Evaluation of Agricultural Best Management Practices (I)

January 1983 - June 1993
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Water Quality Information Center

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EVALUATION OF AGRICULTURAL BEST MANAGEMENT PRACTICES

1 NAL Call. No.: TD172.J61
Agrichemical placement impacts on alachlor and nitrate movement through soil in a ridge tillage system.
Clay, S.A.; Clay, D.E.; Koskinen, W.C.; Malzer, G.L.

Language: English
Descriptors: Alachlor; Nitrates; Placement; Movement in soil; Ridging; Tillage; Lysimeters; Leachates; Rainfall simulators; Surface water; Water flow; Profiles; Downward movement

Agrochemical trends and the fate of pesticides.
Menn, J.J.
Oakland : University of California, Division of Agriculture and Natural Resources; 1987.

Language: English
Descriptors: Pesticides; Pesticide persistence; Pesticide residues; Environmental pollution; Integrated pest management

Assessing and managing agricultural nitrogen losses to the environment. Smith, S.J.; Schepers, J.S.; Porter, L.K.
New York, N.Y. : Springer-Verlag; 1990.

Language: English
Descriptors: Nitrogen; Nitrogen cycle; Losses from soil systems; Groundwater pollution; Eutrophication; Air pollution; Volatilization; Ammonia; Nitrous oxide; Nitric oxide; Nitrogen dioxide; Nitrogen fertilizers; Use efficiency; Movement in soil; Leaching; Tile drainage; Runoff; Water erosion; Wind erosion; Conservation tillage; Soil conservation; Irrigation; Nutrient availability; Ammonium; Environmental impact; Research; Literature reviews

An assessment of Great Lakes tillage practices and their potential impact on water quality.
Logan, T.J.
Effects of conservation tillage on groundwater quality : nitrates and pesticides / edited by Terry J. Logan ... [et
Basic hydrologic studies for assessing impacts of flow diversions on riparian vegetation: examples from streams of the Eastern Sierra Nevada, California, USA.

Kondolf, G.M.; Webb, J.W.; Sale, M.J.; Felando, T.
New York: Springer-Verlag; 1987 Nov.

Basin scale assessment of best management practices.

Heatwole, C.D.; Bottcher, A.B.; Baldwin, L.B.

Basin scale model for evaluating best management practice implementation programs.

Heatwole, C.D.; Bottcher, A.B.; Baldwin, L.B.
Best management practices impacts on water quality in the appoquinimink watershed.
Ritter, W.F.; Chirnside, A.E.M.; Lake, R.W.

Language: English

Descriptors: Water composition and quality; Groundwater pollution; Farmland; Soil chemistry; Phosphorus; Nitrates; Atrazine; Erosion; Farm management; Improvement

Best management practices to reduce runoff of pesticides into surface water: a review and analysis of supporting research.

Language: English

Descriptors: Pesticides; Agricultural pollution; Water

BMP effectiveness evaluation using AGNPS and a GIS.

Language: English

Descriptors: Water quality; Watershed management; Hydrology; Simulation models

Language: English

Descriptors: Texas; Clay loam soils; Infiltration; Chiselling; Dikes; Furrows; Ponding; Rain; Impact; Kinetic energy; Surface layers; Crusts; Hydraulic conductivity; Water conservation

Abstract: Chisel tillage and furrow dikes (small earthen dams constructed in the furrow) are commonly used to increase infiltration and soil water storage in semiarid regions. Data quantifying the combined influences of these practices are limited. Our objective was to determine the effects of chisel tillage, furrow dikes (with and without ponding), and drop impact or surface crusts on infiltration. Infiltration rate (IR) and cumulative infiltration (CI) into an Olton day loam (fine, mixed, thermic Aridic Paleustoll) were measured by applying water at 65 and 80 mm h⁻¹ for 1 h using a rotating-disk-type rainfall simulator. Furrow dikes increased infiltration under both ponded and nonponded conditions. Cumulative infiltration was higher when raindrop impact energy was dissipated and, to some extent, when crusts were removed. Infiltration rate at the end of water application was lower with raindrop impact than when raindrop impact was eliminated; however, there were no differences in the final IR between the initially crusted and uncrusted soils. There were no differences in infiltration between chisel-disk and disk tillage measured during the mid growing season. Furrow dikes not only detain water on the surface to provide more time for infiltration, but also increase infiltration through increased hydraulic head and additional tillage performed during dike installation or by moving loose soil from the furrow into the dikes. Our data do not support using the same hydraulic-conductivity value for both diked and undiked field conditions, which may cause underestimation of conservation in furrow-diked fields.


Language: English

Descriptors: Tillage practices; Soil erosion; Soil conservation; Water pollution; Economic impact; Conservation practices; Yields; Trends

Abstract: Extract: Cropland in minimum tillage rose from 15.8
percent of all cropland in 1973 to 29.1 percent in 1981. The share for no-till rose from 2.0 to 2.9 percent during the same period. These conservation tillage systems—minimum tillage and no-till—can also reduce soil loss up to 99 percent over conventional tillage. This report looks at trends in the use of various tillage systems and compares their economic impacts and effects on soil and water conservation, crop yields, and pesticide and energy use, using selected results from studies of tillage systems.


Language: English

Descriptors: Water quality; Water management; Databases; Water pollution


Language: English; English

Descriptors: Soil conservation; United States; Periodicals; Water conservation; United States; Periodicals; Water quality; United States; Periodicals; Agricultural conservation; United States; Periodicals


Language: English

Descriptors: South eastern states of U.S.A.; Watersheds; Tillage; Phosphorus; Runoff water; Soil and water conservation; Water pollution
16
Conservation tillage effects on water conservation and runoff: project completion report.
Steichen, James M.; LaForce, Russell W.
United States, Dept. of the Interior, Kansas Water Resources Research Institute.
iii, 22 leaves : ill. ; 28 cm. (Contribution (Kansas Water Resources Research Institute) ; no. 226.). Project completion report for period October 1, 1979 to December 31, 1981.
Prepared for United States Department of the Interior.
Bibliography: leaf 21.
Language: English
Descriptors: Conservation tillage; Water conservation; Runoff

17
Considerations for tile drainage-water quality studies in temperature regions. Milburn, P.; MacLeod, J.
Language: English
Descriptors: Water quality; Drainage; Tile drainage; Temperate zones; Crop management; Discharge; Experimental design

Abstract: Experimental designs of 14 subsurface drainage-water quality studies conducted over the past 18 years are reviewed. To more accurately determine mass contaminant flux and processes, more intense monitoring of drain discharge rate and drainage water quality is needed than in most past studies. A recently installed field scale system of subsurface drainage-water quality plots and associated equipment, capable of intense, year round monitoring, is described and preliminary data showing performance of the system is presented. The material presented should be of interest to those planning and designing drainage-water quality studies, or refitting existing drainage installation for water quality investigations.

18
Controlling toxic chemicals., 1st ed.
Postel, S.
Language: English
Costs of protecting water quality during harvesting on private forestlands in the southeast.
Lickwar, P.; Hickman, C.; Cubbage, F.W.

Language: English

Abstract: Data on harvest volumes, topography, and other site and area characteristics were obtained from 22 timber harvests in Alabama, Florida, and Georgia. An economic analysis was then used to estimate the marginal costs of implementing each state's recommended Best Management Practices (BMPs), as well as a set of enhanced BMPs at these sites. Considering all of the areas combined, the costs of using the recommended BMPs averaged 2.9% of gross timber sale revenue, $2.34 per thousand board feet (mbf) of timber harvested, or $12.45/ac. The cost of implementing the enhanced BMPs averaged 5.1% of gross stumpage value, $4.13/mbf, or $21.94/ac. Seed, fertilizer, and mulch, broad based dips, and water bars were the most expensive practices on a total cost basis. Culvert installation, streamside management zones, and road relocation costs were less expensive for most tracts.

Creams: a system for evaluating best management practices.
Knisel, W.G.; Foster, G.R.; Leonard, R.A.

Language: English

Abstract: Data on harvest volumes, topography, and other site and area characteristics were obtained from 22 timber harvests in Alabama, Florida, and Georgia. An economic analysis was then used to estimate the marginal costs of implementing each state's recommended Best Management Practices (BMPs), as well as a set of enhanced BMPs at these sites. Considering all of the areas combined, the costs of using the recommended BMPs averaged 2.9% of gross timber sale revenue, $2.34 per thousand board feet (mbf) of timber harvested, or $12.45/ac. The cost of implementing the enhanced BMPs averaged 5.1% of gross stumpage value, $4.13/mbf, or $21.94/ac. Seed, fertilizer, and mulch, broad based dips, and water bars were the most expensive practices on a total cost basis. Culvert installation, streamside management zones, and road relocation costs were less expensive for most tracts.
annual application of pig slurry to crop rotation of fodder crops].
Skarda, M.; Jokesova, J.

Language:  Czech
Descriptors: Fodder crops; Rotation; Pig slurry; Economic analysis

22
NAL Call. No.: HD156.B55
Economic costs and benefits of degradation and its repair. A. Issues in the economic evaluation of soil and water conservation programs. Seckler, D.
Land degradation and society / Piers Blaikie and Harold Brookfield with contributions by Bryant Allen ... [et al.]. p. 84-96; 1987. This record corrects IND87077735 which was entered incorrectly under call number HD6189.T97.

Language:  English
Descriptors: Environmental degradation; Cost benefit analysis; Land productivity; Soil conservation; Water conservation; Program evaluation; Terraces

23
NAL Call. No.: HD6189.T97
Economic costs and benefits of degradation and its repair. A. Issues in the economic evaluation of soil and water conservation programs. Seckler, D.
Tyranny of the household : investigative essays on women's work / edited by Devaki Jain, Nirmala Banerjee. p. 84-96; 1985.

