REMOTE RANCHHAND LLC
1599 WENDEL AHRENS RD. FREDERICKSBURG TX 78624
830.307.8002 REMOTERANCHHAND.FARM

Agricultural Appraisal Report

12/29/2025

Client: [redacted]

Property:
ABS A-MULTIPLE MULTIPLE ABST, TRACT A219, A969 & A1188

DISCLAIMER

Remote RanchHand LLC(RRH) has compiled this agricultural appraisal report at the request of the client. RRH has used practices and calculations for the report based on IRS guidelines, using governmental, university, and expert agronomic sources for reference documentation. It is ultimately the decision of the client, in conjunction with the client's tax advisor, to determine how to use the information in the report.

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Project Overview

Client: Blake McGregor

Property legal description: ABS A-MULTIPLE MULTIPLE ABST, TRACT A219, A969 & A1188

Property address: 385 Rock Chalk Rd Fredericksburg TX

Acquisition date: 11/18/2021

Report date: 12/27/2025

Total acres: 55.3

Purpose

Evaluate and appraise all agricultural assets on property to determine value in the year that property was acquired(whether bought or inherited). Information in the report is for potential tax planning purposes, as decided by the client, and any tax or financial advisors utilized by the client.

Analysis Procedures

Soil testing was performed in zone configuration in accordance with agronomic standards(see soil testing section for details on methods).

Calculations were performed using agronomic mathematical formulas fully documented in the documentation index included in the report.

Non-soil assets(buildings, fences, wells, etc.) were valued based on an asset condition grading system and adjusted for acquisition year values using the US government's Bureau of Labor Statistics Inflation Calculator.

Fair market value for all assets were determined from national and international data providers and regional retailers and contractors.

Detailed information regarding agricultural deductions, depreciation, and other relevant IRS/CPA information in the report can be found in the Documentation Index.

Soil Nutrient Deductions

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Soil test sampling map and notes

Soil samples were taken from the property from zones that deviated by terrain and elevation from various points on the property, in order to obtain a true representation of soil nutrients. Samples were taken at a depth of 0-6 inches and documented by GPS grid coordinates. Samples were analyzed by Midwest Laboratories out of Omaha, Nebraska.

Sample Grid Coordinates

Sample ID	Coordinates
BM8929-01	30.288032, -98.678695
BM8929-02	30.286789, -98.677071
BM8929-03	30.290919, -98.676475
BM8929-04	30.293552, -98.676184

McGregor

ABS A-MULTIPLE MULTIPLE ABST, TRACT A219, A969 & A1188

REPORT NUMBER
25-343-0660

COMPLETED DATE **Dec 11, 2025** ACCOUNT **80686**

RECEIVED DATE **Dec 9, 2025**

Midwest Laboratories®
13611 B Street • Omaha, Nebraska 68144-3693 • (402) 334-7770
www.midwestlabs.com

TODAY'S DATE **Dec 11, 2025**

PHILLIP SHOCKLEY
Phillip Shockley
1599 WENDEL AHRENS RD
Fredericksburg TX 78624-2367

IDENTIFICATION
MCGREGOR

SOIL ANALYSIS REPORT

INFO SHEET: 1891296

LAB NUMBER *463*	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I. percent	RATE	PHOSPHORUS P1 (WEAK BRAY) 1:7 ppm	RATE	P2 (STRONG BRAY) 1:7 ppm	RATE	OLSEN BICARBONATE P ppm	RATE	POTASSIUM K ppm	RATE	MAGNESIUM Mg ppm	RATE	CALCIUM Ca ppm	RATE	SODIUM Na ppm	RATE	pH SOIL pH 1:1	BUFFER INDEX	CATION EXCHANGE CAPACITY C.E.C. meq/100g	% K	% Mg	% Ca	% H	% Na
88769	BM8929-01	2.9	M	1	VL	5	VL	5	VL	304	VH	200	L	4632	VH	56		8.4		25.8	3.0	6.5	89.6	0.0	0.9
88770	BM8929-02	4.2	H	2	VL	7	VL	7	L	385	VH	256	M	4887	VH	14		8.3		27.6	3.6	7.7	88.5	0.0	0.2
88771	BM8929-03	3.4	M	1	VL	2	VL	6	L	346	VH	296	H	3912	VH	14		8.4		23.0	3.9	10.7	85.1	0.0	0.3
88772	BM8929-04	4.4	H	1	VL	8	L	9	L	390	VH	198	L	5358	VH	11		8.1		29.5	3.4	5.6	90.8	0.0	0.2

(Potassium, Magnesium, Calcium, Sodium: NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE); Percent base saturation (computed).)

LAB NUMBER *463*	NITRATE-N (FIA) SURFACE ppm	SURFACE lbs/A	SURFACE depth (in)	SUBSOIL 1 ppm	SUBSOIL 1 lbs/A	SUBSOIL 1 depth (in)	SUBSOIL 2 ppm	SUBSOIL 2 lbs/A	SUBSOIL 2 depth (in)	Total lbs/A	SULFUR S ICAP ppm	RATE	ZINC Zn DTPA ppm	RATE	MANGANESE Mn DTPA ppm	RATE	IRON Fe DTPA ppm	RATE	COPPER Cu DTPA ppm	RATE	BORON B SORB. DTPA ppm	RATE	EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm	RATE	
88769	2	4	0-6							4	12	L	0.4	VL	5	L	9	L	0.4	L	1.6	H	H	0.3	L	
88770	5	9	0-6							9	14	M	0.8	L	8	L	14	M	0.5	L	1.9	VH	H	0.4	L	
88771	2	4	0-6							4	12	L	0.6	L	5	L	10	L	0.3	VL	1.6	H	H	0.3	L	
88772	17	31	0-6							31	10	L	0.7	L	9	M	11	M	0.2	VL	2.3	VH	H	0.5	L	

REV.10/17

The above analytical results apply only to the sample(s) submitted. Samples are retained a maximum of 30 days.

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SOIL FERTILITY RECOMMENDATIONS (POUNDS PER ACRE)

YOUR SAMPLE NUMBER (LAB NUMBER)	INTENDED CROP	YIELD GOAL	PREVIOUS CROP	SOIL AMENDMENTS				N	P_2O_5	K_2O	Mg	S	Zn	Mn	Fe	Cu	B
				LIME LBS/A OF	LIME TON	GYPSUM TONS/A	ELEMENTAL SULFUR LBS/A	NITROGEN	PHOSPHATE	POTASH	MAGNE-SIUM	SULFUR	ZINC	MANGA-NESE	IRON	COPPER	BORON
BM8929-01 (46388769)	Native Grass-South	1.0	Native Grass-South					15	15	--	--	--	0.2	--	--	--	--
BM8929-02 (46388770)	Native Grass-South	2.0	Native Grass-South					40	30	--	--	--	0.3	--	--	--	--
BM8929-03 (46388771)	Native Grass-South	2.0	Native Grass-South					50	35	--	--	--	0.4	--	--	--	--
BM8929-04 (46388772)	Native Grass-South	2.0	Native Grass-South					15	30	--	--	--	0.3	--	--	--	--

REV. 12/03

The above analytical results apply only to the sample(s) submitted. Samples are retained a maximum of 30 days.

REPORT NUMBER
25-343-7001

COMPLETED DATE **Dec 15, 2025** ACCOUNT **80686**

RECEIVED DATE **Dec 09, 2025**

TODAY'S DATE **Dec 15, 2025**

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PLANT ANALYSIS

Sample ID	Lab Number	Nitrogen N %	Rate	Phosphorus P %	Rate	Potassium K %	Rate	Magnesium Mg %	Rate	Calcium Ca %	Rate	Sulfur S %	Rate	Sodium Na %	Rate	Iron Fe ppm	Rate	Manganese Mn ppm	Rate	Boron B ppm	Rate	Copper Cu ppm	Rate	Zinc Zn ppm	Rate
Analysis Method		LECO Combustion		AOAC 985.01 (mod)																					
BM8929-P	**4031591**	**0.57**	*D*	**0.06**	*D*	**0.75**	*D*	**0.08**	*L-D*	**0.26**	*D*	**0.08**	*D*	**0.019**	*H-E*	**53**	*D*	**34**	*D*	**7**	*L-D*	**3**	*D*	**80**	*E*
	Pasture Norm	*2.77*		*0.39*		*2.20*		*0.18*		*0.56*		*0.20*		*0.010*		*200*		*80*		*10*		*6*		*21*	

Ratings: D = Deficient, L = Low, S = Sufficient, H = High, E = Excessive

** = Testing was performed at the Midwest Laboratories satellite laboratory located at 295 E. Cloverly Road, Fremont, NE, 68025.

Sample ID	Lab Number	Nitrate Nitrogen NO3 ppm	Ammonium NH4 %	Total Kjeldahl N TKN %	Chloride Cl %	Cobalt Co ppm	Molybdenum Mo ppm	Selenium Se ppm	Silicon Si ppm	Carbon C %	C/N Ratio %	** $\delta^{15}N_{AIR}$ ‰	Nitrogen ** N %
Analysis Method		EPA 353.2	AOAC 920.03 (mod)	AOAC 2001.11	Soil Sci & Plant Analysis	EPA 6010	EPA 6010	EPA 6020	EPA 6010	LECO Combustion	Calculation	FIRMS Good Practice Guide	Thermo TCD
BM8929-P	**4031591**												

The above analytical results apply only to the sample(s) submitted. Samples are retained a maximum of 30 days.

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Soil Calculations

Soil samples taken for testing were analyzed by Midwest Labs in Omaha, Nebraska. An S3C full nutrient test was performed that included primary, secondary, and micronutrients in the soil. Soil samples were taken at a depth of 0-6 inches. Nutrients in soil depths deeper than 6 inches can be attributed more to naturally occurring sources than from applied fertilizer on the surface. Nutrient levels in the tests are reported in parts per million(PPM). These levels were then converted into pounds per acre. Value for each nutrient was determined using national and international data sources in the current year and the year in which property was acquired. The crop nutrient removal rate was calculated using formulas developed by the Soil Science Society of America, out of Madison, Wisconsin. Plant tissue testing was performed from forage on the property in order to obtain an exact amount of nutrients being removed from the soil on a yearly basis. Crop nutrient removal was calculated at 1.6 tons of forage per acre[1]

The calculated price per pound of the dry fertilizer compounds have included delivery and application rates in accordance with the Texas A&M Custom Farming Survey from the year survey was conducted closest to the year of acquisition. The final calculated cost per pound of each fertilizer component consists of the commodity spot price of the component, the price difference from spot price to retail[2], and the cost of delivery and application of the product.

