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Evaluation of Best Agricultural Management Practices (II)

1990 - SEPTEMBER 1995
141 citations from AGRICOLA
by
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Water Quality Information Center

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EVALUATION OF AGRICULTURAL BEST MANAGEMENT PRACTICES (II)

1. Adoption of nitrogen and water management practices to improve water quality.
Supalla, R. J.; Selley, R. A.; Bredeweg, S.; Watts, D.

J-soil-water-conserv v.50, p.77-82. (1995).
Includes references.
Descriptors: zea-mays; irrigated-stands; nitrogen-; crop-management; nitrogen- fertilizers; application-to-land; water-management; nitrate-; leaching- ; losses-from-soil; groundwater-pollution; water-quality; farmers'- attitudes; environmental-protection; nebraska-; nitrogen-management
NAL Call No.: 56.8-J822

2. Agricultural use of organic amendments: a historical

perspective.

Parr, J. F.; Hornick, S. B.

Am-J-Alternative-Agric v.7, p.181-189. (1992).

Includes references.

Descriptors: organic-fertilizers; history-; erosion-; composting-; soil-organic- matter; sewage-sludge; solid-wastes; soil-fertility

Abstract: Agricultural research conducted in the United States since establishment of the U.S. Dept. of Agriculture and Land-Grant University System in 1862 has shown that regular and proper additions of organic materials are very important for maintaining the tilth, fertility, and productivity of agricultural soils, protecting them from wind and water erosion, and preventing nutrient losses by runoff and leaching. Several millennia earlier, Roman agriculturists were advocating crop rotations, green manuring, composts, legumes, farmyard manures, crop residues, wood ashes, seaweed, and sewage wastes for supplying humus and nutrients to restore or enhance soil productivity. Even earlier, Asian farmers also used these practices to maintain healthy and productive soils. Today the most serious problem in U.S. agriculture and agriculture worldwide is the widespread degradation of agricultural soils through erosion and the consequential decline in productivity. In view of how much information is available on the benefits of organic recycling on agricultural lands, one wonders why we aren't doing a better job of protecting and conserving our land resource base. We discuss strategies for using organic resources more effectively to achieve a more sustainable agriculture for the future.

NAL Call No.: S605.5.A43

3. Agriculture and water quality in the Great Plains: status and recommendations.

Misc-publ,-Tex-Agric-Exp-Stn. College Station, Tex. : Texas Agricultural Experiment Station. Mar 1992. (1738) 34 p.

Includes references.

Descriptors: water-quality; agricultural-chemicals; water-pollution; groundwater- ; surface-water; irrigation-; livestock-farming; conservation-tillage; agricultural-planning; state-government; federal-government; agricultural-research; agricultural-policy; legislation-; agricultural- regions; northern-plains-states-of-usa; southern-plains-states-of-usa; mountain-states-of-usa

NAL Call No.: 100-T31M

4. Analysis of on-farm best management practices in the Everglades Agricultural Area.

Willis, L. M.; Forrest, S. B.; Nissen, J. A.; Hiscock, J. G.; Kirby, P. V.

Environmentally sound agriculture proceedings of the second conference 20-22 April 1994 / p.93-99. (1994).

Includes references.

Descriptors: marshes-; environmental-protection; agricultural-land; management-; cost-effectiveness-analysis; phosphorus-; discharge-; water-flow; water- quality;

improvement-; sustainability-; florida-; nutrient-loadings

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

5. Animal waste system management in Southwest Missouri.

Feistner, J.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1991. (914570) 10 p.

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

Descriptors: animal-manures; animal-wastes; water-quality; environmental-impact; missouri-

NAL Call No.: 290.9-Am32P

6. Application of GLEAMS to predict nutrient losses from land application of poultry litter.

Yoon, K. S.; Yoo, K. H.; Wood, C. W.; Hall, B. M.

Trans-ASAE v.37, p.453-459. (1994).

Includes references.

Descriptors: poultry-manure; runoff-; nitrogen-; phosphorus-; water-quality; simulation-models; alabama-;

groundwater-loading-effects-of-agricul; -manage; -systems

Abstract: The GLEAMS (Groundwater Loading Effects of Agricultural Management System) (version 2.1) water quality model was used to predict nutrient (N and P) losses in surface and subsurface runoff, and their concentrations in soil layers, following application of two rates (9 and 18 t ha⁻¹) of poultry litter and a recommended rate of a commercial fertilizer on conventionally tilled corn plots at the Tennessee Valley Substation of the Alabama Agricultural Experiment Station. Model simulation results were compared with field data. The experiment included four replications for each of the three soil-amendment treatments. The GLEAMS simulation of soluble and sediment P losses in surface runoff and NO₃-N concentrations in leachate and soil layers were not consistent with field data. Simulation of N-transformation effects on N losses in surface runoff did not agree with field data. The model simulated higher NH₄-N than NO₃-N losses in surface runoff, while field data showed the opposite. The model simulated low concentrations of P in leachate at a 1.0 m depth, while the observed data showed large variations.

NAL Call No.: 290.9-Am32T

7. Assessing phosphorus bioavailability in agricultural soils and runoff.

Sharpley, A. N.

Fertil-res. Dordrecht : Kluwer Academic Publishers. 1993. v. 36 (3) p. 259-272.

Includes references.

Descriptors: phosphorus-; bioavailability-; estimation-; agricultural-soils; runoff-; analytical-methods; iron-oxides; water-quality; eutrophication-; risk-; no-tillage-; tillage-; watershed-management; algae-; nutrient-availability; conventional-tillage; iron-oxide-strips

Abstract: Bioavailable phosphorus (BAP) transported in agricultural runoff can accelerate surface water eutrophication. Although several algal assays and chemical extractions have been proposed to estimate BAP, procedural and theoretical limitations have restricted widespread BAP measurement. Thus, a routine method was developed to estimate BAP, which uses iron oxide-impregnated paper strips (Fe-oxide strips) as a P- sink for BAP in runoff. In the proposed method BAP is determined by shaking 50 mL of unfiltered runoff with one Fe-oxide strip for 16 h. Phosphorus is removed from the strip by 0.1 M H₂SO₄ and measured. The BAP content of runoff from 20 agricultural watersheds in the Southern Plains was related to the growth of P-starved algae incubated for 29 d with runoff as the sole source of P. Acting as a P sink, Fe-oxide strips may have a stronger theoretical basis than chemical extraction in estimating BAP. The method may also have potential use as an environmental soil P test to indicate soils liable to enrich runoff with sufficient P to accelerate eutrophication. Bioavailable P loss in runoff was lower from no till (438 g ha⁻¹ yr⁻¹) than from conventional till (1288 g ha⁻¹ yr⁻¹). Kinetic and enrichment ratio approaches accurately predicted (r² of 0.93) BAP transport in runoff during 1988 to 1990. Use of the Fe-oxide strip method will facilitate estimation of BAP transport in runoff and thereby, improve assessment of the resultant impact on the biological productivity of receiving surface waters.

NAL Call No.: S631.F422

8. Assessment of management practices for reducing pesticide runoff from sloping cropland in Illinois.

Felsot, A. S.; Mitchell, J. K.; Kenimer, A. L.

J-Environ-Qual v.19, p.539-545. (1990).

Includes references.

Descriptors:alachlor-; carbofuran-; terbufos-; runoff-; losses-from-soil; sediment-; runoff-water; conservation-tillage; no-tillage-; chiselling-; ridging-; plowing-; contour-cultivation; row-orientation; sloping- land; zea-mays; glycine-max; illinois-; strip-till-

Abstract: The influence of tillage system and contouring practice on runoff of soil-applied alachlor

[2-chloro-2',6'-diethyl-N-(methoxymethyl) acetanilide], carbofuran (2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate), and terbufos (S-[(tert-butylthio)methyl] O,O-diethyl phosphorodithioate) from small plots (30 m²) were studied using a rainfall simulator. Plots were planted in corn (Zea mays L.) in 1983, soybean [Glycine max (L.) Merr.] in 1984, and corn in 1985. Runoff was measured during a 60-min event with a rainfall intensity of 63 mm/h. During 1984, moldboard-plowed and no-till systems were studied with rows oriented on the contour or up-and-down slope (7-11% slope). Compared to moldboard plow, up-and-down slope no-till and contouring significantly reduced runoff of carbofuran and alachlor. Percentage of applied carbofuran lost in runoff and sediment ranged from 1% (contoured moldboard) to 11% (up-and-down slope moldboard). Percentage of applied alachlor lost ranged from 1% (contoured no-till) to 2% (contoured moldboard). During 1985,

the effects of row orientation were evaluated on moldboard-plow, chisel-plow, ridge-till, strip-till, and no-till systems. Under up-and-down slope conditions, runoff of alachlor and terbufos plus two metabolites (terbufos sulfoxide and terbufos sulfone) was significantly reduced by strip-till (< 1% loss) compared to moldboard-plow (6% loss). Larger losses of alachlor (2% of applied) from up-and-down slope no-till than from the other conservation tillage systems 1% or less) was attributed to high concentrations in runoff associated with extensive washoff of the herbicide from soybean crop residues. With contouring, ridge tillage also was effective in reducing pesticide runoff (< 1% of applied pesticide), and strip-till held losses to < 0.1%. Alachlor and carbofuran were translocated from plots largely in moving water, but terbufos and metabolites were recovered mainly in eroded sediment. Although, no conservation tillage system completely eliminated pesticide runoff, losses were most effectively minimized by contoured strip-till and no-till, which controlled both water and sediment movement.

NAL Call No.: QH540.J6

9. Atrazine leaching and its relation to percolation of water as influenced by three rates and four methods of irrigation water application.

Troiano, J.; California. Environmental Hazards Assessment Program. Worker Safety. Environmental Monitoring and Pest Management Branch.

Sacramento, Calif. : State of California, Dept. of Food and Agriculture, Division of Pest Management, Environmental Protection and Worker Safety, Environmental Monitoring and Pest Management Branch, [1990] vi, 51 p. : ill..

"July, 1990."

Descriptors: Soils-California-Herbicide-movement; Soil-percolation-California; Groundwater-Pollution-California; Atrazine-

NAL Call No.: S592.6.H47A87--1990

10. Barley performance under heavy applications of cattle feedlot manure.

Chang, C.; Sommerfeldt, T. G.; Entz, T.

Agron-j v.85, p.1013-1018. (1993).

Includes references.

Descriptors: hordeum-vulgare; cattle-manure; feedlot-wastes; waste-utilization; application-rates; clay-loam-soils; application-date; timing-; incorporation-; tillage-; crop-yield; grain-; yield-increases; irrigated-conditions; dry-conditions; soil-pollution; water-pollution; alberta-

Abstract: Approximately 4800 cattle feedlots currently operate in Alberta, Canada. The large amount of manure produced annually creates disposal problems for feedlot operators. The objective of the present study was to evaluate the effects of long-term annual manure application on barley (*Hordeum vulgare* L.) performance grown on clay loam soil (Dark Brown Chernozemic, Typic Haploboroll) near Lethbridge, AB. Feedlot cattle manure was applied annually from 1973 to 1989 to irrigated plots at 0, 60, 120, and 180 Mg ha⁻¹ (wet wt. basis) and to nonirrigated

plots at 0, 30, 60, and Mg ha⁻¹. Manure was incorporated with a cultivator plus disk, rototiller, or plow. Method of incorporation did not affect barley yields, but timeliness and amount of precipitation in the current and previous year were important in determining barley response to manure treatments. When moisture conditions were below normal, manure at any rate of application had a negative effect on yield of nonirrigated barley. Under nonirrigated conditions, average barley yield was depressed by 10 and 16% for the 60 and 90 Mg ha⁻¹ manure rates, respectively. Barley yield increased when manure was applied under irrigation, with the 60 Mg ha⁻¹ rate producing a 20% higher average yield than the control. Although manure was disposed of annually on the soil at up to three times the recommended rate without reducing barley yields below those of the unmanured plots under irrigated conditions, such practice is not recommended because of potential soil and water pollution.

NAL Call No.: 4-AM34P

11. Beef cattle feedlot manure management.

Eghball, B.; Power, J. F.

J-soil-water-conserv v.49, p.113-122. (1994).

Includes references.

Descriptors: beef-cattle; cattle-manure; feedlot-wastes; waste-utilization; resource-management; uses-; application-to-land; environmental-impact; environmental-protection; nitrogen-; recovery-; pollution-control; nutrient-conservation

NAL Call No.: 56.8-J822

12. Best management practices (BMP) evaluation using GIS-CREAMS linkage.

Bekdash, F. A.; Shirmohammadi, A.; Magette, W. L.; Ifft, T. H.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1991. (91-7516) 20 p.