Language:  English
Descriptors: Environmental degradation; Cost benefit analysis; Land productivity; Soil and water conservation; Program evaluation; Bench terraces

24
NAL Call. No.: 100 C12CAG

Language:  English
Descriptors: California; Crop management; Salinity; Drainage;
High water tables; Economic impact; Yields; Acreage

25 NAL Call. No.: S95.E2
Economic impacts of agriculture technologies that affect water quality. Tauer, L.W.

Language: English

Descriptors: U.S.A.; Pollution by agriculture; Water composition and quality; Economic impact; Minimum tillage systems; Multiple cropping

26 NAL Call. No.: TC401.A5
The economics of silvicultural best management practices.
Dissmeyer, G.E.; Frandsen, E.
Bethesda, Md. : The Association; 1988 Nov.

Language: English

Descriptors: U.S.A.; Forest resources; Land resources; Water resource management; Soil management; Forestry economics; Forest management; Water pollution; Control; Economic analysis

27 NAL Call. No.: 290.9 AM32P
Edge-of-field water quality impacts and costs of best management practices in Pennsylvania.
Hamlett, J.M.; Epp, D.J.

Language: English

Descriptors: Pennsylvania; Soil conservation; Erosion control; Runoff; Percolation; Sediment

28 NAL Call. No.: TD428.A37T695 1989
The effect of best management practices on nitrogen transport into Chesapeake Bay.
Staver, K.; Brinsfield, R.; Stevenson, J.C.
Denver, Colo. : U.S. Committee on Irrigation and Drainage;

Language: English

Descriptors: Maryland; Water pollution; Coastal areas; Pollution by agriculture; Nitrogen; Leaching; Groundwater pollution; Losses from soil systems; Prevention

29 NAL Call. No.: S604.E35
Effect of conservation tillage on processes affecting nitrogen management. Schepers, J.S.

Language: English

Descriptors: Tillage; Nitrates; Leaching; Groundwater; Water composition and quality

30 NAL Call. No.: FICHE S-72
Effect of conservation tillage on runoff water quality: total, dissolved and algal-available phosphorus losses.
Mueller, D.H.; Andraski, B.J.; Daniel, T.C.; Lowery, B.

Language: English

31 NAL Call. No.: FICHE S-72
Effect of land treatment upon flood flow.
Chenoweth, J.W.
Paper presented at the 1986 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. Includes references.
Effect of standing small grain stubble on snow cover characteristics in alternate fallow strip cropping.
Carprio, J.M.; Grunwald, G.K.; Snyder, R.D.; Cleary, E.C.
Includes references.

Effect of surface application of polyvinyl alcohol on phosphorus losses in runoff and on corn growth.
Marsh, M.H.; Groenevelt, P.H.
Includes references.

Abstract: Phosphorus loading in surface water bodies due to runoff from cropland is a major concern with respect to water quality. Losses of water, soil, and different forms of P, from five runoff plots treated with polyvinyl alcohol (PVA), were compared to losses from five untreated plots. The plots were on a loam soil with 6.5 to 9.5% slopes. The effect of a single application of PVA was observed over 2 yr under natural rainfall. During the first year after application of PVA, runoff and soil losses were reduced by 56 and 80% respectively. Extractable P, total P, and dissolved molybdate-reactive P (DMRP) losses were reduced by 79, 75, and 64%, respectively. Corn (Zea mays L.) grain yield on the treated plots was 12% higher than on the control plots. All the above differences were statistically significant. During the second year, in which no tillage occurred and no PVA was applied, total P and DMRP losses were reduced by 42 and 40%, respectively, by the PVA treatment of the previous year. Although runoff and soil loss were lower for the treated plots, these differences were not significant at P = 0.05 (P values were 0.11 and 0.10, respectively).
Effect of tillage on erosion, runoff and runoff water quality.
Daniel, T.C.; Mueller, D.H.; Andraski, B.J.; Springman, R.E.

Language: English

Descriptors: Conservation tillage; Erosion control; Runoff; Water quality; Phosphorus; Water pollution; Manures

Effect of tillage on infiltration and anion leaching.
Baker, J.L.; Kanwar, R.S.; Laflen, J.M.

Language: English

Descriptors: Soil conservation; Plowing; Minimum tillage systems; Leaching; Nitrates; Groundwater pollution

Effect of tillage on the crop-water production function of sweet corn in western Oregon.
Petersen, K.L.; Mack, H.J.; Cuenca, R.H.
Includes 10 references.

Language: English

Descriptors: Oregon; Zea mays; Evapotranspiration; Yields; Row tillage; No-tillage systems

Effect of tillage systems and rainfall patterns on atrazine distribution in soil.
Sadeghi, A.M.; Isensee, A.R.
Abstract: High variability of atrazine (2-chloro-4-ethylamino-6-isopropylamino-1,3,5 triazine) residues in soil and shallow groundwater have been reported under various agricultural management systems. This 2-yr study was conducted to evaluate atrazine residue levels in soil as influenced by no-till (NT) vs. conventional-till (CT) under natural rainfall conditions. Atrazine was applied annually (at 1.34 kg/ha), 1 d after corn (Zea mays L.) planting, to two NT and two CT plots. Atrazine residues within the 0- to 10-cm soil depth of CT plots were higher than in the NT plots, regardless of the difference in the rainfall patterns. Higher (ca. 61%) mean atrazine residues in the CT plots over NT plots in 1988 was most likely related to the rainfall that began 12 h after application. In contrast, in 1987, it rained 3 to 4 d after application and the residues in the CT were only 31% higher than in NT. These results indicate that even a subtle difference in rainfall distribution (temporal) can result in marked spatial variability in the distribution of atrazine.
Effectiveness of agricultural best management practices implemented in the Taylor Creek/Nubbin Slough watershed and the Lower Kissimmee River Basin. Gunsalus, B.; Flaig, E.G.; Ritter, G.

The effectiveness of silvicultural nonpoint source control programs for several Southern states.
Ice, G.G.

Effects of a settling basin and tiled infiltration bed on runoff from a paved feedlot.
Edwards, W.M.; Owens, L.B.; White, R.K.; Fausey, N.R.
Discharges; Chemical analysis

43 NAL Call. No.: FICHE S-72
Effects of agricultural best management practices on groundwater in Maryland: study design.
McFarland, E.R.

Language: English

Descriptors: Maryland; Groundwater; Hydrology; Water composition and quality; Groundwater pollution; Agricultural production

44 NAL Call. No.: S604.E35
Effects of conservation tillage on groundwater quality nitrates and pesticides.
Logan, Terry James,
xviii, 292 p. : ill. ; 24 cm. Includes bibliographies and index.

Language: English

Descriptors: Conservation tillage; Environmental aspects; Water, Underground; Quality; Nitrates; Environmental aspects; Pesticides; Environmental aspects

45 NAL Call. No.: QK867.J67
Effects of different management practices on surface water quality from rice fields in south Louisiana.

Language: English

Descriptors: Louisiana; Flooded rice; Fields; Water quality; Mineral content; Nutrient content; Pesticide residues; Surface water; Water management; Cultivation; Flood irrigation; Sediment

Abstract: Water samples collected in the Mermentau River Basin over several years at Louisiana Department of Environmental Quality monitoring sites contained high levels
of total solids and nutrients during the spring that were highly correlated to pre- and post-plant discharges from rice fields. This study was developed to evaluate the potential of selected management practices (MP's) for reducing total solids, nutrients and pesticides from discharge water in order to improve the surface water quality in southwest Louisiana. Five rice plots located on the Rice Research Station in Crowley, LA represented the different MP's to be evaluated. The five water seeding MP's were: a.1-no till; a.2-water cultivation with 30-day settling, a.3-dry cultivation with clear water planting; a.4-mudding-in with vegetated filter, and b-mudding-in (control). Quality of discharged water from rice fields in the Mermentau River Basin was clearly affected by the different MP's. From the first year of data, all the MPa's were better than the mudding-in (MPb). The concentrations of the total solids (kg/ha) in the discharged water (initial + final drain) for the different MP's were in the order: MPb(4860) > MPa.3(3906) > MPa.4(3412) > MPa.2(3068) > MPa.1(1807). The Mpa.3, Mpa.4 and MPb had no detectable amounts of pesticides being released. The 30-day holding period (Mpa.2), clear water planting (MPa.3) and the mudding-in with vegetated filter (MPa.4) were similar as far as TDS, TSS and TS with the no-till (MPa.1) being the least. The 30-day holding period (Mpa.2) and the no-till (MPa.1) had less nutrients, but more pesticides released. Depending on the priority of the stream problems, different MP's may be more advantageous than others. All of the selected MP's were better than the control (MPb), and therefore, should help to improve water quality.

46 NAL Call. No.: 290.9 AM32T
Effects of manure management and building environments on swine health and productivity.

Language: English

Descriptors: Gilts; Pig housing; Pig slurry; Waste disposal; Environmental factors; Ventilation

47 NAL Call. No.: TD403.G7
Effects of nutrient management on nitrate levels in ground water near Ephrata, Pennsylvania.
Hall, D.W.