One of the tenets of the IRS rules on soil fertility deductions is that the excess nutrients are a result of fertilizer applied by the previous owners of the property. The IRS makes no distinction in the manner in which the fertilizer is applied. Livestock naturally depositing manure and urea on the pasture is no different than a motorized spreader used to spread the same product. It is assumed that the current owner continued the same general stocking rate of livestock as the previous owner. Grazing livestock typically return 70-90% of ingested nutrients to the soil in the via urine and manure[3], essentially applying a slightly below maintenance level of fertilizer to the field every year.

Soil sampling was completed in 2025 and property was acquired in 2021. Using the nutrient cycling rate described in the preceding paragraph, the nutrients present in the soil at time of sampling are less than they would have been in the acquisition year, due to the slight loss of nutrients that are not cycled through the livestock that have been on the property since the acquisition date. However, for the purposes of this report, no adjustment was made for the difference. Calculations were done in exactitude and no assumptions or estimates were made.

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[1] Texas A&M Agrilife Extension(April 2, 2018, Sam Womble, Pasture Fertilization) 1.6 tons of expected forage on Central Texas pastureland averaging wet and dry seasons in 1990 and 1991 on fertilized ground with no weed control.
[2] University of Illinois Department of Agriculture and Consumer Economics(June 28, 2022 Carl Zulaff) Average cost difference from spot price to retail price of dry fertilizer components average $266/ton from 2008-2022.
[3] Ohio State University Extension(Haynes, R.J., & P.H. Williams. (1993). Nutrient cycling and soil fertility in the grazed pasture ecosystem. *Adv. Agron. 49*, 119–199)

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Nutrient Price Calculation Formula Examples

Potassium(Potash)-

Spot Price-	$374/metric ton
Spot to Retail Markup-	$266/metric ton
Total	$640/metric ton

$640 divided by 2,204(lbs in a metric ton) = 0.29 price per lb
+0.23 per lb shipping costs[1]
Total delivery to farm: 0.52/lb

Calcium(Gypsum/Lime)[2]

Spot price(at quarry)-	$10/Short ton(2,000lbs)
Spreading cost-	$13/st
Delivery-	$60/st[3]
Total cost per ton-	$83/st
Total cost per pound-	$0.041

[1] Based on $0.23 per lb for average LTL freight cost(Hatfield & Associates LLC, 2023) This amount is then adjusted for inflation for property acquisition years.
[2] Calcium(either limestone or gypsum) differs from the other fertilizers as it is the only product that is sourced locally or regionally directly from the producer and not through an agricultural retailer. The standard spot-to-retail markup does not apply.
[3] 2025 Cost determined by local contracted delivery rate of $150 per hour for 5-ton spreader hopper on an estimated 2 hour total time from loading at quarry, transporting to farm, spreading product, and returning to quarry. Prior year rates are adjusted for inflation per Bureau of Labor Statistics inflation calculator.

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2021 Nutrient Price Sources

Nitrogen(Urea)- IndexMundi Commodity Historical Charts
Phosphorus(DAP)- IndexMundi Commodity Historical Charts
Potassium(Potash)- IndexMundi Commodity Historical Charts
Calcium(Gypsum)- US Geological Survey Statistics
Magnesium(Magnesium Sulfate)- iMarc Group
Sulfur(Elemental)- US Geological Survey Statistics
Zinc(Sulfate)- Federal Reserve Bank of St. Louis
Manganese(Sulfate)- 7 Springs Farm Supply(Retail)[1]
Iron(Ferrous Sulfate)- Business News Wire Online
Copper(Chelated)- Federal Reserve Bank of St Louis
Boron(Borax)- US Geological Survey Statistics

2025 Nutrient Price Sources

Nitrogen(Urea)- IndexMundi Commodity Historical Charts
Phosphorus(DAP)- Progressive Farmer DTN Fertilizer Tracking
Potassium(Potash)- IndexMundi Commodity Historical Charts
Calcium(Gypsum)- US Geological Survey Statistics
Magnesium(Magnesium Sulfate)- iMarc Group
Sulfur(Elemental)- US Geological Survey Statistics
Zinc(Sulfate)- Federal Reserve Bank of St. Louis
Manganese(Sulfate)- 7 Springs Farm Supply(Retail)
Iron(Ferrous Sulfate)- Business News Wire Online
Copper(Chelated)- Federal Reserve Bank of St Louis
Boron(Borax)- ChemAnalyst

[1] Historical Data does not exist for 2021 Agricultural Manganese Sulfate.Price has been determined using most current available price and adjusting for inflation using the US Bureau of Labor Statistics inflation calculator.

Soil Nutrient	Soil Test Results (average of all samples, lbs per acre)	Single Season Crop Nutrient Removal(lbs per acre)	Excess Nutrients(lbs per acre)	Current Nutrient Value(2025)	Nutrient Value (2021)	Excess Nutrient Value(excess nutrients X 2021 values)
Nitrogen(Urea)	24.0	18.24	5.76	$0.52/lb	$0.739/lb	$4.25
Phosphorus(DAP)	13.5	4.39	9.11	0.674	0.635	5.78
Potassium(Potash)	712.5	28.8	683.7	0.535	0.43	293.99
Magnesium(Sulfate)	475	2.56	472.4	0.436	0.32	151.17
Calcium(Gypsum/Lime)	9,394.5	8.32	9,386.02	0.046	0.042	394.22
Sulfur(Elemental)	24.0	2.56	21.44	0.423	0.371	7.95
Zinc(Sulfate)	1.25	0.25	1.00	1.569	1.83	1.83
Manganese(Sulfate)	13.5	0.11	13.39	1.88	1.64	15.03
Iron(Ferrous Sulfate)	22.0	0.16	21.84	0.442	0.387	8.45
Copper(Chelated)	0.7	0.009	0.691	5.81	4.65	3.21
Boron(Borax)	3.7	0.02	3.68	0.637	0.507	1.86

Total Excess Nutrient Value Per Acre: $887.74
Total Acres of Property: 55.3
Spreading/Application Cost: $550.79

Total Soil Fertility Deduction: $49,092.02

Non-Soil Assets & Deductions

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Agricultural Asset Grading Legend

All non-soil agricultural assets are evaluated for condition based on a letter grading system. Asset value is then calculated based on condition grade and adjusted for inflation based on acquisition year.

A- Asset is in new or nearly new condition. The asset may have some minor cosmetic issues. All components are fully functional for the foreseeable future. The asset is valued at 100% of the replacement cost.

B- Asset is fully functional. The asset has some non-critical cosmetic issues. While all primary components are intact, there are some signs of wear and some components are approaching replacement condition. The asset is valued at 75% of the replacement cost.

C- Asset is still functional. Some components may not function as designed but are still useful with minor repairs. The asset has some components that are in need of upgrading but not stopping the asset from being used for its original purpose. Significant upgrades or repairs will be needed in the near-to-mid future. The asset is valued at 50% of the replacement cost.

D- Asset is not fully functional. Major component repairs are needed or imminent. The asset still has some value and repair cost is still less than replacement cost. The asset is valued at 25% of the replacement cost.

F- Asset is not functional. The asset has no value other than salvageable scrap. It would cost more to remove/demolish the asset than would receive in value from salvageable components. The asset is valued at zero.

Asset Title: Metal Barn/Shop
(Multi-Purpose Building)

Specifications: 40’ x 50’
Steel frame
Unfinished interior
Concrete slab
Metal exterior
Metal roof
Water and electricity

Evaluation: Building is fully functional with no component issues. Entry and overhead doors are operational. Concrete slab shows no signs of integrity loss. Guttering is intact and functional.
Evaluation Grade: A

Cost Analysis[1]

Slab, building materials, labor-

Value of Asset New(2025): $70,353
Value of Asset by condition evaluation: $70,353
Inflation adjusted value for acquisition year[2]: $60,330.60

Deductible amount: $60,330.60

[1] Cost analysis provided by Remote RanchHand LLC Ranch Services Division per polebarncalculator.com
[2] Per the US Government Bureau of Labor Statistics Inflation Calculator

Asset Title: Cow Pens

Specifications: 410' of permanent steel cow handling pens with partial metal overhang.

Evaluation: Pen components have no integrity issues other than superficial rust. Pens will not need upgrading or significant repairs for the foreseeable future
Evaluation Grade: A

Cost Analysis[1]

410 linear feet@ $40 per foot installed: $16,400
Value of Asset by condition evaluation: $16,400
Inflation adjusted value for acquisition year[2]: $14,063

Deductible amount: $14,063

[1] Cost analysis provided by Remote RanchHand LLC Ranch Services Division
[2] Per the US Government Bureau of Labor Statistics Inflation Calculator

Asset Title: Fences

Specifications: 9 strand 14 gauge barbed wire with steel t-posts

Evaluation:
2,379’ of Grade A perimeter fence
660’ of Grade B Interior cross fence

<u>Cost Analysis</u>[1]

Perimeter fence: $16,352
Perimeter cost share adjustment value[2]: $8,176

Cross Fence: $4,662

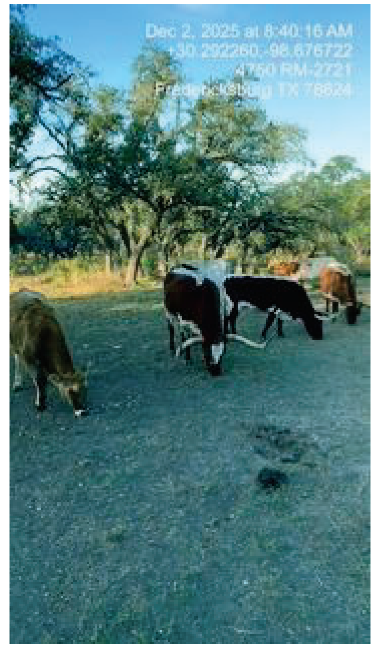
Total fences: $12,838

Inflation adjusted value for acquisition year[3]: $11,009

Deductible amount: $11,009

[1] Cost analysis provided by Remote RanchHand LLC Ranch Services Division
[2] Perimeter(property line) fences are adjusted to reflect 50% ownership by neighboring property. If the property owner has documentation from the previous owner that a higher percentage of the fence is the property of the new landowner, a higher percentage may be deductible.
[3] Per the US Government Bureau of Labor Statistics Inflation Calculator

Asset Title: Longhorn Cattle



Specifications: 5 head of longhorn cows and steers, approximately 6-8 years of age.

