long-term monitoring and initial research have shown that road removal reduces chronic erosion and the risk of landslides. We review the hydrologic, geomorphic, and ecological benefits and impacts of three methods of road removal, identify knowledge gaps, and propose questions for future research, which is urgently needed to quantify how effectively road removal restores terrestrial, riparian, and aquatic habitat and other ecosystem processes.

Sykorova, Z., L. Bodlak, M. Hais and L. Havelka (2006). "Assessment of longterm and shortterm changes in the land use of the Stropnice River catchment." Ekologia (Bratislava) **25**(Suppl. 3): 249-258.
<Go to ISI>://BIOSIS:PREV200600629420

Changes connected with the use of agricultural landscape in the upper part of the Stropnice River catchment were analysed. They are becoming more visible over much shorter periods of time. We evaluated the short and long-term trends in the agriculture and land use by comparing the historical land use data to the current state. We also compared the historical base with the GIS equipment (Indicating sketches, Stable cadastre and its duplicate, Josef's cadastre and historic aerial photographs), to the current modified mapping of the land use.The most significant change was noticed by the year of 2004, when the area of agricultural land decreased from 59.1% to today's 43.8%. Forest covered area has increased by more than 11% since 1995.

Szabo, L. (1997). "Use of the Wischmeier-Smith equation for evaluation of actual and potential risk of erosion for the soils of the central plateau, Angola, intensively used in agriculture." Eurasian Soil Science **30**(1): 63-66.
<Go to ISI>://WOS:A1997XF43300011

The role of plant cover and soil conservation practices in erosion control was estimated during longterm experimental research. Data obtained allowed us to generate maps of actual and potential risk of erosion for the agricultural soils of Huambo province (Central Plateau of Angola). The Wischmeier-Smith method was used for evaluation of erosional losses.

Takahashi, K. (2003). "Effects of climatic conditions on shoot elongation of alpine dwarf pine (Pinus pumila) at its upper and lower altitudinal limits in central Japan." Arctic Antarctic and Alpine Research **35**(1): 1-7.
<Go to ISI>://000181915900001

The effects of climatic conditions on the shoot elongation of alpine dwarf pine (Pinus pumila) were examined at its lower and upper altitudinal limits on Mt. Norikura (2500 and 2840 In a.s.l.) and Mt. Shogigashira (2640 and 2675 m a.s.l.) in central Japan. Altitudinal forest-structural changes were also described. Shoot elongation and stem height of P. pumila increased with decreasing altitude, but its abundance was markedly decreased at the altitudinal ecotone between the upper P. pumila zone and the lower Betula ermanii zone because of the suppression by tall B. ermanii. Thus, the lower altitudinal limit of P. pumila was probably determined by the competition with B. ermanii. The interannual variation in the shoot elongation of P. pumila was related to climatic conditions; long shoot length was associated with high summer temperatures of the previous year at both the upper and lower altitudinal limits on the two mountains. In addition, rates of the increase of shoot elongation in response to the increase of air temperature were not different between the upper and lower altitudinal limits. Thus, the increase of summer temperatures would enhance the growth of P. pumila from its upper to lower altitudinal limits. However, it is harder to predict the altitudinal distribution shift of P. pumila due to environmental change because its lower altitudinal limit is largely affected by competition with B. ermanii. Therefore, this study concluded that long-term monitoring of the population dynamics at the P. pumila-B. ermanii ecotone is necessary to predict the distribution shift of P. pumila.

Takahashi, K., N. Fujitani and M. Yanada (2002). "Long term monitoring of particle fluxes in the Bering Sea and the central subarctic Pacific Ocean, 1990-2000." Progress in Oceanography **55**(1-2): 95-112.
<Go to ISI>://000178920700007

A time-series particle flux study has been conducted at two sites near the Aleutian Islands: Station AB in the Bering Sea for nine years (1990-1999) and Station SA in the central subarctic Pacific for ten years (1990-2000). Significant variability in seasonal and inter-annual particle flux was observed at both stations. The annual primary flux maxima that occurred during spring through summer tended to vary considerably in their timing and magnitude, whereas the secondary maxima in fall tended to be fairly consistent of timing and flux levels. Biogenic opal contributed to a major portion of the time-series fluxes. Especially diatoms such as Neodenticula seminae are important in the biogenic opal fluxes and drive bulk of the biological system. Calcium carbonate fluxes were comprised of six species of planktonic foraminifera and mainly two species of coccolithophores. At Station AB, the fall CaCO3 flux maxima were higher than those of spring, whereas the magnitudes of the CaCO3 flux maxima were similar during both spring and fall at Station SA. The seasonal change in CaCO3 flux was significantly different from that of biogenic opal. The planktonic foraminiferal contribution was greater than that of coccoliths to the total CaCO3 flux. (C) 2002 Elsevier Science Ltd. All rights reserved.

Tallon, F. (1990). "[Is family planning effective and profitable in Rwanda?]." Imbonezamuryango = Famille, sante, developpement / Republique rwandaise, Office national de la population (ONAPO)(18): 22-7.
<Go to ISI>://MEDLINE:12316570

Although the demographic explosion in Rwanda will have catastrophic consequences if it is left unchecked, the family planning program has been received with hostility within the country. The National Population Office has conducted 2 studies to provide information on the costs and use of family planning services from 1981-88 and to project the findings into the future in demographic and financial terms. The population of Rwanda increased from 2 million in 1950 to 7 million in 1990 and will exceed 10 million in 2000. The projection is based on various hypotheses about demographic behavior from 1981, when the family planning program began, to 2011. The model measures the impact of family planning on population size and then assesses the repercussions of family

planning on health, education, and agriculture expenditures. According to the projection, in the year 2011 with and without family planning respectively, the total population will be 17.7 or 13.2 million, the rate of increase will be 4.5% or 2.7% per year, and the number of children per woman will be 10.6 or 4.7. The rate of contraceptive prevalence is projected to increase from 8.0% in 1990 to 34.8% in 2000 and 46.8% in 2011. Expenditures for health care increase as a function of population size and therefore grow more rapidly without family planning. The government would save 29.2% of health expenditures and about 1/3 in education expenditures in 2010 if fertility declined according to the projection. Lower fertility would facilitate improvements in both health and education services. But it is in the agricultural sector that family planning would have the greatest impact in Rwanda. 93% of the economically active population is employed in agriculture, but available land has disappeared and productivity has declined due to soil exhaustion. The food supply is no longer adequate and famine threatens certain regions. Because population is increasing more rapidly than food production, the per capita food supply will decline with or without family planning, in 2010 the total availability of food will be 4.3% greater than with family planning, but the population will be 34% larger. Without family planning per capita food availability will decline by 57.4% compared to 1981, while with family planning the decline will be only 47.9%. A cost analysis of the family planning program indicates that the savings in the health, education, and agricultural sectors obtained through family planning exceed the direct costs of the family assumption of a higher rate of contraceptive usage requiring a 4 times greater expenditure but permitting the food supply to meet the minimal needs of the population in all years.

Taniegra, E. D. (2004). "Hyperparathyroidism." American Family Physician **69**(2): 333-339.
<Go to ISI>://000188389600007

Primary hyperparathyroidism is the most frequent cause of hypercalcemia in ambulatory patients. The condition is most common in postmenopausal women, although it can occur in persons of all ages, including pregnant women. If symptoms are present, they are attributable to hypercalcemia and may include weakness, easy fatigability, anorexia, or anxiety. However, most persons have no symptoms, and primary hyperparathyroidism usually is diagnosed after an elevated serum calcium level is found incidentally on multiphasic chemistry panel testing. Persistent hypercalcemia and an elevated serum parathyroid hormone level are the diagnostic criteria for primary hyperparathyroidism. Other causes of hypercalcemia are rare, and usually are associated with low (or sometimes normal) parathyroid hormone levels. Malignancy is the most frequent cause of hypercalcemia in hospitalized patients. Parathyroidectomy is the definitive treatment for primary hyperparathyroidism. When performed by experienced endocrine surgeons, the procedure has success rates of 90 to 95 percent and a low rate of complications Asymptomatic patients who decline surgery, and meet criteria for medical management must commit to conscientious long-term monitoring. Any unexplained elevation of the serum calcium level should be evaluated promptly to prevent complications from hypercalcemia. Copyright (C) 2004 American Academy of Family Physicians.

Tasker, G. L. and F. Wojnarowska (2003). "Lichen sclerosus." Clinical and Experimental Dermatology **28**(2): 128-133.
<Go to ISI>://000181789700002

Lichen sclerosus is a chronic skin condition, which offers many challenges to the clinician. It affects men, women and children, and usually occurs in the anogenital area. The clinical signs can be confused with those seen in sexual abuse in children. The underlying cause is unknown; however, there is a strong association with autoimmune disorders, and immunogenetic studies have demonstrated a link with HLA DQ7. Patients suffer significant morbidity as a consequence of the intractable symptoms, physical scarring and psychosexual damage. Support groups may be helpful for some patients. Potent topical corticosteroids have been shown to be effective. There is a 5% incidence of squamous cell carcinoma, and all suspicious lesions should be biopsied. It is unclear whether the risk of malignancy is changed with the use of topical corticosteroids, as there is a potential risk of triggering a latent infection of human papillomavirus. A multidisciplinary approach to care is required and ideally all patients should attend a dedicated clinic and be offered long-term monitoring.

Taylor, L. A., J. S. Kreutzer, S. R. Demm and M. A. Meade (2003). "Traumatic brain injury and substance abuse: A review and analysis of the literature." Neuropsychological Rehabilitation **13**(1-2): 165-188.
<Go to ISI>://000182106500010

Traumatic brain injury (TBI) is a leading cause of death and disability worldwide. Accidents are a major cause of brain injury, and many accidents are alcohol or drug related. Evidence indicates that a vast majority of victims test positive for alcohol or illicit drugs at the time of hospital admission. Research also suggests that a majority of TBI survivors were moderate to heavy drinkers pre-injury. This manuscript reviews literature on pre- and post-injury substance use patterns, abuse risk factors, and dangers of post-injury use. Assessment is discussed in detail with information provided on the need for quantitative assessment, records review, corroboration, and long-term monitoring. Information is also provided on critical features of treatment, prevention, and education, and on the role of psychologists in substance abuse assessment and treatment. The manuscript concludes with a section addressing issues, questions, and concerns commonly encountered by clinicians.

Thiruchelvam, N., M. L. Godley, M. K. Farrugia and P. M. Cuckow (2004). "A preliminary study of natural-fill radiotelemetered ovine fetal cystometry." Bju International **93**(3): 382-387.
<Go to ISI>://000188810500031

OBJECTIVE To determine whether fetal cystometric studies by radiotelemetry are feasible in the fetal lamb, and potentially suitable for chronically monitoring fetal bladder pressures in an experimental fetal model of bladder outlet obstruction (BOO), as in utero BOO (e.g. caused by posterior urethral valves) results in significant postnatal bladder dysfunction but the pathophysiological progression of fetal bladder maldevelopment remains poorly understood. MATERIALS AND METHODS The procedure required fetal sheep surgery and anaesthesia. Radiotelemetry implants comprised catheters that transmitted pressure fluctuations to an implant body; data were then transmitted using radio frequency to a receiver that passed this information to a computer. Four fetuses were used with different methods of catheter placement to optimize the technique. RESULTS Recordings were possible in three of the four sheep; during observation there were: (i) quiet periods with no abdominal or bladder pressure rises; (ii) synchronous activity in

the bladder and abdomen; and (iii) discriminate activity, associated with intravesical activity only. Four patterns of discriminate bladder activity were observed, defined as void, immature void, staccato activity and 'unstable' type activity. CONCLUSIONS Radiotelemetry cystometry for long-term monitoring is feasible in the experimental fetus without causing death or morbidity, or inhibiting growth. The method can discriminate reproducible patterns of detrusor activity. Recorded 'voiding' types were consistent between experiments and as reported in other fetal animal studies.