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

Descriptors: pollution-; geographical-information-systems; algorithms-

NAL Call No.: 290.9-Am32P

13. Best management practices for agricultural nonpoint source control. IV, Pesticides : for the project Rural Nonpoint Source Control Water Quality Evaluation and Technical Assistance (National Water Quality Evaluation Project).

United States. Environmental Protection Agency. Office of Research and Development.

Washington, DC : U.S. Environmental Protection Agency, Office of Research and Development, [1992] xiii, 87 p..

Shipping list no.: 92-268-P.

Descriptors:

Rural-Nonpoint-Source-Control-Water-Quality-Evaluation-and-Technical-Assistance-Project; Pesticides-

NAL Call No.: TD427.P35B46-1992

14. Best management practices for forested wetlands in the Southern Appalachian Region.

Aust, W. M.

Water-air-soil-pollut v.77, p.457-468. (1994).

In the special issue: Wetlands of the interior southeastern United States / edited by C.C. Trettin, W.M. Aust, and J. Wisniewski. Conference on "Wetland Ecology, Management, and Conservation," held September 28-30, 1993, Knoxville, Tennessee.

Descriptors: wetlands-; riparian-forests; bottomland-forests; forest-management; environmental-degradation; protection-of-forests; forestry-practices; environmental-impact; logging-effects; southeastern-states-of-usa; appalachian-states-of-usa

NAL Call No.: TD172.W36

15. Biogeochemical responses of a forested watershed to both clearcut harvesting and papermill sludge application.

Kraske, C. R.; Fernandez, I. J.

J-environ-qual v.22, p.776-786. (1993).

Includes references.

Descriptors: paper-mill-sludge; application-to-land; forests-; watersheds-; clearcutting-; forest-soils; pinus-resinosa; soil-ph; soil-organic-matter; calcium-; magnesium-; cation-exchange-capacity; sulfates-; biogeochemistry-; maine-

Abstract: The biogeochemical responses of a forested watershed to both clearcut harvesting and papermill sludge application were evaluated. A mixed northern hardwood and conifer stand in Letter E Township, ME, was clearcut during the winter of 1985-1986.

Harvest residues were windrowed, and red pine (*Pinus resinosa* Aiton) seedlings were planted. In 1987, herbicide was applied to reduce vegetative competition. In the fall of 1989, a combined primary and secondary papermill sludge was operationally applied with a rate of 40 Mg ha⁻¹ (dry sludge). Actual loading rates varied considerably. Study plots were established in sludge-harvest, control-harvest, and uncut forest zones. Soils within the treatment zones consisted of Typic Haplorthods developed from loamy basal tills. Selected soil and soil solution properties were measured in 1989 and 1990. In 1989, harvest area forest floor pH was 0.6 to 0.8 units higher, and organic matter content was up to 40% lower, when compared with that of the uncut forest area. This reflected the accelerated decomposition of the forest floor as a result of the harvest activities. Sludge application further increased forest floor pH by approximately one unit, exchangeable Ca²⁺ and Mg²⁺ by approximately 100 and 60%, respectively, cation-exchange capacity by 60%, and base saturation by 34% compared with that of the control-harvest area. Exchangeable Mg²⁺ and Na⁺, and water-soluble SO₄⁽⁻²⁾ were the mineral soil properties most affected by sludge application. Harvesting increased concentrations of major cations three to six times greater, and Mg²⁺ was three to six times greater in the harvest area than in the uncut forest area. Flushes of Ca²⁺, Mg²⁺, Na⁺, and SO₄⁽⁻²⁾ into soil solution occurred immediately following sludge application. Only Na⁺ and SO₄⁽⁻²⁾ remained elevated in 1990, being five and three

times greater, respectively, in the sludge amended harvest area than in the uncut forest area. Compared with the harvest operations, one-time papermill sludge application appeared to have only small effects on the biogeochemical processes of the treated Letter E site.

NAL Call No.: QH540.J6

16. BMP impacts on watershed runoff, sediment, and nutrient yields.

Park, S. W.; Mostaghimi, S.; Cooke, R. A.; McClellan, P. W.

Water-resour-bull v.30, p.1011-1023. (1994).

Includes references.

Descriptors: watersheds-; pollution-; runoff-; sediment-; nutrients-; water- quality; catchment-hydrology; virginia-; best-management-practice; agricultural-nonpoint-source-pollution

Abstract: To quantify the effectiveness of best management practice (BMP) implementation on runoff, sediment, and nutrient yields from a watershed, the Nomini Creek watershed and water quality monitoring project was initiated in 1985, in Westmoreland County, Virginia. The changes in nonpoint source (NPS) loadings resulting from BMPs were evaluated by comparing selected parameters from data series obtained before, during, and after periods of BMP implementation. The results indicated that the watershed-averaged curve number, sediment, and nutrient (N and P) concentrations were reduced by approximately 5, 20, and 40 percent, respectively, due to BMP implementation. The nutrient yield model developed by Frere et al. (1980) was applied to the water quality parameters from 175 storms, but it failed to adequately describe the observed phenomena. Seasonal changes in nutrient availability factors were not consistent with field conditions, nor were they significantly different in the pre- and post-BMP periods. An extended period of monitoring, with intensive BMP implementation over a larger portion of the watershed, is required to identify RMP effectiveness.

NAL Call No.: 292.9-Am34

17. BMPs for water quality : best management practices to reduce runoff of pesticides into surface water : a review and analysis of supporting research. Best management practices to reduce runoff of pesticides into surface water.

Christensen, B.; Conservation Technology Information Center.

[West Lafayette, Ind.] : Conservation Technology Information Center, [1992 or 1993?] i, 43 p. : ill..

Cover title.

Descriptors: Pesticides-Environmental-aspects-United-States; Water-Pollution- United-States;

Agricultural-pollution-United-States-Management

NAL Call No.: TD427.P35B57--1992

18. Changes in physical and chemical characteristics of poultry litter due to rotary tilling.

Koon, J. L.; Flood, C. A. Jr.; McCaskey, T. A.; Brewer, R. N.

Trans-ASAE v.37, p.269-274. (1994).

Includes references.

Descriptors: poultry-manure; litter-; rotary-cultivators;
physical-properties; chemical-properties

Abstract: Pine shavings poultry litter from four growouts were analyzed for particle size distribution and chemical composition for untilled litter and litter that had been tilled three times following each growout. Little change in the particle size distribution was observed after the first growout for either treatment. The majority of the nutrient mass was associated with the larger size particles (those failing to pass a No. 50 screen) while the percent element analysis increased with the smaller size fractions for both treatments. Little change in nutrient content was observed between treatments, but the tilled liner had an increase in percent ash content and a decrease in percent crude fiber. No difference was observed in the crude protein percentage in the two treatments.

NAL Call No.: 290.9-Am32T

19. Changing farm practice to meet environmental objectives of nutrient loss to Oyster Harbour.

Weaver, D. M.; Prout, A. L.

Fertil-res. Dordrecht : Kluwer Academic Publishers. 1993. v. 36
(2) p. 177-184.

In the special issue: Fertilizers and eutrophication in South-Western Australia / edited by E.P. Hodgkin and J.S. Yeates.

Descriptors: watershed-management; agricultural-land; nutrients-; phosphorus-; losses-from-soil; point-sources; farm-management; environmental- management; water-quality; eutrophication-; western-australia; on-farm-nutrient-management; nonpoint-sources

Abstract: Eutrophication problems in waterbodies in south-western Australia are primarily caused by inputs of nutrients from diffuse sources within the agricultural catchments of these waterbodies. To reduce the algal growth and seagrass decline caused by these inputs, it is essential to modify land management to minimize nutrient losses. Permanent reduction in nutrient losses from agricultural catchments should involve voluntary changes in farm management practices based on improved land management. Specifically, these include on-farm nutrient management such as soil testing, fertilizer management, the use of perennial plants, and water and erosion control measures to reduce nutrient loss from rural land. This paper describes the management of nutrient loss from the catchment of Oyster Harbour on the south coast of Western Australia using a co-operative approach.

NAL Call No.: S631.F422

20. A comparative study of nitrate leaching from soils of differing textures under similar climatic and cropping conditions.

Vinten, A. J. A.; Vivian, B. J.; Wright, F.; Howard, R. S.

J-hydrol v.159, p.197-213. (1994).

Special Issue: Field laboratory and modelling studies of flow and transport processing / edited by H.S. Wheater, P.A.C. Raats, and A.C. Armstrong. Sciences Programme Session HS1 of the XVII General Assembly of the European Geophysical Society, April 6-10, 1992, Edinburgh.

Descriptors: nitrate-nitrogen; leaching-; sandy-soils;
clay-loam-soils; nitrogen- fertilizers; application-rates;
hordeum-vulgare; cultivation-; timing-; drainage-water;
flow-to-drains; losses-from-soil; groundwater-pollution

Abstract: This study reports a direct comparison of nitrate leaching on a field scale from a sandy soil overlying a relatively impermeable glacial till (Ksat = 30-50 mm day⁻¹), with that from a clay loam soil overlying a similar glacial till (Ksat = 2-8 mm day⁻¹), under nearly identical climatic and cropping conditions. Drained plots were installed at each site, and N application rate on the plots, which grew spring barley, varied from 0 to 210 kg N ha⁻¹. Nitrate concentrations in drainage water from the two sites were measured using a simple flow-weighted sampling device and drainflow was measured using tipping bucket flow meters. Total leaching losses (including an estimate of deep percolation) in the first year of the comparison were not significantly higher on the sandy site (38 +/- 11 kg N ha⁻¹ at 150 kg N ha⁻¹ N fertiliser application) than on the clay loam site (27 +/- 4 kg N ha⁻¹). In the subsequent 2 years, leaching losses increased at the sandy loam site. At the clay loam site leaching losses were much lower (7-11 kg N ha⁻¹ in the final year). Timing of cultivation was an important factor influencing the amount of leaching in the clay loam soil. The effect of applied N fertiliser on nitrate leaching was small at both sites, except in the final year at the sandy site, which leached 105 kg N ha⁻¹ at the highest fertiliser rate. The interpretation of these results was aided by concurrent chloride leaching experiments. These experiments showed that the residence time of a substantial proportion of chloride (40-50%) was longer than 1 year. This may be because of diffusion and slow convection into the glacial till horizons, where the residence time is long.

NAL Call No.: 292.8-J82

21. Components of dairy manure management systems.

Van Horn, H. H.; Wilkie, A. C.; Powers, W. J.; Nordstedt, R. A.

J-dairy-sci v.77, p.2008-2030. (1994).

Includes references.

Descriptors: cattle-manure; dairy-farms; application-to-land;
dairy-cows; excretion-; waste-treatment; waste-disposal;
waste-utilization; energy- balance; water-use; ammonia-;
methane-; nitrogen-; phosphorus-

Abstract: Dairy manure management systems should account for the fate of excreted nutrients that may be of environmental concern. Currently, regulatory oversight is directed primarily at the assurance of water quality; N is the most monitored element. Land application of manure at acceptable fertilizer levels to crops produced on the farm by hauling or by pumping flushed manure effluent through irrigation systems is the basis of most systems. Nutrient losses to surface and groundwaters can be avoided, and significant economic value can be obtained from manure as fertilizer if adequate crop production is possible. Dairies with insufficient crop production potential need affordable systems to concentrate manure nutrients, thereby reducing hauling costs and possibly producing a salable product. Precipitation of additional nutrients from flushed manures with

sedimented solids may be possible. Composting of separated manure solids offers a possible method to stabilize solids for distribution, but, most often, solids separated from dairy manures are fibrous and low in fertility. Manure solids combined with wastes from other sources may have potential if a marketable product can be produced or if sufficient subsidy is received for processing supplementary wastes. Solutions to odor problems are needed. Energy generated from manure organic matter, via anaerobic digestion, reduces atmospheric emissions of methane and odorous compounds. Use of constructed wetlands or harvesting of photosynthetic biomass from wastewater has the potential to improve water quality, making extensive recycling possible.

NAL Call No.: 44.8-J822

22. Concepts and practices for improving nitrogen management for vegetables.

Hochmuth, G. J.

HortTechnology v.2, p.121-125. (1992).

Proceedings of the Workshop, "Fertilizer in Horticultural Crops: Implications for Water Pollution," held at the 88th ASHS Annual Meeting, July 24, 1991, Pennsylvania State University, University Park.