Language: English

Language: English

Descriptors: Pennsylvania; Water management; Nutrients; Water quality; Groundwater; Pollution control


Language: English

Descriptors: Pennsylvania; Watersheds; Nutrients; Water management; Water quality


Language: English

Descriptors: Pennsylvania; Groundwater recharge; Aquifers; Farmland; Terracing; Water table


Language: English

Descriptors: Pennsylvania; Runoff water; Terraces; Water quality; Monitoring

52 NAL Call. No.: FICHE S-72
Effects of residue cover on pesticide losses from conventional and no-tillage systems.

Language: English

Descriptors: Atrazine; 2,4-d; Losses; Minimum tillage systems; Crop residues; Rainfall simulators; Runoff water; Water composition and quality

53 NAL Call. No.: S539.5.A77

Language: English

Descriptors: Farm management; Risks; Tillage; Water pollution

54 NAL Call. No.: 292.9 AM34

Language: English

Descriptors: Virginia; Sludges; Nitrogen fertilizers; Phosphorus fertilizers; Application to land; No-tillage; Tillage; Nitrogen; Phosphorus; Losses from soil systems;
Runoff water; Water quality; Sediment

Abstract: Simulated rainfall was used on experimental field plots to compare the effect of chemical fertilizer and sludge application on sediment, nitrogen, and phosphorus in runoff from no-till and conventional tillage systems. Chemical fertilizer application under the no-till system resulted in the least amount of total N and P in surface runoff. However, sludge application under the no-till system resulted in the least amount of NO3-N and sediment in surface runoff. The worst water quality scenarios were observed when either sludge or chemical fertilizer were surface-applied under a conventional tillage system. Nitrogen losses from the conventional tillage system were minimized when sludge was incorporated into the soil. However, phosphorus and sediment yield from such a system were significantly higher when compared to phosphorus and sediment yield from the no-till system. The results from this study indicate that the use of sludge on agricultural land under a no-till system can be a viable alternative to chemical fertilizer for nitrogen and phosphorus control in runoff. A more cautious approach is recommended when the sludge is incorporated into the soil in a conventional tillage system because of potential for high sediment and phosphorus yield in surface runoff.

Language: English

Descriptors: Runoff; Agricultural chemicals; Sediment; Farmland; No-tillage; Conservation tillage; Grass strips; Soil conservation; Filtration; Water conservation; Erosion control; Water pollution

57 NAL Call. No.: S604.S6 1985
Effects of tillage on quality of runoff water.
Baldwin, P.L.; Frye, W.W.; Blevins, R.L.

Language: English

Descriptors: Tillage; Runoff water; Water composition and quality; Silty soils; Loam soils

58 NAL Call. No.: 290.9 AM32P
Effects of tillage on the preferential movement of pesticides.
Gish, T.J.; Isensee, A.R.; Nash, R.G.; Helling, C.S.

Language: English

Descriptors: Groundwater; Water quality; Pesticides; Tillage

59 NAL Call. No.: S671.A22
Effects on water quality.
Ames, Iowa : The Service; 1990 Nov.

Language: English

Descriptors: Iowa; Conservation tillage; Sediment; Agricultural chemicals; Runoff water; Groundwater; Water quality
Environmental and economic impacts of pesticide and irrigation practices: EPIC-PST simulation.
Sabbagh, G.J.; Norris, P.E.; Geleta, S.; Bernado, D.J.; Elliott, R.L.; Mapp, H.P.; Stone, J.F.

Language: English

Descriptors: Oklahoma; Groundwater pollution; Crop management; Environmental impact; Economic impact; Pest control; Irrigation; Computer techniques; Simulation models; Pesticides; Movement in soil; Runoff

Environmental effects of limited tillage.
Wauchope, R.D.; McDowell, L.L.; Hagen, L.J.

Language: English

Descriptors: Minimum tillage systems; Water pollution; Air pollution; Erosion; Pesticide residues; Weed control

Environmental impacts of conservation tillage.
Cook, M.G.

Language: English

Descriptors: North Carolina; Tillage; Soil and water conservation; Pesticide residues; Groundwater pollution; Denitrification; Nature conservation; Spraying precautions


Language: English

Descriptors: Tillage; Pollution by agriculture; Pesticides; Systems analysis
Environmental quality constraints and farm-level decision making. Turvey, C.G.
Language: English
Descriptors: Ontario; Surface water; Watersheds; Soil compaction; Farm management; Regulations; Environmental impact; Profitability; Costs; Constraints; Rain; Liabilities; Externalities; Decision making

Environmental significance of minimum-tillage. Thomas, G.W.
Language: English
Descriptors: U.S.A.; Minimum tillage systems; Herbicides; Environmental assessment; Erosion control; Runoff; Leaching; Pollution

Erosion, sediment, and economic effects of conservation compliance in an agricultural watershed. Prato, T.; Wu, S.
Language: English
Descriptors: Idaho; Watershed management; Erosion control; Sediment; Tillage; Conservation tillage; Rotations; Contour ridging

Estimated economic impact from adoption of water-related agricultural technology. Ellis, J.R.; Lacewell, R.D.; Reneau, D.R.

Language: English

Descriptors: Economic impact; Water use; Technology; Groundwater; Irrigation systems; Tillage

68 NAL Call. No.: TD223.N36 1992
Estimation of lag time for water quality response to BMPs.
Clausen, J.C.; Meals, D.W.; Cassell, E.A.

Language: English

Descriptors: Vermont; Water quality; Watersheds; Watershed management

69 NAL Call. No.: 100 Or3M no. 817
Evaluating coliform concentrations in runoff from various animal waste management systems.
Moore, James A.
Corvallis, Or. : Agricultural Experiment Stations, Oregon State University; 1988.

Language: English

70 NAL Call. No.: TD428.A37E9
Evaluating nutrient and sediment losses from agricultural lands vegetative filter strips.
Dillaha, T. A.
United States, Environmental Protection Agency, Chesapeake Bay Program, Virginia Polytechnic Institute and State University, Dept. of Agricultural Engineering, Virginia Agricultural Experiment Station, Virginia Polytechnic Institute and State University, Dept. of Agronomy Annapolis, MD : U.S. Environmental Protection Agency, Region III, Chesapeake Bay Liaison Office, ; 1987.
xii, 93 p. : ill. ; form ; 28 cm. (CBP/TRS ; 4/87). Project number X-00315-01-0. This study was conducted in cooperation with the Virginia Polytechnic Institute and State University Departments of Agricultural Engineering and Agronomy and the Virginia Agricultural Experiment Station. "Chesapeake Bay Program"--Cover. Includes bibliographical references (p. 67-70).
Evaluating the effectiveness of BMPs (Best Management Practices) from field studies (Controlling water quality problems).
Baker, J.L.; Johnson, H.P.

Evaluation of best management practices for controlling nonpoint pollution from silvicultural operations.
Lynch, J.A.; Corbett, E.S.

Evaluation of best management practices to control phosphorus nonpoint source pollution.
Rousseau, A.; Dickinson, W.T.; Rudra, R.P.

Evaluation of management practices to control agricultural pollutants.
McTernan, W.F.; Weand, B.L.; Grizzard, T.J.
Descriptors: Virginia; Watersheds; Pollution by agriculture; Land use; Minimum tillage systems; Crop management; Mathematical models; Water pollution; Runoff; Agricultural land

75 NAL Call. No.: QH540.J6
Evaluation of nitrogen availability indexes for a sludge compost amended soil. O'Keefe, B.E.; Axley, J.; Meisinger, J.J.
Language: English
Descriptors: Sewage sludge; Soil amendments; Nitrogen; Nutrient availability; Zea mays; Nutrient uptake; Soil testing

76 NAL Call. No.: TD427.P56E92 1989
1 v. (various foliations) : ill. ; 28 cm. Contract no. 68-01-7047. Includes bibliographical references.
Language: English
Descriptors: Water

77 NAL Call. No.: S590.C63
Evaluation of various nitrogen sources and rates on nitrogen movement, Pensacola bahiagrass production, and water quality. Sveda, R.; Rechcigl, J.E.; Nkedi-Kizza, P.
Language: English
Descriptors: Florida; Paspalum notatum; Ammonium sulfate; Ammonium nitrate; Application rates; Nitrogen; Movement in soil; Crop production; Nutrient content; Plant tissues; Water quality

78 NAL Call. No.: SB317.5.A6
Evaluering van bewaringsbewerkingpraktyke vir 'n braak-
koringstelsel in die sentrale Vrystaat  [Evaluation of conservation tillage practices for a fallow-wheat system in the central Free State].
Snyman, P.J.; Engelbrecht, C.; Van Der Merwe, S.W.J.

Language: Afrikaans
Descriptors: South Africa; Triticum; Conservation tillage; Crop residues; Crop yield; Fallow; Infiltration; Water conservation

79  NAL Call. No.: TD426.J68
A field study of the effects of soil structure and irrigation method on preferential flow of pesticides in unsaturated soil.
Ghodrati, M.; Jury, W.A.

Language: English
Descriptors: California; Soil pollution; Pesticides; Formulations; Movement in soil; Irrigation; Soil water regimes; Tillage; Sandy loam soils

80  NAL Call. No.: 290.9 AM32P
A field system to monitor tillage and crop rotation effects on groundwater quality.
Kanwar, R.S.; Baker, D.G.; Singh, P.; Noh, K.M.

Language: English
Descriptors: Groundwater; Water quality; Tillage; Rotations

81  NAL Call. No.: TD171.U5
A "fitting solution" at Snake Creek, Utah.
Wann, D.

Language: English
Descriptors: Utah; Water pollution; Pollution by agriculture; Phosphorus residual effect; Irrigation; Water management; Environmental impact reporting
Ground water models for assessing agricultural best management practice. Shoemaker, L.L.; Magette, W.L.

Language: English

Descriptors: Models; Groundwater pollution; Fertilizer application; Pesticide application; Leaching

Ground water nonpoint source management in Nebraska.
Link, M.

Language: English

Descriptors: Nebraska; Groundwater pollution; Programs; State government; Water quality; Nitrate; Contamination

Growth and selenium uptake of range plants propagated in uranium mine soils. Hossner, L.R.; Woodard, H.J.; Bush, J.

Language: English

Descriptors: Texas; Panicum coloratum; Cynodon dactylon; Gramineae; Selenium; Ion uptake; Mineral content; Uranium; Mine spoil; Shoots; Dry matter accumulation; Cover crops

Abstract: High soil selenium (Se) levels have been found in association with uranium deposits in Texas. A concern that high Se concentrations may be found in forages grown on reclaimed mine lands prompted this investigation. A native soil sampled near the mining area, and overburden materials sampled from two Se enriched uranium mine soil sites were
compared in a plant growth study in the greenhouse. Shoot yields and shoot Se concentration in each of ten grasses common to the region were determined from plants harvested three weeks after germination and from shoot regrowth harvested four weeks after the first harvest. Shoot weights were reduced for 5 of the 10 species growing in soils with medium and high Se status. Total shoot weights of Cynodon dactylon and Panicum coloratum from two harvests were consistently highest in all soil materials and are highly recommended for use as a stabilizing cover crop for lands disturbed from uranium mining. Generally, no correlation was observed between shoot weight and plant Se concentration or uptake in the 10 species. However, plant tissue Se concentrations in all species for at least one of the two harvest dates were above the 5 mg kg⁻¹ concentration considered potentially harmful to grazing livestock. Therefore, none of these species would be a suitable forage for livestock grazing on reclaimed Se-enriched uranium mining overburden.