Thomas, P. B., H. Possingham and R. Roush (2005). "Effects of boneseed (Chrysanthemoides monilifera (L.) Norl. ssp monilifera) on the composition of the vegetation and the soil seed bank ofan open eucalypt woodland." Plant Protection Quarterly **20**(2): 74-80.
<Go to ISI>://BIOSIS:PREV200510181099

The effects of the environmental weed boneseed (Chrysanthemoides monilifera (L.) Norl. ssp. monilifera) on the vegetation, and the soil seed bank, of an open woodland in the Mount Lofty Ranges were investigated. The vegetation and soil seed bank within infested and interspersed uninfested quadrats were assessed and compared. The most notable difference was a decrease in the abundance of two understorey dominants Gonocarpus tetragynus Labill. and Hibbertia exutiacies Wakef. within the infested quadrats. Also, the density of G. tetragynus and H. exutiacies decreased with increasing boneseed density. The understorey within the uninfested quadrats is dominated in terms of number, cover, and biomass by these two species, so their reduction represents a substantial community change. There were fewer G. tetragynus and H. exutiacies seeds, probably due to lower levels of productivity, in the infested quadrats. Seeds of these species had low levels of viability in the presence and absence of boneseed. There was a marginally significant (P=0.057) reduction in G. tetragynus viable seed density in the infested quadrats. Boneseed seeds were present in uninfested areas, but at lower density. Diversity of both above-ground vegetation and the soil seedbank was reduced in infested areas. Changes in vegetation and viable seed densities may well comprise a longterm impact at this site, as regeneration might not restore the original species composition, and regeneration may take a long time to occur.

Thompson, A. A. and B. D. Mapstone (2002). "Intra- versus inter-annual variation in counts of reef fishes and interpretations of long-term monitoring studies." Marine Ecology-Progress Series **232**: 247-257.
<Go to ISI>://000176123900020

Many sampling strategies have been proposed as appropriate for describing spatial patterns in marine organisms. There remain, however, many problems with the description, analysis and interpretation of temporal variation in abundances of organisms. In particular, there is a need to understand temporal error in the estimation of abundance of mobile organisms. In this paper we report estimates of temporal variation in abundances of tropical reef fishes attributable to sampling error at diurnal, daily and 'monthly' scales and compare these to inter-annual variation that might arise from processes such as mortality and recruitment. Uncertainty in estimates taken from the same sites over consecutive days was large for several species and accounted for the majority of error in estimates of abundance within years, Sources of error in estimates of abundance are discussed with consideration of the implications for long-term sampling and monitoring of fish assemblages. Shortterm temporal variation must be considered along with spatial variation in the design and interpretation of temporal studies of mobile species.

Thompson, J. R., H. R. Sorenson, H. Gavin and A. Refsgaard (2004). "Application of the coupled MIKE SHE/MIKE 11 modelling system to a lowland wet grassland in southeast England." Journal of Hydrology **293**(1-4): 151-179.
<Go to ISI>://000221917600010

Hydrological modifications frequently result in wetland loss and degradation while wetland management, restoration and creation schemes rely upon further hydrological manipulations. These schemes can benefit from models which can accurately represent often complex wetland hydrological situations. Although the potential of the physically based, distributed model MIKE SHE to model wetlands has been demonstrated, a number of inadequacies in its channel flow component have been identified. These include difficulties in representing control structures and simulating inundation from channels. A coupling has been developed between MIKE SHE and the MIKE 11 hydraulic modelling system. This paper reports a coupled MIKE SHE/MIKE 11 model developed for a lowland wet grassland, the Elmley Marshes, in southeast England. Long term monitoring, supplemented by selected secondary sources, provided the necessary input, calibration and validation data. A procedure was developed to evaluate evaporation from ditch surfaces which could not be represented dynamically within MIKE 11. Two consecutive 18-month periods were used for model calibration and validation which were based upon comparisons of observed and simulated groundwater depths and ditch water levels. Model results were generally consistent with the observed data and reproduced the seasonal dynamics of groundwater and ditch water. The close association between flooding and both groundwater and ditch water levels was demonstrated. Topographic depressions are important for the initiation of flooding and are responsible for much of the shallow surface water in areas isolated from ditches. Deeper flooding occurs in areas which are inundated from these ditches. Results suggested that improvements could be made to the MIKE SHE bypass flow routine to enable it to more accurately represent macropore flow associated with soil cracking and swelling. Dynamic calculation of evaporation from ditch water surfaces would enhance the ability of the model to explore alternative water level management and climate change scenarios. The potential use of the model to investigate these scenarios is outlined.

Thurston, J. M., E. D. Williams and A. E. Johnston (1976). "Modern Developments in an Experiment on Permanent Grassland Started in 1856 - Effects of Fertilizers and Lime on Botanical Composition and Crop and Soil Analyses." Annales Agronomiques **27**(5-6): 1043-1082.
<Go to ISI>://A1976DN70300031

Timsit, O., B. Sylvand and J. C. Lefeuvre (2004). "Intertidal macrozoobenthos evolution of the 'Baie des Veys' between 1985 and 2000." Comptes Rendus Biologies **327**(1): 51-64.
<Go to ISI>://000220022800006

Intertidal macrozoobenthos evolution of the 'Baie des Veys' between 1985 and 2000. The distribution of intertidal macrozoobenthos in the 'Baie des Veys' (French coast of the eastern English Channel) has been studied in 2000. Results were compared with those of

1985, which are included in a long-term monitoring program established since 1973. The populations remained distributed along an estuarine-marine gradient, with a particularity on the eastern side, which is isolated from the rest of the bay by a river channel. The western and central tidal flats became more subjected by marine influence, which led to a homogenisation of the benthic communities. Oyster farming locally caused a fast decrease of the typical eastern community, which was characterized by Scoloplos armiger and Urothoe poseidonis.

Trist, P. J. O. and D. A. Boyd (1966). "The Saxmundham rotation experiments: rotation I." The Journal of Agricultural Science **66**(03): 327-336. http://dx.doi.org/10.1017/S0021859600063620 AND NEBIS 20120919

At Saxmundham Experimental Station in East Suffolk a four-course rotation experiment testing fertilizer treatments has continued with only minor modifications since the 1899/1900 crop year, the crops being wheat, roots (mainly mangolds), barley and either beans, peas or clover. Factorial combinations of nitrogen (N), phosphorus (P) and potassium (K), with two additional treatments testing farm-yard manure and bonemeal, are applied annually to the same plots regardless of crop.All crops, particularly mangolds and sugar beet, yielded badly without P. N was as important as P for cereals, but had little effect on mangolds and sugar beet unless P was also applied; its effects on the legume yields were slight. On this heavy soil K had little effect on the yield of any crops except the legumes.

Tryjanowski, P. (2000). "Changes in breeding populations of some farmland birds in W Poland in relation to changes in crop structure, weather conditions and number of predators." Folia Zoologica **49**(4): 305-315.
<Go to ISI>://000166352100006

he breeding populations of Acrocephalus palustris, Alauda arvensis, Carduelis cannabina, Carduelis carduelis, Emberiza citrinella, Fringilla coelebs, Miliaria calandra, Motacilla alba, Motacilla flava, Saxicola ruberta, Sylvia communis, and Turdus merula were censused yearly from 1987 through 1997 by territory mapping on a 315 ha of intensively used farmland in W Poland. Five of the 12 species (A, arvensis, E. citrinella, M. alba, M. flava and S. communis) showed long-term decreasing trends, only one species - M, calandra increased in number. Analysis of the effects of changes in crop structure, margin habitats, weather conditions and predation on breeding bird populations revealed that the most important factor was the contribution of margin habitats in the area studied, which had positive effects on five species and negative in one case. In the case of the most abundant species (A, arvensis), predatory pressure was the most important factor controlling the population size.

Tseng, H. F., H. F. Tan and C. K. Chang (2003). "Varicella vaccine safety, incidence of breakthrough, and factors associated with breakthrough in Taiwan." American Journal of Infection Control **31**(3): 151-156.
<Go to ISI>://000182981400004

Background: Varicella vaccine was first available in Taiwan in 1997. The aims of this study were to investigate varicella vaccine safety and occurrence of breakthrough in Taiwan during the first 3 years. The adverse events, incidence of, breakthrough, and factors associated with breakthrough were analyzed. Methods: A personal interview using a structured questionnaire was conducted for the parents of 1248 children less than 12 years old who were vaccinated between 1998 and 2000. Incidence of adverse events and breakthrough were presented and factors associated with breakthrough were estimated by logistic regression. Results: There were 27 (2.16%) breakthrough cases occurring during the maximum follow up period of 31 months, including 22 very mild or mild cases, 3 moderately severe cases, and 2 severe cases. Compared with those who did not have confirmed history of varicella exposure after vaccination, children with such exposure were approximately 28 times as likely to have breakthrough varicella develop (adjusted odds ratio = 27.75, 95% confidence interval: 6.12-125.,78, P = .00). There were 91 (7.3 %) reported cases of adverse events, including rash, fever, and pain or swelling, occurring within 2 weeks of vaccination. Conclusions: Although rare adverse events cannot be well-quantified in this study, the results suggest that, at least in the short term, varicella vaccine is well-tolerated and effective in Taiwan. Long-term monitoring program is necessary to ensure the safety of this vaccine.

Tucek, M., J. Tenglerova, B. Kollarova, M. Kvasnickova, K. Maxa, I. Mohyluk, E. Svandova, O. Topolcan, Z. Vlasak and M. Cikrt (2002). "Effect of acrylate chemistry on human health." International Archives of Occupational and Environmental Health **75**: S67-S72.
<Go to ISI>://000180063700012

Objectives: The prospective cohort study of 1992-1999 describes the effect of occupational exposure to chemical substances in the production of acrylic acid, acrylic acid esters and acrylate dispersions at the various workplaces of one chemical plant, Methods: Exposure to selected chemicals (acrylonitrile, n-butanol, butyl acrylate, ethyl acrylate, methyl acrylate, methyl methacrylate, toluene, and styrene) was determined by personal passive dosimetry (GC/MS method). The annual examinations included general health, by guided interview, a general medical examination, hematological and biochemical examinations, examination of the parameters of serum immunity and selected tumor markers, and spirometry. The authors also repeatedly performed cytogenetic analysis of human peripheral lymphocytes. Results: The authors followed a group of 120 employees (60 exposed, 60 controls), mean age 40+/-8 years in both groups. with average period of exposure to chemicals (exposed group) 13+/-5 years. The measured concentrations of chemicals in the working atmosphere were generally low; maximum allowable concentrations (MAC) values or suggested limits of certain chemicals were occasionally exceeded (most frequently for butyl acrylate). The results of the examination of the workers over the 8 years have not revealed any marked differences between the exposed and control groups that could be attributable solely to the acrylate exposure. Conclusions: Exposure to chemical substances at the workplace was relatively low, the limits being exceeded only sporadically (each such case was investigated at the workplace). and the level of exposure continues to decrease gradually over the years. Considering the fact that the exposed individuals are expected to work for 23 additional years on average, we feel that long- term monitoring of selected health-related parameters, not including tumor markers, appears desirable. The examination of tumor markers has not contributed to the problem evaluation for a number of false-positive results.

Uhart, M. M., F. Quintana, W. B. Karesh and W. E. Braselton (2003). "Hematology, plasma biochemistry, and serosurvey for selected infectious agents in southern giant petrels from Patagonia, Argentina." Journal of Wildlife Diseases **39**(2): 359-365.

<Go to ISI>://000184103200014

In conjunction with reproductive and feeding ecology studies on southern giant petrels (SGP, Macronectes giganteus) blood samples were collected for baseline health evaluations. Twenty- five adult SGP from a breeding colony in Chubut, Argentina, were sampled during two consecutive breeding seasons, 1999-2000 (n = 15) and 2000-01 (n = 10). Values for hematology, plasma biochemistry, and minerals are described for 20 birds in apparent good physical condition. A serologic survey of exposure to selected infectious agents was also conducted on all 25 birds sampled. Southern giant petrels were serologically negative for evidence of exposure to infections laryngotracheitis virus, avian encephalomyelitis virus, avian influenza virus, avian reovirus, infectious bursal disease virus, infectious bronchitis virus, paramyxovirus 1, 2, and 3 virus, Chlamydophila, and Aspergillus. Antibodies to avian adenovirus were found in 14% of SGP during the first sampling season, and 60% in the second year. Additionally, all birds were negative for antibodies to Salmonella pullorum at the first sampling date, but 90% had low titers the following breeding season. This study contributes to understanding the health status of South Atlantic seabirds and to establishment of baseline information for SGP. Long-term monitoring of pelagic predator-scavenger seabirds such as SGP should be established for the surveillance of marine ecosystem health.