Evaluation: All cattle appear in good health and have robust frames. No obvious defects in conformation. Longhorn cattle are considered “plain” cattle in livestock auction pricing. Approximately 1,200 lbs per head.
Evaluation Grade: A

<u>Cost Analysis</u>[1]

Value of Asset 2025: $7,200
Value of Asset by condition evaluation: $7,200
Inflation adjusted value for acquisition year[2]: $3,600

Deductible amount: $3,600

[1] Cost analysis provided by Remote RanchHand LLC Ranch Services Division
[2] Per the Gillespie County Livestock market report September 2021

Asset Title: Terracing

Specifications:14.488 Acres of pasture terracing

Evaluation: Terracing is in excellent condition with minimal degradation from erosion.
Evaluation Grade: A

<u>Cost Analysis</u>[1]

Bulldozer clearing: 131.20 per hour
Bulldozer terracing: 126.60 per hour
Calculated at 257.70 per hour to clear and terrace
And 4 hrs total per acre
Total of 58 hours : $14,946

Deductible amount: $14,946

[1] Cost analysis provided by Remote RanchHand LLC Ranch Services Division per Texas A&M Custom Farming Survey 2020

Asset Title: Well & Water lines

Specifications: Dedicated well only used for livestock water, water lines and 2 metal 8' diameter water troughs. 940' depth.

Evaluation: Well is completely operational and water lines and troughs show no leaks. Some cosmetic issues with discoloration on troughs but no integrity issues were found with any components.
Evaluation Grade: A

Cost Analysis[1]

Well drilling, equipment, labor(940' depth)[2]: $56,500
Inflation adjusted value for acquisition year[3]: $48,451

Piping and troughs setup: $3,250
Inflation adjusted for acquisition year: $2787

Total well and water deductions: $51,238

[1] Cost analysis provided by Remote RanchHand LLC Ranch Services Division
latestcost.com Texas water well drilling cost estimator
[2] Hill Country Water Conservation District well information map
[3] Per the US Government Bureau of Labor Statistics Inflation Calculator

Deductions Summary

Soil Nutrients: $49,092
Fencing: $11,009
Livestock pens: $14,063
Livestock: $3,600
Water assets: $51,238
Barns & Buildings: $60,330
Conservation(terracing): $14,946

Total Deductions: $204,278

Documentation Index

Soil Nutrient Deductions

Tax Disclaimer

The information in this paper is general in nature and based on authorities that are subject to change. The authors assume no obligation to inform the reader of any changes in tax laws or other factors that could affect the information contained herein. This paper does not and is not intended to provide tax, legal, or accounting advice. Farmers, ranchers, timberland owners, and all other readers should consult their tax, legal, and financial advisors concerning the application of these tax laws for their particular financial situation.

About the Authors

James D. Eggleston Jr., Eggleston King Davis, LLP (Weatherford, Texas), Patrick K. Kenney, Dvorak Law Group, LLC (Omaha, Nebraska), and Kevin Thomason, Elliott, Thomason & Gibson, LLP (Dallas, Texas) are all practicing attorneys with specialties in farm and ranch transactions, agribusiness, and income tax. Numerous citations to both legal, financial, and scientific resources are omitted throughout this paper but can be obtained upon request.

Introduction: What Are Soil Nutrients?

Soil is the major source of the nutrients essential for plants. Nutrients are chemical compounds that provide nourishment for the growth and maintenance of all life forms. In particular, nutrients needed for plant growth are derived from soil. Of the 17 essential nutrients for the growth of most plants, the most well-known soil nutrients are nitrogen (N), phosphorus (P) and potassium

(K). They make up the trio known as “NPK.” When one of these essential plant nutrients is deficient, then plant growth will be reduced, even if all other essential nutrients are adequately supplied. Thus, maximum yield potential can only be achieved when the proper balance of nutrients is in place.

The objective of this article is to briefly review at a high level the planning opportunities afforded by various provisions of the Internal Revenue Code (“IRC” or “Code”) that authorize federal tax “legacy nutrient deductions” (“LNDs”) for properly valued and documented soil nutrients. This article is also intended to provide real estate and tax professionals with tools to successfully obtain LNDs in a fashion that should withstand any challenge by the Internal Revenue Service (“IRS”). All Section references herein refer to sections of the Code.

Overview: Legacy Nutrient Deductions, Benefits, and Policy

Legacy nutrient deductions have existed as part of federal tax policy since the adoption of IRC Section 180 in 1960. Section 180 provides a current deduction for the soil nutrient value (residual fertility) in land (a) purchased or inherited in the year that the deduction is pursued, (b) that is used for agricultural production, and (c) where the owner is actively engaged in farming, ranching, or in some cases, production timber. The term “production timber” means timber that would qualify for Section 180 treatment — and not all timberland does.

Other provisions of the Code (Sections 167, 168, and 611) also offer taxpayers the opportunity to utilize LNDs. These approaches are similar to the depreciation or amortization of long-term assets, which include soil nutrients, or the depletion of mineral interests and the depreciation of mines, oil and gas wells, and other natural deposits. While implementing LNDs under these Sections does not allow for a one-time, current deduction as does Section 180, they do offer strategies to landowners who are not actively engaged in the business of farming. They also offer landowners the possibility of pursuing LNDs on previously purchased or inherited properties. While Section 180 is the most powerful tax strategy for landowners due to the up front nature of its tax benefits, these other three Code Sections may fit an even larger number of taxpayers.

Farmers and ranchers who currently own or who are contemplating acquiring land can significantly benefit from an LND strategy. However, though long present in the IRC, LNDs have not been widely understood or used. If a rural landowner qualifies, the tax savings resulting from the use of LNDs not only return cash to a landowner’s pocket, but it also can provide additional working capital, extra resources to buy more land, capital to replace worn-out equipment, and improve infrastructure for farm/ranch lands.

The successful implementation of a soil nutrient deduction strategy starts with understanding the concepts present in the relevant Code Sections and Treasury Regulations and thereafter following the parameters, requirements, and valuation methods discussed below.

Evolution of Deductions and Guidance

While the enactment of Section 180 kick-started the use of LNDs across all four code sections, the IRS didn't publish material guidance on how to safely pursue LNDs until July 1995 (MSSP 3149-122, TPDS No. 83960J) (the "1995 MSSP"). The goal of the 1995 MSSP program, together with subsequent similar announcements, was to eliminate potential taxpayer errors arising from either the lack of guidance from the IRS on how to obtain LNDs or the overaggressive or fraudulent approaches that some taxpayers were pursuing. These taxpayer errors, whether intentional or accidental, generally involved landowners — including farmers, ranchers, or timberland owners, taking the deduction on nonqualifying property (i.e., not agricultural land), taking too big of a deduction (potentially including naturally occurring nutrients or nutrients that are not used in agricultural production), or taking the deduction too quickly (e.g., using the immediate Section 180 deduction when not appropriate or using too short of an amortization period under Sections 167, 168, or 611).

Using the best agronomic and technological understanding at the time, the 1995 MSSP guidelines laid out the following additional criteria to accomplish these goals: (a) establish the presence and extent of the fertilizer (the natural and man-made source of nutrients); (b) show the level of soil fertility attributable to fertilizer applied by the previous owner; (c) provide a basis upon which to measure the increase in fertility in the land; (d) provide evidence indicating the period over which the fertility attributable to the residual fertilizer will be exhausted; and (e) prove that the landowner has beneficial ownership of the residual fertilizer supply.

While the 1995 guidance attempted to provide taxpayers with the parameters on how to successfully obtain LNDs, it left a material amount of ambiguity on how to specifically adhere to its principles. Accordingly, landowners were often left to rely on the filing procedures advised by their individual CPAs. A previously issued Technical Advice Memorandum (TAM 921107, December 3, 1991) from the IRS shed no material additional light on how best to obtain LNDs.

Thirty-plus years have come and gone without any updates or clarifications to the 1995 MSSP as it relates to LNDs. The past three decades have seen tremendous technological advancements, as well as major strides in relevant scientific fields such as forensic agronomy. While these advancements could not have been contemplated in 1995, they have allowed tax practitioners, tax attorneys, and auditors to more easily and defensibly pursue and evaluate LNDs while adhering to the spirit of the 1995 MSSP.

Overview of Taxpayer Errors: When Are LND Errors Most Likely to Occur?

Most taxpayer errors in attempting to obtain LNDs occur when landowners try to pursue these deductions on non-agricultural land, when they try to take the deduction too quickly, or when they try to take too large of a deduction. While meeting the agricultural land requirement is a black-and-white determination (farmland, ranchland, and production timberland are eligible, while gravel pits are not), ensuring that landowners use the deduction at and over the right period of time and in the right amounts requires a deeper understanding of soil science.

Deductions Must be Taken At the Appropriate Time (Not Too Quickly)

Because soil nutrients in the "aerobic zone" of the topsoil (roughly the first 6 to 8 inches) are readily plant-available, they are used in a relatively short time frame. This is a critical factor when thinking about amortization periods of LNDs under Sections 167, 168, or 611 (e.g., farmland, ranchland, and production timberland). For qualifying landowners, Section 180 allows them to take 100% of the deduction in the year of filing. The other sections, however, are silent on the required amortization period.

There are certain nutrients that have atypical behaviors that must be noted. Nitrogen, for example, cycles quickly in soils for a multitude of reasons. In fact, it moves so quickly and opaquely that it usually provides little in value to LNDs. Calcium is another crop-necessary nutrient that has a slightly more complicated relationship with crop production because it serves several purposes in soil. Iron is the last of the three agriculturally necessary nutrients that has a complicated relationship with crop production due to the fact that it is used much more slowly than all of the other crop-necessary nutrients.

The refined understanding of how these nutrients are used in soils has allowed agronomists to successfully model usage and depletion rates by crop type. The tax law does not require a CPA or landowner to amortize the deduction on a nutrient-by-nutrient basis. In fact, many tax preparers argue that LNDs should be amortized under accelerated depreciation principles. However, the Code is silent as to the preferred approach and specific time frames of such amortization and across different land uses, including cropland, rangeland, and production timberland.

Because of this, many CPAs choose to let the calculated usage rates of these nutrients inform their choice in selecting amortization periods. Because of the robust analysis of soil scientists and agricultural extension universities regarding the usage rate of these nutrients, the market has developed a rule of thumb of amortization periods for LNDs. Since most nutrients in the aerobic zone cycle in a three- to seven-year period, most CPAs choose amortization periods ranging from three to seven years when utilizing Sections 167, 168, or 611.

