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Agricultural Research Service, U.S. Department of Agriculture

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## **Expert Systems, Decision Support Systems and Computer-Assisted Instruction for Water Resource Management(II)**

JULY 1993 - SEPTEMBER 1995  
90 citations from AGRICOLA  
by  
Diane Doyle  
Water Quality Information Center

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EXPERT SYSTEMS, DECISION SUPPORT SYSTEMS AND COMPUTER-ASSISTED INSTRUCTION FOR WATER RESOURCE MANAGMENT (II)

1. Agricultural management alternatives: GLEAMS model simulations.  
Knisel, W. G.; Leonard, R. A.; Davis, F. M.

Proceedings of the 1989 Summer Computer Simulation Conference July 24-27, 1989, the Stouffer Austin Hotel, Austin, Texas / edited by Joe K Clema ; conference sponsor, the Society for Computer Simulation. San Diego, CA : The Society, c1989.. p. 701-706.

Includes references.

Descriptors: groundwater-pollution; pesticides-; water-quality;  
groundwater-; application-date; irrigation-scheduling;  
planting-date; computer- simulation; simulation-models; georgia-  
Abstract: The GLEAMS model was used to simulate potential  
pesticide loadings to groundwater for alternative management  
strategies. A 50-year climatic record at Tifton, Georgia was used  
to estimate impacts of alternate planting dates, irrigation  
scheduling and depths applied, and pesticide selection and  
application dates on root zone leaching for two representative  
Coastal Plain soils. Results of simulation are given to  
demonstrate the utility of comprehensive model applications to  
select among possible alternative systems to maintain or improve  
groundwater quality.

NAL Call No.: QA76.9.C65S95-1989

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2. Applying case-based reasoning techniques to the WEPP soil  
erosion model.

Meyer, C. R.; Flanagan, D. C.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of  
Agricultural Engineers, . Winter 1991. (91-2625) 9 p.

Paper presented at the "1991 International Winter Meeting  
sponsored by the American Society of Agricultural Engineers,"  
December 17- 20, 1991, Chicago, Illinois.

Descriptors: erosion-; simulation-models; expert-systems;  
decision-making

NAL Call No.: 290.9-Am32P

\*\*\*\*\*

3. ARX : a spatial expert system shell for modelling  
environmental problems : user's manual.

Whigham, P.

Canberra, ACT, Australia : CSIRO, Institute of Natural Resources  
and Environment, Division of Water Resources, [1993] 43 p..

"December 1993."

S918.A8T44--no.93/21

\*\*\*\*\*

4. Automated extraction of drainage network and watershed data  
from digital elevation models.

Martz, L. W.; Garbrecht, J.

Water-resour-bull v.29, p.901-908. (1993).

Includes references.

Descriptors: drainage-; overland-flow; runoff-; watersheds-;  
hydrological-data; algorithms-; computer-software;  
geomorphology-; oklahoma-;

digital-elevation-drainage-network-model-dednm

Abstract: This paper discusses a computer program which extracts  
a number of watershed and drainage network properties directly  
from digital elevation models (DEM) to assist in the rapid  
parameterization of hydrologic runoff models. The program  
integrates new and established algorithms to address problems  
inherent in the analysis low-relief terrain from raster DEMs  
similar to those distributed by the U.S. Geological Survey for  
7.5-minute quadrangles. The program delineates the drainage  
network from a DEM, and determines the Strahler order, total and  
direct drainage area, length, slope, and upstream and downstream

coordinates of each channel link. It also identifies the subwatershed of each channel source and of the left and right bank of each channel link, and assigns a unique number to each network node. The node numbers are used to associate each subwatershed with the channel link to which it drains, and can be used to control flow routing in cascade hydrologic models. Program output includes tabular data and raster maps of the drainage network and subwatersheds. The raster maps are intended for import to a Geographical Information System where they can be registered to other data layers and used as templates to extract additional network and subwatershed information.

NAL Call No.: 292.9-Am34

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5. CERES-N model predictions of nitrogen mineralized from cover crop residues.

Quemada, M.; Cabrera, M. L.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. July/Aug 1995. v. 59 (4) p. 1059-1065.

Includes references.

Descriptors: cover-crops; crop-residues; decomposition-; nutrient-sources; nitrogen-; mineralization-; simulation-models; computer-simulation; modification-; carbohydrates-; lignin-; cellulose-; stems-; leaves-

Abstract: Winter annual cover crops, widely used in no-till systems, can be an important source of N for the subsequent crop. Because many factors affect net N mineralization from cover crop residues, computer models can be powerful tools to predict it. The CERES models, which are some of the most widespread models for simulating the whole crop-soil system, have a common submodel (CERES-N) that describes N transformations. The objectives of this study were to determine decay rate constants under nonlimiting conditions for the carbohydrates and cellulose pools (CARB and CELL) of CERES-N for residues that decompose on the soil surface, and to test if two modifications to CERES-N could improve the simulation of N mineralization. The two modifications were to: (i) allow the user to vary the relative size of the residue pools (CARB, CELL, and lignin), and (ii) allow stems and leaves to decompose separately, having a common point of interaction through the inorganic N pool. Results of a 6-mo laboratory incubation experiment with four cover crop residues were used to adjust rate constants and test the effect of model modifications. The decay rates obtained were 0.14 and 0.0034 d<sup>-1</sup> for CARB and CELL, respectively. Allowing the user to vary the relative size of residue pools greatly improved the simulation of net N mineralized (root mean square error of the model decreased from 1.0 to 0.28 g m<sup>-2</sup>), whereas modeling the separate decomposition of leaves and stems only caused a slight improvement in the prediction of net N mineralized.

NAL Call No.: 56.9-So3

\*\*\*\*\*

6. College students use of a computer authoring system in agriculture.

Legacy, J.; Amadi, N. S.; Elkins, D. M.

NACTA-j v.38, p.42-44. (1994).

Includes references.

Descriptors: agricultural-education;  
computer-assisted-instruction; computer-software; evaluation-;  
college-students; usage-  
NAL Call No.: 275.9-N213

\*\*\*\*\*

7. A comparison of traditional worksheet and linear programming  
methods for teaching manure application planning.  
Schmitt, M. A.; Levins, R. A.; Richardson, D. W.

J-nat-resour-life-sci-educ v.23, p.23-26. (1994).  
Includes references.

Descriptors: animal-manures; application-to-land; farm-planning;  
decision-making; methodology-; comparisons-;  
computer-programming; management-; nutrient-management

NAL Call No.: S530.J6

\*\*\*\*\*

8. Composting process design computer model.  
Person, H. L.; Shayya, W. H.

Appl-eng-agric v.10, p.277-283. (1994).  
Includes references.

Descriptors: composting-; wastes-; management-; operation-;  
systems-analysis; computer-programming; computer-software  
Abstract: A user-friendly computer package, COMPOST, was  
developed as a design, management, and educational tool to assess  
composting system requirements. The user enters ingredient  
characteristics along with critical operational parameters.  
Output includes the quantity of amendment required to supply the  
energy needed, the quantity of recycled compost required to  
adjust the initial moisture content, the mixture moisture  
content, and the carbon-to-nitrogen ratio of the mixture. The  
volume required for active composting and curing is calculated  
along with air flow rates for oxygen supply, moisture removal,  
and temperature control. The calculations in COMPOST are based on  
the assumption of a continuous, completely mixed system where  
ingredients are continuously added and product is continuously  
removed. However, calculations for mixtures of residue,  
amendment, and recycled compost and water also apply to batch  
systems. Peak airflow is calculated to reflect the requirement  
for a batch system.

NAL Call No.: S671.A66

\*\*\*\*\*

9. Computer-aided conservation planning for the 1985 food  
security act.  
Monson, M. J.; Wollenhaupt, N.

J-soil-water-conserv v.46, p.260-262. (1991).  
Includes references.