Ulen, B. (1998). "Nutrient exports from two agriculture-dominated watersheds in southern Sweden." Nordic Hydrology **29**(1): 41-56.
<Go to ISI>://WOS:000072324700003

Nutrient concentrations and exports were monitored for eight years in two agriculture-dominated watersheds in the central part of the Vastgota Plain in Sweden. The hydrology and the nutrient concentrations in the streams were very similar. Concentrations (monthly flow-weighted) of dissolved phosphate-phosphorus (PO4P) varied substantially during the year (from 0.03 to 0.27 mg l(-1)) whereas concentrations of particulate phosphorus (PartP) varied less (from 0.03 to 0.16 mg l(-1)). No trends in nutrient export during the eight years were found after flow-normalization of export data. Three wet periods dominated the longterm loads of the streams. Although a few events dominated annual yields of suspended solids (SS) from drainage pipes, standard deviation of annual mean SS concentration was reasonably constant between different years. However, when further developing phosphorus load models the variation in SS concentration should probably be considered. In-stream processes may contribute nearly as much to the phosphorus export as those occurring on and in arable soils in terms of their impact on the magnitude of phosphorus export. Total nitrogen (TotN) mean concentration was 5 mg l(-1) and was similar in drainage pipes and in the streams.

United States. Department of State. Bureau of Public, A. (1986). "Chile." Department of State publication. Background notes series: 1-8.
<Go to ISI>://MEDLINE:12178144

In 1985, Chile's population stood at 12 million, with an annual growth rate of 1.7%. 1984's infant mortality rate was 20/1000 live births and life expectancy was 67 years. The literacy rate was 94%. Of the work force of 3,841,000 in 1985, 15.9% were engaged in agriculture, forestry, and fishing; 31.3% were employed in industry and commerce; 38.6% were in the service sector; 8.7% worked in mining; and 4.4% were employed in construction. Chile's military junta is scheduled to be replaced by an elected legislature in 1990. The GDP was US $19.2 billion in 1984, with an annual real growth rate of 6.3%, and per capita GDP stood at US$1590. Inflation averages 23%. Industry comprises 21% of the GDP. Longterm prospects for the Chilean economy are influenced by a high debt service ratio, very low domestic savings and investment, the prospect of little or no increase in copper prices, and continuing problems in the domestic financial sector. In 1985-88, under the International Monetary Fund macroeconomic program, Chile will strive for moderate economic growth while managing its external debt servicing burden.

United States. Department of State. Bureau of Public, A. (1988). "Senegal." Department of State publication. Background notes series: 1-6.
<Go to ISI>://MEDLINE:12178027

Attention in this discussion of Senegal is directed to the following: geography; the people; history; government and political conditions; the economy; foreign relations; defense; and relations between Senegal and the US. Senegal, which lies on the bulge of western Africa, is bounded by the Atlantic Ocean, Mauritania, Mali, Guinea, and Guinea-Bissau. About 70% of the population is rural. French, the official language, is used regularly only by the literate minority. Most Senegalese speak Wolof, Pulaar, Diola, Mandingo, or other ethnic languages. Senegal was inhabited in prehistoric times. In the 13th and 14th centuries, the area came under the influence of the great Mandingo empires to the east. The Jolof Empire of Senegal was founded during this time. French commercial establishments date from the 17th century. During the 19th century, the French gradually established control over the interior regions and administered them as a protectorate until 1920 and as a colony thereafter. In January 1959, Senegal and the French Soudan merged to form the Mali Federation, which became fully independent on June 20, 1960. After the breakup of the Mali Federation on August 20, 1960, President Senghor and Prime Minister Mamdou Dia governed together under a parliamentary system. A 1970 constitutional amendment recreated the post of prime minister, but this post was subsequently abolished in 1983. The 1963 constitution transformed Senegal's government into an executive-presidential system; the president is elected by universal adult suffrage to a 5-year term. Senegal's governing political party is the Socialist Party, and in 1981 the constitution was amended to legitimize previously unrecognized parties. President Diouf continues to pursue a longterm structural adjustment program designed to reverse more than a decade of economic decline. The economy now seems to have stabilized as a result of financial austerity measures and fiscal restraint. The country is overwhelmingly agricultural, with more than 70% of the labor force engaged in farming. Senegal has sought vigorously foreign investment to hasten economic development. The US maintains friendly relations with Senegal. US assistance to Senegal has included capital and technical assistance and loans and donations of food.

United States. Department of State. Bureau of Public, A. (1989). "Burma." Department of State publication. Background notes series: 1-8.
<Go to ISI>://MEDLINE:12177984

Demographic, political, and physical characteristics of Burma are outlined, the largest country on the Southeast Asian mainland. The population of Burma is predominantly rural with the most prevalent ethnic group being the Burmans. Theravada Buddhism is the religion of approximately 85% of the Burmese. Burma was unified in the 11th century by King Anawrahta. In 1988, General U Ne Win, the country's president, stepped down from his position after a series of violent riots protesting severe economic conditions.

That same year, military rule was established and 2 new parties came into being: the National Unity Party and the National League for Democracy. Since August 1988, the issuance of tourist visas has been halted due to the unrest. Longterm visas for business purposes can be obtained, however. For those travelling to Burma, yellow fever inoculation certification is required. Cholera, tuberculosis, plague, leprosy and typhoid are all endemic as well, and dengue fever is present. A fairly inaccessible country, all international flights enter and exit through the country's capital, Rangoon. The tourist visiting Burma will see an agricultural nation. Approximately 70% of the country's exporting economy comes from the sale of rice and teak.

United States. Department of State. Bureau of Public, A. (1989). "Honduras." Department of State publication. Background notes series: 1-7.
<Go to ISI>://MEDLINE:12178019

Honduras is a country with an area of 68,000 square miles, with considerable mountainous terrain, and a subtropical but variable climate. It has a population of 4.4 million people and an annual growth rate of 3.1%. The ethnic make up is 90% mestizo, a mixture of Indian and European, with others consisting of Arab, African, oriental, and Indians. The main religion is Catholic with a fast growing Protestant minority, and the language is Spanish. Infant mortality is 60/1000 and life expectancy is 63 years. The work force is mainly agricultural 63%, services 20%, manufacturing 9%, and construction 3%. The government is a democratic constitutional republic established in 1821. The budget is $1,334 million with 7% used for defense, and the gross national product is $4.4 billion with an annual growth rate of 4.5%. Despite being poor and underdeveloped, natural resources include arable land, hydro- electric power, and considerable forest, marine, and mineral resources. Agriculture products include coffee, bananas, citrus fruit, corn, beans, and livestock. The major industries are textiles, cement, wood products, cigars and foodstuffs. Unemployment is over 15% and underemployment is estimated over 40% with the literacy rate at only 60%. In the last few years with US aid the economy has grown 3.8% a year assisted by mining, construction and the service sectors. Honduras must undertake major economic reforms to gain longterm growth and stability since it has large fiscal and trade deficits, a large public bureaucracy, poorly run state enterprises and overvalued exchange rate.

United States. Department of State. Bureau of Public Affairs. Office, o. and C. Public (1992). "Honduras." Department of State publication. Background notes series: 1-5.
<Go to ISI>://MEDLINE:12178036

Honduras has an area of 112,088 square km or 43,277 square miles with a population of 4.8 million in 1991 of whom 90% are mestizos. Literacy is 68%, the infant mortality rate is 60/1000, and life expectancy is 63 years. After independence from Spain in 1821 the Central American Federation collapsed in 1938. There have been 300 internal rebellions since independence. With an inadequate economic infrastructure, sociopolitical integration has been fragile. In 1982 the Suazo government relied on US support to face the economic recession, the threat posed by the Marxist government in Nicaragua, and civil war in El Salvador. USAID sponsored ambitious social and economic projects. A peaceful transfer of power between civilian presidents occurred in 1986 despite an electoral quirk. In 1990 President Callejas introduced reforms to reduce the deficit, and to stimulate investments and exports. After initial higher inflation and low growth in 1990 and 1991, modest progress is forecast for 1992 and 1993. The powerful military has been kept in check, and human rights have been better protected. The country is among the poorest in Latin America with underemployment of 30-40% and a mostly agricultural economy. The 1990 reforms of deregulation of prices, liberalization of trade, less protectionism, and export orientation is expected to produce longterm benefits not only in agriculture but also in manufacturing. The US is the primary trading partner, and the main direct foreign investor (fruits, refining, and mining). The slash-and-burn agricultural cultivation has created environmental destruction, and as a sign of public awareness the armed forces have engaged in reforestation and fighting forest fires.

Urrestarazu, M., P. Carolina Mazuela and G. Alberto Martinez (2008). "Effect of Substrate Reutilization on Yield and Properties of Melon and Tomato Crops." Journal of Plant Nutrition **31**(11): 2031-2043.
<Go to ISI>://WOS:000262286500012

Certain ecologically-friendly substrates have recently been shown to be perfectly viable alternatives to other more traditional ones such as rockwool, perlite, or some hydroponic systems. However, in order to be competitive for vegetable production in the Mediterranean region, substrates must be used for at least one year. The present study assessed random samples of two commercial substrates, almond shell and compost from greenhouse vegetable residue. The substrates were evaluated as growing media for longterm soilless production. Three experiments were conducted to evaluate the effects of reusing these substrates, comparing them with rockwool in terms of yield and fruit quality characteristics of melon and tomato. The physical, physico-chemical, and chemical properties studied differed significantly on reutilizing these materials. However, these differences did not prove to be limiting factors when fertigation parameters applied were adjusted according to substrate properties. The results suggest that compost and commercial almond shells seem to be acceptable growing media after at least 265 and 530 days of reutilization, respectively.

Ushimaru, A. and K. Matsui (2001). "Sex change in tree species: long-term monitoring of sex expression in Acer rufinerve." Nordic Journal of Botany **21**(4): 397-399.
<Go to ISI>://000174425200008

We monitored sex expression in Acer rufinerve from 1986 to 1999, in order to study branch-autonomous sex changes in tree species. During this observation period, 70 of 338 stems (20.7%) changed sexual expression. Fifty of these sex-changed stems exhibited monoecism (having both female and male branches) in the course of the sex change, while the remaining stems changed directly from male to female or vice versa. A sex change resulting in monoecism was called a partial sex change and a total male/female change was referred to as a complete sex change. The mean diameter at breast height of stems that partially changed sex was significantly greater than that of stems that changed sex completely. Thus, it was primarily large stems with many branches that underwent partial sex changes, These findings suggest that sex change is a branch autonomous event in A. rufinerve and underline the importance of taking branching structure into account when studying sex change in trees.

van Dyk, E. E., E. L. Meyer, F. J. Vorster and A. W. R. Leitch (2002). "Long-term monitoring of photovoltaic devices." Renewable Energy **25**(2): 183-197.
<Go to ISI>://000171416100002

For photovoltaic (PV) devices to operate successfully over an expected lifespan of 30 years, much research is needed in all aspects of these devices. This study is concerned with the monitoring of the performance and degradation of PV devices over extended periods as well as the effect of meteorological conditions on device performance. The PV devices used in this study comprise different cell technologies and designs. The performance of conventional flat plate modules was monitored over a 15-month period and that of a PV concentrator array over a 13-month period. The results of this performance monitoring are presented in this paper. Degradation mechanisms of PV devices are also discussed. This study showed that, as expected, the power ratings of PV devices do not usually give an accurate indication of their performance outdoors. Results obtained also showed that meteorological conditions could cause an 18% reduction of a module's potential power. A degradation monitoring procedure revealed potential degradation mechanisms, such as mismatched cells, hot spot formation and low cell shunt resistances on some modules. A comparative study on the PV concentrator modules showed that the concentrator modules produced much less energy than their rated energy when operating outdoors. The energy performance of a tracked flat plate module vastly exceeded the concentrator modules' performance. (C) 2001 Elsevier Science Ltd. All rights reserved.