Deductions Must Be Taken in Appropriate Amounts (Not Too Much)

Once a landowner has established the volume of soil nutrients present at the time of acquisition or inheritance, he or she must then draw a distinction between the "baseline" nutrient levels and "excess" nutrients present in the soil at that time to appropriately value and prepare his or her LNDs.

Most state agricultural extension agencies regard the best practice for determining "baseline" nutrients as applying one year's worth of crop use to the soil. For example, if a farmer were attempting to produce 220 bushels of corn, best practice with regard to fertilizer would involve applying enough nutrients to produce 220 bushels (commonly referred to as "baseline nutrients"). Any nutrients that are applied in excess of the crop-usage amount are commonly referred to as "excess nutrients." Anything present in the topsoil of the aerobic zone that exceeds that baseline amount at the time the land is purchased or inherited is deemed an "excess" nutrient, the amount that supports the LNDs (subject to basis limitations).

This approach provides a conservative approach — if a landowner were producing a less-nutrient-intensive crop, the deduction would be less than what they could have otherwise argued — to ensure the greatest amount of nutrients are described as "baseline," thus reducing the amount of nutrients that could be deemed as "excess." This method for determining "excess" is far superior to the previously used "comparables" approach, pursuant to which "excess" was determined by comparing one landowner's nutrient levels to a set of regionally comparable properties. Use of this prior method resulted in issues that invited IRS scrutiny.

As with other forms of depreciation, LNDs reduce the basis that a landowner has in its property. Accordingly, the landowner would face depreciation recapture for the full amount of the deduction at the time of sale. The landowner is not avoiding taxes by pursuing LNDs. Rather, he or she is simply postponing payment of certain taxes until a future date when property is sold, unless they pass away without ever selling the property and their beneficiaries receive a step-up in basis. This provides an additional "fail-safe" for tax-revenue collection, making the concerns about the scale of an LND more of a timing issue than an amount dispute.

Forensic Agronomy: Decreasing the Landowner's Risk

Agronomy is the general study or science of crop production, which includes a large number of subtopics, such as genetics, fertility, soil, chemicals, range, and grassland management, as well as production practices and procedures. It is widely used in agriculture to help farm/ranchland/production-timber owners understand the relationship between their practices and their expected agricultural outcomes.

Forensic agronomy, on the other hand, is the study of these practices to identify and understand what these things looked like in the past. Forensic agronomists examine data (including current and historical soil, crop, and grazing records) to reconstruct past soil conditions and to identify key moments that led to adverse events, among other historical occurrences. In doing so, forensic agronomists have honed a unique skill set, often serving as expert witnesses in litigation, insurance, and tax matters.

Today, the ability of forensic agronomists to determine what soil nutrient levels were at a prior date (based on current soil information, crop yields and grazing records, and fertilizer- and manure-application records) far exceeds any capabilities contemplated by the 1995 MSSP.

How a Forensic Agronomist Makes an Effective Assessment

In the case of LNDs, forensic agronomists start with assessing the current levels of agriculturally necessary nutrients (such as phosphorus, potassium, manganese, boron, and others) in the soil. Next, they add back the amount of nutrients that it took to produce the crops that were harvested. Then, they subtract the amount of fertilizer and manure that had been applied. The resulting nutrient balance reflects what existed in the soil prior to that year's fertilizer and crop-production activity.

By evaluating fertilizer application, crop production, stocking rate, and stocking density for each of the intervening years between when the baseline soil tests are taken (which establish current nutrient levels), the farm, ranch, or timberland owners and their advisors can accurately, scientifically, and defensibly hindcast the level of agriculturally necessary nutrients present in land purchased or inherited in prior years. With these forensic practices, the accuracy has been enhanced when comparing historic nutrient levels that are forensically determined and the levels determined by a soil test conducted on the date of acquisition, thus understanding the volume of agriculturally necessary nutrients that were present at that time.

Best Practices for the Expert Agronomist

Forensic agronomy studies and results are only as good as the inputs to the algorithms (i.e., garbage in = garbage out). Accordingly, ensuring that appropriate kinds of data are collected is of paramount importance to the forensic evaluation of LNDs. While records of fertilizer application/crop yields or stocking rates and stocking densities are provided by the landowner, the initial soil tests must be collected by the LND service provider to provide consistency essential for this approach.

The 1995 MSSP, however, is silent on forensic agronomy and consequently offers no direction on the types and amounts of data that should be collected. For example, what type of test should be used? How many tests should be taken? At what depth should soil nutrients be measured? Fortunately, agronomy has answered those questions.

Proper Soil-Testing Depth

The best practices involve soil sampling at a depth of 6 to 8 inches (sometimes even pegged at 6.75″). The following summarizes why that is important:

- The top-soil layer, often called the "aerobic zone," is a natural layer that covers much of our planet's land surface.
- The depth from the surface of the ground down to 6-8 inches is generally considered the zone of soil that allows for enough oxygen to penetrate the soil, thus supporting microbial life.
- Microbes are needed to break down inorganic fertilizers and convert them into a usable food source for plants to uptake the nutrients and convert them into viable plant nutrients.
- Ninety-eight percent or more of all plant nutrients are consumed by plants in this upper zone.
- Samples taken below 6 to 8 inches will show larger amounts of nutrients compared to tests taken at or shallower than 6 to 8 inches. Here is why:

1. Soils naturally contain nutrients necessary for agriculture production. Measuring more soil will naturally lead to larger gross volumes of nutrients than measuring smaller volumes of soil, many of which are not readily used or impacted by agricultural practices.
2. Weather conditions or tillage/farming practices cause fertilizers that are not used by the plant to leach deeper into soil structures and below the aerobic zone.
3. Oxygen penetration in soil is governed by a variety of factors, e.g., soil structure/texture, moisture content, organic matter, and microbial activity. Soil bacterial activity is generally governed by soil oxygen levels, so the bulk of the microbial activity tends to be concentrated in this higher oxygenated zone.
4. Collecting soil samples at a depth of 6 to 8 inches ensures that LNDs only measure agriculturally necessary nutrients that are both derived from human-driven agricultural practices and which prevent landowners from inappropriately benefitting from excessive nutrient levels that are naturally occurring and/or not used in agricultural production at deeper depths in their soil.

Proper Soil Sampling Type

Grid samples or soil-zone sampling are the most common techniques with which agronomists organize individual soil tests to get an accurate perspective of nutrient makeup and distribution across agricultural acres. However, the size of the grid can vary depending on the specific information that the landowner, agronomist —or in this case, tax advisor — is trying to measure. The best practice includes using a grid or soil-zone sampling protocol with 2- to 10-acre grids for farmland and a potentially larger grid size for grazing acres. Here is why:

- If the land is being used for high-margin crops such as fruits or vegetables that require precision fertilizer, tillage, and seeding regimes, grids less than 1 acre may be relevant.

- General row crops typically receive soil tests taken on a 2.5-acre to 10-acre grid, with the variance arising from the particular landowner/tenant's management practices related to fertilizer application, tillage, and seeding protocols.
- Pasture and rangeland soils are typically managed in a broader-stroke approach due to the practicalities of the amount of acreage involved, as well as the generally lower-margin cost structure of livestock compared to crop production. Grid sizes from 10- to 50+ acres are common.
- Data collection methodologies that balance accuracy and cost while adhering to customary practices are crucial to foster better agronomic practices and the preservation of American topsoil and forest soils. Grid sizes that are too large decrease costs but also decrease accuracy. Ten-acre grids for farmland and 10- to 40-acre grids on grazing acres balance these factors and sit within the realm of customary practices.

Using Forensic Agronomy to Better Support the Use of LNDs

In 1995, the IRS believed the best way to prevent landowners from deducting previously expensed nutrients was to require documentation that a prior owner had applied those nutrients. Even then, however, this approach was often impractical. Consider a scenario where a landowner had leased his or her property to multiple tenants for many years before selling the land. How could the new owner retrieve such application records from each of those prior tenants or from the previous landowner directly?

Today, advancements in agronomic sciences have dramatically improved the ability of forensic agronomists to bring clarity to this issue and further prevent inaccurate claims for nutrient values. The methods developed are scientific and much easier to defend and audit.

Between the 1950s and today, the widespread adoption of soil testing has allowed agronomists to better understand how fertilizer application and crop production affect nutrient addition and removal. Improved knowledge of nutrient cycling also clarified the ways different nutrients interact to influence plant availability and performance, leading to substantial increases in agricultural productivity. For example, average corn yields nationally rose from around 40 bushels per acre in 1950 to 177 bushels per acre by 2025.

Multiple factors influence actual crop yields. Weather and climate variations, pest pressures, and myriad other factors can all impact actual yields. For example, a farmer may plant corn with the expectation of raising 220 bushels. To produce 220 bushels of corn, his agronomist recommends application of a specific volume of certain types of fertilizers. The application of the prescribed inputs will supply the amount of nutrients required to produce 220 bushels. However, the farmer doesn't know how many bushels he will actually produce when he applies his fertilizer for the year, as atmospheric and other weather conditions have an impact upon the crop. Additionally, there are insects, fungi, and many other biological impacts upon crops. All these factors impact the actual number of bushels the farmer will produce.

If these factors cause the farmer to only produce 180 bushels of corn in that year, the farmer will have "left" approximately 40 bushels worth of nutrients in the soil. If the farmer produces 220 bushels of corn, there would be no impact on nutrient levels in the farmer's soil since his actual yield equals his forecasted nutrient application. If the farmer produces 260 bushels of corn, there would be a net drawdown of 40 bushels worth of nutrients in the soil.

Best Practices to Consider

- Only use LNDs for farm/ranch/production timberland.
- Only use qualified service providers: agronomy experts with a record of experience and with a résumé of successful defense of the methodologies in accordance with the 1995 MSSP guidelines.
- Consult with CPAs and other tax professionals on the best of the four Code Sections for the landowner's particular situation and the best way to file for the deductions, whether for the current tax year or for past tax years.
- Consult with an experienced attorney to determine whether the resulting losses from an LND are "passive" or "active" based on the landowner's activity.
- Landowners should obtain an expert valuation/appraisal advisor and conduct soil tests as close to the time of the land acquisition as possible. However, service providers with appropriate forensic agronomy expertise can enable landowners to pursue LNDs many years after purchase/inheritance.
- Determine, if possible, the fertilizer (what kind and how much) applied by the previous landowner.