Descriptors: nitrogen-fertilizers; vegetables-; crop-production; water- management; groundwater-pollution; organic-amendments; nitrification- inhibitors; cultivars-; cropping-systems; trickle-irrigation; plant- analysis; literature-reviews; southeastern-states-of-usa

NAL Call No.: SB317.5.H68

23. Conservation tillage a sustainable agricultural practice.

Lakshminarayan, P. G.; Bouzaher, A.; Johnson, S. R.

Environmentally sound agriculture proceedings of the second conference 20-22 April 1994 / p.139-146. (1994).

Includes references.

Descriptors: zea-mays; glycine-max; continuous-cropping; rotations-; conservation-tillage; tillage-; environmental-impact; sustainability-; erosion-; erosion-control; nitrate-nitrogen; losses-from-soil; leaching- ; runoff-; water-quality; simulation-models; statistical-analysis; conventional-tillage; metamodels-

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

24. Conservation tillage: an ecological approach to soil management.

Blevins, R. L.; Frye, W. W.

Adv-agron. San Diego, Calif. : Academic Press. 1993. v. 51 p. 33-78.

Includes references.

Descriptors: conservation-tillage; no-tillage-; soil-management; soil- conservation; water-conservation; water-quality; energy-consumption; soil-organic-matter; soil-physical-properties; soil-water; infiltration- ; evaporation-; herbicides-; weed-control; insect-control; plant-

disease-control; soil-fertility; soil-temperature; soil-ph;
acidification-; literature-reviews

NAL Call No.: 30-Ad9

25. Conservation tillage and environmental issues.
Schertz, D. L.

Yearb-agric. Washington, D.C. : U.S. Dept. of Agriculture : For
sale by the Supt. of Docs., U.S. G.P.O., [1980-. 1991. p. 15-20.
In the series analytic: Agriculture and the Environment / edited
by D. Takiff Smith.

Descriptors: conservation-tillage; erosion-control;
environmental-impact; water- pollution; agricultural-chemicals;
movement-in-soil; losses-from-soil

NAL Call No.: 1-Ag84y

26. Corn yield and nitrogen uptake as influenced by tillage and
applied nitrogen.

Menelik, G.; Reneau, R. B. Jr.; Martens, D. C.

J-plant-nutr v.17, p. 911-913. (1994).

Includes references.

Descriptors: zea-mays; tillage-; no-tillage-;
urea-ammonium-nitrate; application- rates; split-dressings;
sewage-sludge; sewage-products; nutrient- uptake; crop-yield;
nitrogen-; conventional-tillage

Abstract: No-till management systems have been reported to reduce
nonpoint source (NPS) pollution from agricultural fields.
However, questions have been raised concerning the fate of
nitrogen (N) in these systems. increased moisture conservation
and reduced runoff from no-till systems have the potential to
accelerate leaching of nitrate (NO₃) out of the root zone, thus
altering the problem from one of surface water degradation to
one of ground water pollution. However, it is also probable that
the additional moisture conserved in no-till systems result in
increased crop yield and N uptake. Time of N application and
source of N could influence yield and N recovery and thus limit N
losses during critical periods. A 3-year study was conducted to
determine if the fate of N applied to nonirrigated corn (Zea mays
L.) would be influenced by tillage system, N rate, and time and
source of N application. This paper addresses the impact of
these practices on yield and N uptake. The experimental site was
located on a Typic Hapludult that is characteristic of
finer-textured soils used for continuous corn production.
Management practices evaluated were conventional-till vs.
no-till, rate of N application, inorganic N vs. sewage sludge N,
and preplant vs. split application of N. Yield and N recovery
were, respectively, 19 and 22% higher in no-till compared with
conventional-till systems at the point of maximum yield. Corn
yield and N uptake were both increased when sewage sludge was
applied compared with either split or preplant application of
inorganic N. No differences were observed in corn yield and N
uptake between preplant and split application of N. These
studies were conducted. indicate that the higher moisture present
in the no-till system may have contributed to increased yield
and N recovery. The increased N recovery reduces the quantity of
N remaining in the soil profile that might be lost, due to

leaching, after crop harvest.

NAL Call No.: QK867.J67

27. Crop, soil, and management effects on phosphorus soil test levels.

Pierzynski, G. M.; Logan, T. J.

J-prod-agric v.6, p.513-520. (1993).

Paper presented at the "Symposium on assessment of potential phosphorus losses from a field site", November 4, 1992, Minneapolis, Minnesota.

Descriptors: phosphorus-; soil-test-values; variation-; crops-; soil-; crop- management; soil-management; site-factors; losses-from-soil; water- pollution; risk-; indexes-; phosphorus-index

NAL Call No.: S539.5.J68

28. Cyclic and blending strategies for using nonsaline and saline waters for irrigation.

Bradford, S.; Letey, J.

Irrig-sci. Berlin, W. Ger. : Springer International. 1992. v. 13 (3) .

Includes references.

Descriptors: medicago-sativa; zea-mays; gossypium-hirsutum; rotations-; continuous-cropping; salt-tolerance; irrigation-; blending-; cycling-; irrigation-water; saline-water; salinity-; water-quality; simulation- models; dry-matter-accumulation; electrical-conductivity; mathematical- models

Abstract: Large quantities of saline water frequently exist in irrigated areas of the world. Various strategies have been proposed to use these saline waters. Blending involves mixing saline water with good quality water to an acceptable salinity and then using this water to irrigate crops. The cyclic strategy uses waters of various salinities separately either during one season or in a crop rotation as a function of the crop's salt tolerance. A multi-seasonal transient state model, known as the modified van Genuchten-Hanks model, was used to investigate the effects of cyclic or blending application of irrigation waters of two salinity levels on alfalfa (*Medicago sativa* L.), and on a corn (*Zea mays* L.) and cotton (*Gossypium hirsutum* L.) crop rotation. Simulated alfalfa yields were similar for the cyclic and blending strategies that applied the same amount of salt and water. The cyclic strategy produced higher simulated yields of salt-sensitive corn than the blending strategy, whereas the simulated salt-tolerant cotton yield was not affected by the two strategies. The beneficial effects of the cyclic strategy on corn production decreased under deficit irrigation.

NAL Call No.: S612.I756

29. Dairy manure and plant nutrient management issues affecting water quality and the dairy industry.

Lanyon, L. E.

J-dairy-sci v.77, p.1999-2007. (1994).

Includes references.

Descriptors: cattle-manure; water-pollution; pollution-control;

dairy-farms; cattle-feeding; production-costs;
environmental-policy; usa-

Abstract: Specific requirements for dairy manure management to protect water quality from nutrient pollution depend on the organization of individual farms. Further, the management requirements and options are different for point (farmstead) and nonpoint (field-applied) sources of pollution from farms. A formal management process can guide decisions about existing crop nutrient utilization potential, provide a framework for tracking nutrients supplied to crops, and identify future requirements for dairy manure management to protect water quality. Farm managers can use the process to plan daily activities, to assess annual nutrient management performance, and to chart future requirements as herd size increases. Agronomic measures of nutrient balance and tracking of inputs and outputs for various farm management units can provide the quantitative basis for management to allocate better manure to fields, to modify dairy rations, or to develop alternatives to on-farm manure application. Changes in agricultural production since World War II have contributed to a shift from land-based dairy production to a reliance on capital factors of production supplied by the dairy industry. Meanwhile, management of dairy manure to meet increasingly stringent water quality protection requirements is still a land-based activity. Involving the dairy industry and off-farm stakeholders as participants in the management process for field, farm, and regional dairy production can be the basis for decision-making to reconcile the sometimes conflicting demands of production and water quality protection.

NAL Call No.: 44.8-J822

30. Design of forest riparian buffer strips for the protection of water quality : analysis of scientific literature. Analysis of scientific literature.

Belt, G. H.; O'Laughlin, J.; Merrill, T.; Idaho Forest, W. a. R. P. A. G.

Moscow, ID : Idaho Forest, Wildlife and Range Policy Analysis Group, [1992] iv, 35 p..

"June 1992."

Descriptors: Riparian-ecology-Idaho; Riparian-forests-Idaho;

Fishes-Idaho-Effect- of-logging-on;

Fishes-Idaho-Effect-of-water-quality-on

NAL Call No.: QH541.5.R52B44--1992

31. Desing, installation, and performance of percolation lysimeters for water quality sampling.

Klocke, N. L.; Todd, R. W.; Hergert, G. W.; Watts, D. G.;

Parkhurst, A. M.

Trans-A-S-A-E v.36, p.429-435. (1993).

Literature review.

Descriptors: irrigation-; leachates-; lysimeters-; percolation-;

water-quality; zea-mays; literature-reviews; nebraska-

Abstract: Lysimeters are the primary research tool for measuring percolation and water quality. Monolithic percolation lysimeters were evaluated for measuring the quantity and quality of

leachate from the root zone of irrigated crops. Six percolation lysimeters were installed in a continuous corn (*Zea mays* L.) cropping system near North Platte, Nebraska, during the fall of 1988 and spring 1989. The lysimeters were 0.9 m in diameter and 2.4 m deep. They were filled with undisturbed soil using a hydraulic pull-down method. Porous stainless steel extractors were installed vertically upward into the lysimeter bottoms, and leachate was extracted from the unsaturated soil. Leachate volume, volumetric soil water content, soil temperature, and soil bulk density were measured. Isolation of a large soil monolith in the lysimeter did not significantly affect plant growth, soil bulk density, or temperature. Soil water content near the lysimeter bottoms was greater than in the surrounding field after a wet spring in 1991. However, extractors removed most excess water and adequately matched unsaturated drainage in the field. Though leachate varied among lysimeters, they behaved similarly over time. Results will help relate irrigation management and scheduling strategies to potential leaching of soil water and associated chemicals into groundwater.

NAL Call No.: 290.9-AM32T

32. Development and implementation of the Virginia agronomic land use evaluation system (values).

Donohue, S. J.; Simpson, T. W.; Baker, J. C.; Monnett, M. M.; Hawkins, G. W.

Commun-soil-sci-plant-anal. New York, N.Y. : Marcel Dekker. 1994. v. 25 (7/8) p. 1103-1108.

Paper presented at the 1993 International Symposium on Soil Testing and Plant Analysis: Precision Nutrient Management, August 14-19, 1993, Olympia, Washington. Part 1.

Descriptors: fertilizer-requirement-determination; soil-testing; nutrients-; management-; databases-; land-use; land-evaluation; water-quality; environmental-protection; water-pollution; pollution-control; point- sources; virginia-; nutrient-management; nonpoint-source-pollution; values-database

NAL Call No.: S590.C63

33. Dynamic simulation modelling for evaluating water quality response to agricultural BMP implementation.

Cassell, E. A.; Clausen, J. C.

Water-sci-technol v.28, p.635-648. (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-land; phosphorus-; input-output-analysis; movement-in- soil; groundwater-pollution; surface-water; pollution-; sources-; dynamic-models; simulation-models; vermont-; best-management-practices

NAL Call No.: TD420.A1P7

34. An economic analysis of cover crop use in Georgia to protect groundwater quality.

Jordan, J. L.; Morgan, S. L.; Elnagheeb, A. H.

Res-bull-Univ-Ga,-Coll-Agric,-Exp-Stn. Athens, Ga. : The

Stations, 1967-. June 1994. (419) 13 p.

Includes references.

Descriptors: cover-crops; leaching-; groundwater-; nitrates-; nitrogen-; fertilizers-; cost-benefit-analysis; secale-cereale; georgia-

NAL Call No.: S51.E2

35. Economic and environmental considerations for nitrogen management in the mid-Atlantic coastal plain.

Norris, P. E.; Shabman, L. A.

Am-J-Alternative-Agric v.7, p.148-156. (1992).

Includes references.

Descriptors: crop-production; nitrogen-; organic-fertilizers; rotations-; poultry-manure; cost-benefit-analysis; water-quality; virginia-

Abstract: A case study in eastern Virginia provides evidence that both environmental and farm profit goals may be satisfied by alternative nitrogen (N) management strategies for grain production. We used a linear programming framework with an N mass balance model to calculate returns from several options for providing N to crops. Replacing single applications of inorganic N fertilizer with split applications or with additions of organic N were found to reduce the potential for N loss from cropland and to increase net returns. For some N management strategies, however, adaption may require financial and educational assistance. As a result, water quality policies may benefit by including such incentives.

NAL Call No.: S605.5.A43

36. Economic and environmental effects of nitrogen testing for fertilizer management.

Bosch, D. J.; Fuglie, K. O.; Keim, R. W.; United States. Dept. of Agriculture. Economic Research Service. Resources and Technology Division.

[Washington, D.C.] : Economic Research Service, Resources and Technology Division, [1994] iv, 37 p. : ill., map.