Varvel, G. E. (2006). "Soil organic carbon changes in diversified rotations of the western corn belt." Soil Science Society of America Journal **70**(2): 426-433.
<Go to ISI>://WOS:000236009100012

dSequestration and storage of carbon (C) by agricultural soils has been cited as one potential part of the solution to soil degradation and global climate change. However, C sequestration in soils is a slow and dynamic process. The objective of this study was to evaluate the effects of crop rotation and N fertilizer management on soil organic C (SOC) levels at several points in time during 18 yr of a long-term study in the Western Corn Belt. Seven cropping systems (three monoculture, two 2-yr, and two 4-yr rotations) with three levels of N fertilizer were compared. Soil samples were taken in the spring in 1984, 1992, 1998, and 2002 to a depth of 30 cm in 0- to 7.5-, 7.5- to 15-, and 15- to 30-cm increments. No differences were obtained in SOC levels in 1984 at the beginning of the study. After 8 yr, rotation significantly increased SOC 449 kg ha(-1) across all cropping systems. From 1992 to 2002, SOC levels in the 0- to 7.5-cm depth decreased by 516 kg ha(-1) across all cropping systems. Soil organic C levels in the 7.5- to 15-cm depths in 1992 and 2002 demonstrated similar rotation effects to those in the surface 0- to 7.5-cm, being not significantly affected from 1984 to 1992 but being significantly decreased from 1992 to 2002 (568 kg SOC ha(-1) across all cropping systems). Many of the SOC gains in the surface 30 cm measured during the first 8 yr of the study were lost during the next 10 yr in all but the 4-yr cropping systems after 18 yr. The loss of SOC in this latter period occurred when depth of tillage was increased by using a tandem disk with larger-diameter disks. These results demonstrate that more than one point-in-time measurement from long-term experiments is necessary to monitor SOC changes when several management variables, such as cropping system and N fertilizer, are being used. They also indicate that apparent small changes in cultural practices, such as in depth of tillage in this experiment, can significantly change SOC dynamics in the soil. Subtle changes in cultural practices (e.g., tillage depth) can have significant long-term results, but longterm experiments are required to quantify their impact under variable climatic conditions.

Vaughan, S., R. Edelson and R. S. Warwick (2004). "Chandra observations of five X-ray transient galactic nuclei." Monthly Notices of the Royal Astronomical Society **349**(1): L1-L5.
<Go to ISI>://000220152700001

We report on exploratory Chandra observations of five galactic nuclei that were found to be X-ray bright during the ROSAT All- Sky Survey (with L-X greater than or similar to 10(43) erg s(- 1)) but subsequently exhibited a dramatic decline in X-ray luminosity. Very little is known about the post-outburst X-ray properties of these enigmatic sources. In all five cases Chandra detects an X-ray source positionally coincident with the nucleus of the host galaxy. The spectrum of the brightest source (IC 3599) appears consistent with a steep power law (Gamma similar to 3.6). The other sources have too few counts to extract individual, well-determined spectra, but their X-ray spectra appear flatter (Gamma similar to 2) on average. The Chandra fluxes are similar to10(2)-10(3) fainter than was observed during the outburst (up to 12 yr previously). That all post-outburst X-ray observations have seen a similarly low X- ray luminosities is consistent with these sources having 'switched' to a persistent low-luminosity state. Unfortunately the relative dearth of long-term monitoring and other data mean that the physical mechanism responsible for this spectacular behaviour is still highly unconstrained.

Vellend, M. (2004). "Parallel effects of land-use history on species diversity and genetic diversity of forest herbs." Ecology **85**(11): 3043-3055.
<Go to ISI>://WOS:000225263500014

The two most fundamental levels of biodiversity, species diversity and genetic diversity, are seldom studied simultaneously despite a strikingly similar set of processes that underlie patterns at the two levels. Agricultural land use drastically reduces populations of forest herbs in the north-temperate zone, so that bottlenecks or founder events in forests on abandoned agricultural land (i.e., secondary forests) may have a longterm impact on both species diversity and genetic diversity. Using forest-herb community surveys and molecular-genetic analysis of populations of Trillium grandiflorum, a representative species of forest herb, I investigated the influence of land-use history, landscape context, and environmental conditions on diversity and divergence at the population and community levels. Secondary forests (70-100 years old) had reduced diversity of both genes and species relative to primary forests (i.e., stands never cleared for agriculture). The community in secondary forests had an overrepresentation of the most common species in the landscape, though divergence in species' relative abundances within stands suggested an influence of community drift via local bottlenecks. Secondary-forest populations of T. grandiflorum were more genetically divergent than those in primary forests, again indicating drift in small populations. Land-use history and the size of populations and communities drove correlations between species diversity and genetic diversity (and community divergence X genetic divergence), though the strength of correlations was

relatively weak. These results extend the generality of positive species-genetic diversity correlations previously observed for islands, and they demonstrate a long-term legacy of land-use history at multiple levels of biodiversity.

Viet, N. (1989). "Law on Land, 8 January 1988." Annual review of population law **16**: 604-11.
<Go to ISI>://MEDLINE:12344311

This document contains major provisions of Viet Nam's January 1988 Law relating to land use. The provisions hold that the land is owned by all of the people and is under state management. The state assigns land for stable, longterm use or for specific periods. Land-users are encouraged to invest in the land and their legitimate interests in the land are protected. Land-users must pay a land-use tax. The provisions also give conditions governing the use and transfer of land. The law further lays out a system of land management which relies on the drafting and planning of projects by the Council of Ministers for the entire country and similar work by local people's committees. Provisions are also made for a system of land use which sets the obligations of users of agricultural and of forest land. Land-use measures are provided for a family-based economy and for production by individual peasants. Regulations also are given for the use of garden land. Finally, additional obligations and interests of land users are set forth.

Viglizzo, E. F., F. Lertora, A. J. Pordomingo, J. N. Bernardos, Z. E. Roberto and H. Del Valle (2001). "Ecological lessons and applications from one century of low external-input farming in the pampas of Argentina." Agriculture Ecosystems & Environment **83**(1-2): 65-81.
<Go to ISI>://000166461200007 AND http://www.botanischergarten.ch/Longterm/Viglizzo-Lessons-Pampas-2001.pdf

Ecology may benefit from long term, large scale experiments on low intensity farming to test theoretical principles and convert them into practical lessons, One century of land conversion in the Argentine pampas, and its effect on critical ecological properties, were analysed and discussed. Land transformation has resulted in significant changes of land use, land cover, energy flow, nutrient dynamics, hydrology, and the trade-offs between productivity, stability and sustainability. The analytical procedure involved the complementary utilisation of different data sources and approaches. The study was focused on large geographical scales: the entire pampas and its five ecoregions. Results were interpreted under the theoretical framework of succession in ecology. The historical conversion of natural grasslands into cultivated grasslands and croplands was not homogeneous, determining a variety of land use and land cover patterns. Due to its higher productivity, much more energy, nutrients and water were mobilised in the rolling pampas than in the other ecoregions. This study provides lessons about how the energy flow, the nutrient dynamics and the hydrological process are modified by land transformation under low external-input conditions. Technical coefficients to be applied in emerging fields of environment administration such as ecological-monitoring, environmental accounting and auditing, agro-ecological certification, land evaluation and allocation, and land management, can also be supplied by this kind of studies.

Voigt, G., F. Rauch and H. G. Paretzke (1996). "Long-term behavior of radiocesium in dairy herds in the years following the Chernobyl accident." Health Physics **71**(3): 370-373.
<Go to ISI>://WOS:A1996VC46200016

The longterm behavior of Cs-137 in milk of a Bavarian farm (farm A) deposited as a consequence of the Chernobyl accident has been followed from April 1986 until August 1994. On the basis of activity measurements in milk and feed, transfer coefficients for the different seasons have been estimated in order to see any changes in transfer behavior (aging effect) of Cs-137 with time. The influence of different grazing regimes has been tested by comparison of activity concentrations in milk and pasture grass in one farm (farm A with rotational grazing regime) with that of a nearby farm (farm B with continuous grazing regime) over a complete grazing season by frequent measurements in 1993. Though the farms are located only 4 km apart, have similar soils, and were contaminated to the same extent by the Chernobyl fallout, tenfold lower Cs-137 activity concentrations in milk have been observed in farm B. This finding seems to be partly due to the influence of a different grazing intensity.

Volkov, A. N. and V. G. Druzhinin (2001). "Long-term monitoring of cytogenetic aberrations in adolescents of a large industrial town." Russian Journal of Genetics **37**(9): 1087-1089.
<Go to ISI>://000172213500015

Long-term cytogenetic monitoring was carried out in adolescents of the town of Kemerovo. In total, aberrant metaphase frequency increased from 1.53% in 1992 to 4.40% in 1996 in Kemerovo adolescents, being significantly higher than a control frequency from 1993 to 1996. In all samples, chromosome aberrations mostly included acentric fragments, while exchanges were rare. The highest number of aberrations per aberrant metaphase was 2 in Kemerovo adolescents and 1 in the control sample. The observed increase in total number of chromosome aberrations suggests that the mutagenic effect of chemical environmental pollutants on Kemerovo adolescents increased over the five years.

von Kruger, M. A. and D. H. Evans (2002). "Doppler ultrasound tracking instrument for monitoring blood flow velocity." Ultrasound in Medicine and Biology **28**(11-12): 1499-1508.
<Go to ISI>://000180041500016

Doppler ultrasound (US) is potentially a valuable method for monitoring changes of blood flow velocity over a period of many minutes or even hours, but is seldom used in this way. One difficulty that may have contributed to this is the problem of maintaining a fixed geometry between the US beam and the blood vessel. A method of improving the success of monitoring might be to actively steer the US beam so as to maintain an adequate signal even when small displacements of the transducer occur. We have designed and built a prototype system for this purpose. The system comprises a continuous-wave phased-array transducer controlled by a purpose-built Doppler unit. The system constantly evaluates the quality of the returning Doppler signal in terms of total power and signal-to-noise ratio (SNR) (evaluated by assessing the quality of derived envelope signals), and steers the ultrasonic beam in a manner so as to improve the signal, should this be necessary. The system was tested in vitro, where the automatic tracking of the Doppler signal doubled the effective beam width of the transducer. Further developments that increase sensitivity and steering

range should result in US Doppler systems that are better suited to long-term monitoring. (E-mail: dhe@le.ac.uk) (C) 2002 World Federation for Ultrasound in Medicine Biology.

Vyssotski, A. L., G. Dell'Omo, Poletaeva, II, D. L. Vyssotski, L. Minichiello, R. Klein, D. P. Wolfer and H. P. Lipp (2002). "Long-term monitoring of hippocampus-dependent behavior in naturalistic settings: Mutant mice lacking neurotrophin receptor TrkB in the forebrain show spatial learning but impaired behavioral flexibility." Hippocampus **12**(1): 27-38.
<Go to ISI>://000174148700005

Previous behavioral studies (Minichiello et al., Neuron 1999;24:401-414) showed that mice deficient for the TrkB receptor in the forebrain were unable to learn a swimming navigation task with an invisible platform and were severely impaired in finding a visible platform in the same setup. Likewise, additional behavioral deficits suggested a malfunction of the hippocampus and proximally connected forebrain structures. In order to discriminate whether the behavioral impairment was caused either by deficits in spatial memory and learning, or alternatively by loss of behavioral flexibility, 8 trk8 mutant, 13 wild-type, and 22 heterozygous mice were implanted with transponders and released for 21 days into a large outdoor pen (10 x 10 m). The enclosure contained 2 shelters and 8 computer-controlled feeder boxes, delivering food portions for every mouse only during their first visit. Every third day, mice received food ad libitum inside the shelters. All mice learned to patrol the boxes correctly within a few days. However, significant differences emerged during those days with free food available. Wild-type mice remained inside the shelters, while all homozygous mutants continued to patrol the boxes in their habitual way, the heterozygous mutants showing intermediate scores. These and previous data suggest that one of the natural functions of the mouse hippocampus is to comediate behavioral flexibility, and that TrkB receptors might play an essential role in maintaining the neuronal short-term plasticity necessary for this capacity. (C) 2002 Wiley-Liss, Inc.