Descriptors: soil-conservation; computer-software;  
expert-systems; farmland-; cropping-systems; missouri-

NAL Call No.: 56.8-J822

\*\*\*\*\*

10. A computer aided integrated crop management system in winter  
wheat.  
Olesen, J. E.; Andreasen, F.; Andreasen, L.

Asp-appl-biol p.93-96. (1994).

In the series analytic: Arable farming under CAP reform / edited by J. Clarke, A. Lane, A. Mitchell, M. Ramans and P. Ryan.

Descriptors: triticum-aestivum; winter-wheat; interdisciplinary-research; expert-systems; integrated-systems; farm-management; crop-production; denmark-; advisory-systems

NAL Call No.: QH301.A76

\*\*\*\*\*

11. Computer-aided molecular modeling for development of biomarkers for human exposure to pesticides.

Saleh, M. A.; Wallace, C. Jr.; Blancato, J. N.

ACS-symp-ser p.76-112. (1994).

In the series analytic: Biomarkers of human exposure to pesticides / edited by M.A. Saleh, J.N. Blancato, and C.H.

Nauman. Paper presented at the 204th National Meeting of the American Chemical Society, August 23-28, 1992, Washington, D.C.

Descriptors: insecticides-; toxicity-; exposure-; mode-of-action; receptors-; binding-site; prediction-; models-; computer-analysis

Abstract: A molecular modeling and computer graphics study has been conducted on a group of insecticides including 50 bicycloorthocarboxylates, 12 bicyclophosphorus esters and 20 chlorinated insecticides which are known to have a common mode of action, i.e., binding to the gamma-aminobutyric acid chloride channel receptor. Three-dimensional steric and electrostatic fields were correlated with each compound's toxicological properties using comparative molecular field analysis. Toxicological potencies were strongly influenced by the nature and orientation of the substituent groups, molecular volume and dipole moment. Also described are models for predicting binding affinity to the receptor and for predicting acute mammalian toxicity. These chemicals may serve as useful probes for elucidation of the topography of the binding sites of the receptor and provide leads in the design of new compounds with more potent insecticidal activity and selectivity.

NAL Call No.: QD1.A45

\*\*\*\*\*

12. Computer anxiety and other factors preventing computer use among United States secondary agricultural educators.

Fletcher, W. E.; Deeds, J. P.

J-agric-educ v.35, p.16-21. (1994).

Includes references.

Descriptors: agricultural-education; teachers-; computer-assisted-instruction; secondary-education; attitudes-; usage-; usa-

NAL Call No.: S530.A4

\*\*\*\*\*

13. Computer-assisted teaching: LANDCADD: professionalizing agricultural graphic applications in the classroom.

Kirby, B. M.

Agric-Educ-Mag v.65, p.22-23. (1992).

Descriptors: agricultural-education; computer-assisted-instruction; computer-software; computer-graphics; design-; planning-; graphs-

NAL Call No.: 275.8-AG8

\*\*\*\*\*

14. A computer controlled drainage and water quality field experimental system.

Tait, R.; Madramootoo, C. A.; Enright, P.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Winter 1993. (93-3531) 16 p.

Paper presented at the "1993 International Winter Meeting sponsored by the American Society of Agricultural Engineers," December 14- 17, 1993, Chicago, Illinois.

Descriptors: water-quality; drainage-; subsurface-irrigation; runoff-; computer-simulation; computer-analysis; quebec-

NAL Call No.: 290.9-Am32P

\*\*\*\*\*

15. Computer decision aids for reducing herbicide use.

Coble, H. D.

Proc-annu-meet-Northeast-Weed-Sci-Soc. College Park, Md. : The Society. 1994. v. 48 p. 155-159.

Meeting held Janurary 3-6, 1994, Baltimore, Maryland.

Descriptors: low-input-agriculture; herbicides-; application-rates; weed-control; chemical-control; decision-making; computer-software; herb-computer-software

NAL Call No.: 79.9-N814

\*\*\*\*\*

16. Computer multimedia instruction versus traditional instruction in agriculture.

Marrison, D. L.; Tao, B. W.; Frick, M. J.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Winter 1993. (933544) 9 p.

Paper presented at the "1993 International Winter Meeting sponsored by the American Society of Agricultural Engineers," December 14- 17, 1993, Chicago, Illinois.

Descriptors: agricultural-economics; students-; academic-achievement; computer-assisted-instruction; traditions-; comparisons-; indiana-

NAL Call No.: 290.9-Am32P

\*\*\*\*\*

17. Coupling geographic information systems and models for weed control and groundwater protection.

Wilson, J. P.; Inskeep, W. P.; Rubright, P. R.; Cooksey, D.;

Jacobsen, J. S.; Snyder, R. D.

Weed-technol v.7, p.255-264. (1993).

Paper presented at the "Symposium on Geographic Information Systems," February 11, 1992, Orlando, Florida.

Descriptors: weeds-; centaurea-maculosa; euphorbia-esula; weed-control; herbicide-residues; groundwater-; contamination-; geographical-information- systems; mathematical-models; computer-simulation; montana-

NAL Call No.: SB610.W39

\*\*\*\*\*

18. DD50 computerized rice management program.

Slaton, N. A.; Helms, R. S.; Wilson, C. E. Jr.; Wells, B. R.

FSA-Univ-Ark-Syst-Coop-Ext-Serv. [Little Rock, Ark.] : Cooperative Extension Service,. June 1993. (2124) 4 p.

Insubseries: Computer Technical Series.  
Descriptors: oryza-sativa; mathematical-models; decision-making;  
growth-stages; herbicides-; application-date; air-temperature;  
arkansas-  
NAL Call No.: S37.F72  
\*\*\*\*\*  
19. A decision support system for evaluating the effects of  
alternative farm management systems on water quality and  
economics.  
Yakowitz, D. S.; Stone, J. J.; Lane, L. J.; Heilman, P.;  
Masterson, J.; Abolt, J.; Imam, B.

Water-sci-technol v.28, p.47-54. (1993).  
Paper presented at the IAWQ First International Conference on  
"Diffuse (Nonpoint) Pollution: Sources, Prevention, Impact,  
Abatement." September 19-24, 1993, Chicago, Illinois.  
Descriptors: water-quality; farm-management; systems-;  
decision-making; support-systems; farm-income; simulation-models;  
arizona-  
NAL Call No.: TD420.A1P7  
\*\*\*\*\*  
20. Decision support system for groundwater quality assessment.  
Embleton, K. M.; Engel, B. A.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of  
Agricultural Engineers,. Winter 1991. (917578) 6 p.  
Paper presented at the "1991 International Winter Meeting  
sponsored by The American Society of Agricultural Engineers,"  
December 17- 20, 1991, Chicago, Illinois.  
Descriptors: water-quality; groundwater-; expert-systems  
NAL Call No.: 290.9-Am32P  
\*\*\*\*\*  
21. A decision support system for pesticide use management.  
Arjoon, D.; Kok, R.; Prasher, S.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of  
Agricultural Engineers,. Summer 1993. (933043) 7 p.  
Paper presented at the "1993 International Summer Meeting  
sponsored by The American Society of Agricultural Engineers,"  
June 20-23, 1993, Spokane, Washington.  
Descriptors: pesticides-; groundwater-  
NAL Call No.: 290.9-Am32P  
\*\*\*\*\*  
22. A decision support system for wetland management on national  
wildlife refuges.  
Sojda, R. S.; Dean, D. J.; Howe, A. E.

AI-appl v.8, p.44-50. (1994).  
Includes references.  
Descriptors: nature-reserves; wildlife-; wetlands-; management-;  
support-systems; geographical-information-systems;  
expert-systems; usa-  
NAL Call No.: QA76.76.E95A5  
\*\*\*\*\*  
23. Determining wastewater user service charge rates : a step by  
step manual.  
Farmer, H.; Finane, W. J.; Fitzgerald, S. H.; United States.

Environmental Protection Agency. Office of Water.

Washington, D.C. : U.S. Environmental Protection Agency, Office of Water, 1992. 29 p. : ill. 2 computer disks..