Other Issues to Consider in Developing a Nutrient Deduction Strategy

Careful analysis as to what is best strategically for each landowner is necessary. The quantity and fertility of the nutrients is what determines the value of the deduction. The higher the fertility, the greater the deduction. On the face of Section 180, it would appear that a taxpayer can deduct 100% of the value of the excess nutrients, subject to basis limitations. Often, tax professionals will recommend that a taxpayer take a deduction for less than 100% of the value of the excess nutrients, even though such value may have been accurately determined and correctly reported by the most expert advisors. Many advisors recommend an aggregate deduction not exceeding 50% to 75% of the purchase price of the applicable farmland or ranchland.

To ensure compliance with IRS guidelines and to maximize the benefit of soil nutrient deductions, landowners should seek counsel from reputable and experienced third-party advisors for data collection, appraisal, and preparation of supporting data for any valuation. It is recommended that landowners avoid advisors who want to be compensated based on percentage-based charges ("success fees") but instead look for advisors charging a per-acre fee for the analysis. The resulting per-acre-fee appraisals and reports, on a comparative basis, start with a presumption of independence and greater reliability than reports produced by those charging success fees.

Policy and Strategic Considerations

A major challenge facing the farm/ranch owner is the disparity between the value attached by passive investors to farm/ranchland and the values that farmers and ranchers attach to the land. Farmers and ranchers consider tangible and intangible factors such as productivity, anticipated revenues, government support programs, financing costs, and related factors. Food producers view their farm or ranch as comprising a large part of who they are, what values they hold, how they raise their children, and what legacies they will leave. It is part of their family or community ethos, the basis of the trust shared among like-minded participants in the food chain, and what ties them to generations of those who have shared or will share their unique life experiences.

Thus, the challenge is ever-growing: How can rural America hang on to crop- and forage-producing lands that are increasingly appealing to nonfarming, nonranching investors? This appeal is due to the attraction of consistent investment returns on rural land over long periods of time, the declining worldwide supply of arable land, and the relative advantage of U.S. agriculture (due to our technology advantages, logistics infrastructure, the relative size of natural and international markets, and political stability compared to other countries).

The long-term investment advantage of investments in farm/ranchland is in large part due to the low correlation between returns on and the value of such land in the hands of investors and the investment return on and values of equities offered by the stock market. The low correlation is that the returns and values of each (rural land and public equities) seldom move in the same direction. Farm/ranchland is, to the passive investor, an "inflationary hedge." Inflationary increases in the prices of commodities boost acreage values and crop income. But that same inflation drives up the price of fuel, equipment, labor, and other expenses faced by a food producer, expenses that are not always of concern to the passive investor.

Consider this case study of how the use of an LND strategy may level the playing field. Assume a farmer wants to purchase 1,500 acres of land at a price of $5,000 per acre. The total acquisition price would be $7,500,000. Assume the farmer utilizes a soil nutrition deduction of $1,500 per acre (nutrient valuation that is often recognized by one of the larger nutrient agronomy and analysis firms.) If that farmer is in the 35% tax bracket for the current year, the deduction could be worth $525 or more per acre (after tax) or a cash equivalent of approximately $800,000. This dollar amount is approximately 12% what he paid for the land. This advantage could be the edge farm/ranch landowners need to retain desirable rural lands in the hands of food producers.

If a policy were adopted nationally that expands the use of LNDs, greater financial resources could be available to rural America as a whole and agriculture-dependent states in particular.

Greater financial resources will provide greater security to the future of America’s food production, the values and lifestyle found in farm/ranch country, and the capital critical to America’s farm/ranch industry.

Conclusion

LNDs represent a critical tool for agricultural landowners that can strengthen rural communities and entice better stewardship of America’s farm and grazing lands. Like all tools, LNDs can be misused. Such misuse can erode both the credibility of a taxpayer and the willingness of the IRS to readily allow these deductions, ultimately harming the agricultural community as a whole. Proper soil sampling, consistent testing depths, scientifically supported baselines, and usage/amortization rates can aid farm and ranch professionals in more accurately quantifying, documenting, and defending legitimate LNDs. Good tax advisors, experienced legal counsel, and financial advisors are well worth the cost in pursuing a successful and profitable LND strategy.

Depreciation of farm assets: Tips from IRS Pub 225

1. Introduction to farm asset depreciation

Asset Value and Depreciation

Farm Asset Depreciation

Depreciation is a fundamental concept in the world of finance and accounting. It refers to the decrease in value of an asset over time due to wear and tear, obsolescence, or other factors. For farmers, understanding farm asset depreciation is crucial to accurately report their income and expenses, as well as to make informed financial decisions. In this section, we will delve into the introduction of farm asset depreciation, exploring various perspectives and providing an in-depth analysis of different options available.

1. Understanding Depreciable Property:

Depreciable property includes tangible assets used in farming operations that have a determinable useful life. This can encompass a wide range of items, such as tractors, buildings, fences, machinery, and even livestock. It is important to note that land is not considered depreciable property, as it typically appreciates in value over time. When determining the depreciable basis of an asset, it is essential to consider the cost of the asset, any improvements made, and any salvage value that may be obtained at the end of its useful life.

2. Methods of Depreciation:

Farmers have the flexibility to choose from different **methods of depreciation**, depending on their specific circumstances and preferences.

The two most commonly used methods are straight-line depreciation and accelerated depreciation.

- straight-line depreciation evenly spreads the cost of an asset over its estimated useful life. This method is straightforward and provides a consistent deduction each year. For example, if a tractor is expected to last 10 years and costs $50,000, the farmer can deduct $5,000 per year for depreciation.

- Accelerated depreciation, on the other hand, allows for larger deductions in the earlier years of an asset's life. This method recognizes that assets often lose value more rapidly in the early years and gradually slow down. One popular accelerated depreciation method is the modified Accelerated Cost Recovery system (MACRS), which assigns assets to designated classes and applies specific depreciation rates based on these classes. While accelerated depreciation can provide greater tax savings in the short term, it may result in smaller deductions in later years.

3. Section 179 Deduction:

The Section 179 deduction is a valuable option for farmers looking to accelerate the depreciation of qualifying assets. Under this provision, farmers can deduct the full cost of eligible assets in the year they are placed in service, rather than spreading the deduction over several years. The maximum deduction limit for 2021 is $1,050,000, and it begins to phase out once the total asset cost exceeds $2,620,000. This deduction can be a significant advantage for farmers, as it allows them to offset a substantial portion of their taxable income immediately.

4. Bonus Depreciation:

In addition to the Section 179 deduction, farmers may also be eligible for bonus depreciation. This provision allows for an additional deduction of 100% of the cost of qualified property in the year it is placed in service. Unlike the Section 179 deduction, there is no maximum limit or phase-out threshold for bonus depreciation. However, it is important to note that bonus depreciation applies only to new property, while used property is not eligible.

Understanding farm asset depreciation is crucial for farmers to accurately reflect the value of their assets and make informed financial decisions. By considering the different methods of depreciation, such as **straight-line and**

accelerated depreciation, farmers can choose the approach that best suits their needs. Additionally, taking advantage of provisions like the **section 179 deduction and bonus depreciation** can provide significant tax savings. To ensure compliance with IRS regulations and optimize their financial position, farmers should consult with tax professionals or refer to IRS Publication 225 for detailed guidelines.

Introduction to farm asset depreciation - Depreciation of farm assets: Tips from IRS Pub 225

2. Understanding the basics of depreciation

Understanding the basics of depreciation

Depreciation is an important concept to understand when it comes to managing farm assets. It refers to the gradual decrease in the value of an asset over time due to wear and tear, obsolescence, or other factors. By properly accounting for depreciation, farmers can accurately reflect the true value of their assets on their **financial statements and tax returns**. In this section, we will delve into the basics of depreciation and explore different methods that farmers can use to calculate and claim depreciation on their farm assets.

1. What is depreciation?

depreciation is a non-cash expense that allows farmers to allocate the cost of an asset over its useful life. It is important to note that depreciation does not represent the actual decline in the market value of an asset, but rather reflects the portion of the asset's cost that has been used up or consumed. Depreciation is typically calculated on tangible assets such as buildings, machinery, equipment, and vehicles.

2. Methods of depreciation

There are several methods of depreciation that farmers can choose from, including straight-line, declining balance, and units of production. The straight-line method is the most commonly used and involves spreading the cost of an asset evenly over its useful life. For example, if a tractor is purchased for $100,000 with a useful life of 10 years, the annual depreciation expense using the straight-line method would be $10,000.

3. Comparing the options

While the straight-line method may be the simplest to calculate and understand, it may not always be the most accurate representation of an asset's decline in value. The declining balance method, on the other hand, allows for higher depreciation expenses in the earlier years of an asset's life and lower expenses in the later years. This method is often preferred for assets that have a higher rate of obsolescence or wear and tear in the initial years.

4. units of production method

The units of production method is particularly useful for assets that are used more intensively in some years than others. This method calculates depreciation based on the actual usage or production output of the asset. For example, a combine harvester may have a longer useful life if it is only used during the harvest season, compared to one that is used year-round. The units of production method allows for a more accurate allocation of depreciation expenses based on the actual usage of the asset.

5. Best option for farmers

The choice of depreciation method ultimately depends on the specific circumstances and needs of the farmer. While the straight-line method may be simpler to calculate, it may not accurately reflect the decline in value for certain assets. The declining balance method and units of production method offer more flexibility and accuracy in certain situations. Farmers should carefully consider the nature of their assets, their intended usage, and consult with a tax professional to determine the most appropriate method for their farm.

Understanding the basics of depreciation is crucial for farmers to accurately account for the decline in value of their assets. By choosing the most suitable depreciation method and properly recording depreciation expenses, farmers can ensure that their financial statements and tax returns reflect the true value of their farm assets.

Understanding the basics of depreciation - Depreciation of farm assets: Tips from IRS Pub 225

3. Different methods of depreciation for farm assets

Methods of Depreciation

1. Straight-Line Depreciation:

One of the most commonly used methods of depreciation for farm assets is the straight-line method. This method allows farmers to deduct an equal amount of depreciation expense each year over the useful life of the asset. By spreading the cost of the asset evenly over its useful life, this method provides a straightforward and predictable way to calculate depreciation. For example, let's say you purchase a tractor for $50,000 with an estimated useful life of 10 years. Using the straight-line method, you would deduct $5,000 as depreciation expense each year for the next 10 years.