Wang, Q., Y. Bai, H. Gao, J. He, H. Chen, R. C. Chesney, N. J. Kuhn and H. Li (2008). "Soil chemical properties and microbial biomass after 16 years of no-tillage fanning on the Loess Plateau, China." Geoderma **144**(3-4): 502-508.
<Go to ISI>://WOS:000255343800011

Data from a 16-year field experiment conducted in Shanxi, on the Chinese Loess Plateau, were used to compare the long-term effects of no-tillage with straw cover (NTSC) and traditional tillage with straw removal (TTSR) in a winter wheat (Triticum aestivum L.) monoculture. Longterm no-tillage with straw cover increased SOM by 21.7% and TN by 51.0% at 0-10 cm depth and available P by 97.3% at 0-5 cm depth compared to traditional tillage. Soil microbial biomass C and N increased by 135.3% and 104.4% with NTSC compared to TTSR for 0-10 cm depth, respectively. Under NTSC, the metabolic quotient (CO2 evolved per unit of MBC) decreased by 45.1% on average in the top 10 cm soil layer, which suggests that TTSR produced a microbial pool that was more metabolically active than under NTSC. Consequently, winter wheat yield was about 15.5% higher under NTSC than under TTSR. The data collected from our 16-year experiment show that NTSC is a more sustainable farming system which can improve soil chemical properties, microbial biomass and activity, and thus increase crop yield in the rainfed dryland farming areas of northern China. The soil processes responsible for the improved yields and soil quality, in particular soil organic matter, require further research.

Watson, I. and P. Novelly (2004). "Making the biodiversity monitoring system sustainable: Design issues for large-scale monitoring systems." Austral Ecology **29**(1): 16-30.
<Go to ISI>://000220091200003

There is strong demand for information about the status of, and trends in, Australia's biodiversity. Almost inevitably, this demand for information has led to demand for a broad-scale monitoring system. However the decision to embark on a monitoring system should only be made once it has been established that a monitoring system is the optimal way to inform management. We stress the need to invest resources in assessing whether a monitoring system is necessary before committing resources to the design and implementation of the system. Current debate associated with the design of a biodiversity monitoring system has similarities to the debate within the range management profession in the early 1970s. The experience with range monitoring shows that large-scale monitoring systems such as those being proposed will require considerable resources, recurrently expended into the distant future, but with only a limited ability to adapt to new demands. Those involved in any biodiversity monitoring system will need to understand the implications of investing in a long-term monitoring programme. Monitoring sustainability will only be possible if the monitoring system is itself sustainable. We discuss a number of issues that need to be addressed before the system is at all sustainable. These attributes are a mix of biophysical, social and institutional attributes and highlight the view that monitoring systems of the type being suggested comprise an unusual mixture of attributes not found in typical scientific activity. The present paper is not a technical manual, but rather considers some of the design issues associated with designing and implementing large-scale monitoring systems.

Waysbort, D., E. Manisterski, H. Leader, B. Manisterski and Y. Ashani (2004). "Laboratory setup for long-term monitoring of the volatilization of hazardous materials: Preliminary tests of O-ethyl-S-2-(N,N- diisopropylamino) ethyl methyl phosphonothiolate on asphalt." Environmental Science & Technology **38**(7): 2217-2223.
<Go to ISI>://000220577800052

Contrary to commonly used pesticides, the rate of volatilization of extremely toxic chemicals such as the nerve agent O-ethyl S-2-(NN-diisopropylamino)ethyl methylphosphonothiolate (VX) cannot be readily obtained under environmental conditions due to its high mammalian toxicity that would require extraordinary precautions. An alternative is a laboratory setup that would be used to obtain environmentally relevant data required for risk assessment studies. In this paper we describe a newly designed climatic hood that enables control of temperature, humidity, and air velocity within less than +/-0.5% fluctuations during continuous operation. The performance of the evaporation system together with the sampling and analytical procedures produced a meaningful concentration profile of vapors obtained from a 15 mg sample of VX dispersed as small droplets over a 10 x 16 cm piece of asphalt road. The released vapors amounted to approximately 30% of the applied mass, and its time course was best fitted to a

triexponential curve with rate constants changing over time from 2.2 to 0.03 h(-1). The asphalt enhanced a specific degradation pathway of VX that is relatively minor in aqueous solutions. Results provide the first data on the volatilization of VX from samples of asphalt road, and offer an insight into VX behavior in the environment.

Wegren, S. K. (1995). "RURAL MIGRATION AND AGRARIAN-REFORM IN RUSSIA - A RESEARCH NOTE." Europe-Asia Studies **47**(5): 877-888.
<Go to ISI>://WOS:A1995RP21400007

Wei, X., M. Hao, M. Shao and W. J. Gale (2006). "Changes in soil properties and the availability of soil micronutrients after 18 years of cropping and fertilization." Soil & Tillage Research **91**(1-2): 120-130.
<Go to ISI>://WOS:000241487100015

Micronutrient deficiencies are common in many parts of China's Loess Plateau. The objective of this experiment was to study the effects of long-term cropping and fertilization practices on soil properties and micronutrient availability in this region. The field plot experiment began in 1984. It included five cropping systems and four fertilizer treatments. In September 2002, soil samples were collected and soil pH, organic matter content, available P, and CaCO3 were measured. Total and available Zn, Cu, Mn, and Fe were also determined. The relationship between soil properties and available micronutrients was determined by correlation and path analysis. After 18 years, soil pH and CaCO3 levels were lower in the cropped and fertilized treatments compared to the fallow treatment. In contrast, soil organic matter and available P levels were higher in cropped compared to fallow treatments. A comparison of unfertilized treatments indicated that available Zn and Cu levels in cropped treatments were lower compared to the fallow treatment, probably due to the removal of these micronutrients from the system through crop uptake and harvest. In contrast, available Mn and Fe levels were higher in cropped treatments compared to the fallow treatment. The impacts of fertilization on available micronutrients varied with cropping systems. Generally, available Zn and Fe were higher in fertilized compared to unfertilized treatments, but available Cu was not significantly influenced by fertilization. Fertilization tended to increase available Mn in continuous wheat and maize, but reduced available Mn in continuous clover and the crop-legume rotation. The total (plant available + unavailable) micronutrient contents were lower in the four cropped-treatments compared to the fallow treatment. The addition of manure or P fertilizer increased total Zn, Fe, and Mn, but had no significant effect on total Cu. The results of correlation analysis and path analysis indicated that soil organic matter exerts a significant and direct effect on the availability of Zn, Mn, and Fe, but has little influence on available Cu. The effects of available P, CaCO3, and pH on micronutrient availability were indirect, passing through soil organic matter. The results of this study suggest that longterm cropping and fertilization altered several important soil properties and increased the plant available micronutrient content of this loess-derived soil. (c) 2005 Elsevier B.V. All rights reserved.

Weiler, M., H. Rauer, J. Knollenberg, L. Jorda and J. Helbert (2003). "The dust activity of comet C/1995 O1 (Hale-Bopp) between 3 AU and 13 AU from the Sun." Astronomy & Astrophysics **403**(1): 313-322.
<Go to ISI>://000182561100033

The active comet C/1995 O1 (Hale-Bopp) was target of an optical long-term monitoring program carried out at the European Southern Observatory (ESO) (Rauer et al. 1997, 2003). Longslit spectra and images were obtained at heliocentric distances from 4.6 AU to 2.9 AU preperihelion and 2.8 AU to 12.8 AU postperihelion. Based on these data, the dust activity of comet Hale-Bopp is analysed. The color of the dust coma and the Afrho. parameter are determined. A model for the dust release from the cometary nucleus is presented and used to compute dust production rates. The dust to gas ratio is determined.

Weiss, M., M. Koren-Michowitz, E. Segal and S. Ish-Shalom (2003). "Monitoring response to osteoporosis therapy with alendronate by a multisite ultrasound device." Journal of Clinical Densitometry **6**(3): 219-224.
<Go to ISI>://000185611500004

Background: Osteoporotic fractures are a major health problem among postmenopausal women. A significant proportion of subjects with low bone density are currently undiagnosed. Peripheral devices can be used for osteoporosis diagnosis, but their role in long-term monitoring of skeletal changes is unclear. The current study evaluated the ability of quantitative ultrasound (QUS) measurements to follow osteoporotic subjects treated with alendronate. Methods: QUS measurements were done with Sunlight Omnisense(TM) (Omnisense, Sunlight Medical Ltd., Tel Aviv, Israel), which determines the bone speed of sound (SOS) in several skeletal sites. Postmenopausal women with T-scores of -2 or less at one site were recruited and treated with alendronate for at least 1 yr. Follow-up was done with QUS and dual-energy X-ray absorptiometry (DXA) (Lunar DPX scanner, Madison, WI, USA) measurements. Results: After 12 mo, bone mineral density (BMD) increased significantly at the lumbar spine (LS) (0.34 +/- 0.08 T-score, p = 0.0001 with 95% CI [0.19, 0.49]) and QUS at the tibia (TIB) (0.21 +/- 0.09 T-score, p = 0.02 with 95% CI [0.03, 0.39]). After 12 mo, a significant increase in mean T-scores was demonstrated in all sites assessed according to baseline T- score of -2 or less. Conclusions: Peripheral QUS measurement may be considered for follow-up on skeletal changes in response to alendronate treatment.

Wells, D. N. (2005). "Animal cloning: problems and prospects." Revue Scientifique Et Technique-Office International Des Epizooties **24**(1): 251-264.
<Go to ISI>://WOS:000230857000022

An efficient animal cloning technology would provide many new opportunities for livestock agriculture, human medicine, and animal conservation. Nuclear cloning involves the production of animals that are genetically identical to the donor cells used in a technique known as nuclear transfer (NT). However, at present it is an inefficient process: in cattle, only around 6% of the embryos transferred to the reproductive tracts of recipient cows result in healthy, longterm surviving clones. Of concern are the high losses throughout gestation, during birth and in the post-natal period through to adulthood. Many of the pregnancy losses relate to failure of the placenta to develop and function correctly. Placental dysfunction may also have an adverse influence on postnatal health. These anomalies are probably due to incorrect epigenetic reprogramming of the donor genome following NT, leading to inappropriate

patterns of gene expression during the development of clones. Whilst some physiological tests on surviving clones suggest normality, other reports indicate a variety of post-natal clone-associated abnormalities. This variability in outcome may reflect species-specific and/or cloning methodological differences. Importantly, to date it appears that these clone-associated phenotypes are not transmitted to offspring following sexual reproduction. This indicates that they represent epigenetic errors, rather than genetic errors,which are corrected during gametogenesis. Whilst this needs confirmation at the molecular level, it provides initial confidence in the first application of NT in agriculture, namely, the production of small numbers of cloned sires from genetically elite bulls, for natural mating, to effectively disseminate genetic gain. In addition to the animal welfare concerns with the technology, the underlying health of the animals and the consequential effect on food safety are critical aspects that require investigation to gain regulatory and consumer acceptance. Future improvements in animal cloning will largely arise from a greater understanding of the molecular mechanisms of reprogramming.