Cover title.

Descriptors:

Sewage-disposal-plants-United-States-Fees-Computer-programs;  
User-charges-United-States-Computer-programs;  
Financial-management- Computer-programs

NAL Call No.: HD4477.F37-1992

\*\*\*\*\*

24. Development and use of a system for predicting the macroinvertebrate fauna in flowing waters.

Wright, J. F.

Aust-j-ecol v.20, p.181-197. (1995).

In the special issue; Use of biota to assess water quality / edited by R.H. Norris, B.T. Hart, M. Finlayson and K.R. Norris.

Descriptors: aquatic-insects; insect-communities;  
community-ecology; computer-software; rivers-; streams-;  
water-pollution; water-quality; indicator- species;  
biological-indicators; uk-; rivpacs-; pollution-indicators

NAL Call No.: QH540.A8

\*\*\*\*\*

25. Development of a biologically-based system for detection and tracking of airborne herbicides.

Al Khatib, K.; Mink, G. I.; Reisenauer, G.; Parker, R.; Westberg, H.; Lamb, B.

Weed-technol v.7, p.404-410. (1993).

Includes references.

Descriptors: drift-; detection-; nontarget-effects; symptoms-;  
phytotoxicity-; monitoring-; air-pollutants; movement-;  
computer-simulation; mathematical- models; phaseolus-vulgaris;  
lens-culinaris; pisum-sativum; bromoxynil-; chlorsulfuron-;  
dicamba-; glyphosate-; metsulfuron-; paraquat-; 2,4-d-;  
tribenuron-; sulfonyleurea-herbicides; thifensulfuron-

NAL Call No.: SB610.W39

\*\*\*\*\*

26. Development of a decision support system for prioritization of multimedia dischargers.

Keyes, A. M.; Palmer, R. N.

Environ-Manage v.17, p.601-612. (1993).

Includes references.

Descriptors: water-pollution; air-pollution; hazards-; wastes-;  
risk-; environmental-protection; government-organizations;  
regulations-; environmental- impact; u; s;  
-environmental-protection-agency

NAL Call No.: HC79.E5E5

\*\*\*\*\*

27. Development of an expert system for the identification and control of weeds in wheat, triticale, barley and oat crops.

Pasqual, G. M.

Comput-electron-agric v.10, p.117-134. (1994).

Includes references.

Descriptors: triticum-aestivum; hordeum-vulgare; avena-sativa;  
expert-systems; weed-control; identification-; australia-  
NAL Call No.: S494.5.D3C652

\*\*\*\*\*

28. DIAGNOSIS--a novel, multimedia, computer-based approach to  
training crop protection practitioners.

Stewart, T. M.; Blackshaw, B. P.; Duncan, S.; Dale, M. L.;  
Zalucki, M. P.; Norton, G. A.

Crop-prot v.14, p.241-246. (1995).

Includes references.

Descriptors: crops-; plant-protection; plant-pests;  
plant-diseases; training-; teaching-materials; computer-software  
Abstract: The multimedia computer package DIAGNOSIS provides a  
training aid to students of crop protection for pest and disease  
diagnosis. The program simulates field and laboratory scenarios,  
in which students must actively seek clues and interpret  
observations on the cause of plant problems. Output may consist  
of text graphics and video. The software allows the simple  
construction of local scenarios by individual tutors. Once  
students have recorded their diagnosis, justification and  
recommendations for action, they receive an automatic debriefing  
on their problem-solving approach. Student input is recorded to  
disk for later assessment by the tutor.

NAL Call No.: SB599.C8

\*\*\*\*\*

29. The effect of agricultural students' learning styles on  
academic achievement and their perceptions of two methods of  
instruction.

Marrison, D. L.; Frick, M. J.

J-agric-educ v.35, p.26-30. (1994).

Includes references.

Descriptors: college-students; learning-ability;  
academic-achievement; teaching-methods;  
computer-assisted-instruction; lectures-; comparisons-;  
agricultural-education

NAL Call No.: S530.A4

\*\*\*\*\*

30. Evaluation of a farmstead drinking water quality decision  
support system.

Embleton, K. M.; Engel, B. A.; Jones, D. D.

Appl-eng-agric v.10, p.863-869. (1994).

Includes references.

Descriptors: drinking-water; water-quality; water-pollution;  
risk-; assessment-; farmland-; farm-management; decision-making;  
expert-systems

Abstract: A prototype decision support system (DSS) has been  
developed to provide information concerning the influence of  
common farmstead management practices and site conditions on the  
quality of drinking water from private wells. This article  
describes prototype development and testing procedures. Farmers,  
college students, agricultural extension agents, and risk  
assessment experts participated in the testing. Results indicate  
that the DSS was more accurate and user friendly than the  
paper-based assessment tool from which the computer program

evolved.

NAL Call No.: S671.A66

\*\*\*\*\*

31. Experimental evaluation of the effectiveness of a computer-assisted instructional unit on sustainable agriculture. Kahler, A. A.

J-Agric-Educ v.34, p.77-83. (1993).

Includes references.

Descriptors: agricultural-education; sustainability-; computer-assisted-instruction; environmental-education; secondary-education; iowa-

NAL Call No.: S530.A4

\*\*\*\*\*

32. Expert evaluation system for assessing field vulnerability to agrochemical compounds in Mediterranean regions. Rosa, D. d. la.; Moreno, J. A.; Garcia, L. V.

J-agric-eng-res v.56, p.153-164. (1993).

Includes references.

Descriptors: soil-pollution; groundwater-pollution; pollutants-; agricultural-chemicals; expert-systems; evaluation-; nitrates-; pesticides-; leaching-; soil- properties; microcomputers-; spain-; management-system-criteria; automated-land-evaluation-system; computer-based-expert-knowledge-system

Abstract: An expert evaluation system (named ARENAL) has been developed using a knowledge-based approach that allows estimation of the relative vulnerability of soil and groundwater to diffuse agrochemical contamination. ARENAL interprets groundwater vulnerability at the field scale especially from nitrate and pesticide leaching. Soil properties and related agricultural land-features are combined with management system criteria for Mediterranean regions. The Automated Land Evaluation System (ALES) was used to acquire this computer-captured expert knowledge and allied data. The ARENAL expert system uses basic input data or "key" parameters from existing soil and land survey information. Such an evaluation approach can be the basis for estimation of the environmental impact of agricultural activities, with reference to chemical degradation of soil and water resources.

NAL Call No.: 58.8-J82

\*\*\*\*\*

33. Expert system for fertilization management of rice. Chai, K. L.; Costello, T. A.; Wells, B. R.; Norman, R. J.

Appl-eng-agric v.10, p.849-855. (1994).

Includes references.

Descriptors: oryza-sativa; flooded-rice; crop-management; fertilizers-; expert-systems; rice-fertility-; nutrient-management

Abstract: A computer-based decision support system called Rice Fertility has been developed to provide information and recommendations on efficient utilization of fertilizer for the production of flooded rice in Arkansas. Conventional information sources regarding timing and rate of fertilizer applications were consolidated in developing a computer-based tool that generated recommendations quickly for many situations. The text

of each recommendation was formulated to be sensitive to the tactical context of the individual problem scenario. The inputs to the expert system included cultural system, rice cultivar, rice growth stage, flood status, soil texture, and soil pH. Appropriate recommendations were generated for rates of early nitrogen (N), maximum tillering N, midseason N, and other soil fertility problems involving salinity, liming, phosphorus, potassium, zinc, and/or sulfur. The system logic was successfully validated in 29 of 31 sample scenarios tested. The set of sample scenarios was defined using the Arkansas Rice Research Verification Trials as a balanced source of fertilizer decisions made in growers' fields. A method of classifying the results of the validation testing was useful in evaluating the software.

NAL Call No.: S671.A66

\*\*\*\*\*

34. An expert system for soil erosion mitigation in logging operations on steep land.

Ross, J.

AI-appl v.7, p.69-70. (1993).

Includes references.