85 NAL Call. No.: QH540.J6
Herbicide residues from winter wheat plots: effect of tillage and crop management.
Brown, D.F.; McCool, D.K.; Papendick, R.L.; McDonough, L.M.

Language: English

Descriptors: Washington; Triticum aestivum; Pisum sativum; Metribuzin; Bromoxynil; Residual effects; Soil pollution; Runoff; Tillage; Crop management; Winter; Erosion

86 NAL Call. No.: SB951.4.E58
Herbicides in surface waters.
Leonard, R.A.

Language: English

Descriptors: Herbicides; Surface water; Runoff water; Transport; Distribution; Persistence; Erosion control; Soil conservation; Tillage; Simulation models; Prediction

87 NAL Call. No.: S604.E35
Hydrologic effects of conservation tillage and their importance relative to water quality.
Baker, J.L.
Effects of conservation tillage on groundwater quality:
nitrates and pesticides / edited by Terry J. Logan ... [et al.]. p. 113-124; 1987. Literature review. Includes references.

Language: English

Descriptors: Tillage; Water composition and quality; Hydrology

88 NAL Call. No.: 292.2 AM34
Hydrological response of an agricultural watershed to various hydrologic and management conditions.
Razavian, D.

Language: English

Descriptors: Nebraska; Watersheds; Agricultural land; Pollution; Tillage; Erosion; Sediment yield; Runoff; Catchment hydrology; Climatic factors; Crops management; Simulation models

89 NAL Call. No.: 292.8 W295
Hydrological impacts of changing land management practices in a moderate-sized agricultural catchment.
Potter, K.W.

Language: English

Descriptors: Wisconsin; Stream flow; Catchment hydrology; Conservation tillage; Agricultural land; Land management; Land use; Soil conservation; Erosion; Runoff; Floods; Precipitation; Seasonal variation

Abstract: Since the mid-1930s a variety of soil conservation practices have been applied to agricultural lands throughout the United States. While intended to reduce soil erosion, if effective, these practices should alter the hydrology of streams which drain the treated lands. This hypothesis was explored for the East Branch of the Pecatonica River, a gaged 221 square mile agricultural catchment in southwestern Wisconsin. On the basis of the analysis of peak and daily flow data there has been a decrease in flood peaks and in winter/spring flood volumes and an increase in hydrologic rise times and in the contribution of winter/spring snowmelt events to base flow. These changes do not appear to be due to climatic variations, reservoir construction, or major land use changes. Instead, they appear to have resulted from the adoption of various soil conservation practices, particularly those involving the treatment of gullies and the adoption of conservation tillage.

Language:  English

Descriptors: Stream measurements; Water quality; Fertilizers; Hydrology


Language:  English

Descriptors: Northern plains states of U.S.A.; Southern plains states of U.S.A.; Water quality; Groundwater; Surface water; Agricultural production; Environmental impact; Water supply; Agricultural chemicals; Irrigation; Conservation tillage


Language:  English

Descriptors: Pesticides; Runoff; Water pollution; Water quality; Conservation tillage; Crop residues; Environmental impact reporting; Groundwater; Literature reviews
The impact of fertilizer application techniques on nitrogen yield from two tillage systems.
Mostaghimi, S.; Younos, T.M.; Tim, U.S

Descriptors: Virginia; Agricultural land; Hapludults; Silt loam soils; Nitrogen; Losses from soil systems; Sediment; Runoff; Water pollution; No-tillage; Tillage; Nitrogen fertilizers; Subsurface application; Application methods; Artificial precipitation; Rain; Yields; Nitrate nitrogen; Ammonium nitrogen; Kjeldahl method; Eutrophication; Surface water; Movement in soil


Descriptors: Sewage sludge; Tillage; Systems; Application methods; Runoff water; Water composition and quality; Sediments; Nitrogen; Losses from soil systems; Runoff control; Yield response functions

The impact of nitrogen and irrigation management and vadose zone conditions on ground water contamination by nitrate-nitrogen.
Watts, D.; Christiansen, A.; Frank, K.; Penas, E.

Descriptors: Nebraska; Zea mays; Nitrogen; Irrigation; Groundwater; Pollution
Impact of pesticides on shallow groundwater quality.
Gish, T.J.; Isensee, A.R.; Nash, R.G.; Helling, C.S.

Language: English

Descriptors: Maryland; Alachlor; Atrazine; Carbofuran; Cyanazine; Groundwater; Monitoring; Movement in soil; Pesticide residues; Tillage; Water pollution; Water quality

Abstract: A three-year field study was initiated in 1986 to determine the impact of tillage practice, mode of pesticide application, and pesticide formulation on chemical transport. The 1.28-ha field site was divided into four plots, two each devoted to no-till and conventional tillage management. Pesticide transport was evaluated by monitoring the rate of change in concentrations of pesticides in a shallow perched water table, located approximately 1 m below the soil surface. Pesticides monitored included atrazine, alachlor, cyanazine and carbofuran. All three herbicides were applied as a single broadcast spray: granular insecticide carbofuran was band-injected at planting.

Impact of rainfall and tillage systems on off-site herbicide movement. Shaw, D.R.; Smith, C.A.; Hariston, J.E.
Communications in soil science and plant analysis v. 23 (15/16): p. 1843-1858; 1992. Includes references.

Language: English

Descriptors: Glycine max; Cropping systems; Tillage; Conservation tillage; Herbicides; Losses from soil; Runoff; Water pollution

Impact of tillage practices on pesticide leaching in coastal plain soils. Brinsfield, R.; Staver, K.; Magette, W.

Language: English

Descriptors: Tillage; Techniques; Herbicide application; Leaching; Coastal plains; Soil; Groundwater pollution; Water
Impacts of BMP's and water table management on selected nitrogen processes. Wright, J.A.; Shirmohammadi, A.; Magette, W.L.; Hill, R.

Language: English
Descriptors: Groundwater; Hydrology; Nitrogen; Losses; Models

Influence of tillage on hydrology in western Iowa.
Hjelmfelt, A.T. Jr; Kramer, L.A.

Language: English
Descriptors: Iowa; Loess soils; Watersheds; Catchment hydrology; Tillage; Terracing; Pastures; Monoculture; Zea mays; Runoff; Evapotranspiration; Soil conservation

Initial storm effects on macropore transport of surface-applied chemicals in no-till soil.
Shipitalo, M.J.; Edwards, W.M.; Dick, W.A.; Owens, L.B.
Madison, Wis. : The Society; 1990 Nov.

Language: English
Descriptors: Zea mays; No-tillage; Macropores; Macropore flow; Atrazine; Strontium; Bromides; Movement in soil; Groundwater pollution; Agricultural chemicals; Rain; Percolation; Leaching

Abstract: Previous research has established that macropores can rapidly transmit water through soil. This observation has raised concern that macropores may also promote rapid movement of agricultural chemicals to groundwater. This is a particular concern for no-till fields where lack of disruption by tillage can lead to the development of extensive macropore systems. In order to investigate the effect of initial rainfall on chemical transport, strontium bromide hexahydrate (SrBr2.6H2O)
and atrazine (2-chloro-4-ethylamino-6-isopropylamino-s-triazine) were surface-applied to six 30 by 30 by 30 cm blocks of undisturbed soil obtained from a 25-yr-old, no-till corn (Zea mays L.) field with evidence of well-defined macropores attributable to earthworm activity. Half of the blocks then received a 1-h 5-mm simulated rain, which did not produce percolate. Two days later, the blocks received a 0.5-h 30-mm simulated rain, followed by another 0.5-h 30-mm rain 1 wk later. The remaining blocks received only the two 30-mm events. An average of 12% of the applied water passed through all the blocks during and shortly after the first 30-mm rain. Bromide, Sr, and atrazine losses in this percolate were 7, 10, and 2 times less, respectively, from blocks that received the 5-mm rain than from blocks not receiving this initial, light rain. The second 30-mm rain on the blocks not receiving the initial 5 mm produced 1.6 X more percolate than the first 30-mm rain. Yet, transport and flow-weighted average concentrations of Br, Sr, and atrazine were all reduced. These results indicated that the first storm after application can move solutes into the soil matrix, thereby reducing the potential for transport in macropores during subsequent rainfall events.
Lake Erie conservation tillage demonstration projects evaluating management of pesticides, fertilizer, residue to improve water quality. United States, Environmental Protection Agency, Great Lakes National Program Office, National Association of Conservation Districts
S.l. : s.n. ; ; 1985.

Language: English

Long-term effectiveness and maintenance of vegetative filter strips.
Dillaha, Theo Alvin; Sherrard, Joseph H.; Lee, D.
Virginia Water Resources Research Center, Geological Survey (U.S.), Water Resources Division
Blacksburg, VA: Virginia Water Resources Research Center, Virginia Polytechnic Institute and State University.

Language: English

Long-term effects of tillage and crop rotation on the leaching of nitrate and pesticides to shallow groundwater.
Kanwar, R.S.; Stoltenberg, D.E.; Pfeiffer, R.; Karlen, D.L.; Colvin, T.S.; Honeyman, M.

Language: English

Long-term effects of tillage and crop rotation on the leaching of nitrate and pesticides to shallow groundwater.
Kanwar, R.S.; Stoltenberg, D.E.; Pfeiffer, R.; Karlen, D.L.; Colvin, T.S.; Honeyman, M.