Wennrich, L., P. Popp and C. Hafner (2002). "Novel integrative passive samplers for the long-term monitoring of semivolatile organic air pollutants." Journal of Environmental Monitoring **4**(3): 371-376.
<Go to ISI>://000176397000006

Two types of passive sampler were developed for the long-term monitoring of semivolatile organic compounds (SOCs) in air. They consist of poly(dimethylsiloxane) (PDMS)-coated stir bars (type A) or silicone tubing (type B), acting as a solid receiving medium, enclosed in a heat-sealed low-density polyethylene (LDPE) membrane. These samplers combine the advantages of integrative passive sampling with those of analysing accumulated analytes by thermodesorption-GC-MS, whilst avoiding the use of solvents and expensive sample preparation and cleanup steps. The performance of these samplers was investigated for the integrative sampling of SOCs, including alpha- and gamma-hexachlorocyclohexanes, hexachlorobenzene, 2,4,4'-trichlorobiphenyl, 2,2',5,5'-tetrachlorobiphenyl and fluoranthene, in laboratory exposure experiments under controlled conditions. For both types of sampler, the uptake of all the analytes investigated was linear over an exposure period of 15 days. The sampling rates calculated ranged from 70 to 320 ml h(-1) (sampler A) and 630 to 4300 ml h(-1) -(sampler B). The passive samplers are able to detect low time-weighted average air concentrations in the pg m(-3) range. The small, robust and inexpensive sampling devices were tested successfully for the long-term air monitoring of semivolatile organic pollutants in a polluted area over an exposure period of up to 28 days..

Wenzel, U., H. Vijgen and W. Ullrich (2003). "On-line monitoring of a frontal chromatographic separation using inductively coupled plasma atomic emission spectroscopy." Analytical and Bioanalytical Chemistry **377**(1): 48-57.
<Go to ISI>://000185423200008

A test array is described employing a destructive analytical technique for the long-term monitoring of an industrial-scale separation process. As an example, we chose frontal chromatography as the separation and ICP/AES as the analytical method. The feed solution of the process was conveyed by a process pump via the separation unit to a sample station, where a small portion was diverted and transported by a roller pump into the spectrometer. We equipped our array with different loops for operating the process, calibrating the instrument and verifying the calibration. We obtained identical results for the different loops by absorbing the pulsation of the process pump and arranging for identical suction lines of the spectrometer pump. Based on the results, we redesigned the sample station for a technical application using only commercially available parts.

Wetzel, M. A., G. E. Shaw, J. R. Slusser, R. D. Borys and C. F. Cahill (2003). "Physical, chemical, and ultraviolet radiative characteristics of aerosol in central Alaska." Journal of Geophysical Research-Atmospheres **108**(D14): art. no.-4418.
<Go to ISI>://000184611500002

[1] A new long-term monitoring site for providing multiwavelength (ultraviolet through near-infrared) and broadband irradiances has been established at the Poker Flat Research Range, Alaska, in order to assess the impacts of ozone, cloud cover, surface albedo, and aerosol conditions on trends in ultraviolet (UV) radiation reaching the surface. Targeted field measurements were conducted in the first year of site operation to characterize the properties of aerosols commonly found in the study region. Chemical analysis was used to match aerosol composition to aerosol size distributions and spectral aerosol optical depth (AOD). Results are reported on four air mass types: three springtime examples, including an Asian air mass with Gobi Desert dust, aged industrial pollution from the Arctic, and humid marine air, and a comparative case in late summer. Aerosol imported to central Alaska from extraregional sources produced small to moderate increases in UV optical depth calculated from direct-beam spectral extinction and a limited reduction in transmittance at UV wavelengths. Marine aerosol in a high-humidity environment produced the largest impact on UV extinction. The Angstrom coefficients and single scattering albedos calculated from the spectral AOD and irradiances and the spectral characteristics of size-specific aerosol absorption measurements showed distinct differences between the aerosol source types, suggesting that even in cases of low aerosol concentration, air mass characteristics influence the spectral and angular distributions of UV radiation that are important for modeling photochemical processes and biological exposure.

Wick, M. and B. Freier (2000). "Long-term effects of an insecticide application on non-target arthropods in winter wheat - a field study over 2 seasons." Anzeiger Fur Schadlingskunde-Journal of Pest Science **73**(3): 61-69.
<Go to ISI>://000087756700001 AND http://www.botanischergarten.ch/Longterm/Wick-Longterm-2000.pdf

The effects of the insecticide lambda-cyhalothrin (Karate) on non-target arthropods in winter wheat were studied throughout two successive seasons in 1998 and 1999. The study particularly focussed on the crop in the growing season after insecticide application (also winter wheat) for detection of potential long-term effects and for determination of the suitability of different sampling methods. The investigations were based on the assumption that arthropod immigration from surrounding areas is limited in large fields. For this reason a simple approach seemed to be feasible. Two plots of equal size (10 ha, adjusted to each other) were defined in a 100ha field and designated control and treatment plots. Ten sampling points were established on each plot. The following monitoring methods were utilised: visual counting, sweep netting and pitfall trapping. In the first year of investigation, countings and catches were carried out 2 days prior to insecticide application and 2, 16, 30 and 44 days after application. In the next year, they were carried out 365 days and 384 days after insecticide application in the successive crop of winter wheat. At the time of the first

sampling prior to insecticide application, the two plots showed significant differences with respect to arthropod density or activity, particularly in visual counting and to a minor degree to sweep netting and pitfall trapping. Lower densities or activities were observed in the plot reserved for treatment. Measures for mathematical equalisation of the results of population densities before pesticide treatment should be considered. After insecticide application, the densities or activities of non-target arthropods decreased, particularly in visual counting and sweep netting. After one year, these effects disappeared to a large extent. Several groups of arthropods reached even higher levels in the treated plot than in the untreated one. The pitfall traps revealed weak activity-decreasing effects in carabids and spiders in the treated plot, but the opposite tendency for staphylinids. Hence, it seems that the conditions in a large field are less homogeneous, and that smaller scale conditions can support processes of recovery in non-target populations.

Widmer, F., F. Rasche, M. Hartmann and A. Fliessbach (2006). "Community structures and substrate utilization of bacteria in soils from organic and conventional fanning systems of the DOK long-term field experiment." Applied Soil Ecology **33**(3): 294-307.
<Go to ISI>://WOS:000239857200008

Preservation or improvement of soil quality and productivity is of major importance for sustainable agriculture. Microorganisms strongly influence these soil characteristics as they are involved in nutrient cycling, transformation processes and soil aggregate formation, as well as in plant pathology or plant growth promotion. A profound understanding of structure, dynamics and functions of soil microbial populations represents one key to the understanding and description of soil quality. Therefore, we analyzed longterm effects of three farmyard manure (FYM)-based farming systems, i.e. bio-dynamic (BIODYN), bio-organic (BIOORG) and conventional (CONFYM), on microbiological soil characteristics and compared them to long-term effects of minerally fertilized (CONMIN) and unfertilized (NOFERT) control systems. Furthermore, we compared these long-term effects of farming systems to short-term effects of the crops winter wheat and grass-clover ley. The DOK field experiment in Therwil, Switzerland, which was established in 1978, represents in a unique long-term comparison, allowing to approach these questions. Effects on microbiological soil characteristics were assessed with a polyphasic approach by analyzing soil microbial biomass, soil DNA content, colony forming unit (CFU) counts, community level substrate utilization (CLSU) patterns with Biolog (TM) EcoPlates, and terminal restriction fragment length polymorphism (T-RFLP) profiles of bacterial 16S rRNA genes. The soil biomass parameters, i.e. microbial biomass, DNA content and CFU, were all strongly influenced by the farming systems, whereas only CFUs were significantly affected by the two crops analyzed. Differences among the FYM-based farming systems BIODYN, 13100RG and CONFYM were only significant for microbial biomass and DNA content. CLSU and T-RFLP profiling, on the other hand, allowed for consistent differentiation of soil bacterial community structure in relation to the influence of farming systems and crops. The analyses revealed that the main and highly significant effect on microbiological soil characteristics was related to FYM applications. Less strong but significant effects were caused by the two crops, i.e. winter wheat and grass-clover. Effects of the farming systems BIODYN, BIOORG and CONFYM on soil bacterial community structure were relatively weak and not significant. These results suggest that for successful soil quality management fertilization regime and crop rotation are of major importance and that polyphasic approaches are needed to describe and assess microbiological soil characteristics.

Wiggins, S. (2003). "Autonomous acoustic recording packages (ARPs) for long-term monitoring of whale sounds." Marine Technology Society Journal **37**(2): 13-22.
<Go to ISI>://000185196900002

Advancements in low-power and high-data capacity computer technology during the past decade have been adapted to autonomously record acoustic data from vocalizing whales over long time periods. Acoustic monitoring of whales has advantages over traditional visual surveys including greater detection ranges, continuous long-term monitoring in remote locations and in various weather conditions, and lower cost. An autonomous acoustic recording package (ARP) is described that uses a tethered hydrophone above a seafloor-mounted instrument frame. ARPs have been deployed to record baleen whale sounds in the Bering Sea, off the coast of southern California, near the West Antarctic Peninsula, and near Hawaii. ARP data have provided new information on the seasonal presence, abundance, call character, and patterns of vocalizing whales. Current development is underway for a broader-band, higher-data capacity system capable of recording odontocete whales, dolphins, and porpoises for long time periods.

Williams, M. J., Jr. (2003). Intercropping process.
<Go to ISI>://BIOSIS:PREV200300523552

A novel process for successfully intercropping corn and soybean plants is described herein. For best ecological results, the corn and soybeans are planted at specific predetermined distances at the same time of year. The corn and soybeans create a microclimate of humidity, as well as a root system and groundcover which effectively resists drought and erosion. Another advantage is use of conservation tillage which is compatible with the ecological longterm advantages of intercropping commercial annual grains and legumes.

Wise, K. D., D. J. Anderson, J. F. Hetke, D. R. Kipke and K. Najafi (2004). "Wireless implantable microsystems: High-density electronic interfaces to the nervous system." Proceedings of the Ieee **92**(1): 76-97.
<Go to ISI>://000187999200006

This paper describes the development of a high-density electronic interface to the central nervous system. Silicon micromachined electrode arrays now permit the long-term monitoring of neural activity in vivo as well as the insertion of electronic signals into neural networks at the cellular level. Efforts to understand and engineer the biology of the implant/tissue interface are also underway. These electrode arrays are facilitating, significant advances in our understanding of the nervous system, and merged with on-chip circuitry, signal processing, microfluidics, and wireless interfaces, they are forming the basis for a family of neural prostheses for the possible treatment of disorders such as blindness, deafness, paralysis, severe epilepsy, and Parkinson's disease.

Wood, D. (1993). "FORESTS TO FIELDS - RESTORING TROPICAL LANDS TO AGRICULTURE." Land Use Policy **10**(2): 91-107.
<Go to ISI>://WOS:A1993KR74700001

As world population increases there will be a need for more food. If tropical countries are to meet this need, agricultural production must rise. There are large areas of tropical land formerly managed under traditional cropping systems and later abandoned to forest for reasons unrelated to their agricultural potential. This land should be identified and brought back into sustainable agricultural production, as it is: (a) unrecognized as former agricultural land; (b) on undegraded soils; (c) in wetter areas of higher potential for agriculture; (d) threatened with permanent inclusion in the expanding estate of forest and nature reserves.

Woodruff, J. E. (1986). "Ideal of food self-sufficiency goes by board in China." Sun (Baltimore, Md. : 1837) **299**(9): 1F.
<Go to ISI>://MEDLINE:12314567

Recent trends in China have raised questions as to whether self-sufficiency in grain production is a viable longterm development goal. China's grain output dropped by 27 million tons in 1985, and each of 11 townships in south and southwestern China visited by the author reported significant reductions in the amount of land planted in grain in recent years. More profitable crops such as vegetables, cotton, and oilseeds are being grown instead, and many communes have failed to meet their grain quotas. The Government is considering incentives to encourage more farmers to switch back to grain. A broader problem concerns the growing scarcity of farmland as a result of industrial development. In many cases, the nature of the new land uses will damage the land irretrievably. New land management laws are aimed at strict control of any conversion of arable land out of farm use. In addition, the Government is considered to have contributed to the drop in grain production through its neglect of flood control, irrigation, and other public works projects that enable farming in China. Grain growers have become one of the lowest income groups in China. The average daily income of Sichuan grain farmers is less than 1/3 that of workers in rural commerce or industry.