Cover title.

Descriptors: Nitrogen-fertilizers-United-States;

Water-quality-United-States

NAL Call No.: aS651.B67--1994

37. Effect of conventional vs. no-tillage on pesticide leaching to shallow groundwater.

Isensee, A. R.; Nash, R. G.; Helling, C. S.

J-Environ-Qual v.19, p.434-440. (1990).

Includes references.

Descriptors: atrazine-; metabolites-; alachlor-; cyanazine-; carbofuran-; leaching-; groundwater-pollution; no-tillage-; tillage-; zea-mays; maryland-; deethylatrazine-

Abstract: A field site was established at Beltsville, MD, in 1986 to assess the effect of conventional and no-till cultural practices on the movement of pesticides into shallow groundwater. Groundwater samples taken from unconfined (< 1.5 m deep) and confined (< 3 m deep) monitoring wells in 1986-1988

were analyzed for atrazine [6-chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine], deethylatrazine [6-chloro-N-(1-methylethyl)-1,3,5-triazine-2,4-diamine], alachlor 12-chloro-N-2,6-diethylphenyl-N-(methoxymethyl)acetamide], cyanazine [2-[[4-chloro-6-(ethylamino)-1,3,5-triazine-2-yl] amino]-2-methylpropanenitrile], and carbofuran (2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate). Atrazine was found in groundwater all year, while cyanazine, alachlor, and carbofuran were present only for a short period (< 3 mo) after pesticide application. Fairly constant background levels of < 0.5 microgram L-1 atrazine were found under fields treated before 1986, while levels under continuously treated fields were < 2.0 microgram L-1 for 22 of 25 samplings. Pesticide residues in unconfined groundwater were usually higher (ca. 2 to 4X) than in confined groundwater. Rainfall timing relative to pesticide application was critically important to pesticide leaching. A prolonged rain immediately after the 1988 application resulted in peak atrazine and cyanazine levels of ca. 200 microgram L-1 in unconfined and ca. 30 to 40 microgram L-1 in confined groundwater, which resulted in short-term levels ca. 2 to 50X greater under no-till than conventional till plots. Results of this study suggest that preferential transport occurred.

NAL Call No.: QH540.J6

38. The effect of crop rotation on nitrate leaching losses; sandland and limestone aquifers.

Shepherd, M. A.; Johnson, P. A.; Smith, P.

Asp-appl-biol p.183-190. (1992).

In the series analytic: Nitrate and farming systems / edited by J.R. Archer, K.W.T. Goulding, S.C. Jarvis, C.M. Knott, I. Lord, S.E. Ogilvy, J. Orson, K.A. Smith, and B. Wilson.

Descriptors: nitrate-; leaching-; rotations-; crop-husbandry; soil-fertility; cultivation-; cover-crops; aquifers-; limestone-; limestone-soils; sandy-soils; cropping-systems; stubble-cultivation; eastern-england

NAL Call No.: QH301.A76

39. Effect of extractable soil surface phosphorus on runoff water quality.

Daniel, T. C.; Edwards, D. R.; Sharpley, A. N.

Trans-ASAE v.36, p.1079-1085. (1993).

Includes references.

Descriptors: losses-from-soil; phosphorus-; pollution-; runoff-; water-quality; arkansas-

Abstract: Phosphorus (P) additions to surface water from agricultural nonpoint sources are of concern, because P often limits eutrophication of surface waters. Numerous sources of runoff P exist: indigenous soil and plant material, land-applied manure and sludge, and commercial fertilizer. In many soils receiving commercial fertilizer and manure, concentrations of P at the soil surface have been steadily rising due to either long-term or excessive applications of P. Critical levels of soil surface P may exist, above which runoff may promote

eutrophication. Methods for rationally identifying these critical levels are needed to manage losses of P, which implies the need for curate methods of relating soil surface P concentration (Ps) to runoff P concentration. A study was conducted on both pasture and tilled plots (with and without residue) to evaluate the relationship between Ps and dissolved reactive P in runoff (PR) using simulated rainfall. The data indicated that even for comparable storms, Ps alone was not a satisfactory estimator of PR. A model describing the kinetics of P release from surface soil to runoff was used to include additional variables in predicting PR. When used with uncalibrated parameters, the model explained a significant proportion of the variation in observed PR values for pasture plots ($r^2 = 0.43$) but was less successful in predicting PR for tilled plots (with and without residue, $r^2 = 0.13$). Calibration of (adjustments to) the extraction coefficients resulted in an overall coefficient of determination between observed and predicted PR values of 0.73. While the model was successful in describing how PR and the independent variables are related for the pasture plots, the extraction coefficients should be calibrated to obtain best estimates of PR. When used with calibrated extraction coefficients, the model provided.

NAL Call No.: 290.9-Am32T

40. Effect of soil test phosphorus on runoff water quality.
Daniel, T. C.; Edwards, D. R.; Sharpley, A. N.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Winter 1991. (91-2605) 13 p.
Paper presented at the 1991 International Winter Meeting sponsored by The American Society of Agricultural Engineers, December 17-20, 1991, Chicago, Illinois.

Descriptors: soil-; water-quality; phosphorus-; water-pollution; runoff-

NAL Call No.: 290.9-Am32P

41. Effect of tillage systems on soil erosion and runoff water quality.
Seta, A. K. 1.

1991. vii, 68 leaves : ill..

Includes vita and abstract.

Descriptors: Soil-erosion; Runoff-; Tillage-

NAL Call No.: KyU Thesis-1991-Seta

42. Effectiveness of BMPs for stormwater management in urbanized watersheds.

Kuo, C. Y.; Virginia Water Resources Research Center.

Blacksburg : Virginia Water Resources Research Center, Virginia Polytechnic Institute and State University, 1987. xiii, 121 p. : ill., maps.

Partly funded by the U.S. Geological Survey, U.S. Dept. of the Interior.

Descriptors: Urban-runoff-Mathematical-models;

Water-quality-management-Data- processing

NAL Call No.: TD201.V57--no.159

43. The effectiveness of buffer strips for ameliorating offsite transport of sediment, nutrients, and pesticides from silvicultural operations.
Comerford, N.; Mansell, R.; Neary, D.; National Council of the Paper Industry for Air and Stream Improvement (U.S.).

New York, N.Y. : National Council of the Paper Industry for Air and Stream Improvement, 1992. ii, 48 p. ; 28 cm..
"June 1992."

Descriptors: Forest-management-Environmental-aspects;
Forest-influences; Water- Pollution,
NAL Call No.: TD899.P3N34-no.631

44. Effectiveness of vegetative buffer strips in reducing herbicide transport with surface runoff under simulated rainfall.
Misra, A. K.; Baker, J. L.; Mickelson, S. K.; Shang, H.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Summer 1994. (94-2120/94-2155) 21 p.
Paper presented at the 1994 International Summer Meeting, sponsored by the ASAE, June 19-22, 1994, Kansas City, Missouri.
Descriptors: grass-strips; water-pollution; water-quality; runoff-water; herbicides-; rainfall-simulators
NAL Call No.: 290.9-Am32P

45. Effects of agricultural nutrient management on nitrogen fate and transport in Lancaster County, Pennsylvania.
Hall, D. W.; Risser, D. W.

Water-resour-bull v.29, p.55-76. (1993).
Includes references.

Descriptors: nitrogen-; nitrates-; application-to-land; movement-in-soil; losses- from-soil; water-budget; precipitation-; groundwater-; manures-; fertilizers-; hydrology-; groundwater-pollution; pennsylvania-; best-management-practices; nonpoint-source-pollution; groundwater- hydrology
Abstract: Nitrogen inputs to, and outputs from, a 55-acre site in Lancaster County, Pennsylvania, were estimated to determine the pathways and relative magnitude of loads of nitrogen entering and leaving the site, and to compare the loads of nitrogen before and after the implementation of nutrient management. Inputs of nitrogen to the site were manure fertilizer, commercial fertilizer, nitrogen in precipitation, and nitrogen in ground-water inflow; and these sources averaged 93, 4, 2, and 1 percent of average annual nitrogen additions, respectively. Outputs of nitrogen from the site were nitrogen in harvested crops, loads of nitrogen in surface runoff, volatilization of nitrogen, and loads of nitrogen in ground-water discharge, which averaged 37, less than 1, 25, and 38 percent of average annual nitrogen removals from the site, respectively. Virtually all of the nitrogen leaving the site that was not removed in harvested crops or by volatilization was discharged in the ground water. Applications of manure and fertilizer nitrogen to 47.5 acres of cropped fields decreased about 33 percent, from an average of 22,700 pounds per year (480 pounds per acre per year) before

nutrient management to 15,175 pounds of nitrogen per year (320 pounds per acre per year) after the implementation of nutrient management practices. Nitrogen loads in ground-water discharged from the site decreased about 30 percent, from an average of 292 pounds of nitrogen per million gallons of ground water before nutrient management to an average of 203 pounds of nitrogen per million gallons as a result of the decreased manure and commercial fertilizer applications. Reductions in manure and commercial fertilizer applications caused a reduction of approximately 11,000 pounds (3,760 pounds per year; 70. ground water from the 55-acre site during the three-year period 1987-1990.

NAL Call No.: 292.9-Am34

46. Effects of deep tillage on redistribution of lead shot and chufa tuber biomass at Catahoula Lake, Louisiana.
Peters, M. S. M. S. 1.

1992. vi, 25 leaves : ill..
Vita.

Descriptors: Waterfowl-management-Louisiana;
Lead-Toxicology-Louisiana; Tillage- Louisiana; Catahoula-Lake-La
NAL Call No.: LU 378.76-L930-1992-pete

47. Effects of management practices on surface water quality from rice fields.
Feagley, S. E.; Sigua, G. C.; Bengston, R. L.; Bollich, P. K.;
Linscombe, S. D.

La-Agric-La-Agric-Exp-Stn v.36, p.8-10. (1993).

Descriptors: oryza-sativa; water-pollution; weed-control;
cultural-control; fertilizers-; field-tests; no-tillage-;
cultivation-; water-quality; louisiana-

NAL Call No.: 100-L939

48. Effects of poultry litter application on surface water quality. 1. A field experiment.
Huhnke, R. L.; Storm, D. E.; Brown, G. O.; Smolen, M. D.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Summer 1992. (92-2121/92-3010) 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: poultry-manure; soil-chemistry; pastures-;
runoff-water; tillage-; plant-height; water-quality;
water-pollution; waste-utilization; rain-; oklahoma-

NAL Call No.: 290.9-Am32P

49. The effects of tillage and crop residues on water and nitrate movement in soil columns.
Serem, V. K.; Madramootoo, C. A.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Summer 1993. (932082) 16 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: tillage-; crop-residues; nitrates-; water-quality; drainage-; leaching-

NAL Call No.: 290.9-Am32P

50. Effects of tillage on pesticide concentrations in shallow ground water and surface runoff from fragipan soils in North Mississippi, USA.

Smith, S. Jr.

Proceedings of Industrial and Agricultural Impacts on the Hydrologic Environment the Second USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology / USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology. Alexandria, VA : Water Environment Federation, c1993.. v. 2 p. 79-91.

Title on cover : Environmental impact of agricultural practices and agrichemicals / edited by Y. Eckstein and A. Zaporozec.

Descriptors: glycine-max; groundwater-pollution; surface-water; runoff-; pesticides-; concentration-; watersheds-; fragipans-; no-tillage-; movement-in-soil; mississippi-

NAL Call No.: GB652.U82-1993

51. Estimation of nitrate concentrations in groundwater using a whole farm nitrogen budget.

Barry, D. A. J.; Goorahoo, D.; Goss, M. J.

J-environ-qual v.22, p.767-775. (1993).

Includes references.