Language: English

Long-term effects of tillage and crop rotation on the leaching of nitrate and pesticides to shallow groundwater.
Kanwar, R.S.; Stoltenberg, D.E.; Pfeiffer, R.; Karlen, D.L.; Colvin, T.S.; Honeyman, M.

Language: English

Language: English
Descriptors: Maryland; Water management; Storms; Regulations; Structures; Maintenance


Language: English
Descriptors: Oklahoma; Triticum aestivum; Rangelands; Land management; Environmental impact reporting; Watersheds; Soil management; Erosion; Runoff; Sediments; Nitrogen; Phosphorus; Losses from soil systems; Surveys; No-tillage


Language: English
Descriptors: Pig farming; Pig slurry; Waste disposal; Environmental pollution; Pollution


Language: English
Descriptors: Maryland; Water pollution; Water quality; Farm management; Runoff; Soil chemistry; Cost analysis
Mechanized tillage systems effects on soil erosion from an alfisol in watersheds cropped to maize (Nigeria).
Lal, R.
Amsterdam : Elsevier; July 1984.

Language: English
Descriptors: Nigeria

A method to measure the environmental impact of pesticides.
Kovach, J.; Petzoldt, C.; Degni, J.; Tette, J.

Language: English
Descriptors: New York; Pesticides; Environmental impact; Integrated pest management; Measurement; Comparisons; Toxicity; Regulations

Minimizing nitrate leaching in agricultural production: how good can we get?. Magdoff, F.

Language: English
Descriptors: U.S.A.; Crop production; Nitrate; Leaching; Groundwater pollution

Mobility of agrochemicals through soil from two tillage systems. Levanon, D.; Codling, E.E.; Meisinger, J.J.; Starr, J.L.

Language: English
Abstract: The fate of agrochemicals is often greatly affected by the surface-soil conditions in the field. This study was conducted to characterize the impact of two contrasting tillage systems on the movement of agrochemicals in soil. The two tillage systems were plow-tillage (PT) and no-tillage (NT) for corn (Zea mays L.) production. The study included incubation and leaching of undisturbed soil columns and disturbed soil samples from 16-yr plots subject to the two tillage regimes. The agrochemicals used in the study were NH$_4$NO$_3$, atrazine (2-chloro-4-ethylamino-6- isopropylamino-1,3, 5-triazine-2,4 diamine), carbofuran (2,3-dihydro-2,2-dimethyl- 7-benzofuranyl methylcarbamate), diazinon (0,0-diethyl-O-(6- methyl- 2(1-methyethyl)-4-pyramidinyl phosphor- othioate), and metolachlor (2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2- metoxy-1-methyl ethyl) acetamide). The results of this study show greater ponded flow movement of all agrochemicals in soils under PT vs. NT conditions. Strong evidence was found for preferential flow through the soil, with the chemicals by-passing much of the soil-matrix under recently plowed soils as well as NT soils. Nitrate leaching was significantly greater under PT than NT, apparently due to greater mineralizing activity of the PT soil compared with the NT soil. The pesticide movement also tended to be greater under PT than NT. Caution should be exercised in generalizing to field conditions, but these data suggest that there can be greater leaching losses of surface-applied agrochemicals to groundwater under PT than under NT.
Stored manure provides more plant-available nitrogen than does daily-spread manure.

Modeling animal waste BMP impacts on bacteria levels in runoff from agricultural lands.
Language: English
Descriptors: Animal wastes; Bacterial count; Runoff water; Simulation models

Modeling animal waste management practices: impacts on bacteria levels in runoff from agricultural lands.
Language: English
Descriptors: Virginia; Animal wastes; Water pollution; Runoff; Bacteria; Monte carlo method; Simulation models

Modeling cost-effectiveness of agricultural nonpoint pollution abatement programs on two Florida basins.
Language: English
Descriptors: Florida; Pollution by agriculture; Nitrogen; Phosphorus; Control methods; Water composition and quality; Cost benefit analysis; Project appraisal; Water resource management; Models; Coastal areas

Abstract: Long-term assessment of solute transport in the unsaturated zone is an important consideration for irrigation management, pesticide management, and subsurface contaminant restoration analysis and design. Mathematical models are often used to perform such analyses. Modeling fluid flow and solute transport in the unsaturated zone typically requires solution of the nonlinear Richards equation and an advective-dispersive equation for contaminant transport as a function of time. Such solutions are possible but computationally expensive. A simplified water balance approach to solve fluid flow in shallow, drained unsaturated zones has been developed and refined over the last 15 years. The objectives of this study were to use results from a water balance model to obtain solutions for solute transport in drained, shallow water table soils, and to compare the results with solutions based upon Richards' equation. Transient soil water flux rates computed with a water balance model were used as input to a Petrov-Galerkin advective-dispersive transport model to simulate solute transport in unsaturated soils. The transport model was checked for consistency by comparison with an analytical solution. Sample simulations showed good agreement between a Richards' equation-based transport model and a water balance-based transport model. Simulations were performed to show predicted trends in water quality over 1-year periods.


Nitrogen leaching sensitivity to evapotranspiration and soil
water storage estimates in EPIC.

Language: English
Descriptors: U.S.A.; Water quality; Nitrogen; Leaching; Movement in soil; Percolation; Soil water balance; Evapotranspiration; Soil water; Storage; Estimation; Methodology; Comparisons; Simulation models; Climatic zones; Meteorological factors; Geographical distribution; Spatial variation; Soil variability; Crop growth stage; Crop management

126 NAL Call. No.: S651.N57

Language: English
Descriptors: Nitrogen fertilizers; Crop husbandry; Fertilizer application; Pollution by agriculture

127 NAL Call. No.: TD428.A37N67 1990

Language: English
Descriptors: Agricultural pollution; Water quality management; Water quality

Abstract: This North Central Regional Water Quality Conference Reference Manual contains numerous publications which provide the best available information on measures including pesticide applicator practices to minimize and prevent groundwater contamination and solve water quality problems. The six topic areas covered are: 1) site assessment;
2) pest management; 3) nutrient management; 4) waste management; 5) economics; and 6) policy. Where groundwater comes from, how it moves and the health effects of groundwater contamination as well as pesticide surface runoff, leaching, and exposure concerns are discussed.

Nutrient and pesticide best management practices for Wisconsin farms.. Best management practices for Wisconsin farms, 1st ed..

Language: English; English

Descriptors: Agricultural pollution; Farm management; Agriculture; Pesticides; Fertilizers

Abstract: This manual summarizes recommended nutrient and pesticide Best Management Practices (BMPs) for pesticide applicators in the state of Wisconsin to reduce and/or prevent contamination of water resources by pesticides. It also includes an implementation survey of research assessment techniques used to determine management research issues, and cropland and crop-specific assessment techniques. Groundwater contamination susceptibility in Wisconsin is discussed and indicated on the map on the inside back cover.

On-site assessment of best management practices as an indicator of cumulative watershed effects in the Flathead Basin.
Ehinger, William; Potts, Donald F.

Language: English

Descriptors: Flathead National Forest (Mont.); Forest management; Water quality management; Sediment transport
Pesticide and nitrate movement under conservation and conventional tilled plots.
Steenhuis, T.; Paulsen, R.; Richard, T.; Staubitz, W.; Andreini, M.; Surface, J.
Planning now for irrigation and drainage in the 21st century:
Language: English
Descriptors: Pesticides; Nitrates; Soil water movement; Tillage; Experimental plots; Groundwater pollution; Soil analysis; Water composition and quality

Pesticide applicator training .. Slide scripts for private pesticide applicator training
266 slides : col. + 1 script. Title from running title on script. Title on script: Slide scripts for private pesticide applicator training.
Language: English
Descriptors: Pesticides; Pests; Pesticide applicators (Persons); Spraying equipment
Abstract: This private pesticide applicator training slide program with accompanying script consists of sections on Integrated Pest Management (IPM); pesticides including information on labels, formulations, toxicity, entry, exposure, poisoning symptoms, safe handling, storage and disposal; application equipment and calibration for chemigation and broadcast sprayers; pesticides in the environment, reducing their adverse effects and ground water contamination risks; and nitrogen management.

Pesticide contamination of ground water in the United States--a review. Ritter, W.F.
New York, N.Y. : Marcel Dekker; 1990 Feb.
Language: English
Descriptors: U.S.A.; Pollution by agriculture; Pesticides;
Groundwater pollution; Mathematical models; Environmental protection; Integrated pest management

133                                   NAL Call. No.: HD101.S6
Prababilistic cost effectiveness in agricultural nonpoint pollution control. McSweeney, W.T.; Shortle, J.S.

Language:  English

Descriptors: Virginia; Maize; Soybeans; Wheat; Nitrogen; Pollution by agriculture; Water pollution; Runoff control; Water composition and quality; Farm management; Watersheds; Cost analysis; Tillage; No-tillage; Linear programming; Probabilistic models; Case studies

Abstract: Conceptual weaknesses in the use of costs of average abatement as a measure of the cost effectiveness of agricultural nonpoint pollution control are examined. A probabilistic alternative is developed. The focus is on methods for evaluating whole-farm pollution control plans rather than individual practices. As a consequence, the analysis is presented in a chance-constrained activity analysis framework because activity analysis procedures are a practical and well developed device for screening farm plans. Reliability of control is shown to be as important as reduction targets in designing farm plans for pollution control. Furthermore, broad-axe prescriptions of technology in the form of Best Management Practices may perform poorly with respect to cost effectiveness.

134                                NAL Call. No.: 290.9 AM32T
Predicting runoff of water, sediment, and nutrients from a New Zealand grazed pasture using CREAMS.
Cooper, A.B.; Smith, C.M.; Bottcher, A.B.