Woodward, S. L., G. C. Waghorn and N. A. Thomson (2006). "Supplementing dairy cows with oils to improve performance and reduce methane - does it work?" Proceedings of the New Zealand Society of Animal Production **66**: 176-181.
<Go to ISI>://BIOSIS:PREV200600566522

Oil supplements can be used in dairy rations to increase dietary energy density (and energy intake) and reduce methane (CH4) emissions from rumen fermentation. Trials at Dexcel measured effects of oil supplementation on dry matter intake (DMI), milk yield and methane production after lactating dairy cows were fed pasture-based diets for short (14-day) and long (12-week) periods. In the short-term trial, 32 cows received either no oil or three mixtures of sunflower and fish oil at 500g/d. In the long-term trial 20 cows grazed pasture and received either no oil or 300g linseed and fish oil for 11 weeks prior to methane measurements. The type of oil in the short-term trial did not affect methane production and oils had no effect on DMI or milk yield but reduced total methane emissions by 27% (176 vs. 242g CH4/Cow/d, sed=10.6) and CH4/kg DM (13.5 vs. 18.5g CH4/kg DM, sed=0.88). In the long-term trial, oil had no effect on methane emissions (353 (oil) vs. 323g CH4/cow/d (control), sed=17.0 and 21.7 vs. 23.0g CH4/kg DM, sed=1.01). These trials did not show benefits of oils for milk production and emphasize the need for longterm studies when developing on-farm strategies for methane mitigation.

Wu, G., P. Gunawardana, M. M. Bryant, R. A. Voitle and D. A. Roland, Sr. (2007). "Effect of molting method and dietary energy on postmolt performance, egg components, egg solid, and egg quality in bovans white and dekalb white hens during second cycle phases two and three." Poultry Science **86**(5): 869-876.
<Go to ISI>://WOS:000245895900011

Two experiments of 4 x 2 x 2 factorial arrangements of 4 dietary energy levels, 2 molting methods (feed withdrawal and no salt diet), and 2 strains (Bovans White and Dekalb White) were conducted to determine the effect of dietary energy and molting method on longterm postmolt performance of 2 strains of commercial Leghorns. In experiments I and 2, Bovans White hens (n = 576) and Dekalb White hens (n = 576) were randomly divided into 16 treatments (6 replicates of 12 birds per treatment). Experiment I lasted from 86 to 96 wk of age, and experiment 2 lasted from 100 to 110 wk of age. Bovans White hens had significantly higher egg production than Dekalb White hens, whereas Bovans White hens had significantly lower egg weight, percentage of eggshell, and egg specific gravity than Dekalb White hens. Based on improved feed conversion, dietary energy of 2,846 kcal of ME/kg appeared to be enough for optimal performance during second cycle phase 2. Based on BW of hens, dietary energy level for optimal performance should be less than 2,936 kcal of ME/kg during second cycle phase 3. There can be no fixed ideal dietary energy level for optimal profits for postmolt egg production. Molting method had no effect on egg production and egg mass during the early and middle stages of the postmolt production period. However, hens molted by feed withdrawal had significantly higher egg production and egg mass during the later stage of the postmolt production period compared with hens molted by a no salt diet. There was no significant difference in egg specific gravity due to molting method. Feeding a no salt diet resulted in reasonable long-term postmolt performance and eggshell quality, rather than optimal performance and eggshell quality.

Wurster, F. C., D. J. Cooper and W. E. Sanford (2003). "Stream/aquifer interactions at Great Sand Dunes National Monument, Colorado: influences on interdunal wetland disappearance." Journal of Hydrology **271**(1-4): 77-100.
<Go to ISI>://WOS:000180678400006

Between 1937 and 1995 a complex of more than 100 interdunal wetlands disappeared from Great Sand Dunes National Monument, Colorado. We investigated three hypotheses that could explain Welland disappearance: (1) dune movement during a severe drought in the 1950s buried the wetlands, (2) agriculture related ground water pumping lowered the regional water table, and (3) changes in local hydrologic processes led to wetland loss. We used regional stream flow records, ground water level measurements, natural stable isotope analyses, soil stratigraphy, buried seed banks, and ground water modeling to address these hypotheses. Hydrologic data and stable isotope analyses illustrated the interaction between Sand Creek, a nearby stream, and the unconfined aquifer in the area where wetlands occurred. When the intermittent Sand Creek flows, seepage through its bed creates a large ground water mound under the creek. The seasonal development and dispersion of this mound propagates pressure waves through the aquifer that influence ground water levels up to 2 km from Sand Creek. Our data suggest the primary factors contributing to wetland

disappearance were recent climatic fluctuations and incision of the Sand Creek channel. Below average stream flow between 1950 and 1980 reduced the duration of Sand Creek flow across the dune complex, minimizing ground water mound development. Consequently, the water table in the unconfined aquifer dropped similar to 1.0 m and interdunal wetlands dried up. Twentieth Century incision of Sand Creek's channel reduced ground water mound height similar to 2.5 m, decreasing seasonal water table fluctuations at interdunal wetlands and contributing to the overall water table decline. Longterm wet and dry cycles affect the water table elevation more than channel incision, leading us to conclude that many interdunal wetlands are ephemeral features. Wetland area is maximized during consecutive years of above average Sand Creek discharge and minimized as the water table drops during dry periods. (C) 2002 Published by Elsevier Science B.V.

Wyrzykowski, L., A. Udalski, P. L. Schechter, O. Szewczyk, M. Szymanski, M. Kubiak, G. Pietrzynski, I. Soszynski and K. Zebrun (2003). "The optical gravitational lensing experiment. Optical monitoring of the gravitationally lensed quasar HE1104-1805 in 1997-2002." Acta Astronomica **53**(3): 229-240.
<Go to ISI>://000186237900002

We present results of the long term monitoring of the gravitationally lensed quasar HE1104-1805. The photometric data were collected between August 1997 and January 2002 as a subproject of the OGLE survey. We determine the time delay in the light curves of images A and B of HE1104-1805 to be equal to 157 +/- 21 days with the variability in the image Blight curve leading variability of the image A. The result is in excellent agreement with the earlier determination by Ofek and Maoz. OGLE photometry of HE1104-1805 is available to the astronomical community from the OGLE Internet archive.

Xie, L.-y. and E.-d. Lin (2007). "Effects of CO2 enrichment on grain quality of rice and wheat: a research review." Yingyong Shengtai Xuebao **18**(3): 659-664.
<Go to ISI>://BIOSIS:PREV200700393159

Crop grain quality is mainly depended on variety's genetic characteristics and environmental conditions, while elevated CO2 concentration in atmosphere, one of the main factors resulting in global climate change, would have a significant effect on crop grain quality. In this paper, the research progress on the effects of CO2 enrichment on rice and wheat grain quality was summarized from the aspects of protein and nitrogen contents, trace elements, and other characters, emphasized the necessity and urgency of the study in this field, and pointed out the key directions and contents of further study, i. e., (a) direct effects of CO2 enrichment on rice and wheat grain quality and their differences for different varieties, (b) integrated effects of CO2 enrichment and other climate factors on rice and wheat grain quality and their quantitative indices, (c) action mechanisms of CO2 enrichment and other climate factors on rice and wheat grain quality formation, (d) longterm directions and strategies of rice and wheat breeding in quality improvement to adapt climate change, (e) integrated planting technology systems in quality improvement for adapting climate change, and (f) application of molecule-marker and gene-transfer in rice and wheat breeding for quality improvement.

Xue, X. and M. Hao "Nitrate leaching on loess soils in north-west China: Appropriate fertilizer rates for winter wheat." Acta Agriculturae Scandinavica Section B-Soil and Plant Science **61**(3): 253-263.
<Go to ISI>://WOS:000289346100009

Nitrate leaching is an important factor affecting N fertilizer consumption in the agroecosystem of the Loess Plateau of China. Therefore, the movement and residual amounts of nitrate within the soil profile under different fertilizer application rates were studied to determine the most appropriate rates of fertilizer application. Soil samples were collected from a longterm experimental site to determine the concentration of nitrate in mid-September 1999 and 2007. The results showed that NO(3)(-)-N had moved more than 100 cm down the soil profile from 1999 to 2007, and two peaks of NO(3)(-)-N were present at different depths after 23 years of high rates of N application. NO(3)(-)-N had leached to depths exceeding 300 cm in plots where > 90 kg ha(-1) N had been applied alone. At the fertilization rate of 180 kg N ha(-1), up to 1500 kg ha(-1) residual NO(3)(-)-N was detected, equivalent to 34.8% of the total input of N fertilizer during the experiment. The total amount of residual nitrate increased with increases in the N application rate, but decreased with increases in P(2)O(5) application when the N application was up to 90 kg ha(-1) or more. The results indicate that fertilization using a 1: 1 mixture of N: P(2)O(5) at 90 kg ha(-1) p.a. could prevent NO(3)(-)-N from leaching in soil used to grow continuous winter wheat (Triticum aestivum L.) crops in the rain-fed agricultural areas of China, while providing optimum yields.

Yamamoto, T., K. Takaki, T. Koyama and K. Furukawa (2008). "Long-term stability of partial nitritation of swine wastewater digester liquor and its subsequent treatment by Anammox." Bioresource Technology **99**(14): 6419-6425.
<Go to ISI>://WOS:000257150800058

Partial nitritation using inhibition of free ammonia and free nitric acid is an effective technique for the treatment of high concentrations of ammonium in wastewaters. This technique was applied to the digester liquor of swine wastewater and the stability of its longterm operation was investigated. Partial nitritation was successfully maintained at a nitrogen loading rate (NLR) of 1.0 kg N m(-3) d(-1) for 120 days without acclimatization of nitrite oxidizing bacteria (NOB) to the inhibitory compounds (free ammonia and free nitric acid). The conversion efficiencies of NH4-N to NO2-N and to NO3-N were determined to be around 58% and < 5%,), respectively. After the establishment of partial nitritation, the influence of swine wastewater on the Anammox reaction was examined using continuous flow treatment experiments. Consistent nitrogen removal was achieved for 70 days at a nitrogen removal rate (NRR) of 0.22 kg N m(-3) d(-1) and the color of Anammox bacteria changed from red to greyish black. The NO2-N consumption and the NO3-N production increased concurrently and the Anammox reaction ratio was estimated to be 1:1.67:0.53, which is different from that reported previously (1:1.32:0.26). (c) 2007 Elsevier Ltd. All rights reserved.

Yang, J. W., H. J. Cho, S. H. Lee and J. Y. Lee (2004). "Characterization of SnO2 ceramic gas sensor for exhaust gas monitoring of SVE process." Environmental Monitoring and Assessment **92**(1-3): 153-161.
<Go to ISI>://000188709000011

A Figaro-type gas sensor system was investigated for the monitoring of volatile organic contaminants (VOC) in the exhaust gas from a soil vapor extraction (SVE) process. Benzene, toluene, ethyl benzene and xylene (BTEX), and their mixtures, were tested as representative contaminants. Reasonably good correlation factors > 0.98 were obtained between the GC analyses and the sensor responses for each component, and for the total gas concentrations. Although the composition of the exhaust gas from SVE process, as well as the amount of each component, change with time, the sensor can be used to estimate the residual amount of contaminants by measuring the total concentrations in the exhaust gas. The sensor can be utilized as a valuable tool for the monitoring of SVE process by indicating when the operation to remediate a contaminated site should be stopped. The proposed ceramic gas sensor system may be a good alternative to existing methods, because it can satisfy the essential monitoring necessities of SVE processes, and has many advantages over other fully equipped instrumentation, as a cost-effective device, with long-term monitoring stability.