Descriptors: nitrate-nitrogen; leaching-; nitrogen-balance; farming-systems; rotations-; zea-mays; glycine-max; triticum-aestivum; phleum-pratense; medicago-sativa;

groundwater-pollution; farming-systems-research; ontario-
Abstract: Contamination of groundwater under agricultural land by NO₃ is influenced by the kind of farming system. One possible method of selecting farming systems that result in less NO₃ leaching is to calculate whole farm N budgets, that are simplified by assuming soil-N remains constant from one cycle of a rotation to the next. This method was applied to two model crop rotations using average crop yield data for two regions of Ontario, and to a cash-crop farm and a dairy farm using information on purchases, sales, and crop yields, for these farms. The model rotations were corn (Zea mays L.)-soybean [Glycine max (L.) Merr.]-wheat (Triticum aestivum L.) and corn-soybean- wheat-hay (mixture of timothy, Phleum pratense L. and alfalfa, Medicago sativa L.)-hay-hay. Atmospheric deposition (18.4 kg N ha⁻¹ yr) was obtained by literature review. Symbiotic N₂ fixation by legume crops with different yields was estimated from regression equations. A net surplus in the N balance was converted to maximum mean NO₃-N concentration in groundwater by assuming a groundwater recharge rate of 160 mm yr⁻¹, and no denitrification. Predicted NO₃-N concentrations in leachate for the model corn-soybean-wheat rotation were greater for southwestern Ontario (22.4 mg L⁻¹) than western Ontario (8.5 mg L⁻¹), probably because more N fertilizer was recommended in the southwest. Including hay in

the model rotation increased the amount of N leached by a factor of two in western Ontario, but only by 9% in the southwest. was 6.7 mg L-1, compared with an average measured value of 9.5 mg L-1 in the tile drainage water. For the dairy farm the predicted value was 58 mg L-1 and a measured value was not available. The simplified N balance method provided useful estimates of potential NO3 leaching losses even though it relied on some major assumptions. A major uncertainty was atmospheric deposition of ammonia volatilized from on-farm sources. Denitrification could be as much as 62 kg N ha-1 yr-1 under continuous production of grain corn, based on differences between N present after harvest and amount of N leached.

NAL Call No.: QH540.J6

52. Evaluating farming strategies for water quality at the Ohio Management Systems Evaluation Area.

Watermeier, N. L.; Workman, S. R.; Nokes, S. E.; Borwn, L. C.

Proceedings of the National Symposium on Protecting Rural America's Water Resources Partnerships for Pollution Solutions, October 23-26, 1994, Omni Shoreham Hotel, Washington, DC / National Symposium on Protecting Rural America's Water Resources: Partnerships for Pollution Solutions. [Oklahoma, City, OK? : Ground Water Protection Council?, 1994]. p. 185-195. Includes references.

Descriptors: zea-mays; glycine-max; triticum-aestivum; continuous-cropping; rotations-; no-tillage-; tillage-; cover-crops; vicia-villosa; nitrate-; alachlor-; metribuzin-; chlorimuron-; leaching-; groundwater- pollution; water-quality; crop-yield; atrazine-; ohio-; ridge-tillage

NAL Call No.: TD927.N38-1994

53. Evaluating herbicide removal by buffer strips under natural rainfall.

Arora, K.; Mickelson, S. K.; Baker, J. L.; Tierney, D. P.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1993. (932593) 16 p. Paper presented at the "1993 International Winter Meeting of the American Society of Agricultural Engineers," December 14-17, 1993, Chicago, Illinois.

Descriptors: herbicide-residues; water-quality; erosion-control

NAL Call No.: 290.9-Am32P

54. Evaluating the effectiveness of forestry best management practices in meeting water quality goals or standards.

Dissmeyer, G. E.; United States. Forest Service. Southern Region.

Atlanta, Ga. : USDA, Forest Service, Southern Region, [1994] viii, 166 p. : ill..

"July 1994."

Descriptors: Water-quality-United-States;

Forest-management-United-States

NAL Call No.: 1--Ag84M-no.1520

55. Evaluation of a rice herbicide transport model.

Breuer, R. S.; California Environmental Protection Agency.

Environmental Hazards Assessment Program.

Sacramento, Calif. : Environmental Hazards Assessment Program, State of California, Environmental Protection Agency, Dept. of Pesticide Regulation, Environmental Monitoring and Pest Management Branch, [1992] iv, 7 p. : ill..

Cover title.

Descriptors:

Herbicides-Environmental-aspects-California-Sacramento-River; Nematocides-Environmental-aspects-California-Sacramento-River; Water- Pollution-California-Sacramento-River-Computer-programs

NAL Call No.: TD427.P35B74--1992

56. An evaluation of extension programs to enhance water quality through nutrient management in the urban landscape.

Relf, P. D.; McKissack, D.

HortTechnology v.2, p.245-247. (1992).

Includes references.

Descriptors: cooperative-extension-service; volunteers-; environmental- education; educational-programs; water-quality; water-pollution; fertilizers-; runoff-; mass-media; extension-education; technology- transfer; maryland-; nonpoint-source-pollution; chesapeake-bay; master-gardeners

NAL Call No.: SB317.5.H68

57. Evaluation of GLEAMS and PRZM for predicting pesticide leaching under field conditions.

Zacharias, S.; Heatwole, C. D.

Trans-ASAE v.37, p.439-451. (1994).

Includes references.

Descriptors: zea-mays; no-tillage-; pesticides-; leaching-; simulation-models; virginia-; groundwater-loading; effects-of-agricultural-management-systems; pesticide-rootzone-model; nonpoint-source-pollution

Abstract: Pesticide simulation models, GLEAMS and PRZM, were evaluated for their ability to predict pesticide behavior using field data from a plot under no-till corn in the Coastal Plain region of Virginia. The models were evaluated in an uncalibrated mode as well as with adjustment of important hydrology parameters. The evaluation of model performance was based on graphical displays and statistical measures. Difference in evapotranspiration (ET) predictions by the two models caused the simulated results from their hydrology components to vary. Runoff and soil moisture measured in the field were predicted reasonably well after adjusting important hydrology parameters. Except for differences in magnitude, both models predicted the chemical concentration profiles similarly. Overall, GLEAMS represented pesticide behavior in soil better than PRZM. The models, GLEAMS and PRZM, performed well in predicting pesticide mass in the root zone, but were less reliable in predicting pesticide concentration distributions in soil. Model predictions of pesticide fate and transport were not greatly affected by changes in curve number and the water holding capacity of the soil.

NAL Call No.: 290.9-Am32T

58. Evaluation of two field screening test kits for the detection of PCBs in soil by immunoassay.

Waters, L. C.; Smith, R. R.; Stewart, J. H.; Jenkins, R. A.; Counts, R. W.

J-AOAC-Int v.77, p.1664-1671. (1994).

Includes references.

Descriptors: soil-testing; polluted-soils; polychlorinated-biphenyls; contamination-; determination-; screening-; immunoassay-

NAL Call No.: S583.A7

59. Fall tillage method: effect on short-term carbon dioxide flux from soil.

Reicosky, D. C.; Lindstrom, M. J.

Agron-j v.85, p.1237-1248. (1993).

Includes references.

Descriptors: autumn-; tillage-; techniques-; no-tillage-; carbon-dioxide; flow-; soil-air; global-warming; greenhouse-effect; air-pollution; climatic- change; soil-analysis; organic-compounds; carbon-; soil-water-content; soil-; surface-roughness; surface-roughness; minnesota-

Abstract: The increasing concern for rising CO2 concentrations from agricultural activities has prompted the need to better understand the flux of greenhouse gases to the atmosphere. This work determines the effect of four fall tillage methods on short-term CO2 flux from a Hamerly clay loam (fine-loamy, frigid Aeric Calciaquoll) in the northern Corn Belt. Moldboard plow only, moldboard plow plus disk harrow twice, disk harrow once, and chisel plow once using standard tillage equipment following a wheat (Triticum aestivum L.) crop were compared with no-tillage. The CO2 flux was measured with a large portable system commonly used to measure canopy gas exchange of field crops. Measurements of CO2 flux were initiated within 5 min after tillage completion for each tillage treatment and continued intermittently for 19 d. Moldboard plow had the roughest soil surface and the highest initial CO2 flux (29 g m-2 h-1) and maintained the highest flux throughout the study. Moldboard plow plus disking twice and chisel plow had similar initial rates (7 and 6 g m-2 h-1, respectively) that were greater than disk harrow and no-tillage. The high initial CO2 fluxes were more related to depth of soil disturbance that resulted in a rougher surface and larger voids than to residue incorporation. The differences in CO2 flux between tillage treatments were small but consistent 19 d after initial tillage and 64 mm rain. Lower CO2 flux rates caused by tillage were associated with low soil disturbance and/or small voids. Tillage. soil management can minimize agriculture's impact on global CO2 increase.

NAL Call No.: 4-AM34P

60. Farm nutrient management training needs assessment for Minnesota : a nutrient management technical assistance project.

Minnesota. Dept. of Agriculture.

[Saint Paul, Minn. : Minnesota Dept. of Agriculture, 1994] 61 p.
: 1 map.

"Funded by a grant from USEPA, Section 319 of the Water Quality Act of 1987, "Nonpoint source management".

Descriptors: Soil-management-Minnesota; Soil-fertility-Minnesota; Soil-science- Minnesota; Needs-assessment-Minnesota

NAL Call No.: S599.M6F37--1994

61. A farm scale water quality planning system for evaluating best management practices.

Batchelor, W. D.; Dillaha, T. A. I.; Wolfe, M. L.; Heatwole, C. D.; Mostaghimi, S.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Summer 1994. (94-2156/94-2185) 17 p.

Paper presented at the "1994 International Summer Meeting sponsored by the American Society of Agricultural Engineers," June 19-22, 1994, Kansas City, Missouri.

Descriptors: water-pollution; water-quality; land-management; simulation-models; pollution-control; non-point-source-pollution

NAL Call No.: 290.9-Am32P

62. A field study to evaluate leaching of aldicarb, metolachlor, and bromide in a sandy loam soil.

Smith, C. N.; Parrish, R. S.

J-environ-qual v.22, p.562-577. (1993).

Paper presented at the USDA-ARS Beltsville Agricultural Research Center Symposium XVII, "Agricultural Water Quality Priorities, A Team Approach to Conserving Natural Resources," May 4-8, 1992, Beltsville, MD.

Descriptors: aldicarb-; granules-; metolachlor-; emulsifiable-concentrates; bromide-; tracers-; leaching-; vertical-movement; application-; spatial- variation; soil-depth; sandy-loam-soils; saturated-conditions; persistence-; half-life; arachis-hypogaea; uptake-; georgia-

Abstract: Transport and transformation of pesticides used in agricultural situations are subject to vailability from several sources that are impossible to simulate in laboratory settings. This study was conducted to characterize pesticide leaching behavior under conventional cropping conditions and to determine the impacts of related sources of vailability. An agricultural field site (Ardilia fine sandy loam, Clarendon loamy sand, Tifton loamy sand, and Lucy loamy sand) located within the Dougherty Plain region of southwest Georgia was used to study pesticide movement in unsaturated and saturated soil zones from 1984 through 1988. A granular formulation of aldicarb [2-methyl-2 - (methylthio) propionaldehyde O-(methylcarbamoyl) oxime], an emulsifiable concentrate of metolachlor [2-chloro-N-(2-ethyl-6-methyl- phenyl)-N-(2-metboxy-1-methyl ethyl) acetamide], and a bromide (Br-) tracer were applied on peanut (*Arachis hypogea* L.) crops under modified conventional tillage practices. Postapplication vertical movement was monitored for periods of up to 111 d for pesticides and 1307 d for Br-. Application distributions for aldicarb showed measured coefficients of variation ranging from 42 to 72, and for metolachlor from 23 to 44. Spatial variability analyses

indicated the existence of small-scale correlation for both pesticides upon initial application, and some large-scale trending was observed for metolachlor. Field-based transformation rates of aldicarb were up to three times higher than laboratory-based values. There was no evidence of migration of any of the pesticides into the saturated zone during the study, although Br⁻ was observed at less than 1 mg kg⁽⁻¹⁾ in well-water samples. Aldicarb degraded almost completely within d each year, and concentrations decreasing with increasing depth, and there was no significant movement below 0.3 m. Bromide was observed in soil samples as deep as 3 m only on the 1307th d, and the profiles showed peak concentrations no lower than 1.5 m with relative vertical dispersion increasing continuously.

NAL Call No.: QH540.J6

63. Forest practices as nonpoint sources of pollution in North America.

Binkley, D.; Brown, T. C.

Water-resour-bull v.29, p.729-740. (1993).

Includes references.

Descriptors: water-pollution; streams-; water-quality;

forest-influences; forest- management; usa-; canada-

Abstract: Forest management activities may substantially alter the quality of water draining forests, and are regulated as nonpoint sources of pollution. Important impacts have been documented, in some cases, for undesirable changes in stream temperature and concentrations of dissolved oxygen, nitrate-N, and suspended sediments. We present a comprehensive summary of North American studies that have examined the impacts of forest practices on each of these parameters of water quality. In most cases, retention of forested buffer strips along streams prevents unacceptable increases in stream temperatures. Current practices do not typically involve addition of large quantities of fine organic material to streams, and depletion of streamwater oxygen is not a problem; however, sedimentation of gravel streambeds may reduce oxygen diffusion into spawning beds in some cases. Concentrations of nitrate-N typically increase substantially after forest harvesting and fertilization, but only a few cases have resulted in concentrations approaching the drinking-water standard of 10 mg of nitrate- N/L. Road construction and harvesting increase suspended sediment concentrations in streamwater, with highly variable results among regions in North America. The use of best management practices usually prevents unacceptable increases in sediment concentrations, but exceptionally large responses (especially in relation to intense storms) are not unusual.