Language:  English

Descriptors: New Zealand; Grassland management; Grazing effects; Hydraulic conductivity; Losses from soil systems; Prediction; Runoff; Water quality; Computers; Simulation models

Abstract: The ability of the CREAMS model to predict loadings of runoff, sediment and nutrients from a New Zealand grazed pasture was evaluated. Before use, CREAMS was adapted to better represent N and P cycling in grazed pastures and the seasonal variation in hydraulic conductivity observed at the site. There was a moderately strong relationship (r2 = 0.81)
between daily surface runoff volumes predicted by this modified model and volumes measured at the site for 62 events over a three and one half year period. Although the ability of the model to predict daily losses of sediment and nutrients was considerably less ($r^2 < 0.45$), the model was always an unbiased predictor. This unbiased predictive ability provides good estimates of losses over longer time scales (e.g., seasonal) which is often sufficient when evaluating the impacts of land use practices on water quality. The adapted CREAMS model successfully simulated measured reductions in edge-of-field losses of sediment and nutrient upon installation of a vegetated filter strip. We conclude that although CREAMS has limitations in representing the dynamics of grazed pastures, it shows potential as a water quality management tool in pastoral watersheds.


Descriptors: Maryland; Atrazine; Cyanazine; Field tests; Groundwater; Movement in soil; Silt loam soils; Water pollution

Abstract: The relative importance of preferential pesticide transport in agricultural soils was determined in a two-phase study conducted on a silt loam soil in Maryland. The first phase (1984) consisted of evaluating persistence and mobility of atrazine [2-chloro-4-(ethylamino)-6-(isopropylamino)-s-triazine] and cyanazine [2-chloro-4-(1-cyano-1-methylethylamino)-6-ethylamino-s-triazine] under no-tillage corn management. The second phase (1986) dealt with persistence and mobility of the same herbicides on fallow tilled soil subjected to frequent, large water inputs. Although preferential flow was observed under both treatments and water regimes, the no-till system had the most rapid movement of herbicide relative to water inputs. Additionally, all treatments indicated that the greatest potential movement of surface-applied pesticide occurred with the first water input subsequent to application. Once the pesticide has been preferentially transported, it appears to diffuse into the soil matrix, where it is no longer subject to significant preferential movement. Based on field data and calculated mass balance, persistence of atrazine and cyanazine was unaffected by tillage practice and water regime.


& Natural Resources, Univ. of Conn; 1991 May.
The Grower: vegetable and small fruit newsletter v. 91 (5): p. 6-7; 1991 May.

Language: English

Descriptors: Nitrogen; Nitrogen fertilizers; Nitrates; Nitrites; Nitrogen content; Pollution

137 NAL Call. No.: 100 C12CAG
Research results: statewide IPM's first 10 years.
Grieshop, J.I.; Pence, R.A.
Oakland, Calif.: Division of Agriculture and Natural Resources, University of California; 1990 Sep.

Language: English

Descriptors: California; Integrated pest management; Research projects; Pesticides; Cultural control; Program effectiveness; Evaluation

138 NAL Call. No.: 290.9 AM32T
Residue, chemical placement, and metolachlor mobility.
Mote, C.R.; Tompkins, F.D.; Allison, J.S.

Language: English

Descriptors: Tillage; No-tillage; Metolachlor; Herbicide residues; Soil pollution; Rain; Runoff water

Abstract: Monolithic soil cores were used to evaluate the impact of tillage and point-of-chemical placement on off-site movement of metolachlor. Nine 254-mm diameter soil cores were removed from an agriculturally productive field site and positioned under a rainfall simulator. Provisions were made for collecting surface runoff and deep seepage from the cores. A one-time application of metolachlor at a rate of 2.2 kg active ingredient per ha was made to three bare, tilled surfaces, three untilled surfaces beneath a covering of wheat straw, and three untilled surfaces over-the-top of a covering of wheat straw. The nine cores were subjected to simulated rainfall events of 26.5 mm per hr intensity at 4, 48, 168, 504, 1008, and 2016 hours after application of metolachlor. A small quantity of metolachlor exited the cores in both runoff and in deep seepage water. There were no significant differences in concentrations of metolachlor in deep seepage among cores with the three different surface treatments. There was, however, significantly more metolachlor in runoff from cores where the chemical was applied over-the-top of wheat straw. Results, thus, indicate that a contribution to improved water quality may be made by developing under-residue
herbicide application practices.


Language: English

Descriptors: Texas; No-tillage; Tillage; Soil management; Clay soils; Triticum aestivum; Zea mays; Sorghum bicolor; Sediment; Nutrients; Losses from soil; Runoff water; Water pollution; Nitrogen; Phosphorus; Agricultural land; Watersheds

Abstract: Agricultural source pollution of water resources has been a source of concern in recent years. Research is needed to define mechanisms of chemical and sediment loss in runoff from agricultural land, and to develop management practices that minimize transport of these pollutants. This study was designed to compare the effect of no-till (NT) and conventional chisel-till (CT) soil management on runoff water volumes, sediment loss, and N and P loss from small watersheds on a clay soil. Three NT and three CT watersheds located on Houston Black clay vertisol soil (fine, montmorillonitic, thermic, Udic Pellusterts) in east central Texas were used for the study. Wheat (Triticum aestivum L.), corn (Zea mays L.) and sorghum [Sorghum bicolor (L.) Moench] were grown rotationally on the watersheds from 1984 to 1989. Runoff amounts, sediment loss, and N and P losses were measured for each rainfall event that produced runoff. Runoff volume was not changed by tillage system and sediment loss and N and P losses in runoff were less, on average, from NT than from CT. Runoff averaged 1.3 ML ha⁻¹ annually for both CT and NT. Average annual quantities for sediment and nutrient losses were: 160 kg ha⁻¹ and 1575 kg ha⁻¹ for sediment, 3.8 kg ha⁻¹ and 8.1 kg ha⁻¹ for N, and 0.8 kg ha⁻¹ and 1.5 kg ha⁻¹ for P for NT and CT, respectively. These results indicate that the loss of sediment and nutrients from agricultural lands could be minimized by using NT on clay soils.

Simulation of BMP alternatives for NPS pollution assessment.
Soil chemistry after eleven annual applications of cattle feedlot manure. Chang, C.; Sommerfeldt, T.G.; Entz, T.

Abstract: In a long-term experiment at Lethbridge, AB, the effects of cattle (Bos sp.) manure on soil characteristics were determined after 11 annual applications. Manure, incorporated by cultivating, rototilling or plowing, was applied annually from 1973 to 1983 at 30, 60, and 90 Mg ha\(^{-1}\) (wet wt.) and 60, 120, and 180 Mg ha\(^{-1}\), respectively, to nonirrigated and irrigated dark brown Chernozemic (Typic Haploborolls) clay loam soil. On both the nonirrigated and irrigated soil, the effects from manure, applied annually at greater than recommended rates for 11 yr, were minimal on Cu and NH\(_4\) content and substantial on other parameters determined. There were no significant effects due to tillage methods on these soil parameters. The effects on these soil parameters extended to greater depths under irrigation than under nonirrigation. Most of the applied NH\(_4\) was nitrified, volatilized, or fixed. The accumulation of organic matter, total N, NO\(_3\), total P, available P, soluble Na, Ca+Mg, Cl, SO\(_4\), HCO\(_3\), and Zn in the soil increased with increasing rates of manure applied. The electrical conductivity and sodium adsorption ratio of the soil increased and the soil pH in the surface 60 cm of nonirrigated and 90 cm of irrigated decreased with increased manure rates. The total NO\(_3\) accumulation in the 150-cm soil depth was near 1 Mg ha\(^{-1}\), even at recommended rates, and was high enough to potentially cause soil and water pollution. The available P accumulated mostly in the surface soil and might be sufficient to interfere with the nutrient balance of some crops. Long-term annual application of cattle manure to southern Alberta soils at maximum recommended rates [30 mg ha\(^{-1}\) and 60 Mg ha\(^{-1}\) (wet wt.) for nonirrigated and irrigated land, respectively] is not advisable.
Kraft, S.E.; Toohill, T.L.
Language: English
Descriptors: Illinois; Soil degradation; Land use; Farm management; Analysis; Tillage; No-tillage; Soil conservation; Law; Programming

Soil tests for estimating labile, soluble, and algae-available phosphorus in agricultural soils.
Wolf, A.M.; Baker, D.E.; Pionke, H.B.; Kunishi, H.M.
Language: English
Descriptors: U.S.A.; Agricultural soils; Phosphorus residual effect; Soil testing; Water pollution

Some concepts concerning soil site assessment for water quality. Mausbach, M.J.; Nielsen, R.D.
Language: English
Descriptors: Water quality; Land evaluation; Surface water; Contamination; Groundwater pollution; Contaminants; Nutrients; Pesticides; Site factors; Soil types; Runoff; Soil water; Geometry; Vertical movement; Horizontal infiltration; Slope; Geomorphology; Surface layers; Soil properties; Soil formation; Land use; Land management; Tillage; Spatial variation; Temporal variation; Horizons; Profiles; Catchment hydrology

Spatial simulation to aid in evaluating and treating erosion and water quality problems affecting Lake Erie.
Beasley, D.B.

Abstract: Management of surface water has four broad objectives: (1) Appropriate removal of excess water during wet periods, (2) Water conservation for crop use, (3) On-site erosion control to protect long-term soil productivity and reduce short term damages, and (4) Off-site damage prevention from sedimentation and water pollution. The various techniques of water management vary in effectiveness for the four objectives given. However, for production of crops on erodible land the importance of water conservation to enhance yield and potential profits must be emphasized. The benefits of water management for on-site erosion control are well established. Economic studies, however, conclude that structural approaches to control on-site erosion are seldom profitable in terms of protecting soil productivity. The use of a tillage and cropping system designed for erosion protection is economically more attractive than structures, especially if the cropping system does not greatly reduce the total value of farm products sold. In contrast to the on site losses annual costs of off-site damages from cropland erosion and runoff are probably 10 to 55 times as great. Grain crop production on highly erodible land continues to be difficult and risky. Whether farmers can achieve this profitably, and with conservation compliance as defined by the 1985 Food Security Act, will greatly depend upon the alternative types of land available and the extent of conservation treatment required.
Abstract: Extract: The public cost of reducing erosion in a west Tennessee watershed pilot program was 34 percent lower than the national average. The difference was attributed to the pilot program's emphasis on targeting specific erosion problems and to the establishment of permanent vegetative cover on highly eroding land. Even greater use of permanent vegetative cover, no-till cropping practices, and less reliance on cover improvement and terraces could reduce erosion in the area by an additional 32 percent with the same level of funds. A variable cost-sharing approach to erosion control may yield even bigger dividends in a targeting program.