2. declining Balance depreciation:

Another method that farmers can use to depreciate their **assets is the declining balance method**. This method allows for a larger depreciation deduction in the earlier years of the asset's life, with the deduction gradually decreasing over time. It is particularly useful for assets that are expected to have a higher rate of decline in value in the early years. For instance, if you buy a piece of equipment for $100,000 with a five-year useful life and choose a 200% declining balance method, you would deduct $40,000 as depreciation expense in the first year, $24,000 in the second year, and so on until the asset has been fully depreciated.

3. Sum-of-the-Years' Digits Depreciation:

The sum-of-the-years' digits (SYD) method is another depreciation option available to farmers. This method allows for a greater depreciation expense in the earlier years of the asset's life, similar to the declining balance method. However, the SYD method spreads the depreciation deductions more evenly compared to the declining balance method. Under this method, the depreciation expense is determined by multiplying the asset's cost by a fraction, which is determined by adding the digits of the asset's useful life. For example, if you purchase a building for $200,000 with a useful life of 20 years, the first-year depreciation expense would be $20,000 (20/210 x $200,000).

4. units of Production depreciation:

The units of production method is a unique depreciation method that can be particularly advantageous for farmers whose assets' value is directly related to the amount of production they generate. This method allows for depreciation deductions based on the asset's usage or output rather than its useful life. For instance, if you own a fruit orchard and purchase a harvester for $50,000, you can depreciate the asset based on the number of pounds of fruit harvested each year. Let's say the harvester is expected to harvest a total of 100,000 pounds of fruit over its useful life. If you harvest 10,000 pounds in the first year, you would deduct $5,000 ($50,000/100,000 x 10,000) as depreciation expense.

5. Best Option:

Determining the best method of depreciation for farm assets depends on various factors, including the type of asset, its useful life, and its expected decline in value. It is essential to consider these factors and consult with a tax professional to determine the most appropriate method for your specific situation. While straight-line depreciation offers simplicity and predictability, declining balance and sum-of-the-years' digits methods may be advantageous for assets that rapidly lose value in the early years. On the other hand, the units of production method is ideal for assets tied to production output. By understanding the advantages and limitations of each method, farmers can make informed decisions to maximize their depreciation deductions while remaining compliant with IRS regulations.

Different methods of depreciation for farm assets - Depreciation of farm assets: Tips from IRS Pub 225

4. Depreciation guidelines for specific types of farm assets

Specific Types

Depreciation guidelines for specific types of farm assets:

When it comes to farm assets, depreciation guidelines can be quite specific and vary depending on the type of asset. It is important for farmers to understand these guidelines in order to accurately calculate depreciation expenses and maximize tax benefits. In this section, we will explore the depreciation guidelines for specific types of farm assets, providing insights from different perspectives to help farmers make informed decisions.

1. Buildings and structures:

- Generally, buildings and structures used in farming operations are depreciable assets. This includes barns, storage facilities, and other structures used for housing livestock or storing crops.

- The IRS provides a useful guideline for determining the useful life of a building, which is typically 20 years for most farm buildings. However, this can vary depending on factors such as the type of construction and the intended use of the building.

- It is important to note that land is not depreciable, so it is necessary to allocate the cost of a building between the land and the structure itself. This allocation can be based on the fair market value of each component or by using an appraisal.

2. Machinery and equipment:

- Machinery and equipment, such as tractors, combines, and irrigation systems, are essential for modern farming operations. These assets are typically subject to depreciation over a shorter useful life compared to buildings.

- The IRS provides guidelines for determining the useful life of machinery and equipment based on industry standards. For example, tractors are generally depreciated over a useful life of 5 to 7 years, while combines may have a useful life of 10 to 12 years.

- Farmers should consider the expected usage and technological advancements in the industry when determining the appropriate useful life for machinery and equipment. Upgrades and replacements may be necessary to maintain efficiency and productivity.

3. Livestock:

- Depreciation guidelines for livestock can be a bit more complex. Livestock, such as cows, horses, and poultry, are considered to have a limited useful life due to factors like breeding, market value, and natural lifespan.

- The IRS allows farmers to choose between two methods of depreciating livestock: the units-of-production **method or the straight-line method**. The units-of-production method takes into account the number of productive units (such as pounds of meat or gallons of milk) that the livestock will produce over its useful life. The straight-line method, on the other hand, spreads the cost of the livestock evenly over its useful life.

- Farmers should carefully evaluate their specific circumstances and consult with a tax professional to determine which depreciation method is more advantageous for their livestock operations.

4. Special rules for fruit and nut-bearing plants:

- Fruit and nut-bearing plants, such as apple trees or almond trees, have a longer productive life compared to other farm assets. As a result, the IRS provides special rules for depreciating these plants.

- Farmers can choose to depreciate the cost of fruit and nut-bearing plants over a 10-year period using the straight-line method. Alternatively, they can elect to use the 150% declining balance method, which allows for a faster depreciation rate.

- The choice of depreciation method depends on factors such as the expected productivity of the plants and the farmer's tax planning strategy. It is important to carefully analyze the potential tax benefits and consult with a tax advisor before making a decision.

Understanding the depreciation guidelines for specific types of farm assets is crucial for farmers to effectively manage their tax liabilities. By considering factors such as useful life, depreciation methods, and technological advancements, farmers can make informed decisions that maximize tax benefits and support the long-term sustainability of their farming operations.

Depreciation guidelines for specific types of farm assets - Depreciation of farm assets: Tips from IRS Pub 225

5. Calculating depreciation expenses for tax purposes

Calculating depreciation
Expenses for Tax

Calculating depreciation expenses for tax purposes can be a complex task for farmers who are looking to accurately report their income and deductions. The internal Revenue service (IRS) provides guidelines and rules on how to calculate depreciation expenses for farm assets in their publication 225. Understanding these guidelines can help farmers make informed decisions and maximize their tax benefits. In this section, we will explore the different methods of calculating depreciation expenses for tax purposes and evaluate their pros and cons.

1. Straight-Line Depreciation:

One common method used to calculate depreciation expenses is the straight-line method. This method assumes that the asset depreciates evenly over its useful life. To calculate depreciation using this method, you need to know the asset's cost, estimated salvage value, and expected useful life. The formula for straight-line depreciation is as follows:

Depreciation Expense = (Cost - Salvage Value) / Useful Life

For example, let's say a farmer purchases a tractor for $50,000 with an estimated salvage value of $5,000 and a useful life of 10 years. Using the straight-line method, the annual depreciation expense would be ($50,000 - $5,000) / 10 = $4,500.

Pros of Straight-Line Depreciation:

- Simple and easy to understand.

- Provides a consistent and predictable depreciation expense each year.

Cons of Straight-Line Depreciation:

- Does not account for the asset's actual usage or productivity.

- May not accurately reflect the asset's depreciation pattern.

2. Accelerated Depreciation:

Another method to consider is accelerated depreciation, which allows farmers to deduct larger depreciation expenses in the earlier years of an asset's life. This method recognizes that assets tend to lose value more rapidly in their early years. The most commonly used **accelerated depreciation method is the Modified Accelerated Cost Recovery system** (MACRS), which assigns assets to different recovery periods based on their classification.

Pros of Accelerated Depreciation:

- Provides larger tax deductions in the earlier years, which can help reduce taxable income.

- Reflects the asset's actual depreciation pattern more accurately.

Cons of Accelerated Depreciation:

- Requires more detailed record-keeping and understanding of IRS rules.

- Can result in smaller deductions in later years.

3. Section 179 Deduction:

In addition to regular depreciation, farmers may also be eligible for the Section 179 deduction. This deduction allows farmers to expense the full cost of qualifying assets in the year they are placed in service, rather than depreciating them over time. However, there are limitations and restrictions on the types of assets that qualify for this deduction.

Pros of Section 179 Deduction:

- Immediate tax savings by deducting the full cost of the asset in the year of purchase.

- Simplicity and ease of use compared to other depreciation methods.

Cons of Section 179 Deduction:

- Limited to a maximum deduction amount each year.

- Not all assets qualify for this deduction.

4. Choosing the Best Option:

Determining the best depreciation method for tax purposes depends on various factors such as the type of asset, its expected useful life, and the farmer's financial goals. While accelerated depreciation methods like MACRS can provide larger deductions in the earlier years, straight-line depreciation may be more suitable for assets that have a longer useful life. Additionally, the Section 179 deduction can be beneficial for farmers who want to maximize their immediate tax savings.

It is essential for farmers to consult with a tax professional or refer to IRS guidelines to ensure they are calculating depreciation expenses correctly and taking advantage of all available deductions. By understanding the different methods and evaluating their pros and cons, farmers can make informed decisions that align with their financial objectives and maximize their tax benefits.

Calculating depreciation expenses for tax purposes - Depreciation of farm assets: Tips from IRS Pub 225

6. Important considerations when depreciating farm assets

2. Useful Life Considerations

When depreciating farm assets, it is important to determine the useful life of each asset. The useful life refers to the length of time over which the asset is expected to contribute to the farming operation. Different assets may have varying useful lives, so it is crucial to evaluate each one individually.

Insights from a farmer's perspective:

From the farmer's point of view, determining the useful life of an asset requires considering factors such as the asset's condition, expected productivity, and technological advancements. For example, a tractor may have a longer useful life if it is well-maintained, regularly serviced, and used for fewer hours each year. On the other hand, a piece of equipment that becomes outdated due to technological advancements may have a shorter useful life.

Insights from a tax advisor's perspective:

From a tax advisor's point of view, it is important to understand the IRS guidelines for determining the useful life of farm assets. The IRS provides a list of assets and their corresponding recovery periods in Publication 225.

However, it is worth noting that the useful life determined by the IRS may not always align with the actual useful life of an asset. In such cases, it is advisable to consult with a tax professional to ensure compliance with tax regulations while accurately reflecting the asset's true useful life.

Considerations for choosing the best option:

1. Straight-Line Method:

The **straight-line method is a common depreciation** method that allocates the cost of an asset evenly over its useful life. This method is straightforward and easy to calculate, making it a popular choice for many farmers. For example, if a tractor has a useful life of 10 years and a cost of $50,000, the annual **depreciation expense under the straight-line** method would be $5,000 ($50,000/10).