NAL Call No.: 292.9-Am34

64. Forests as nonpoint sources of pollution, and effectiveness of best management practices.

National Council of the Paper Industry for Air and Stream Improvement (U.S.).

New York, N.Y. : National Council of the Paper Industry for Air and Stream Improvement, 1994. 2, iii, 57 p. : ill..

Cover title.

Descriptors: Nonpoint-source-pollution-United-States;
Forest-management- Environmental-aspects-United-States;
Watershed-management-Environmental- aspects-United-States
NAL Call No.: TD899.P3N34--no.672

65. GLEAMS modeling of BMPs to reduce nitrate leaching in Middle Suwannee River Area.

Reck, W. R.

Environmentally sound agriculture proceedings of the second conference 20-22 April 1994 /. St. Joseph, Mich. : American Society of Agricultural Engineers, c1994. 1994. 361-367. Includes references.

Descriptors: groundwater-; water-quality; nitrate-nitrogen; leaching-; farming- systems; farm-management; dairy-farming; poultry-farming; monitoring-; models-; computer-techniques; florida-; groundwater-loading-effects-of-agricultural-management-systems; best-management-practices

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

66. GOSSYM/COMAX: a cotton crop management emphasizing irrigation scheduling and water quality.

McKinion, J. M.; Boone, M. Y. L.; Porter, D. O.; Whisler, F. D.

Proceedings of Industrial and Agricultural Impacts on the Hydrologic Environment the Second USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology / USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology. Alexandria, VA : Water Environment Federation, c1993.. v. 2 p. 23-36.

Title on cover : Environmental impact of agricultural practices and agrichemicals / edited by Y. Eckstein and A. Zaporozec.

Descriptors: gossypium-; irrigated-farming; irrigation-scheduling; simulation- models; water-quality; mississippi-

NAL Call No.: GB652.U82-1993

67. Herbicide leaching under tilled and no-tillage fields.

Gish, T. J.; Shirmohammadi, A.; Vyravipillai, R.; Wienhold, B. J.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. May/June 1995. v. 59 (3) p. 895-901.

Includes references.

Descriptors: atrazine-; alachlor-; losses-from-soil; formulations-; persistence- ; adsorption-; degradation-; leaching-; movement-in-soil; no-tillage-; tillage-; drained-conditions; controlled-release; groundwater-; water-quality; maryland-; well-drained-soils

Abstract: The effect of no-tillage practices on water quality exiting the root zone of deep, well-drained fields is largely unknown. This project was initiated to determine herbicide leaching characteristics as influenced by tillage practice and herbicide formulation. The research site consisted of four adjacent (0.25-ha) fields, two fields each dedicated to either tilled or no-tillage management. One field in each tillage regime received a controlled-release formulation of atrazine [6-

chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine] and alachlor [2-chloro-N-(2,6-diethylphenyl)-N-(methoxymethyl)-acetamide, starch encapsulated], while the others received standard herbicide formulations of atrazine and alachlor. Both herbicide formulations were annually applied at the same rate: 1.7 kg ha⁻¹ for atrazine and 2.8 kg ha⁻¹ for alachlor. Atrazine, deethylatrazine [DEAT; 6-chloro-N-(1-methylethyl)-1,3,5-triazine-2,4-diamine], alachlor, and Br-1 concentrations were monitored with 12 suction lysimeters (six each at 1.5- and 1.8-m depths) in each field. Alachlor was detected in 41% of the samples. Under no-tillage, atrazine was detected in CP > NT. The sum of all chemicals lost was less than 3% of the total amount of each applied.

NAL Call No.: QH540.J6

109. Relationship between salinity and efficient water use.
Letey, J.

Irrig-sci. Berlin, W. Ger. : Springer International. 1993. v. 14 (2) .

Paper presented at the First Volcani International Symposium on The Limits of Water Use Efficiency in Agriculture, October 1992, Bet Dagan, Israel.

Descriptors: salinity-; saline-water; water-use-efficiency; irrigation-water; water-management

Abstract: The relationship between salinity and water use efficiency is highly dependent upon which definition of water use efficiency is used. The two common definitions, yield per unit evapotranspiration and yield per unit applied water, both have significant deficiencies and can lead to erroneous conclusions. Thus, the analysis of efficient use of saline waters invokes a broader analysis than merely computing water use efficiency. An array of models is available to simulate the effects of various irrigation management strategies with saline waters. Based on results computed from these models, which consider the osmotic and matric potential effects on plant growth, strategies can be developed to effectively use saline waters in crop production. The cyclic strategy of using waters of different salinities can effectively be used in maintaining crop rotations which include both salt-sensitive and salt-tolerant crops. The major deficiency of the models is that they do not account for the effects of water quality on soil physical conditions with consequent effects on crop production. Indeed, the most limiting factor in use of saline waters on soils may be deterioration of soil physical conditions. The deterioration of soil waters per se but from subsequent rainfall or low salinity waters. Thus far the emphasis on using saline waters on crop production has centered on yields and less attention has been given to the long-term consequences on soil. be a focus of attention in future experiments. Relatively high saline water tables can be maintained without drainage if a non-saline source of water is available, and irrigation amounts can be controlled. This strategy might invoke the necessity for shifting irrigation systems from surface to pressurized systems. Eventually, some salt must be removed from the

system. It is probably more efficient to allow it to become very concentrated and remove small volumes to be disposed of in some manner rather than apply it to productive land.

NAL Call No.: S612.I756

110. Relationship between soil test methods and uptake of copper and zinc by grasses on polluted soils.

Singh, R. S.; Singh, R. P.; Rai, R. K.; Agrawal, H. P.

Commun-soil-sci-plant-anal. New York, N.Y. : Marcel Dekker. 1994. v. 25 (9/10) p. 1313-1320.

Paper presented at the 1993 International Symposium on Soil Testing and Plant Analysis: Precision Nutrient Management. II., August 14-19, 1993, Olympia, Washington.

Descriptors: cynodon-dactylon; cyperus-rotundus; polluted-soils; copper-; zinc-; nutrient-uptake; correlation-; soil-testing; nutrient-availability; extractants-; comparisons-

NAL Call No.: S590.C63

111. Residual soil nitrate under intensive agriculture.

Hofman, G.; Smet, J. de.; Meirvenne, M. v.; Verstegen, P.

Commun-soil-sci-plant-anal. New York, N.Y. : Marcel Dekker. 1994. v. 25 (9/10) p. 1197-1207.

Paper presented at the 1993 International Symposium on Soil Testing and Plant Analysis: Precision Nutrient Management. II., August 14-19, 1993, Olympia, Washington.

Descriptors: agricultural-soils; intensive-farming; nitrate-; nitrogen-content; residues-; regional-surveys; water-pollution; risk-; belgium-; residual-nitrate-content

NAL Call No.: S590.C63

112. Residue management for winter wheat and grain sorghum production with limited irrigation.

Unger, P. W.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. Mar/Apr 1994. v. 58 (2) p. 537-542.

Includes references.

Descriptors: triticum-aestivum; winter-wheat; sorghum-bicolor; rotations-; irrigated-conditions; crop-residues; management-; conservation-tillage; soil-water-content; soil-water-retention; water-use; crop-yield; yield-components; water-use-efficiency; water-conservation; crop-residue-management

Abstract: Winter wheat (*Triticum aestivum* L.) and grain sorghum [*Sorghum bicolor* (L.) Moench] are extensively grown in the southern Great Plains on dryland and with irrigation, but yields often are low on dryland and irrigation water is limited. Because both crops respond well to timely irrigation, they sometimes are grown with limited irrigation. Thus, it was hypothesized that using limited irrigation for these crops would produce sufficient residues to increase soil water storage if conservation tillage practices were used. This study on Pullman soil (fine, mixed, thermic Torric Paleustoll) at Bushland, TX, determined the effects of residue management on soil water storage and use, yields, and yield components for wheat and sorghum grown in rotation with limited irrigation. Treatments

were no-tillage with standing (T1) or shredded (T2) residues, and no-tillage after wheat and tillage after sorghum (T3). Tillage did not affect water storage after wheat, but storage ranged from 68 mm to T3 to 101 mm with T1 after sorghum. Water use by wheat ranged from 93 mm with T3 to 131 mm with T1, but tillage did not affect water use by sorghum. Tillage did not affect wheat yields because differences in soil water storage and use were small and irrigations minimized the water content differences. Tillage did not affect sorghum yields because using no-tillage during fallow after wheat resulted in similar water storage in all cases. This study showed that practices that retain surface residues are effective for producing wheat and grain sorghum in rotation under limited-irrigation conditions in the southern Great Plains.

NAL Call No.: 56.9-So3

113. Residue management impact on the environment.

Sims, G. K.; Buhler, D. D.; Turco, R. F.

Managing agricultural residues /. Boca Raton : Lewis Publishers, c1994.. p. 77-98.

Includes references.

Descriptors: crop-residues; crop-management; conservation-tillage; tillage-; no- tillage-; transport-processes; losses-from-soil; runoff-; pesticides-; fertilizers-; nutrients-; leaching-; soil-properties; water-quality; surface-water; water-pollution; conventional-tillage

NAL Call No.: S604.M28-1994

114. Reversing yield declines of a sub-tropical vertisol.

Bell, M. A.; Lafitte, H. R.; Edmeades, G. O.; Chapman, S. C.

Commun-soil-sci-plant-anal v.26, p.1105-1119. (1995).

Includes references.

Descriptors: zea-mays; vertisols-; crop-yield; soil-fertility; soil-degradation; soil-structure; soil-water-content; drainage-; calcium-; bicarbonates-; iron-; chlorosis-; irrigation-water; water-quality; cover-crops; rotations-; land-improvement; mexico-
Abstract: Problems of declining yield and increased chlorosis have been noted for maize (*Zea mays*) grown at CIMMYT's experiment station at Tlaltizapan, Mexico. Yields predicted by a crop model based on temperature and incident radiation showed no decline with time, suggesting that the problem was related to soil factors and/or management. Neither soil organic matter (SOM) nor pH were implicated, as SOM increased by 58%, and soil pH remained unchanged over the 15 years studied. Through a procedure of spatial and temporal analysis, the problem was hypothesized to be a combination of bicarbonate ion (HCO_3^-) induced iron (Fe) chlorosis and soil structure deterioration. Given this hypothesis, a trial was established to evaluate the effect of different cover crops on soil moisture and the subsequent yield of maize. In addition, blocks were sown to alfalfa (*Medicago sativa*) with the intention that drying of the soil profile would re-establish soil structure. Yield results from the cover crop trial, plus improvements in infiltration and growth in blocks sown to alfalfa, supported the conclusion that

changes in management could, at least partially, ameliorate the degradation of soil structure on this station.

NAL Call No.: S590.C63

115. Ridge height and furrow blocking effects on water use and grain yield.

Unger, P. W.

Soil-Sci-Soc-Am-J v. 56, p.1609-1614. (1992).

Includes references.

Descriptors: triticum-aestivum; sorghum-bicolor; rotations-; water-conservation; water-use; ridges-; height-; furrows-; dams-; no-tillage-; conservation- tillage; soil-water-content; crop-yield; texas-; reduce-tillage

Abstract: Because water supplies are limited for crops in the Great Plains, use of water-conserving practices is important. This study determined the influence of ridge height and furrow blocking on water conservation and use, and yields of irrigated winter wheat (*Triticum aestivum* L.) and dryland grain sorghum [*Sorghum bicolor* (L.) Moench] grown in rotation. The rotation results in two crops in 3 yr with a 330-d fallow between each crop. The study was conducted from 1981 to 1990 at Bushland, TX, on Pullman clay loam (fine, mixed, thermic Torrertic Paleustoll), Ridge heights were 12 to 15 or 5 to 8 cm and furrows were blocked or open. The ridge-height and furrow-blocking treatments were imposed every 3 yr before planting wheat. No-tillage was used during fallow after wheat and reduced tillage was used to reform the ridges during fallow after sorghum. Water infiltration was little affected by treatments. Differences in soil water content at planting and harvest were significant in some cases, but trends were inconsistent. Total water use was not affected by ridge height, but was greater with open than with blocked furrows for wheat. Although significant in some years, mean wheat and sorghum yield differences were small. On gentle (< 0.5%) slopes, furrow blocking in combination with no-tillage and reduced tillage did not increase soil water storage or crop yields over those obtained with no-tillage alone. There was no indication that long-term no-tillage and reduced-tillage practices adversely affect wheat and grain sorghum production.