Descriptors: erosion-; logging-; slopes-; expert-systems;  
new-south-wales

NAL Call No.: QA76.76.E95A5

\*\*\*\*\*

35. An expert system linked with a GIS database for spatially variable fertilizer application.

He, B.; Peterson, C. L.; Mahler, R. L.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1992. (92-3556) 23 p.

Includes references.

Descriptors: fertilizers-; application-rates; expert-systems;  
computer-software; simulation-models; maps-; idaho-;  
geographical-information-system

NAL Call No.: 290.9-Am32P

\*\*\*\*\*

36. An expert systems approach for assessing the potential for pesticide contamination of ground water.

Crowe, A. S.; Mutch, J. P.

Ground-water. Dublin, Ohio : Ground Water Pub. Co. May/June 1994. v. 32 (3) p. 487-498.

Includes references.

Descriptors: pesticides-; groundwater-pollution; expert-systems;  
assessment-; models-

NAL Call No.: TD403.G7

\*\*\*\*\*

37. Expert systems, decision support systems and computer-assisted instruction for water resource management: January 1985 - June 1993.

Emmert, B.; Makuch, J.

Quick-bibliogr-ser. Beltsville, Md., National Agricultural Library. Aug 1993. (93-62) 64 p.

Descriptors: water-management; support-systems; expert-systems;  
computer-assisted-instruction; bibliographies-

NAL Call No.: aZ5071.N3

\*\*\*\*\*

38. Expert systems for evaluating physicochemical property values. 1. Aqueous solubility.

Heller, S. R.; Bigwood, D. W.; May, W. E.

J-chem-inf-comput-sci v.34, p.627-636. (1994).

Includes references.

Descriptors: pesticide-residues; chemical-analysis; computer-software; expert-systems; physicochemical-properties; solubility-; water-

Abstract: Providing consistent data evaluation is critical to scientific studies. An expert system for evaluating the efficacy of the reported methodology for determining aqueous solubility is described and compared with two other similar manual data quality evaluation systems. The expert system, SOL, is a post-peer review filter for data evaluation. SOL has been designed to run on any IBM-PC compatible computer using the CLIPS public domain expert system shell.

NAL Call No.: 241.64-J82

\*\*\*\*\*

39. An exploration of the economics of farm management alternatives to improve water quality.

Heilman, P.; Yakowitz, D. S.; Stone, J. J.; Kramer, L. A.; Lane, L. J.; Imam, B.

Application of advanced information technologies effective management of natural resources proceedings of the 18-19 June 1993 Conference, Spokane, Washington /. St. Joseph, Mich. : American Society of Agricultural Engineers, c1993.. p. 194-205. Includes references.

Descriptors: water-quality; pollutants-; farm-management; farm-income; decision-making; simulation-models; usda-; iowa-; prototype-decision-support-system; agricultural-research-service

NAL Call No.: GE5.A66-1993

\*\*\*\*\*

40. Farm application of the model-based-reasoning system GOSSYM/COMAX.

Landivar, J. A.; Wall, G. W.; Siefker, J. H.; Baker, D. N.; Whisler, F. D.; McKinion, J. M.

Proceedings of the 1989 Summer Computer Simulation Conference July 24-27, 1989, the Stouffer Austin Hotel, Austin, Texas / edited by Joe K Clema ; conference sponsor, the Society for Computer Simulation. San Diego, CA : The Society, c1989.. p. 688-694.

Includes references.

Descriptors: gossypium-hirsutum; crop-production; plant-physiology; phenology-; equations-; computer-simulation; simulation-models; growth-models

Abstract: The GOSSYM/COMAX system, a decision aid for cotton crop management, has been tested over the last five years on research and commercial farms across the cotton belt of the United States. GOSSYM simulates the major biotic and abiotic processes which influence growth, development and yield of cotton.

Phenological and physiological rate equations derived from Soil-Plant-Atmosphere-Research (SPAR) experimental databases are

crucial to the model development process. COMAX is an expert system environment that provides data management and a user friendly interface to GOSSYM. GOSSYM/COMAX is more properly called a model-based-reasoning system rather than an expert system. This is due primarily to COMAX's use of rules to control its operation while the important knowledge about cotton resides in GOSSYM. The rules used by COMAX contain the expert knowledge of the model builders on how to use GOSSYM and how to interpret the model results. The belt-wide farm management test has provided useful information on designing an enhanced user interface and developing improved rules to optimize management inputs.

NAL Call No.: QA76.9.C65S95-1989

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41. Farm-level economic and environmental impacts of eastern Corn Belt cropping systems.

Foltz, J. C.; Lee, J. G.; Martin, M. A.

J-prod-agric v.6, p.290-296. (1993).

Includes references.

Descriptors: zea-mays; medicago-sativa; glycine-max; microeconomic-analysis; economic-impact; alternative-farming; environmental-impact; rotations-; continuous-cropping; simulation-models; computer-simulation; erosion-; runoff-; pesticides-; water-pollution; corn-belt-states-of-usa; epic-simulation-model; gleams-simulation-model

NAL Call No.: S539.5.J68

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42. Geophysics advisor expert system. Version 2.0.

Olhoeft, G. R.; Mazzella, A. T.; Geological Survey (U.S.).

[Denver, Colo.? : U.S. Geological Survey?] ; Springfield, VA :  
Reproduced by NTIS, 1992? 1 computer disk 1 booklet (21 p. ; 28  
cm.) .

Title from title screen.

Descriptors: Geophysics-Computer-programs;

Hazardous-waste-sites-Computer-programs

NAL Call No.: QE501.044-1992

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43. Groundwater quality assessment expert system package.

Embleton, K. M.; Engel, B. A.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of  
Agricultural Engineers, . Summer 1992. (927028) 14 p.

Paper presented at the "1992 International Summer Meeting  
sponsored by the American Society of Agricultural Engineers,"  
June 21-24, 1992, Charlotte, North Carolina.

Descriptors: water-quality; expert-systems; risk-

NAL Call No.: 290.9-Am32P

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44. Guide to WEEDING version 1.0: a Weed Ecology and Economic  
Decision making INstructional Game.

Wiles, L. J.; Wilkerson, G. G.; Buol, G. S.; Coble, H. D.

Res-rep-NC-State-Univ,-Dep-Crop-Sci. Raleigh : Dept. of Crop  
Science, N.C. State of the University at Raleigh, 1964-. Apr  
1992. (136) 48 p.

Includes references.

Descriptors: glycine-max; weed-control; decision-making;  
simulation-models; computer-assisted-instruction; teaching-;  
materials-; educational-games; north-carolina

NAL Call No.: 100-N8122

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45. A hypermedia lecture aid for engineering education.

Beck, H. W.; Smerage, G. H.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of  
Agricultural Engineers, . Winter 1993. (933541) 8 p.

Paper presented at the "1993 International Winter Meeting  
sponsored by the American Society of Agricultural Engineers,"  
December 14- 17, 1993, Chicago, Illinois.

Descriptors: engineering-; computer-assisted-instruction;  
databases-; teaching-materials; microcomputers-; models-;  
electronic-blackboard

NAL Call No.: 290.9-Am32P

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46. An information management technology program for ex ante  
nutrient loss reduction from farms.

Lemberg, B.; McSweeney, W. T.; Lanyon, L. E.

J-Environ-Qual v.21, p.574-578. (1992).

Includes references.