2. Accelerated Depreciation Methods:

Accelerated depreciation methods, such as the Modified

Important considerations when depreciating farm assets - Depreciation of farm assets: Tips from IRS Pub 225

7. Maximizing tax benefits through bonus depreciation

Maximizing Tax Benefits
Benefits of Using Bonus
Benefits of Bonus Depreciation

maximizing tax benefits through bonus depreciation:

Bonus depreciation is a tax benefit that allows farmers to deduct a larger portion of the cost of qualifying assets in the year they are placed in service. This can be a significant advantage for farmers looking to maximize their tax savings and improve their cash flow. However, it is important to understand the rules and limitations of bonus depreciation to ensure that you are taking full advantage of this tax benefit.

1. Understanding bonus depreciation:

Bonus depreciation allows farmers to deduct 100% of the cost of qualifying assets in the year they are placed in service. This is a substantial increase from the regular depreciation deductions, which are spread out over several years. It is important to note that bonus depreciation is only available for new assets, not used ones. Additionally, the asset must have a recovery period of 20 years or less, which includes most farm equipment and machinery.

2. Timing of asset purchases:

To maximize the tax benefits of bonus depreciation, farmers should carefully consider the timing of their asset purchases. Placing assets in service before the end of the tax year allows for immediate deduction of the full cost under bonus depreciation. However, if the assets are placed in service after the tax year has ended, the deduction will be delayed until the following year. Farmers should work closely with their tax advisors to determine the most advantageous timing for their asset purchases.

3. Electing out of bonus depreciation:

While bonus depreciation can be a valuable tax benefit, there are situations where electing out of it may be more beneficial. For example, if a farmer expects to be in a higher tax bracket in the future, they may choose to forgo bonus depreciation and instead take advantage of regular depreciation deductions over several years. This allows for a more even distribution of tax savings and can help to reduce future tax liabilities.

4. Section 179 deduction:

In addition to bonus depreciation, farmers may also consider utilizing the Section 179 deduction. This deduction allows for the immediate expensing of the full cost of qualifying assets, up to a certain limit. The Section 179 deduction is subject to a dollar limit, which is adjusted annually, and a total investment limit. Farmers should compare the benefits of bonus depreciation and the Section 179 deduction to determine the best option for their specific circumstances.

5. Example scenario:

To illustrate the potential tax benefits of bonus depreciation, let's consider a farmer who purchases a new tractor for $100,000 in 2021. Under regular depreciation rules, the farmer would be able to deduct a portion of the cost over several years. However, with bonus depreciation, the farmer can deduct the full $100,000 in 2021, providing an immediate tax savings. This can be especially advantageous for farmers who are looking to reinvest in their operations or expand their businesses.

Maximizing tax benefits through bonus depreciation requires careful planning and consideration of the specific circumstances. By understanding the rules and limitations of bonus depreciation, timing asset purchases strategically, and comparing different options such as the Section 179 deduction, farmers can optimize their tax savings and improve their overall financial position. consulting with a tax advisor is crucial to ensure that you are taking full advantage of these tax benefits and making informed decisions for your farm.

Maximizing tax benefits through bonus depreciation - Depreciation of farm assets: Tips from IRS Pub 225

8. IRS regulations and reporting requirements for farm asset depreciation

IRS regulations
Asset Value and Depreciation

IRS regulations and reporting requirements for farm asset depreciation can be complex and overwhelming for farmers. However, understanding these regulations is crucial for accurately reporting and taking advantage of tax benefits related to depreciation. In this section, we will delve into the intricacies of IRS regulations and reporting requirements for farm asset depreciation, providing valuable insights from different points of view and comparing various options to determine the best course of action.

1. Understanding the Modified Accelerated cost Recovery system (MACRS): The MACRS is the method prescribed by the IRS for depreciating most tangible assets, including farm assets. It allows farmers to recover the cost of their assets over a predetermined period, typically through annual depreciation deductions. Farmers can choose between the general Depreciation system (GDS) or the alternative Depreciation system (ADS) under MACRS.

2. General Depreciation System (GDS) vs. Alternative Depreciation System (ADS): The GDS is the most commonly used method for farm asset depreciation. It provides for shorter recovery periods and higher depreciation deductions compared to the ADS. However, the ADS may be more suitable for

certain farm assets, such as property used predominantly for farming purposes or property used in a farming **business loan** secured by the property.

3. Depreciation Methods: Within the MACRS, farmers can use either the straight-line method or the declining balance method to calculate depreciation. The straight-line method allocates an equal amount of depreciation expense each year, while the declining balance method allows for higher deductions in the earlier years of asset use. Farmers should carefully consider the expected useful life of their assets and their financial goals when selecting a depreciation method.

4. Section 179 Expense Deduction: The Section 179 expense deduction allows farmers to deduct the full cost of certain qualifying assets, up to a specified limit, in the year they are placed in service. This deduction can provide significant tax savings and may be particularly beneficial for smaller farmers or those looking to invest in new equipment or property.

5. **bonus depreciation**: Bonus depreciation provides an additional depreciation deduction for qualified property. It allows farmers to deduct a percentage of the cost of eligible assets in the year they are placed in service, in addition to the regular depreciation deductions. This temporary provision can be especially advantageous for farmers looking to make substantial investments in new assets.

6. Reporting Requirements: Farmers must accurately report their depreciation deductions on their tax returns using form 4562, Depreciation and Amortization. This form requires detailed information about the assets, their costs, depreciation methods used, and other relevant details. It is essential to maintain proper records and documentation to support the reported depreciation deductions.

7. Consult with a Tax Professional: Given the complexity of IRS regulations and reporting requirements for farm asset depreciation, it is highly advisable for farmers to consult with a tax professional. A knowledgeable tax advisor can provide personalized guidance, help navigate the various options, and ensure compliance with all applicable regulations.

By understanding IRS regulations and reporting requirements for farm asset depreciation, farmers can optimize their tax benefits and make informed decisions regarding their assets. Considering the different depreciation methods, Section 179 expense deduction, bonus depreciation, and consulting with a tax professional are all essential steps in effectively managing farm asset depreciation. With careful planning and accurate reporting, farmers can maximize their tax savings and contribute to the overall financial success of their farming operations.

IRS regulations and reporting requirements for farm asset depreciation - Depreciation of farm assets: Tips from IRS Pub 225

9. Common mistakes to avoid when depreciating farm assets

Depreciating farm assets is a crucial aspect of managing a successful agricultural operation. As outlined in IRS Publication 225, understanding the guidelines and regulations surrounding depreciation can help farmers make informed decisions that can positively impact their financial stability. However, navigating the complex world of depreciation can be challenging, and there are several common mistakes that farmers should avoid to ensure they are maximizing their tax benefits while staying compliant with the irs. In this blog post, we will explore some of these common mistakes and provide insights on how to avoid them.

1. Failing to understand the different depreciation methods:

One of the most common mistakes farmers make is not fully understanding the various depreciation methods available to them. The IRS allows for different methods, such as the Modified Accelerated Cost Recovery System (MACRS) and the **straight-Line Depreciation method**. Each method has its own advantages and disadvantages, and it is crucial to evaluate which method aligns best with your farm's financial goals. For example, MACRS allows for faster depreciation in the early years, while straight-line depreciation offers a consistent deduction each year.

2. Neglecting to properly classify assets:

Another mistake farmers often make is failing to accurately classify their assets for depreciation purposes. It is essential to properly identify whether an asset is a tangible property (such as machinery or buildings) or an intangible property (such as patents or copyrights). Tangible assets typically have longer recovery periods, while intangible assets may be subject to different rules. By correctly classifying assets, farmers can ensure they are using the correct depreciation method and recovery period for each asset.

3. Overlooking bonus depreciation and Section 179 deduction:

Farmers should not overlook the potential benefits of bonus depreciation and the Section 179 deduction. Bonus depreciation allows farmers to deduct a significant portion of the asset's cost in the first year, while the Section 179 deduction allows for an immediate deduction of the asset's full cost, up to a certain limit. understanding the eligibility requirements and limitations of these deductions can help farmers make informed decisions about when to take advantage of them.

4. Ignoring the importance of record-keeping:

accurate record-keeping is crucial when it comes to depreciation. Farmers should maintain detailed records of asset purchases, costs, and any improvements made to the assets. This documentation will not only help in determining the correct depreciation deductions but also serve as evidence in case of an IRS audit. Utilizing farm management software or working with a qualified tax professional can streamline the record-keeping process and ensure compliance with IRS requirements.

5. Failing to reassess asset values:

Farmers often make the mistake of assuming that the value of their assets remains constant over time. However, asset values can change due to factors such as wear and tear, market fluctuations, or technological advancements. It is essential to regularly reassess the value of farm assets and adjust their depreciation accordingly. By doing so, farmers can ensure that their depreciation deductions accurately reflect the current value of their assets.

Avoiding common mistakes when depreciating farm assets is crucial for maximizing tax benefits and **staying compliant with IRS regulations**. By understanding the different depreciation methods, properly classifying assets, taking advantage of bonus depreciation and the Section 179 deduction, maintaining accurate records, and reassessing asset values, farmers can make informed decisions that align with their financial goals. Consulting with a tax professional who specializes in agricultural taxation can provide valuable insights and guidance tailored to your specific farm operation.

Understanding Farm Asset Depreciation and Tax Implications

Long-term assets that are used over multiple years, such as tractors, trucks, or combine harvesters, have a resale value that will be less than what was paid for that asset initially. The difference between the initial value of the asset and the current value stems from various factors, including wear-and-tear, reduced expected life, and so on. The difference– or the reduction in asset value– is called depreciation. Depreciation is an accounting procedure in which the anticipated decline over time in an asset value is reflected.

Determining depreciation is sometimes complicated because different assets depreciate at different rates. While the most popular depreciation approach is the straight-line depreciation approach, the Internal Revenue Service (IRS) requires certain assets to be depreciated using the declining balance approach. In certain cases, a farmer has the option to choose different depreciation methods.

So why does the depreciation method matter? Depending on the depreciation method selected, the annual tax amount owed can differ. While depreciation is not an actual cash expense, annual depreciation expense is deducted to calculate the net farm profit, and that profit amount is subject to taxation. Thus, when the depreciation expense is large, net farm profit will decrease and the amount of taxes owed may decrease accordingly.

This becomes more relevant especially when a farmer spends a significant amount of money to purchase or build a new long-term asset. When there is a major purchase of a large piece of equipment, the farmer may have a reduced cash balance for the year and face liquidity problems. Selecting depreciation methods, such as double declining balance or 150 percent declining balance approaches, can result in a greater depreciation expense in the early years, providing more room for cash reservation because more money can be saved from taxation in the early years of ownership. In this publication, we examine the specific rules of depreciation provided by the IRS and three different depreciation methods.