NAL Call No.: 56.9-S03

116. Role of information in the adoption of best management practices for water quality improvement.

Feather, P. M.; Amacher, G. S.

Agric-econ v. 11, p.159-170. (1994).

Includes references.

Descriptors: water-quality; information-; incentives-; farm-management; innovation-adoption; profitability-; demonstration-farms; federal- programs; usda-; mathematical-models; usa-; demonstration-projects

Abstract: This study investigates the role of information in influencing the adoption of improved farm management practices. A lack of producer information regarding both the profitability and the environmental benefits of adopting improved practices may be a reason why widespread adoption of these practices has

not occurred. Compared to direct regulation or financial incentives, raising producer information levels may be a more cost-effective method of increasing adoption. The United States Department of Agriculture has recently established and begun implementing a program based on this idea. To test the validity of the program, a two-stage adoption model is specified and estimated using data from a survey of producers in the program area. The results indicate that producer perceptions play an important role in the decision to adopt. Changing these perceptions by means of an educational program may be a reasonable alternative to financial incentives in encouraging BMP adoption.

NAL Call No.: HD1401.A47

117. Simulating NO₃-N transport to subsurface drain flows as affected by tillage under continuous corn using modified RZWQM. Singh, P.; Kanwar, R. S.

Trans-ASAE v.38, p.499-506. (1995).

Includes references.

Descriptors: subsurface-drainage; water-flow; water-quality; nitrate-nitrogen; tillage-; simulation-models; computer-simulation; performance- appraisals

Abstract: The Root Zone Water Quality Model (RZWQM) was previously modified to simulate subsurface drain flows and evaluate the impact of different tillage systems on subsurface drain flows (Singh and Kanwar, 1994). This article discusses further modifications made in the RZWQM to simulate nitrate-nitrogen (NO₃-N) concentrations and NO₃-N losses with subsurface drain flows. Daily NO₃-N concentrations were simulated in subsurface drain flows under four different tillage systems: chisel plow (CP), moldboard plow (MB), no-tillage (NT), and ridge-ntillage (RT) by using the modified RZWQM. Simulations were conducted for the growing seasons of three years (1990 to 1992). Simulated NO₃-N concentrations and losses with subsurface drain flows were compared with the measured data obtained from a water quality research site at Nashua, Iowa. Predicted NO₃-N concentrations generally followed the same pattern as the observed concentrations. Simulated annual average NO₃-N concentrations in subsurface drain flows were within 11% (averaged over all three years) of observed annual average NO₃-N concentrations in subsurface drain flows. The model correctly predicted maximum concentrations under MB treatment and minimum under NT for all three years. Simulated annual NO₃-N losses were within 14% (averaged over all three years) of observed annual NO₃-N losses. Various NO₃-N transformation processes need to be calibrated as a function of tillage system to improve model performance.

NAL Call No.: 290.9-Am32T

118. Simulating tillage effects on water quality by using RZWQM. Singh, P.; Kanwar, R. S.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers,. Winter 1992. (922539) 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: water-quality; tillage-; drainage-water; models-;
pesticides-; nitrogen-; soil-water-movement; prediction-; iowa-
NAL Call No.: 290.9-Am32P

119. Simulation and evaluation of alternative nutrient management practices on a demonstration watershed.

Stone, K. C.; Hunt, P. G.; Coffey, S. W.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1993. (93-2572) 13 p.

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

Descriptors: surface-water; groundwater-; plant-nutrition; watersheds-; catchment-hydrology; water-quality; simulation-models; evaluation-; crop-management; north-carolina; gleams-simulation-model

NAL Call No.: 290.9-Am32P

120. Sludge application effects on runoff, infiltration, and water quality.

Bruggeman, A. C.; Mostaghimi, S.

Water-resour-bull v.29, p.15-26. (1993).

Includes references.

Descriptors: agricultural-soils; sewage-sludge; application-rates; no-tillage-; tillage-; infiltration-; runoff-; losses-from-soil; water-quality; virginia-; conventional-tillage
Abstract: Land application of sewage sludge requires careful monitoring because of its potential for contamination of surface water and ground water. A rainfall simulator was used to investigate the effects of freshly applied sludge on infiltration, and on runoff of sediment and nutrients from agricultural crop lands. Rain was applied to 16 experimental field plots. A three-run sequence was used to simulate different initial moisture conditions. Runoff, sediment, and nutrient losses were monitored at the base of each plot during the simulated rainfall events. Sludge was surface applied and incorporated at conventionally-tilled plots and surface applied at no-till plots, at rates of 0, 76, 150 kg-N/ha. Steady-state infiltrability increased as a result of sludge application, although the no-till practice was more effective in increasing the infiltrability than the sludge application. No-till practices greatly reduced runoff, sediment, and nutrient losses from the sludge treated plots, relative to the conventional tillage practices. Incorporation of the sludge was effective in reducing nutrient yields at the conventionally-tilled plots. This effect was more pronounced during the third rainstorm, with wet initial conditions. Peak loadings of nutrients appeared during the rainstorm with wet initial conditions.

NAL Call No.: 292.9-Am34

121. Soil nitrate leaching potential indices: using a simulation model as a screening system.

Khakural, B. R.; Robert, P. C.

J-environ-qual v.22, p.839-845. (1993).

Includes references.

Descriptors: nitrate-nitrogen; leaching-; losses-from-soil; simulation-models; groundwater-pollution; minnesota-

Abstract: Simulation models LEACHM-N (Leaching Estimation and Chemistry Model) first tested using NO₃ leaching data obtained from lysimeter and tile drainage studies conducted at three University of Minnesota experiment stations. Both simulation models did well in simulating total (seasonally accumulated) leaching loss of NO₃-N from the soil profile. LEACHM-N was selected as a screening tool to develop soil NO₃ leaching potential (NLP) ratings using soil survey information and representative county weather station data. Simulated growing season total NO₃-N leached from the soil profile (below 1.5 m) were used as NLP index. Crop management practices and initial N were kept constant. Soil NO₃ leaching potential ratings for three Minnesota counties, Redwood, Stearns, and Sherburne were developed using this method. This soil NLP rating information was included in the Soil Survey Information used to plan best N management schemes.

NAL Call No.: QH540.J6

122. Soil, plant, animal waste & water analysis status report for the United States 1988-1991.

Plank, C. O.; Council on Soil Testing and Plant Analysis.

[Washington, D.C.?] : U.S. Dept. of Agriculture, Extension Service .

"Compilation of the tables and writing of the report was done by C. Owen Plank"--P. 2. supported by the United States Department of Agriculture, Extension Service.

Descriptors: Soils-United-States-States-Analysis-Statistics;

Plants-United- States-States-Analysis-Statistics;

Animal-waste-United-States-States- Analysis-Statistics;

Water-United-States-States-Analysis-Statistics

NAL Call No.: aS593.P53--1992

123. Soil tillage effects on ammonia volatilization from surface-applied or injected animal slurry.

Sommer, S. G.; Ersboll, A. K.

J-environ-qual v.23, p.493-498. (1994).

Includes references.

Descriptors: ammonia-; losses-from-soil; volatilization-; cattle-slurry; pig- slurry; harrowing-; air-temperature; wind-speed; soil-water-content; soil-water-potential; mathematical-models

Abstract: Ammonia (NH₃) losses from cattle (Bos sp.) and pig (Sus scrofa) slurry applied to a harrowed and unworked soil were studied in seven field experiments from October 1990 to December 1991. In one experiment slurry was directly injected into the soil and in six experiments slurry was surface-applied. Ammonia losses were measured with a wind tunnel system. From directly injected slurry applied to a recently harrowed soil, NH₃ losses were 30% of the losses from an unworked soil. Harrowing the soil immediately before surface application of the slurry reduced losses to less than 50% of the losses from an unworked soil. The

accumulated NH3 loss from slurry applied in the field was described with a Michaelis-Menten-like equation, showing the NH3 loss reaction modeled adequately as a first-order reaction. The effect of treatment, soil conditions, or environmental conditions on NH3 loss pattern from slurry applied in the field may therefore be treated statistically by comparing the parameters in the Michaelis-Menten equation.

NAL Call No.: QH540.J6

124. Statistical techniques for assessing water-quality effects of BMPs.

Walker, J. F.

J-irrig-drain-eng v.120, p.334-347. (1994).

Includes references.

Descriptors: farm-management; watersheds-; water-quality; trends-; statistical- analysis; illinois-; best-management-practices

NAL Call No.: 290.9-AM3Ps-IR

125. Subsurface drip irrigation, A BMP for controlling drainage outflow and reducing groundwater contamination.

Phene, C. J.; Hutmacher, R. B.; Ayers, J. E.; Ben Asher, J.

Proceedings of Industrial and Agricultural Impacts on the Hydrologic Environment the Second USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology / USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology. Alexandria, VA : Water Environment Federation, c1993.. v. 2 p. 51-69.

Title on cover : Environmental impact of agricultural practices and agrichemicals / edited by Y. Eckstein and A. Zaporozec.

Descriptors: vegetables-; trickle-irrigation; subsurface-irrigation; drainage-; groundwater-; groundwater-pollution; water-; salinity-; california-; best-management-practice; drainage-outflow-control; groundwater-salinity-control

NAL Call No.: GB652.U82-1993

126. Technical guidance for implementing BMPS in the Coastal zone.

Frederick, R. E.; Dressing, S. A.

Water-sci-technol v.28, p.129-135. (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-pollution; coastal-areas; technical-aid; guidelines-; pollution-; sources-; usa-; best-management-practices; environmental-protection-agency; nonpoint-source-pollution

NAL Call No.: TD420.A1P7

127. A test of procedures for determining the ground water protection list.

Johnson, B. R.; California Environmental Protection Agency. Environmental Hazards Assessment Program.

Sacramento, Calif. : Environmental Hazards Assessment Program, State of California, Environmental Protection Agency, Dept. of Pesticide Regulation, Environmental Monitoring and Pest Management Branch, [1992] v, 42 p. : map.

"August, 1992"--Cover.

Descriptors: Groundwater-California-Sampling;
Groundwater-Pollution-California;
Water-quality-California-Measurement; Wells-California

NAL Call No.: GB1001.72.S3T469--1992

128. A test of procedures for determining the ground water protection list : appendix to report EH 92-06.

Johnson, B. R.; California Environmental Protection Agency. Environmental Hazards Assessment Program.

Sacramento, Calif. : Environmental Hazards Assessment Program, State of California, Environmental Protection Agency, Dept. of Pesticide Regulation, Environmental Monitoring and Pest Management Branch, [1992] 126 p. : ill..

Cover title.

Descriptors: Groundwater-California-Sampling;
Groundwater-Pollution-California;
Water-quality-California-Measurement; Wells-California

NAL Call No.: GB1001.72.S3T47--1992

129. Tillage and ammonia banding impacts on water, N, and herbicide movement : final technical report.

Clay, S. A.; Clay, D. E.; Geological Survey (U.S.).

Brookings, S.D. : Plant Science Dept., South Dakota State University, [1993] vii, 49 leaves : ill..

Cover title.

Descriptors: Agricultural-chemicals-Environmental-aspects;
Groundwater-flow; Tillage-Environmental-aspects;
Soils-Agricultural-chemical-content

NAL Call No.: TD427.A35C63--1993

130. Tillage and furrow diking effects on water balance and yields of sorghum and cotton.

Baumhardt, R. L.; Wendt, C. W.; Keeling, J. W.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. July/Aug 1993. v. 57 (4) p. 1077-1083.

Includes references.