Descriptors: dairy-farms; fertilizers-;  
fertilizer-requirement-determination; nutrients-;  
losses-from-soil; use-efficiency; farm-management; environmental-  
impact; economic-impact; information-systems; computer-software;  
water-resources; environmental-protection

Abstract: Reducing nutrient losses from farms to the environment  
can be done before or after the nutrients have been applied to  
the fields. If effective best management practices can be  
implemented before nutrients are applied (ex ante), difficult and  
uncertain remedial management practices can be avoided. The  
relative environmental and economic consequences of an  
information management technology program were compared under  
two contrasting water resource protection perspectives by linear  
programming simulation of a dairy farm. The information program  
was based on measuring the amount of materials transferred to and  
from the fields as crops and manure, and the sampling and  
analyses of those materials. Potential N losses to the  
environment were reduced substantially and costs of the  
information management program were generally more than offset  
by the savings in fertilizer expenditures compared to the outcome  
when no credit was given to manure nutrients in the  
fertilization of farm crops. Exacting requirements for nutrient  
utilization under a restrictive water resource protection  
perspective resulted in only a fraction of the total manure  
produced being spread on the farm fields, however. The negative  
economic impact of this limitation was potentially much greater  
than the costs to implement the information management technology  
program. Standards for both the extent of the information  
required to adequately meet the environmental expectations and  
the acceptable range of the expectations must be established if  
the management practice is to be feasible and successful.

NAL Call No.: QH540.J6

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47. Information requirements and critical success factors for corn/soybean decision support systems.

Barrett, J. R.; Thompson, T. L.; Campbell, W. P.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1991. (91-7501) 8 p.

Paper presented at the "1991 International Winter Meeting sponsored by the American Society of Agricultural Engineers," December 17- 20, 1991, Chicago, Illinois.

Descriptors: maize-; soybeans-; crop-production; decision-making; support-systems; expert-systems

NAL Call No.: 290.9-Am32P

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48. An instrumented, field-scale research facility for drainage and water quality studies.

Tait, R.; Madramootoo, C. A.; Enright, P.

Comput-electron-agric v.12, p.131-145. (1995).

Includes references.

Descriptors: drainage-; irrigation-systems; water-quality; nitrogen-fertilizers; field-experimentation; cropping-systems; computer-software; runoff-; nitrates-; data-collection; quebec-; subirrigation-; soulanges-county,-quebec

NAL Call No.: S494.5.D3C652

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49. Integrated water-fertilizer-pest management for environmentally sound crop production.

Fouss, J. L.; Willis, G. H.

Environmentally sound agriculture proceedings of the second conference 20-22 April 1994 / p.53-61. (1994).

Includes references.

Descriptors: agricultural-land; crop-production; high-water-tables; water-management; soil-management; pest-management; integrated-systems; water- pollution; pollution-control; computer-simulation; simulation-models; projects-; usa-; lower-mississippi-valley

NAL Call No.: S589.7.E57-1994

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50. Integrated wheat crop management based on generic task knowledge-based systems and CERES numerical simulation.

Kamel, A.; Schroeder, K.; Sticklen, J.; Rafea, A.; Salah, A.; Schulthess, U.; Ward, R.; Ritchie, J.

AI-appl v.9, p.17-28. (1995).

Includes references.

Descriptors: triticum-aestivum; irrigated-conditions; crop-management; crop-yield; expert-systems; simulation-models; ceres-wheat-model

NAL Call No.: QA76.76.E95A5

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51. Integration of geographic information systems and a computer model to evaluate impacts of agricultural runoff on water quality.

He, C.; Riggs, J. F.; Kang, Y. T.

Water-resour-bull v.29, p.891-900. (1993).

Includes references.

Descriptors: runoff-; river-water; water-pollution;  
water-quality; nitrogen-; phosphorus-; simulation-models;  
geographical-information-systems; michigan-;  
geographic-resource-analysis-support-system-grass;  
grass-waterworks;

agricultural-nonpoint-source-pollution-model-agnps; cass-river;  
saginaw-bay; best-management-practices

Abstract: This study integrates an Agricultural Non-Point Source Pollution Model (AGNPS), the Geographic Resource Analysis Support System (GRASS) (U.S. Army Corps of Engineers, 1987), and GRASS WATERWORKS (a hydrologic modeling tool box being developed at the Michigan State University Center for Remote Sensing) to evaluate the impact of agricultural runoff on water quality in the Cass River, a subwatershed of Saginaw Bay. AGNPS is used to estimate the amounts, origin, and distribution of sediment, nitrogen (N), and phosphorus (P) in the watershed. GRASS and GRASS WATERWORKS are used to generate parameters needed for AGNPS from digital maps, which include soil association, land use, watershed boundaries, water features, and digital elevation. Outputs of the model include spatially distributed estimates of volume and peak runoff, overland and channel erosion, sediment yields, and concentrations of nitrogen and phosphorus. Management scenarios are explored in the AGNPS model to minimize sedimentation and nutrient loading. Scenarios evaluated include variations in crop cover, tillage methods, and other agricultural management practices. In addition, areas vulnerable to erosion are identified for best management practices.

NAL Call No.: 292.9-Am34

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52. Interfacing issues for GOSSYM/COMAX/WHIMS.

McKinion, J. M.; Olson, R. L.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Winter 1992. (923555) 11 p.

Paper presented at the "1992 International Winter Meeting sponsored by the American Society of Agricultural Engineers," December 15- 18, 1992, Nashville, Tennessee.

Descriptors: gossypium-hirsutum; simulation-models; growth-;  
crop-yield; expert-systems; databases-; crop-management

NAL Call No.: 290.9-Am32P

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53. It boggles the mind.

Odell, K. S.

Agric-educ-mag. Henry, Ill. : The Agricultural Education Magazine, Inc., 1980-. Aug 1994. v. 67 (2) 5, 10.

Descriptors: educational-technology;  
computer-assisted-instruction; agricultural-education

NAL Call No.: 275.8-Ag8

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54. A knowledge based approach to extract input data from GIS.

Srinivasan, R.; Engel, B. A.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Summer 1991. (917045) 6 p.

Paper presented at the "1991 International Summer Meeting sponsored by the American Society of Agricultural Engineers," June 23-26, 1991, Albuquerque, New Mexico.

Descriptors: expert-systems; pollution-; models-

NAL Call No.: 290.9-Am32P

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55. Knowledge-based system for environmental design of stream modifications.

Shields, F. D. Jr.; Aziz, N. M.

Appl-Eng-Agric v.8, p.553-562. (1992).

Includes references.

Descriptors: watershed-management; streams-; modification-; expert-systems; erosion-control; flood-control

Abstract: A knowledge-based, microcomputer software package was developed for preliminary selection of environmental features for use with streambank protection projects, straightened and enlarged channels, and flood control levees. The system contains a module for each of the three major alteration types: bank protection, levees, and channels. Each module queries the user for information regarding environmental factors to be protected and a description of the project setting, with the internal logic configured to minimize the number of questions asked. System output consists of a list of environmental design features suitable for the specific location and descriptive information. Help screens explain why certain questions are asked, define terms, and suggest responses or sources of information. At the conclusion of a consultation, additional help screens may be displayed that provide a discussion of each recommended feature, a list of existing projects that incorporate the feature, and a bibliography. The streambank protection module screens a master list of 20 methods based on the dominant erosion mechanisms operative at the project site, and the channel module performs a rough channel stability assessment using regime equations. The latest version of the software aids in feature selection, but does not design channel alterations. However, the software interfaces with routines that perform basic hydraulic computations (e.g., composite roughness, normal depth, riprap size) for steady flow in order to allow users to quickly evaluate feasibility of in-channel environmental features. A survey of users indicated that the package has been used by entry-level and experienced professionals to perform a limited range of specialized tasks. Seventy-four percent of the users described the software as a useful instrument for planning and preliminary design.

NAL Call No.: S671.A66

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56. A knowledge-based system for insecticide management for rice crops.

Gupta, C. P.; Suryanto, H.

Trans-A-S-A-E v.36, p.585-591. (1993).

Includes references.

Descriptors: oryza-sativa; insect-control; insecticides-; sprayers-; computer-software; droplet-size; mathematical-models; tropical-asia; basic-computer-program

Abstract: A knowledge-based system was developed using an expert

system shell to help farmers in insecticide management for rice crops for tropical Asian countries. It has 72 rules for recommending insecticides and an external program written in BASIC for selecting sprayers. Insecticides are recommended based on the type of insect, symptoms, economic threshold, cost, and the effectiveness of chemical. An attempt was made to face this system with a real problem of rice leaf folder. Field experiments have been performed to evaluate the program's recommendations for controlling the rice leaf folder. The program should be expanded for other major rice insects before it is used by farmers. An external program for sprayer selection has been developed. Sprayer selection is based on droplet size, deposition efficiency, capacity, and operating cost. Laboratory and field experiments using manually carried sprayers were to provide data required by the user.