Yen, W. and L. F. Carter (1993). "Unintended consequences of Ze Ren Zhi reforms in China: interplay of agricultural reform and population control policy." Applied behavioral science review **1**(1): 27-46.
<Go to ISI>://MEDLINE:12318309

The aim of the discussion of unintended consequences of Ze Ren Zhi policy reforms in China is to show how isolating problems and developing solutions in isolation can lead to serious consequences. The Ze Ren Zhi reforms in 1978 were intended to increase agricultural productivity by changing from the collective system to an individual responsibility system, but the unintended and undesirable consequences were a growth in family size and discouragement of some environmentally sound land use practices. The prior system gave an equal share of collective income for an equal number of days worked. Under the new reform, "Baochan Daohu," each household had responsibility for a contracted quantity of grain production. Within 2-4 years, economic conditions improved considerably. A discussion is provided of the transition from rights and duties of the collectives to the new responsibility system and the experimentation with different systems. Specific attention is directed to land reforms, mutual aid teams, cooperatives, communes, variations of Ze Ren Zhi, contracting output to individual laborers, contracting jobs to households, and contracting output quotas to households. During the reforms, beginning in the 1950s and lasting until 1978, other changes were taking place. Death rates were declining and birth rates were increasing, such that in 1971 a campaign was established to promote the Late, Sparse, and Few policy for marrying and giving birth later, increasing birth intervals, and having fewer children. This voluntary program eventually took on a more universally mandatory nature. The 1950 Marriage Law stipulated 20 years as the legal age for marriage (18 years for females), and family planning (FP) workers during the 1970s were encouraging even later marriage, and by 1980 a system of rewards and penalties was established to reinforce small family size. After 1978 and a period of birth declines, the crude birth rate increased to 3.06 in 1983. The new responsibility system changed the reward and penalty system, led to a loss of FP workers, created conditions that gave advantages to large families, promoted early marriage and pregnancy, and created a migrant labor surplus. Chemical fertilizers were used and there was little incentive to get involved in reclamation or reforestation efforts that have longterm gain. Integrated planning and programming is needed for the short and long run.

Yildirim, H., M. E. Ozel, R. Radberger and A. Akca (2002). "Long term monitoring of land use changes of means of remote sensing and GIS." Allgemeine Forst Und Jagdzeitung **173**(1): 15-19.
<Go to ISI>://000173762100003

The use of remote sensing techniques and subsequent analysis by means of a GIS offer possibilities for the area-wide monitoring of landscape changes. To exemplify the effectiveness of such methods against the background of global urbanization and its threat to natural resources, the article shows the results of a study at the location of Gebze, an industrial town within the Istanbul metropolitan area. It can be seen that, for the study periods from 1986 till 1993 and from 1993 till 1998, a dramatic industrialization and urbanization has taken place. mainly during the first period. While the portion of built-Lip areas was only 30% in 1986, it increased to 49% in 1993 and nearly 55% in 1998 (Tab. 1). Most of the built-up areas were drawn from land previously used for pasture and other agricultural activities (Fig. 1 and 2). The fact that the land use plan, issued in 1986 by the provincial government, was practically ignored by the actual development has to be taken very seriously (Tab. 3). Concerning this problem, the combined use of remote sensing and GIS appears to be necessary to provide authorities with up-to-date and spatially explicit information. Thus, reasonable and better control of land use changes can be facilitated.

Zabranska, J., M. Dohanyos, P. Jenicek, H. Ruzicikova and A. Vranova (2003). "Efficiency of autothermal thermophilic aerobic digestion and thermophilic anaerobic digestion of municipal wastewater sludge in removing Salmonella spp. and indicator bacteria." Water Science and Technology **47**(3): 151-156.
<Go to ISI>://000181785000026

The study is focused on the comparison of autothermal thermophilic aerobic digestion, thermophilic and mesophilic anaerobic digestion, based on long term monitoring of all processes in full-scale wastewater treatment plants, with an emphasis on the efficiency in destroying pathogens. The hygienisation effect was evaluated as a removal of counts of indicator bacteria, thermotolerant coliforms and enterococci as CFU/g total sludge solids and a frequency of a positive Salmonella spp. detection. Both thermophilic technologies of municipal wastewater sludge stabilisation had the capability of producing sludge A biosolids suitable for agricultural land application when all operational parameters (mainly temperature, mixing and retention time) were stable and maintained at an appropriate level.

Zadoks, J. C. (1995). An Epidemiological View on the Introduction of GMOs at the Third Trophic Level. Pan-European conference on the potential long-term ecological impact of genetically modified organisms, Strasbourg, Council of Europe Press.

Zapata, F. (2003). "The use of environmental radionuclides as tracers in soil erosion and sedimentation investigations: recent advances and future developments." Soil & Tillage Research **69**(1-2): 3-13.

<Go to ISI>://000181159100002

Although much of the recent attention on the environmental problems has focused on climatic change, there is also increasing concern that accelerated soil erosion and associated land degradation represent a major problem for sustainable development and environmental protection. There is an urgent need to obtain reliable quantitative data on the extent and rates of soil erosion worldwide to provide a more comprehensive assessment of the magnitude of the problems and to underpin the selection of effective soil conservation measures. The use of environmental radionuclides, in particular Cs-137, affords an effective and valuable means for studying erosion and deposition within the landscape. The key advantage of this approach is that it can provide retrospective information on medium-term (30-40 years) erosion/deposition rates and spatial patterns of soil redistribution, without the need for long-term monitoring programmes. Advantages and limitations of the technique are highlighted. The launching of two closely linked International Atomic Energy Agency (IAEA) research networked projects in 1996 involving some 25 research groups worldwide has made a major contribution to co-ordinating efforts to refine and to standardise the Cs-137 technique. The efficacy and value of the approach has been demonstrated by investigations in a number of environments. Significant developments that have been made to exploit its application in a wide range of studies are reported in this review paper. Other environmental radionuclides, such as unsupported Pb-210 and Be-7 offer considerable potential for use in soil erosion investigations, both individually and complementary to Cs-137. The IAEA through research networks and other mechanisms is promoting further development and applications of these radionuclides in soil erosion and sedimentation studies for a sustainable resource use and environmental protection.

Zeng, Z., Q. Yan, X. Zhu, L. Lin and B. Zhu Effects of Long-term Fertilization Regimes on Soil Hydrolase's Activities at Different Growth Stages of Maize. Advances in Biomedical Engineering. J. Hu**:** 273-276.
<Go to ISI>://BIOSIS:PREV201100334259

To discuss the effect of long-term fertilization regimes on soil hydrolase activities, soil hydrolase activities at different growth stages of maize under long-term fertilization regimes were measured. Soil hydrolase (urease, alkaline phosphatase, invertase, and protease) activities changed in the same seasonal patterns, which increased at early growth stage of maize, then reached the maxima at tasseling stage, and thereafter declined. In the vigorous growth stage of maize (tasseling stage), the maxima of four enzymes activities were 120.22 mg/(kg.d), 120.11 mg/(g.d), 7.118 mg/(g.h) and 128.41 mg/(100g.d), respectively, which were 225%, 220%, 204% and 135% higher than those respectively, in the no fertilization treatment. Longterm fertilization treatments of ONINPK and RSDNPK could significantly improve the activities of soil urease, alkaline phosphatase, invertase and protease, and create a better soil biochemical environment.

Zhang, Y., J. E. Coleman, G. E. Fuchs and S. L. Semple-Rowland (2003). "Circadian oscillator function in embryonic retina and retinal explant cultures." Molecular Brain Research **114**(1): 9-19.
<Go to ISI>://000183665100002

Retinal circadian oscillators regulate many aspects of retinal function. Investigations of these oscillators and the biochemical cascades that entrain them would be greatly facilitated if experimental paradigms could be identified that permit long-term monitoring of retinal circadian oscillator function in vitro. The purpose of this study was to determine if chicken retinas maintained in explant culture conditions could serve in this capacity. Retinal circadian oscillator function was studied by monitoring iodopsin transcription under cyclic light, constant dark, and following reversal of the light cycle. Rhythms observed in the explant cultures were compared to those observed in retinas of embryos (in ovo) and post-hatch chickens. Robust iodopsin transcript rhythms were observed for up to 9 days in explant cultures maintained under cyclic light. These rhythms persisted for 48 h in constant darkness and the time course for re-entrainment of the rhythm to a reversed light/dark cycle was similar to that observed in post-hatch chicken retinas. These results show that circadian oscillators located within the retina play a key role in the regulation of iodopsin transcription in retinal explant cultures and in retinas of post-hatch chickens. Interestingly, our data show that iodopsin transcription in retinas of intact embryos is primarily, if not entirely, driven by light. These results show that the circadian oscillators driving iodopsin. transcription in embryonic retinal explant cultures exhibit functional characteristics similar to those found in post-hatch chicken retina, supporting use of this paradigm in further studies of entrainment of these oscillators in retina.

Zhou, W. F., B. F. Beck and T. S. Green (2003). "Evaluation of a peat filtration system for treating highway runoff in a karst setting." Environmental Geology **44**(2): 187-202.
<Go to ISI>://000183872900008

The deleterious character of highway runoff, especially following long periods without precipitation, has been well documented in the literature. It transports hydrocarbons, heavy metals, and other contaminants from highways, contributing to the pollution of surface water and groundwater. Groundwater is particularly vulnerable in karst areas where highway runoff is transferred quickly into subsurface conduit networks through open sinkholes and/or sinking streams. The difficulties in remediating contaminated karst aquifers make it crucial for karst aquifers to receive only uncontaminated water. A peat filtration system was constructed at the I-40/I-640 interchange in eastern Knoxville, Tennessee, USA, to remove highway runoff contaminants prior to being transported into karst aquifers.- Recent field tests indicate that the system can significantly decrease the concentrations of analyzed constituents including PAHs (polyaromatic hydrocarbons), popper, and zinc. However, the removal efficiency depends on the concentration of the contaminants in the runoff. Long-term monitoring is required to determine the true effectiveness of the designed filtration system and its reliability.

Zueghart, W., A. Benzler, F. Berhorn, U. Sukopp and F. Graef (2008). "Determining indicators, methods and sites for monitoring potential adverse effects of genetically modified plants to the environment: the legal and conceptional framework for implementation." Euphytica **164**(3): 845-852.

http://dx.doi.org/10.1007/s10681-007-9475-6 AND http://www.ask-force.org/web/Longterm/Zueghart-Determining-Indicators-Monitoring-2008.pdf

According to Directive 2001/18/EC commercial cultivation of genetically modified plants (GMPs) have to be monitored. The aim of the monitoring is to identify potential adverse effects of the GMPs and their use on human health and the environment. There are few concepts showing how GMP monitoring may be implemented. This article indicates monitoring requirements with a focus on environmental issues. GMP monitoring has to be appropriate to detect direct and indirect, immediate and long-term as well as unforeseen effects. For choosing suitable monitoring indicators and methods, we propose a case-by-case approach, which is hypothesis-driven and related to specified protection targets. We present criteria for selecting suitable monitoring sites and demonstrate possibilities to integrate GMP monitoring with existing environmental monitoring programmes. To ensure comparability, interpretability and quality of GMP monitoring data a harmonisation on both national and international level is proposed.

Zweifel, C. and R. Stephan (2003). "Microbiological monitoring of carcasses within the scope of self-control - Information content und expressiveness of different evaluation forms." Fleischwirtschaft **83**(12): 88-92.
<Go to ISI>://000187362700013

The data on microbiological status (total colony count) of sheep carcasses (n = 310) were used as the basis for different evaluation forms and were compared with the directives of the EU-decision 2001/471/EG. Results of each carcass should be shown in a form easy to understand, e.g. a bar chart. Quality control charts offer a biometric-founded concept for drawing a graph of average log(10) values of each sampling day. However, average values do not recognize localized contamination on carcasses and therefore do not allow reliable conclusions with regard to abattoir-specific weak points in slaughter hygiene. Therefore, with results out of limits and periodically, additional examinations separated for the different sampling sites, with results shown e.g. as box plots, should be planned. The evaluations demanded by the EU-decision (pooling the samples of each carcass, continuous documentation of average values and categorizing these values as acceptable, critical or not acceptable) are appropriate for a long-term monitoring of slaughter hygiene in an abattoir. However, because the results of microbiological examinations are abattoir-specific, "limit values" can only form a "baseline".