Descriptors: sorghum-bicolor; gossypium-hirsutum; rotations-;
deep-tillage; chiselling-; no-tillage-; dikes-; furrows-;
water-conservation; semiarid-soils; soil-water-balance;
crop-yield; runoff-; rain-

Abstract: Information on the combined effects of deep or no-tillage together with furrow dikes (small earthen dams constructed in the furrow) on water conservation in semiarid regions is limited. The purpose of this study was to compare the amount of rain conserved and the yields of forage sorghum [*Sorghum bicolor* (L.) Moench] and cotton (*Gossypium hirsutum* L.) as affected by furrow dikes and tillage for a 3-yr period. An Olton clay loam (fine, mixed, thermic Aridic Paleustoll) was

alternately cropped to cotton and sorghum. Forage sorghum was grown in (i) disk or (ii) chisel-disk tilled 16 by 23.8 m field plots with and without furrow diking. Cotton was grown in rotation following sorghum after (i) conventional moldboard-disk or (ii) no-tillage, with furrow dikes in one-half of the tillage treatment plots. Crop yield, rainfall amount, soil water content, and runoff of natural rainfall and of simulated rainfall, applied at 80 mm h⁻¹ for 1 h, were measured. Compared with conventionally tilled undiked plots, cumulative nonponded infiltration of simulated rainfall was significantly greater with no-tillage treatments and greater (not significant) in furrow-diked treatments. Runoff of natural rainfall from plots with furrow dikes averaged approximately 22 mm less than from undiked plots, and it was as much as 57 mm less; however, runoff from diked fields was observed. Under the conditions of this 3-yr study, diking did not significantly increase crop water use and yield, but no-tillage significantly increased crop water use and yield 1 yr. We conclude that furrow dikes installed during the growing season did not increase water conservation and crop yields under the conditions of this 3-yr study due to seasonal dike consolidation that reduced the detention capacity and to. is more effective than chisel tillage for increasing water conservation and crop yields for the conditions of this study.

NAL Call No.: 56.9-So3

131. Tillage and grass filter strip effects on sediment and chemical losses.

Madison, C. E.

1992. xv, 155 leaves : ill..

Includes vita and abstract.

Descriptors: Tillage-; No-tillage-;

Conservation-tillage-Evaluation; Agricultural-pollution

NAL Call No.: KyU Thesis-1992-Madison

132. Tillage and winter wheat residue management effects on water infiltration and storage.

Dao, T. H.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. Nov/Dec 1993. v. 57 (6) p. 1586-1595.

Includes references.

Descriptors: triticum-aestivum; winter-wheat; soil-water-balance; soil-water- content; soil-water-regimes; soil-depth; seasonal-variation; no-tillage- ; stubble-mulching; plowing-; crop-residues; infiltration-; soil- density; hydraulic-conductivity; water-conservation; precipitation-; evaporation-; oklahoma-; crop-residue-management

Abstract: In traditional winter wheat (*Triticum aestivum* L.) cropping regions of the southern Great Plains, production constraints exist because of extreme variability in precipitation during planting periods. Intensive tillage aggravates dry early fall conditions to further hamper wheat emergence and growth. From 1983 through 1991, we determined the effects of three tillage and residue management practices on soil water storage in Bethany (fine, mixed, thermic Pacific Paleustoll) and Renfrow (fine, mixed, thermic Udertic

Paleustoll) silt loams on a 2% slope near El Reno, OK. We measured soil management cumulative effects on soil bulk density and water infiltration during and after the 1990-1991 growing season. Every season, no-till soil consistently had higher volumetric water content in the 0- to 1.2-m depth, except in late fall or early spring when root-zone recharge took place for both soils. The gain was corroborated by increased water-holding capacity and decreased bulk density of no-till soils. Seasonal variability of field infiltration was more evident in plowed soil than in no-till soil. Such temporal dependence would affect surface distribution and flow of precipitation to explain differences in runoff, soil erosion, and environmental impacts of tillage systems between October and June. Water infiltration into no-till soil was significantly higher than into plowed soil at similar water contents. Under ponding, recharge occurred through macropores, directly wetting depths of 0.4 to 0.6 m of no-till soil, in implications on profile recharge rate and solute transport in the field. Therefore, elimination of inversion tillage enhanced precipitation storage, thereby alleviating detrimental effects of climate variability in annual winter wheat cultivation.

NAL Call No.: 56.9-So3

133. Tillage effects on agrichemical movement through the Vadose Zone.

Wilson, G. V.; Tyler, D. D.; Storck, N. J.; Essington, M. E.; Mueller, T. G.

Tenn-farm-home-sci p.34-39. (1994).

Includes references.

Descriptors: soil-analysis; water-quality; macropores-; conservation-tillage; groundwater-; infiltration-; leachates-; field-tests; tennessee-

NAL Call No.: 100-T25F

134. Tillage effects on fate and transport of pesticides in a Coastal Plain Soil. I. Surface runoff.

Heatwole, C. D.; Zacharias, S.; Dillaha, T. A.; Mostaghimi, S.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1991. (912543) 13 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; tillage-

NAL Call No.: 290.9-Am32P

135. Tillage effects on SCS runoff curve numbers.

Yoon, K. S.; Yoo, K. H.; Soileau, J. M.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1991. (91-2615) 21 p.

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

Descriptors: cotton-; tillage-; probability-; runoff-; rain-; alabama-

NAL Call No.: 290.9-Am32P

136. Tillage studies with a corn-soybean rotation: hydrology and sediment loss.

Edwards, W. M.; Triplett, G. B.; Van Doren, D. M.; Owens, L. B.; Redmond, C. E.; Dick, W. A.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. July/Aug 1993. v. 57 (4) p. 1051-1055.

Includes references.

Descriptors: glycine-max; zea-mays; rotations-; secale-cereale; cover-crops; conservation-tillage; no-tillage-; tillage-; runoff-; soil-; losses- from-soil; water-erosion; watersheds-; conventional-tillage

Abstract: When soybean [Glycine max (L.) Merr.] is produced on sloping fields using conventional tillage and mechanical cultivation for weed control, potential soil losses are high, limiting production to relatively flat lands. With the advent of conservation tillage practices and herbicides for weed control, soybean production with tolerable soil losses on sloping fields has become technically possible. To evaluate soil loss under these new conditions, runoff and erosion were measured on six small watersheds that were farmed for 6 yr in a corn (Zea mays L.)- soybean rotation with conservation tillage. Two of the watersheds were chiseled each year, two others paraplowed, and the other two received no-tillage. A rye (Secale cereale L.) cover crop was established each winter following soybean. With average yearly rainfall of 930 mm, yearly runoff was 63.5 mm and varied between 28 and 108 mm. Average yearly soil loss for the 6-yr period was 526 kg/ha, < 10% of the allowable soil loss. Two storms caused most of the erosion, with a single storm accounting for 42% of the total measured soil loss. Earlier, these same watersheds averaged 5750 kg/ha of measured soil loss during the corn years of a corn-wheat-meadow-meadow rotation with conventional tillage.

NAL Call No.: 56.9-So3

137. Tillage studies with a corn-soybean rotation: surface runoff chemistry.

Owens, L. B.; Edwards, W. M.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. July/Aug 1993. v. 57 (4) p. 1055-1060.

Includes references.

Descriptors: glycine-max; zea-mays; rotations-; secale-cereale; cover-crops; conservation-tillage; no-tillage-; nutrients-; losses-from-soil; runoff- water; surface-water; nutrient-content; watersheds-

Abstract: When soybean (Glycine max (L.) Merr.) is grown on sloping soils, there is a high potential for soil and nutrient losses. The purpose of this study was to compare nutrient losses in surface runoff across a range of watershed conditions when tillage practice was a variable. For 6 yr in east-central Ohio, nutrient concentrations and transport in surface runoff were measured from six small (< 1-ha) watersheds planted to a corn (Zea mays L.)-soybean rotation. Two watersheds were chisel plowed each year, two were paraplowed, and two received

no-tillage. Rye (*Secale cereale* L.) provided winter cover following soybean harvest. Nitrate-N and K concentrations in surface runoff were greater during corn years than soybean years, but there was no significant difference among tillage treatments. There were no consistent differences between crops or among tillage practices for the transport of soluble P, soluble K, and total organic C (TOC). Most of the NO₃-N loss was in the runoff from a small percentage of runoff events. Although NO₃-N concentrations in surface runoff frequently exceeded 10 mg/L during the corn years, the actual amount of N lost was small. But because of year-to-year variation in runoff, which masked most of the differences resulting from cropping or tillage practice, there is a need for long-term research (> 6 yr) to assess the environmental risks associated with a particular management practice.

NAL Call No.: 56.9-So3

138. Use of an integrated transient flow and water budget procedure to predict and partition components of local recharge. Schuh, W. M.; Klinkebiel, D. L.; Gardner, J. C.

J-hydrol v.148, p.27-60. (1993).

Includes references.

Descriptors: groundwater-recharge; water-budget; transient-flow; soil-water-movement; topography-; methodology-; microtopography-
Abstract: A combined transient flow and water budget (TFWB) method and accounting procedure was developed and used to measure and partition the components of recharge to a sand and gravel aquifer underlying about 6.0 m of glacial till overlain by a nearly level land surface. The TFWB procedure was used to evaluate and quantify the dynamic interaction between surface recharge, till water level (at 2-4 m), and water cycling within the soil and vadose zone. Site-specific recharge activity was highly dependent upon surface microtopography. However, the homogenizing effect of the water table, measured by capillary movement of water through the vadose and soil zone, substantially offset the effects of surface and soil spatial variability and allowed relatively uniform estimates of local recharge at individual measurement sites. Substantial internal cycling of water within the soil and vadose zone was caused by the interaction of surface infiltration variability and water redistribution at the water table, even for measurement sites having little direct surface recharge activity. Through internal cycling, a single volume of water originating at the surface frequently passed through more than one soil and vadose profile during the recharge process. By applying TFWB procedures for the full soil and vadose zone between the surface to the water table, good estimates of local recharge to the Carrington aquifer could be made for the experimental area using few measurement sites.

NAL Call No.: 292.8-J82

139. Use of GIS to evaluate manure management alternatives. Young, S. E.; Richert, S. E.; Johnson, C.; Emenheiser, T. C.

Pap-Am-Soc-Agric-Eng. St. Joseph, Mich. : American Society of Agricultural Engineers, . Winter 1992. (922533) 15 p.

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

Descriptors: animal-manures; models-; land-use; uptake-; nitrogen-; phosphorus-; crop-yield; agricultural-wastes; watersheds-; pennsylvania-; geographical-information-systems
NAL Call No.: 290.9-Am32P

140. Water quality impacts of conservation and nutrient management practices in Pennsylvania.

Hamlett, J. M.; Epp, D. J.

J-soil-water-conserv v.49, p.59-66. (1994).

Includes references.

Descriptors: water-quality; sediment-; nutrients-; losses-from-soil; computer- simulation; soil-management; environmental-management; environmental- impact; pennsylvania-; best-management-practices-bmp; chesapeake-bay

NAL Call No.: 56.8-J822

141. Water quality in mountain ash forests--separating the impacts of roads from those of logging operations.

Grayson, R. B.; Haydon, S. R.; Jayasuriya, M. D. A.; Finlayson, B. L.

J-hydrol v.150, p.459-480. (1993).

In the special issue: Water Issues in Forests Today / edited by E.M. O'Loughlin and F.X. Dunin. November 22-26, 1992, Canberra, Australia.

Descriptors: eucalyptus-regnans; mountain-forests; water-quality; flow-; clearcutting-; logging-effects; regeneration-; roads-; usage-; maintenance-; runoff-water; sediment-yield; catchment-hydrology; australia-; base-flow; storm-flow

Abstract: The purpose of the two catchment studies reported here was to allow the effects on water quality of road use and maintenance to be separated from the effects of a logging operation. In the first project, known as the Myrtle experiment, two small catchments in an old-growth mountain ash (Eucalyptus regnans) forest were chosen for a paired catchment study of the effects on physical and chemical water quality (baseflow and stormflow) of logging under a strict code of practice and with no roads crossing runoff producing areas. In the second project, known as the Road 11 experiment, the effect on sediment production from unsealed forest roads of vehicle use and level of road maintenance was assessed. The Myrtle experiment showed that the harvesting and regeneration operation did not have a major impact on the stream physical or chemical water quality.

Increases were detected in turbidity, iron and suspended solids at baseflows, but these were small in absolute terms and of similar magnitude to the measurement error. The stormflow data revealed no significant influence of the logging operation. The suspension of logging during wet weather, the protection of the runoff producing areas with buffer strips and the management of runoff from roads, snig tracks and log landing areas eliminated intrusion of contaminated runoff into the streams, thereby avoiding the adverse effects of logging. The Road 11 study determined that annual sediment production from forest roads was

in the range of 50-90 t of sediment per hectare of road surface per year, with approximately two-thirds being suspended sediment and one-third coarse material. The use of gravel reduced sediment production, provided a sufficient depth of material was used. Increasing the level of road maintenance with increasing traffic load controlled. sediment production increased by approximately 40%. The results indicate that by identifying the areas that produce runoff it is possible to prevent contaminated runoff reaching the streams. Roads, on the other hand, produce large quantities of sediment, even when well maintained, so careful consideration of their placement and management is paramount.

NAL Call No.: 292.8-J82

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