NAL Call No.: 290.9-AM32T

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57. A knowledge-based system linked to AGNPS/GRASS interface.

Mohite, M.; Whittaker, A. D.; Srinivasan, R.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Summer 1993. (933041) 20 p.

Paper presented at the "1993 International Summer Meeting sponsored by The American Society of Agricultural Engineers," June 20-23, 1993, Spokane, Washington.

Descriptors: erosion-; watersheds-; expert-systems

NAL Call No.: 290.9-Am32P

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58. Knowledge-based systems for pest management: an applications-based review.

Edwards Jones, G.

Pestic-sci v.36, p.143-153. (1992).

Paper presented at the symposium, "Artificial Intelligence Methods in Drug and Pesticide Research," March 3, 1992, London, UK.

Descriptors: pest-management; computer-software; problem-solving; technology-transfer; research-support; literature-reviews; uk-; artificial-intelligence

Abstract: Since the first application of artificial intelligence (AI) techniques to agricultural problems in 1982 nearly 300 further systems have been reported, of which 50 have been developed for pest management. Typically, these systems perform one of three tasks; diagnostics, treatment prescription or strategy development. The characteristics of all three types of system are discussed with reference to several examples. Although these examples serve to emphasise the power of AI techniques for aiding management decisions, few existing agricultural knowledge-based systems utilise this potential to the full, and as yet there has not been a widespread adoption of this technology by practising pest managers. Despite the failure to transfer this technology from the laboratory to the field, the potential of knowledge-based systems is widely recognised. However, further development of this technology for agricultural use within the UK is likely to be hindered by funding constraints.

NAL Call No.: SB951.P47

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59. Lake Okeechobee agricultural decision support system (LOADSS).

Lal, H.; Fonyo, C.; Negahban, B.; Boggess, W. G.; Kiker, G. A.; Campbell, K. L.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Winter 1991. (91-2623) 23 p.

Paper presented at the "1991 International Winter Meeting sponsored by the American Society of Agricultural Engineers," December 17- 20, 1991, Chicago, Illinois.

Descriptors: water-pollution; water-quality; models-; geographical-information-systems; decision-making; support-systems; florida-

NAL Call No.: 290.9-Am32P

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60. Leading the commonwealth toward tomorrow.

Breeze, P. R. ed.; Brinlee, B. ed.

Publication collection, Virginia Cooperative Extension Service. 1991. (490-103) 18 p.

Includes references.

Descriptors: cooperative-extension-service; programs-; food-safety; lymantria-dispar; integrated-pest-management; hydroponics-; fish-culture; environmental-protection; education-; zoning-; financial-planning; solid-wastes; youth-programs; microcomputers-; computer-software; agricultural-economics; dairy-education; geographical-information-systems; virginia-; virginia-geographic-information-system; solid-waste-management; women's-financial-information-program; crop-rotation-planning-system- crops; appalachian-integrated-pest-management-project

NAL Call No.: S544.3.V8V52

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61. Learning and knowledge refinement of a barley management expert system.

Parente, A. C.; Broner, I.; Comstock, C. S.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Summer 1991. (91-7019) 14 p.

Paper presented at the "1991 International Summer Meeting sponsored by the American Society of Agricultural Engineers," June 23-26, 1991, Albuquerque, New Mexico.

Descriptors: barley-; education-; expert-systems; crop-management

NAL Call No.: 290.9-Am32P

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62. Making the right choices.

Osborne, E.

Agric-educ-mag v.67, p.3, 10. (1994).

Descriptors: educational-technology; agricultural-education; computer-assisted-instruction

NAL Call No.: 275.8-Ag8

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63. Managing water resources: the Institute of Water Research.

Peterson, S.

Futures v.11, p.20-22, 24. (1993).

Descriptors: water-management; water-pollution;  
research-projects; computer-techniques; information-systems;  
community-education; michigan-

NAL Call No.: S75.F87

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64. Mapping contaminant plumes using geophysical methods.

Brune, D. E.; Zheng, M.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of  
Agricultural Engineers,. Summer 1993. (934015) 28 p.

Paper presented at the "1993 International Summer Meeting  
sponsored by The American Society of Agricultural Engineers," and  
The Canadian Society of Agricultural Engineering," June 20-23,  
1993, Spokane, Washington.

Descriptors: animal-wastes; waste-disposal-sites; lagoons-;  
groundwater-; water-quality; soil-; conductivity-; pollution-;  
expert-systems

NAL Call No.: 290.9-Am32P

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65. Merging your classroom onto the information superhighway.

Murphy, T.

Agric-educ-mag v.67, p.6-8. (1994).

Includes references.

Descriptors: educational-technology;  
computer-assisted-instruction; agricultural-education; internet-;  
on-line-services

NAL Call No.: 275.8-Ag8

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66. Monitoring wheat for plant N, P, and K content and fertilizer  
management.

Adams, D.; University of Arkansas (System). Cooperative Extension  
Service.

Little Rock, Ark. : University of Arkansas, Cooperative Extension  
Service, 1985. 16 p..

Includes bibliographical references (p. 10-11).

Descriptors: Wheat-Yield-Computer-programs

NAL Call No.: SB191.W5M58--1985

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67. N-expert--a decision support system for vegetable  
fertilization in the field.

Fink, M.; Scharpf, H. C.

Acta-hortic p.67-74. (1993).

Paper presented at the Workshop on Ecological Aspects of  
Vegetable Fertilization in Integrated Crop Production in the  
Field, September 7-11, 1992, Wadenswil, Switzerland.

Descriptors: vegetables-; nitrogen-fertilizers;  
application-rates; computer-software; germany-

NAL Call No.: 80-Ac82

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68. Nitrogen fertilizer and the environment: the role of crop  
modelling in management and impact assessment.

Thornton, P. K.

Proc-annu-meet-Fert-Ind-Round-Table p.150-157. (1993).

Includes references.

Descriptors: crops-; simulation-models; computer-simulation;  
mathematical-models; fertilizer-requirement-determination;  
decision-making; environmental-impact; assessment-;  
crop-management

NAL Call No.: 57.09-F41

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69. NPK\$PLUS: a computer program to examine agronomic and economic value of alternative fertilizer rates.

Johnson, G. V.; Nofziger, D. L.

J-Prod-Agric v.5, p.415-420. (1992).

Includes references.

Descriptors: fertilizers-; lime-; application-rates;  
decision-making; computer-software; economic-analysis;  
crop-management

NAL Call No.: S539.5.J68

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70. Parameter adjustment to a crop model using a sensor-based decision support system.

Thomson, S. J.; Peart, R. M.; Mishoe, J. W.

Trans-A-S-A-E v.36, p.205-213. (1993).

Includes references.

Descriptors: arachis-hypogaea; crop-management; decision-making;  
expert-systems; growth-models; sensors-; simulation-models;  
soil-water; comax-software; modvex-software

Abstract: A knowledge-based system was developed to adjust input parameters to the soil-water and rooting components of PNUTGRO, a process-oriented peanut growth model. The system was developed to provide a better representation of temporal water status in the root zone of a growing crop. Soil water sensors provided input to adjust appropriate parameters based on interpretation of their readings. These interpretations were programmed using human expertise combined with data from peanuts grown in lysimeters. A separate expert system screened sensor readings to insure their validity before using their readings to adjust parameters. Tests of the system over one season showed that model-based representations of soil-water status converged on sensor-based representations in the soil water regulation zone as the adjusted input parameters converged on new static values early in the season.

NAL Call No.: 290.9-AM32T

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71. Personal computers--more than calculators and word processors.