Language: English

Descriptors: Groundwater pollution; Water composition and quality; Agricultural land; Tillage; Nitrogen fertilizers; Leaching


Language: English

Descriptors: Tillage; Zea mays; Nitrogen; Drainage water; Water composition and quality; Crop yield; Subsurface drainage


Language: English

Descriptors: South Dakota; Agricultural chemicals; Movement in soil; Aquifers; Groundwater pollution
Tillage effects on runoff water quality from sludge-amended soils. Mostaghimi, Saied
Virginia Water Resources Research Center, Geological Survey (U.S.), Branch of Water Institute Programs
Bibliography: p. 77-81.
Language: English
Descriptors: Soil conservation; Methodology; Sewage sludge as fertilizer; Environmental aspects; Tillage; Environmental aspects; No-tillage; Environmental aspects; Runoff; Soils; Composition

Tillage effects on sediment and soluble nutrient losses from a Maury silt loam soil.
Blevins, R.L.; Frye, W.W.; Baldwin, P.L.; Robertson, S.D.
Language: English
Descriptors: Kentucky; Zea mays; Tillage; Chiselling; No-tillage; Runoff; Sediment; Runoff water; Ammonium nitrate; Triple superphosphate; Potassium fertilizers; Triazine herbicides; Crop yield; Silt loam soils
Abstract: As the role of nonpoint-source contamination of surface waters becomes more evident, increasingly more attention is focused on the effects of agricultural practices on soil erosion and water quality. Tillage systems are known to affect the amount of water moving over the surface and through the soil. This study compared the contributions of three tillage systems used in corn (Zea mays L.) production with (i) sediment losses and surface runoff and (ii) the potential for nonpoint-source surface water pollution from N and P fertilizers and triazine herbicides. Tillage treatments were no-tillage, chisel-plow tillage, and conventional tillage (moldboard plow plus secondary tillage). The study site was on a Maury silt loam (Typic Paleudalfs). Over the 4-yr period, conventional tillage runoff volume was 576.7 kL ha-1, chisel-plow 205.7 kL ha-1, and no-tillage 239.9 kL ha-1. Total soil loss from conventional tillage was 19.79 Mg ha-1, chisel plow 0.71 Mg ha-1, and no-tillage 0.55 Mg ha-1. Amounts of NO3(-), soluble P, and atrazine leaving the plots in surface runoff were greatest from conventional tillage and about equal from chisel-plow and no-tillage. The magnitudes of the losses in surface runoff water were small for all chemicals measured.

Abstract: The feasibility of using starch-encapsulated atrazine to minimize convective transport under conditions favoring preferential flow was evaluated. Forty small, undisturbed, soil columns (45 cm² X 3 cm) were removed from an established no-tillage management site and randomly grouped into one of five atrazine treatments: 1) technical grade; 2) borate process, starch-encapsulated; 3) jet-cooked, pearl starch-encapsulated; 4) jet-cooked, waxy starch-encapsulated; and 5) untreated control. Columns were drip-irrigated at the rate of 2.5 cm every three days. Highest atrazine levels, 1.30 mg L⁻¹, were observed in the effluent from columns receiving technical-grade atrazine after the first irrigation (2.3 pore volumes), even though piston flow theory indicated that atrazine should not have appeared before 21.9 pore volumes. Computer simulations using the general convection-dispersion equation with first-order dissipation and linear adsorption also significantly underpredicted atrazine mobility. All encapsulated formulations, relative to technical-grade, revealed significantly lower initial atrazine levels in the effluent. Cumulative effluent concentrations indicate that after 16.1 pore volumes, 35, 10, 3, and < 1% of the available atrazine had been leached from the technical-grade, borate, pearl, and waxy starch formulations, respectively.


Abstract: Bioavailable P (BAP) in agricultural runoff represents P potentially available for algal uptake and
consists of soluble P (SP) and a variable portion of particulate P (PP). Evaluation of the impact of agricultural management on BAP in runoff will aid assessment of the resultant biological productivity of receiving water bodies. Soluble P, PP, and bioavailable PP (BPP) (estimated by NaOH extraction) were determined over a 5-yr period in runoff from 20 unfertilized and fertilized, grassed, and cropped watersheds in the Southern Plains. Soluble P, BPP, and BAP loss in runoff was reduced by practices minimizing erosion and runoff, with respective mean annual amounts ranging from 237 to 122, 1559 to 54, and 1796 to 176 g P ha⁻¹ yr⁻¹ (for peanut-sorghum [Arachis hypogaea L.-Sorghum bicolor (L.) Moench] and native grass watersheds, respectively). However, as vegetative cover improved, BAP (SP plus BPP) comprised a larger portion of total P (TP) loss (29% for peanut-sorghum and 88% for native grass). This results from an increasing contribution to BAP of SP (13% for peanut-sorghum and 69% for native grass watersheds) and BPP to PP (26% for peanut-sorghum and 69% for native grass watersheds). Clearly, P bioavailability is a dynamic function of physiochemical processes controlling erosion, particle size enrichment, P desorption-dissolution reactions, and plant residue breakdown, in addition to soil and fertilizer P management. Hence, the change in trophic state of a water body may not be adequately reflected by TP inputs only. To more reliably evaluate the biological response of a water body to agricultural P inputs, particularly from conservation tillage practices, it may be necessary to determine BAP in runoff.

Using models to identify cost-effective pest management programs that minimize ground-water pollution.
Language: English
Descriptors: New York; Groundwater; Pollution; Pesticide residues; Integrated pest management; Simulation models

Using simulation to assess the impacts of conservation tillage on movement of sediment and phosphorus into Lake Erie.
Language: English
Descriptors: Ohio; Michigan; Indiana; Watersheds; Conservation; Tillage; Water pollution; Sediment pollution;
Phosphorus; Computer simulation; Pollution by agriculture

160  NAL Call. No.: 275.29 IO9PA
Vegetative filter strips for improved surface water quality.
Smith, M.
PM - Iowa State University, Cooperative Extension Service
Language: English
Descriptors: Water quality; Filters; Grass strips; Vegetation types; Grasses; Effects

161  NAL Call. No.: 56.8 J822
Water quality consequences of conservation tillage.
Baker, J.L.; JSWCA; Lafien, J.M.
Language: English
Descriptors: Water quality; Tillage practices; Conservation practices; Water pollution
Abstract: Extract: Conservation tillage, which leaves some or all of the residue from the previous crop on the soil surface, effectively protects the soil against erosion. Use of conservation tillage has other environmental implications as well, particularly for water quality.

162  NAL Call. No.: QH540.J6
Language: English
Descriptors: Sorghum bicolor; Nitrogen fertilizers; Phosphorus fertilizers; Runoff; Sediment; Surface water; Tillage; Transport processes; Water pollution; Water quality; Watersheds; Environmental impact; Eutrophication

163  NAL Call. No.: QH540.J6
Abstract: Water quality information regarding wheat culture in the Southern Plains is sparse. The objective of this study is to determine the extent to which the area's surface and ground-water quality is influenced by different wheat cultural practices. Concentrations and amounts of sediment, N and P in surface runoff water were determined for conventional till (CT), reduced till (RT), and no till (NT) wheat (Triticum aestivum L.) watersheds in the High Plain, Reddish Prairie, and Rolling Red Plain land resource areas of Oklahoma and Texas. During the 4 to 6 yr study periods, RT and NT practices were superior to CT for reducing sediment and associated particulate nutrient discharge. Mean annual discharge ranged from 230 to 15 900 kg ha-1 for sediment, 1 to 27 kg ha-1 for total N, and 0.1 to 6 kg ha-1 for total P. Irrespective of tillage practice, annual soluble nutrient losses in surface runoff water tended to be small, often < 1 kg ha-1 N or P. Successful prediction of soluble P, particulate P, and particulate N losses was achieved using appropriate kinetic desorption and enrichment ratio procedures. Soluble N in runoff posed no particular water quality problem, but recommended P levels were exceeded, even from baseline, unfertilized grassland watersheds. With regard to groundwater quality, elevated levels of NO3- (e.g., 34 mg N L-1 maximum) were observed on one Reddish Prairie NT watershed.
Water table management practice effects on water quality.
Wright, J.A.; Shirmohammadi, A.; Magette, W.L.; Fouss, J.L.; Bengtson, R.L.; Parsons, J.E.

Abstract: Impacts of water table management (WTM) practices on water quality were modeled using a linked version of CREAMS and DRAINMOD (Parsons and Skaggs, 1988). The CREAMS denitrification component and the linked DRAINMOD-CREAMS model were modified to simulate daily hydrology (runoff, infiltration, evaporation, and soil moisture content), erosion, and nutrient processes for different WTM conditions. Measured data from Baton Rouge, Louisiana, were used to validate the linked model, and then controlled drainage-subirrigation (CD-SI) was simulated to investigate the effects of different WTM systems on runoff, erosion, and nitrogen losses. Results of the study indicated that the linked models performed better than the original CREAMS model in predicting runoff, infiltration, soil moisture content, and erosion, and that the modified linked model performed better than both CREAMS and the original linked model in predicting nitrogen losses from the study site. Results also showed that the CD-SI system simulated by the modified DRAINMOD-CREAMS model predicted increased denitrification and lowered nitrate leaching, unlike the original version. This study concluded that the CD-SI system may be used as a BMP to reduce nitrogen leaching to shallow groundwater systems for areas with high water table conditions.