McCaslin, N. L.

Agric-Educ-Mag v.64, p.22-23. (1992).

Includes references.

Descriptors: agricultural-education;  
computer-assisted-instruction; microcomputers-;  
computer-mediated-communication

NAL Call No.: 275.8-AG8

\*\*\*\*\*

72. Relating United States crop land use to natural resources and

climate change.

Hubbard, K. G.; Flores Mendoza, F. J.

J-climate v.8, p.329-335. (1995).

Includes references.

Descriptors: agricultural-land; land-use; crop-production;  
zea-mays; glycine-max; triticum-aestivum; sorghum-;  
climatic-change; air-temperature; precipitation-;  
water-holding-capacity; regression-analysis; mathematical-models;  
usa-

Abstract: Crop production depends not only on the yield but also on the area harvested. The yield response to climate change has been widely examined, but the sensitivity of crop land use to hypothetical climate change has not been examined directly. Crop land-use regression models for estimating crop area indices (CAIs)--the percent of land used for corn, soybean, wheat, and sorghum production--are presented. Inputs to the models include available water-holding capacity of the soil, percent of land available for rain-fed agricultural production, annual precipitation, and annual temperature. The total variance of CAI explained by the models ranged from 78% for wheat to 87% for sorghum, and the root-mean-square errors ranged from 1.74% for sorghum to 4.24% for corn. The introduction of additional climatic variables to the models did not significantly improve their performance. The crop land-use models were used to predict the CAI for every crop reporting district in the United States for the current climatic condition and for possible future climate change scenarios (various combinations of temperature and precipitation changes over a range of -3 degrees to +6 degrees C and -20% to +20%, respectively). The magnitude of climatic warming suggested by GCMs (GISS and GFDL) is from 3.5 degrees to 5.9 degrees C for regions of the United States. For this magnitude of warming, the model suggests corn and soybean production areas may decline while wheat and sorghum production areas may expand. If the warming is accompanied by a decrease in annual precipitation from 1% to 10%, then the areas used for corn and soybean production could decrease by as much as 20% and 40%, respectively. The area for sorghum and precipitation. In general, small changes in temperature or precipitation produced larger corresponding changes (on a percentage basis) in soybean, wheat, and sorghum area than in corn area.

NAL Call No.: QC851.J62

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73. RES-N-Till crop residue conservation and tillage management software.

Kok, H.; Thien, J.

J-soil-water-conserv. Ankeny, Iowa : Soil and Water Conservation Society. Nov/Dec 1994. V. 49 (6) p. 551-553.

Includes references.

Descriptors: crop-residues; management-; soil-conservation;  
erosion-control; conservation-tillage; decision-making;  
computer-software

NAL Call No.: 56.8-J822

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74. RESMAN: a tool for soil conservation education.

Stott, D. E.

J-soil-water-conserv v.46, p.332-333. (1991).

Includes references.

Descriptors: soil-conservation; computer-software;  
decision-making; expert-systems; crops-; tillage-; crop-residues  
NAL Call No.: 56.8-J822

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75. Rule induction for systems predicting biological activity.  
Judson, P. N.

J-chem-inf-comput-sci v.34, p.148-153. (1994).

Includes references.

Descriptors: databases-; expert-systems; activity-;  
pharmaceutical-products; agricultural-chemicals;  
computer-analysis

Abstract: Knowledge-based expert systems are now in practical use, giving advice about the potential biological activities of substances. Systems depending on the automatic generation of rules for their knowledge bases had the disadvantage that rules were not easily comprehensible to human users, making them difficult to verify. REX and DEREK link rule generation and the application of rules via a knowledge-base language that is fully comprehensible to human users, so that scientists can edit rules and incorporate knowledge coming from diverse sources.

NAL Call No.: 241.64-J82

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76. SEASware: an expert consulting system for shoreline erosion control measures.

Hardaway, C. S. Jr.; Posenau, J. H.; Baumer, J. C.

Application of advanced information technologies effective management of natural resources proceedings of the 18-19 June 1993 Conference, Spokane, Washington /. St. Joseph, Mich. : American Society of Agricultural Engineers, c1993.. p. 278-390.

Includes references.

Descriptors: coasts-; erosion-control; expert-systems;  
decision-making; virginia-; chesapeake-bay

NAL Call No.: GE5.A66-1993

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77. SELOMA: expert system for weed management in herbicide-intensive crops.

Stigliani, L.; Resina, C.

Weed-technol v.7, p.550-559. (1993).

Includes references.

Descriptors: weed-control; decision-making; expert-systems;  
hordeum-vulgare; zea-mays; avena-sativa; secale-cereale;  
beta-vulgaris; sorghum-bicolor; triticum-durum;  
computer-hardware; computer-software; weeds-; integrated-control;  
herbicides-; chemical-control; cultural-weed-control

NAL Call No.: SB610.W39

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78. Simulation by NCSWAP of seasonal nitrogen dynamics in corn. II. Corn growth and yield.

Lengnick, L. L.; Fox, R. H.

Agron-j v.86, p.176-182. (1994).

Includes references.

Descriptors: zea-mays; computer-simulation; calibration-; simulation-models; nutrient-uptake; nitrogen-; seasonal-variation; growth-rate; organic- fertilizers; fertilizers-; crop-yield; grain-; nitrogen-cycle; pennsylvania-; inorganic-fertilizers

Abstract: The accurate simulation of crop growth is important in the effort to apply computer simulation models to improvements in the management of N resources in agricultural systems. The objective of this study was to validate the crop growth submodel of the model NCSWAP using seasonal corn (*Zea mays* L.) growth and final grain yields from a 3-yr N rate-study conducted in central Pennsylvania. The results of the validation suggest that the model poorly simulated crop growth response under conditions of limited water or N availability. However, NCSWAP accurately simulated observed seasonal corn growth and harvested yields in treatments with no N or water limitations. The crop growth submodel has the potential to be useful in simulation of crop production, because with a minimum of inputs it can be calibrated for any crop and can incorporate variables that influence crop growth and are specific to a local environment. Improvements in the simulation of crop growth under N and water deficits would enhance the usefulness of NCSWAP to researchers exploring seasonal N cycling in soils and crops.

NAL Call No.: 4-AM34P

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79. Simulation by NCSWAP of seasonal nitrogen dynamics in corn.

I. Soil nitrate.

Lengnick, L. L.; Fox, R. H.

Agron-j v.86, p.167-175. (1994).

Includes references.

Descriptors: zea-mays; computer-simulation; calibration-; simulation-models; nitrogen-cycle; cycling-; carbon-; soil-fertility; nitrates-; seasonal- variation; leaching-; soil-water-movement; soil-structure; soil-morphological-features; agricultural-soils; edaphic-factors; organic-fertilizers; pennsylvania-; inorganic-fertilizers

Abstract: Computer simulation models of crop-soil systems offer the potential to increase understanding of soil N cycle processes, thereby improving management of N resources in agricultural systems. NCSWAP (Nitrogen, Carbon, Soil, Water, And Plant) is a comprehensive, deterministic computer model of the plant-soil system that simulates seasonal soil C and N cycles under the control of temperature, moisture, microbial activity, and crop growth. The objective of this study was to validate NCSWAP using data collected during a 3-yr N-rate study in central Pennsylvania that investigated seasonal N dynamics in corn (*Zea mays* L.) provided with N as liquid dairy manure or as  $\text{NH}_4\text{NO}_3$ . Seasonal soil  $\text{NO}_3$  concentration in the upper soil layer, seasonal aboveground N accumulation by corn, and water leached past 1.2 m during the second year of the study were used to calibrate input values controlling soil water flow and  $\text{NO}_3$  production from mineralization of soil organic N sources. The validation of NCSWAP identified several limitations in the water flow and C and N cycling submodels as well as in the potential of the model to simulate seasonal N dynamics in corn. Validation

simulations were about as accurate as calibration simulations, reflecting the ability of the model to simulate C and N dynamics without recalibration from year to year. Much of the simulation error was related to an overestimation of NO3 leaching caused by the inability of the model's microporous flow submodel to simulate the macropore-influenced water flow in the well-structured soil used in the validation.

NAL Call No.: 4-AM34P

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80. SOYHERB--A computer program for soybean herbicide decision making.

Renner, K. A.; Black, J. R.

Agron-J v.83, p.921-925. (1991).

Includes references.

Descriptors: glycine-max; herbicides-; application-methods; weeds-; decision-making; weed-competition; computer-software

Abstract: There has been a rapid increase in the number of herbicides and herbicide mixtures registered for use in soybean [Glycine max (L.) Merr.] production. SOYHERB is a computer program developed to assist Cooperative Extension Service personnel, agribusiness, farmers, and teachers in determining herbicide options for soybean production. Tillage practices, atrazine (6-chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine) or simazine (6-chloro-N,N'-diethyl-1,3,5-triazine-2,4-diamine) use in a previous corn crop, soil type and percentage of organic matter, soil pH, projected crop rotation plans, method of herbicide application, and weed species and weed pressure are entered by the user. SOYHERB generates herbicide programs and their cost per acre that provide excellent control of all weed species at the weed pressures indicated. Fair (80-90%) weed control options may also be generated. Additional screens describe control of perennial weeds, a summary of herbicide premixes, and a table listing the maximum height of broadleaf weeds controlled by postemergence herbicides. Data can be saved for future reference. A computer capable of running MS-DOS or PC-DOS version 2.1 or greater with a minimum of 512K bytes of RAM is required.

NAL Call No.: 4-AM34P

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81. A spatial decision support system for assessing agricultural nonpoint source pollution.

Srinivasan, R.; Engel, B. A.

Water-resour-bull v.30, p.441-452. (1994).

Includes references.

Descriptors: pollution-; watersheds-; runoff-; erosion-; geographical-information-systems; simulation-models; integrated-systems; texas-

Abstract: A spatial decision support system (SDSS) was developed to assess agricultural nonpoint source (NPS) pollution using an NPS pollution model and geographic information systems (GIS). With minimal user interaction, the SDSS assists with extracting the input parameters for a distributed parameter NPS pollution model from user-supplied GIS base layers. Thus, significant amounts of time, labor, and expertise can be saved. Further, the SDSS assists with visualizing and analyzing the output of the NPS

pollution simulations. Capabilities of the visualization component include displays of sediment, nutrient, and runoff movement from a watershed. The input and output interface techniques/algorithms used to develop the SDSS, along with an example application of the SDSS, are described.

NAL Call No.: 292.9-Am34

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82. Student responses to the initial use of a computer-based tutorial in an introductory agricultural economics course.  
Pompelli, G.; Hobbs, T.

NACTA-j v.34, p.33-36. (1995).

Includes references.

Descriptors: agricultural-education; agricultural-colleges; computer-assisted-instruction; student-participation; attitudes-; surveys-; tennessee-

NAL Call No.: 275.9-N213

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83. Teaching GIS and its application to water resources: multimedia applications.  
Srinivasan, R.; Zhuang, X.; Engel, B. A.; Rewarts, C. C.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Winter 1991. (91-5517) 5 p.

Paper presented at the "1991 International Winter Meeting sponsored by the American Society of Agricultural Engineers," December 17- 20, 1991, Chicago, Illinois.

Descriptors: water-resources; education-; geography-; computer-assisted-instruction

NAL Call No.: 290.9-Am32P

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84. Teaching systems courses using computer assisted lectures.  
Heinemann, P. H.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Winter 1993. (93-3565) 14 p.

Paper presented at the "1993 International Winter Meeting sponsored by the American Society of Agricultural Engineers," December 14- 17, 1993, Chicago, Illinois.

Descriptors: computer-assisted-instruction; agricultural-education; technology-; teaching-materials; models-; educational-courses; pennsylvania-

NAL Call No.: 290.9-Am32P

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85. Teams: a decision support system for integrated resource management.  
Covington, W. W.; Dewhurst, S. M.; Wood, D. B.

Proc-Soc-Am-For-Natl-Conv p.516-517. (1991).

Meeting held Aug 4-7, 1991, San Francisco, California.

Descriptors: forest-management; decision-making; computer-software; watershed-management; models-; american-indians; arizona-

NAL Call No.: SD143.S64

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86. Texas rice producers' technology adoption levels--computers, management, and production practices.

Jarvis, A. M.; Rister, M. E.; Grant, W. R.; Mjelde, J. W.

Misc-publ,-Tex-Agric-Exp-Stn. College Station, Tex. : Texas Agricultural Experiment Station. Oct 1992. (1733) 16 p.

Includes references.

Descriptors: oryza-sativa; farmers-; microcomputers-; expert-systems; farm-management; decision-making; crop-production; texas-

NAL Call No.: 100-T31M

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87. Using computer assisted hypermedia in the classroom.

DeFelice, M. S.; Monson, M. J.

N-A-C-T-A-J v.37, p.40-43. (1993).

Includes references.

Descriptors: agricultural-education; computer-assisted-instruction; teaching-methods; pilot-projects; missouri-

NAL Call No.: 275.9-N213

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88. Using GLEAMS to evaluate the agricultural waste application rule-based decision support (AWARDS) computer program.

Ford, D. A.; Kruzic, A. P.; Doneker, R. L.

Water-sci-technol v.28, p.625-634. (1993).

Paper presented at the IAWQ First International Conference on "Diffuse (Nonpoint) Pollution: Sources, Prevention, Impact, Abatement." September 19-24, 1993, Chicago, Illinois.

Descriptors: agricultural-wastes; application-to-land; computer-software; pollutants-; loads-; water-pollution; simulation-models; groundwater-pollution; surface-water; groundwater-loading-effects-of-agricultural-management-systems; artificial-intelligence

NAL Call No.: TD420.A1P7

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89. Validation of AGNPS for small watersheds using an integrated AGNPS/GIS system.

Mitchell, J. K.; Engel, B. A.; Srinivasan, R.; Wang, S. S. Y.

Water-resour-bull v.29, p.833-842. (1993).

Includes references.

Descriptors: watersheds-; pollution-; runoff-; sediment-; erosion-; catchment-hydrology; simulation-models; geographical-information-systems; integrated-systems; topography-; illinois-; agricultural-nonpoint-source

Abstract: The AGNPS (Agricultural NonPoint Source) model was evaluated for predicting runoff and sediment delivery from small watersheds of mild topography. Fifty sediment yield events were monitored from two watersheds and five nested subwatersheds in East Central Illinois throughout the growing season of four years. Half of these events were used to calibrate parameters in the AGNPS model. Average calibrated parameters were used as input for the remaining events to obtain runoff and sediment yield data. These data were used to evaluate the suitability of the AGNPS model for predicting runoff and sediment yield from small, mild-sloped watersheds. An integrated AGNPS/GIS system was used to efficiently create the large

number of data input changes necessary to this study. This system is one where the AGNPS model was integrated with the GRASS (Geographic Resources Analysis Support System) GIS (Geographical Information System) to develop a decision support tool to assist with management of runoff and erosion from agricultural watersheds. The integrated system assists with the development of input GIS layers to AGNPS, running the model, and interpretation of the results.

NAL Call No.: 292.9-Am34

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90. VISITT, vendor information form. Version 4.0 : to be completed for participation in the Vendor Information System for Innovative Treatment Technologies (VISITT), version 4.0. Version 4.0. Vendor Information System for Innovative Treatment Technologies.

United States. Environmental Protection Agency. Office of Solid Waste and Emergency Response.

Washington, DC : U.S. Environmental Protection Agency, [1994] 1 v. (various pagings) : ill., forms 1 computer disk (3 1/2 in.). Cover title.

Descriptors:

Hazardous-wastes-Technological-innovations-Computer-programs;

Hazardous-wastes-Computer-programs

NAL Call No.: TD1050.T43V57--1994

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