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<td>6819</td>
<td>(CROP()ROTAT? OR MANAGE?) OR CRITICAL()AREA()SEEDING OR IPM OR</td>
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</table>
INTEGRATED() PEST MANAGEMENT OR SOIL() TEST? OR ((SETTLEMENT OR SETTLING) () BASIN?)
S3 5172 (PEST OR IRRIGATION OR NITROGEN OR NUTRIENT OR FERTILIZER OR MANURE OR (ANIMAL()WATES?)) () MANAGE?
S4 20039 S1 OR S2 OR S3
S5 63487 (WATER() QUALITY() (RESPONSE? OR IMPROVE?)) OR ((RESPONSE OR LAG) () TIME? OR ((SPATIAL OR TEMPORAL) () OCCURRENCE?) OR (NUTRIENT()(REDUC? OR CONCENTRAT?)))
S7 373059 S5 OR S6
S8 5703 S4 AND S7
S9 63487 SH=P200 OR SH=W000 OR (WATER() (QUALITY OR POLLUT?))
S10 298 S8 AND S9

*****************************************************************
NAL DOCUMENT DELIVERY SERVICES
June 1993

United States Department of Agriculture
National Agricultural Library
Public Services Division
Document Delivery Services Branch
Beltsville, Maryland 20705-2351

The National Agricultural Library has established document delivery service policies for three user categories. They are 1) individuals; 2) libraries, other information centers, and commercial organizations; and 3) foreign libraries, information centers, and commercial organizations. Available services for each user category are given below. For information on electronic access for interlibrary loan requests, the "Interlibrary Loan" file.

1) DOCUMENT DELIVERY SERVICES TO INDIVIDUALS

The National Agricultural Library (NAL) supplies agricultural materials not found elsewhere to other libraries.

Filling requests for materials readily available from other sources diverts NAL's resources and diminishes its ability to serve as a national source for agricultural and agriculturally related materials. Therefore, NAL is viewed as a library of last resort. SUBMIT REQUESTS FIRST TO LOCAL OR STATE LIBRARY SOURCES PRIOR TO SENDING TO NAL. In the United States, possible sources are public libraries, land-grant university or other large research libraries within a state. In other countries submit requests through major university, national, or provincial institutions. If the needed publications are not available from these sources, submit requests to NAL with a statement indicating their
non-availability. Submit one request per page following the instructions for libraries below.

NAL'S DOCUMENT DELIVERY SERVICE INFORMATION FOR THE LIBRARY

The following information is provided to assist your librarian in obtaining the required materials.

LOAN SERVICE -- Materials in NAL's collection are loaned only to other U.S. libraries. Requests for loans are made through local public, academic, or special libraries.

The following materials are not available for loan: serials (except USDA serials); rare, reference, and reserve books; microforms; and proceedings of conferences or symposia. Photocopy or microform of non-circulating publications may be purchased as described below.

DOCUMENT DELIVERY SERVICE -- Photocopies of articles are available for a fee. Make requests through local public, academic, or special libraries. The library will submit a separate interlibrary loan form for each article or item requested. If the citation is from an NAL database (CAIN/AGRICOLA, "Bibliography of Agriculture," or the NAL Catalog) and the call number is given, put that call number in the proper block on the request form. Willingness to pay charges must be indicated on the form. Include compliance with copyright law or a statement that the article is for "research purposes only" on the interlibrary loan form or letter. Requests cannot be processed without these statements. Please read copyright notice below.

CHARGES:

* Photocopy, hard copy of microfilm and microfiche - $5.00 for the first 10 pages or fraction copied from a single article or publication. $3.00 for each additional 10 pages or fraction.

* Duplication of NAL-owned microfilm - $10.00 per reel.

* Duplication of NAL-owned microfiche - $5.00 for the first fiche and $.50 for each additional fiche per title.

BILLING - Charges include postage and handling, and are subject to change. Invoices are issued quarterly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Establishing a deposit account with NTIS is encouraged. DO NOT SEND PREPAYMENT.

Send Requests to:
USDA, National Agricultural Library
Document Delivery Services Branch, ILL, PhotoLab
10301 Baltimore Blvd., NAL Bldg.
Beltsville, Maryland 20705-2351

Contact the Head, Document Delivery Services Branch in writing or by calling (301) 504-5755 with questions or comments about this policy.
3) DOCUMENT DELIVERY SERVICES AVAILABLE TO FOREIGN LIBRARIES, INFORMATION CENTERS AND COMMERCIAL ORGANIZATIONS.

The National Agricultural Library (NAL) accepts requests from libraries and other organizations in accordance with the national and international interlibrary loan code and guidelines.

In its national role, NAL supplies copies of agricultural materials not found elsewhere. Filling requests for materials readily available from other sources diverts NAL's resources and diminishes its ability to serve as a national source for agricultural and agriculturally related materials. Therefore, NAL is viewed as a library of last resort.

Submit requests to major university libraries, national or provincial institutions or network sources prior to sending requests to NAL. If the needed publications are not available from these sources, submit requests to NAL with a statement indicating their non-availability.

AGLINET -- Requesters in countries with an AGLINET library are encouraged to make full use of that library and its networking capabilities. As an AGLINET participant, NAL provides free document delivery service for materials published in the United States to other AGLINET participants.

REQUESTS -- Submit requests on the American Library Association (ALA) or the International Federation of Library Associations and Institutions (IFLA) interlibrary loan form or via electronic mail or telefacsimile (see over for more details). Include the complete name of the person authorizing the request on each form; the standard bibliographic source which lists the title as owned by NAL; and the call number if the citation is from an NAL database (CAIN/AGRICOLA, "Bibliography of Agriculture", or the NAL catalog).

DOCUMENT DELIVERY SERVICE -- Submit a separate completed interlibrary loan form for each article requested. Indicate willingness to pay charges on the form, and compliance with copyright law or include a statement that the article is for "research purposes only". Requests cannot be processed without these statements. Please read copyright notice below.

CHARGES:

* Photocopy, hard copy of microfilm and microfiche - $5.00 for the first 10 pages or fraction copied from a single article or publication. $3.00 for each additional 10 pages or fraction.

* Duplication of NAL-owned microfilm - $10.00 per reel.

* Duplication of NAL-owned microfiche - $5.00 for the first fiche and $.50 for each additional fiche per title.

BILLING - Charges include postage and handling, and are subject to change. Invoices are issued quarterly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Establishing deposit account with NTIS is encouraged. Annual billing is available to foreign institutions on request by contacting NAL at the address below. DO NOT SEND
PREPAYMENT.

Send Requests to:
USDA, National Agricultural Library
Document Delivery Services Branch, ILL, PhotoLab
10301 Baltimore Blvd., NAL Bldg.
Beltsville, Maryland 20705-2351

Contact the Head, Document Delivery Services Branch at (301) 504-5755 with questions or comments about this policy.

ELECTRONIC MAIL ACCESS FOR INTERLIBRARY LOAN (ILL) REQUESTS

The National Agricultural Library (NAL), Document Delivery Services Branch accepts ILL requests from libraries via several electronic services. All requests must comply with established routing and referral policies and procedures. The transmitting library will pay all fees incurred during the creation of requests and communication with NAL. A sample format for ILL requests is printed below along with a list of the required data/format elements.

ELECTRONIC MAIL - (Sample form below)

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>ADDRESS CODE</th>
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<tbody>
<tr>
<td>INTERNET. . . . <a href="mailto:LENDING@NALUSDA.GOV">LENDING@NALUSDA.GOV</a></td>
<td></td>
</tr>
<tr>
<td>EASYLINK. . . . 62031265</td>
<td></td>
</tr>
<tr>
<td>ONTYME. . . . NAL/LB</td>
<td></td>
</tr>
<tr>
<td>TWX/TELEX . . . Number is 710-828-0506 NAL LEND. This number may only be used for ILL requests.</td>
<td></td>
</tr>
<tr>
<td>FTS2000 . . . A12NALLEND</td>
<td></td>
</tr>
<tr>
<td>OCLC . . . . NAL's symbol AGL need only be entered once, but it must be the last entry in the Lender string. Requests from USDA and Federal libraries may contain AGL anywhere in the Lender String.</td>
<td></td>
</tr>
</tbody>
</table>

SAMPLE ELECTRONIC MAIL REQUEST

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<tr>
<th>University/NAL</th>
<th>ILLRQ 231</th>
<th>4/1/93</th>
<th>NEED BY: 6/1/93</th>
<th>AG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interlibrary Loan Department</td>
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<tr>
<td>Agriculture University</td>
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<tr>
<td>Heartland, IA 56789</td>
<td></td>
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<tr>
<td>Dr. Smith Faculty Ag School</td>
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<tr>
<td>DeJong, R. Comparison of two soil-water models under semi-arid growing conditions</td>
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<tr>
<td>Ver: AGRICOLA</td>
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<tr>
<td>Remarks: Not available at IU or in region.</td>
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<td></td>
</tr>
</tbody>
</table>
TELEFACSIMILE - Telephone number is 301-504-5675. NAL accepts ILL requests via telefacsimile. Requests should be created on standard ILL forms and then faxed to NAL. NAL does not fill requests via Fax at this time.

REQUIRED DATA ELEMENTS/FORMAT

1. Borrower's address must be in block format with at least two blank lines above and below so form may be used in window envelopes.
2. Provide complete citation including verification, etc.
3. Provide authorizing official's name (request will be rejected if not included).
4. Include statement of copyright compliance if applicable.
   Please read copyright notice below.
5. Indicate willingness to pay applicable charges.
6. Include NAL call number if available. Contact the Document Delivery Services Branch at (301) 504-6503 if additional information is required.

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37 C.F.R. 201.14

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Return to Bibliographies

Return to the Water Quality Information Center at the National Agricultural Library.
Last update: April 27, 1998
The URL of this page is http://www.nal.usda.gov/wqic/Bibliographies/qb9366.html

J. R. Makuch /USDA-ARS-NAL-WQIC/ jmakuch@nal.usda.gov

Disclaimers

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