IRS Depreciation Rules

The IRS has established percentage tables that incorporate the applicable convention and depreciation method, which is used for taxation documents such as Schedule F Form 1040 Profit or Loss from Farming (IRS 2021a). Item 14 of the Schedule F form is for depreciation expense, which is deducted to calculate net farm profit or loss. Farmers are required to calculate depreciation expense using the Modified Accelerated Cost Recovery System (MACRS), which is a depreciation system used for tax purposes provided by the IRS (IRS 2021b; IRS 2021c).

Depending on the asset type and expected life, either the General Depreciation System (GDS) or the Alternative Depreciation System (ADS) can be used under MARCS. GDS is generally used, but ADS might be required under the following conditions:

- All property used predominantly in a farming business and placed in service in any tax year during which an election not to apply the uniform capitalization rules to certain farming costs is in effect.
- Listed property used 50 percent or less in qualified business use.

Table 1. Depreciation Method Given Type of Property

System/Method	Type of Property
GDS using 150% DB	All 15- and 20-year property; Farm or Nonfarm 3-, 5-, 7-, and 10-year property[1]
GDS using SL	Nonresidential real property; Residential rental property; Trees or vines bearing fruits or nuts; All 3-, 5-, 7-, 10-, 15-, and 20-year property[2]
ADS using SL	Any property that meets one of the ADS criteria discussed above.
GDS using 200% DB	Nonfarm 3-, 5-, 7-, and 10-year property; Farm 3-, 5-, 7-, and 10-year property placed in service after 2017

[1] If farm property obtained after 2017 the 150% DB method is no longer required
[2] 15- or 20-year farm property must use GDS using 150% DB, GDS using SL, or ADS using SL

- Any tax-exempt use property.
- Any tax-exempt bond-financed property.
- Any property imported from a foreign country for which an Executive Order is in effect because the country maintains trade restrictions or engages in other discriminatory acts.
- Any tangible property used predominantly outside the United States during the year.

2021 IRS Publication 225 provides depreciation periods for farm assets, separated between GDS and ADS (IRS 2021c). Table 1 outlines which method to use depending on the type of the asset. Note that DB refers to the declining balance approach and SL refers to the straight-line approach.

As shown in Table 1, GDS is used in most cases. Even when ADS is required, ADS only follows the straight-line approach and thus the calculation is not more complicated.

For certain assets, a farmer may elect GDS or ADS depending on the conditions outlined previously. Table 2 shows the recovery periods (depreciation period or the expected life) of an asset, separated for GDS and ADS. For example, if a farmer has a grain bin and that bin does not meet any of the ADS criteria, the farmer may use 7 years as the recovery period. If the grain bin does meet the ADS criteria, the farmer must use 10 years as the recovery period.

Depreciation Methods

Once a depreciation method is selected it is important to understand how depreciation is calculated for a given method since this can impact your tax burden. The following shows how straight-line and declining balance approaches calculate depreciation along with examples and comparisons between the two methods.

Straight-line (SL) Approach

Straight-line depreciation is the most commonly used depreciation method. The annual depreciation amount is calculated by dividing the purchase price of an asset, minus its salvage value, by the useful life of the asset or the recovery periods from Table 2.

Table 2. Depreciation Periods for Long-Term Assets

Asset	GDS	ADS
Agricultural structures (single purpose)	10	15
Automobiles	5	5
Calculators and copiers	5	6
Cattle (dairy or breeding)	5	7
Communication equipment	7	10
Computer and peripheral equipment	5	5
Drainage facilities	15	20
Farm buildings	20	25
New farm machinery and equipment	5	10
Used farm machinery and equipment	7	10
Fences (agricultural)	7	10
Goats and sheep (breeding)	5	5
Grain bin	7	10
Hogs (breeding)	3	3
Horses (age when placed in service)		
Breeding and working (12 years or less)	7	10
Breeding and working (more than 12 years)	3	10
Racing horses (more than 2 years)	3	12
Horticultural structures (single purpose)	10	15
Logging machinery and equipment	5	6
Nonresidential real property	39	40
Office furniture, fixtures, and equipment (not calculators, copiers, or typewriters)	7	10
Paved lots	15	20
Residential rental property	27.5	40
Tractor units (over-the-road)	3	4
Trees or vines bearing fruits or nuts	10	20
Truck (heavy duty, unloaded weight 13,000 lbs. or more)	5	6
Truck (actual weight less than 13,000 lbs.)	5	5
Water wells	15	20

Table 3. Depreciation Expense Example Comparison Between Straight-Line, Declining Balance Using 150%, and Declining Balance Using 200%

Year	Straight-Line	150% Declining Balance	200% Declining Balance
1	$1,800	$3,000	$4,000
2	$1,800	$2,100	$2,400
3	$1,800	$1,470	$1,440
4	$1,800	$1,029	$864
5	$1,800	$1,401	$296
Total	$9,000	$9,000	$9,000

Salvage value refers to the expected resale value of an asset after its useful life.

Annual Depreciation = (Purchase Price of an Asset-Salvage Value) / (Recovery Periods)

Example 1: Assume that you just purchased an automobile for $10,000. Based on MACRS depreciation periods, you expect the asset to last five years. After five years, you expect to sell the asset at $1,000. Then, under the straight-line approach, the annual depreciation amount is $1,800, which will be the same across the entire five years of its useful life:

Annual Depreciation = ($10,000-$1,000) / 5= 1,800

The main benefits of SL include consistency and convenience. It is easy to calculate, and the depreciation amount does not change over the years. In this example, the annual depreciation amount for the next five years is fixed at $1,800.

Declining Balance (DB) Approach

Under the declining balance approach, the depreciation amount is the greatest at the beginning of the asset's useful life and the amount decreases over time. The equation is:

Annual Depreciation = (1.5 or 2) / (Recovery Periods) * Value of asset at the beginning of the year

where the value of the asset at the beginning of the year is equal to the value of the asset at the beginning of the previous year minus the depreciation amount of last year. When using 150% DB, use 1.5 for the numerator. If 200% DB is to be used, use 2 for the numerator. The annual depreciation amount at the last year of the asset's useful life is the simple difference between the asset value at the beginning of the final year minus the salvage value.

Example 2: We are going to assume that the asset has the same purchase value, salvage value, and recovery periods as Example 1. However, we are going to see what happens to the depreciation expense amount under the declining balance approach using the 200% rule. For the declining balance approach using the 150% rule, you can simply switch 2 to 1.5 in the numerator.

For Year 1, the value of an asset is equal to the purchase price of $10,000. Thus, the annual depreciation amount for Year 1 is:

Depreciation Year 1 = 2/5 * $10,000 = $4,000

Therefore, the asset depreciated by $4,000 in year 1. For Year 2, the depreciation expense that occurred at Year 1 reflects the reduction in the asset's value. Thus, the value of the automobile at the beginning of Year 2 is $6,000 ($10,000-$4,000=$6,000). The annual depreciation amount for Year 2 is calculated by:

Depreciation Year 2 = 2/5 * $6,000 = $2,400

In Year 2, the annual depreciation expense is now $2,400. The value of the automobile at the beginning of Year 3 is $3,600 ($6,000-$2,400=$3,600). This is repeated for Years 3 and 4, with the annual depreciation expenses being $1,440 and $864, respectively. At the end of Year 4, the asset value should be equal to $1,296.

For Year 5, the depreciation expense is the difference between the asset value at the beginning of Year 5 minus the salvage value because this will be the final year of useful life. In this example the salvage value was $1,000. So, the Year 5 depreciation amount is the difference between $1,296 and $1,000, or $296. Table 3 provides an annual depreciation expense summary for this example using different depreciation methods.

Note that the total accumulated depreciation expenses are equal to $9,000 regardless of which method is used. In general, under the declining balance approach, the annual depreciation expense decreases over time. Compared to the straight-line approach where annual depreciation expense is the same over the life of the asset. The declining balance approach can be particularly helpful when making a significant purchase, reducing tax burdens in the early years of ownership.

The following example shows how different depreciation methods can impact your tax burden. Assume that a farmer is subject to an 18% income tax and their annual farm profit excluding depreciation expense is $100,000. Because depreciation expense is an expense that reduces net farm profit, a greater depreciation expense will result in a lower taxable income.

For years 1 through 5, the farm tax amount will look like this:

Table 4. Differences in Annual Tax Expense Between Depreciation Methods

Year	Straight-Line	150% Declining Balance	200% Declining Balance
1	(100,000-1,800)*0.18 = 17,676	(100,000-3,000)*0.18 = 17,460	(100,000-4,000)*0.18 = 17,280
2	(100,000-1,800)*0.18 = 17,676	(100,000-2,100)*0.18 = 17,622	(100,000-2,400)*0.18 = 17,568
3	(100,000-1,800)*0.18 = 17,676	(100,000-1,470)*0.18 = 17,735.4	(100,000-1,440)*0.18 = 17,740.8
4	(100,000-1,800)*0.18 = 17,676	(100,000-1,029)*0.18 = 17,814.8	(100,000-864)*0.18 = 17,844.5
5	(100,000-1,800)*0.18 = 17,676	(100,000-1,401)*0.18 = 17,747.8	(100,000-296)*0.18 = 17,946.7

Under the straight-line approach, the tax amount would be $17,676 in Year 1. If they elected 200% declining balance approach, however, the tax amount would be $17,280 or a decrease of $396 relative to the straight-line approach.

Almost always, the declining balance approach provides greater tax benefits in the early years compared to the straight-line approach. However, the straight-line approach can have greater tax benefits as the asset reaches the end of its useful life. For instance, the Year 5 tax expense is the greatest for the 200% declining balance approach at $17,946.70 compared to $17,676 for the straight-line approach and $17,747.80 for the 150% declining balance approach.

The only difference between GDS and ADS is the depreciation years. If ADS is to be applied, use the years in the last column of Table 2.

As discussed, if a farmer makes a major purchase, they likely have a reduced cash balance for the year. Selecting the DB method can help the farmer to save more on tax in the early years at the expense of greater tax expense in later years. It is important for farmers to understand how these different depreciation methods can impact their tax burden throughout the lifetime of the asset, and determine which depreciation method will help maintain a financially resilient farm business.

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MISSISSIPPI STATE UNIVERSITY EXTENSION

2020 Texas Agricultural Custom Rates

July 2020

Custom Rates Survey
Conducted and Compiled by
Texas A&M AgriLife Extension Service
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2020 Texas Agricultural Custom Rates

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2020 Texas Agricultural Custom Rates

Introduction

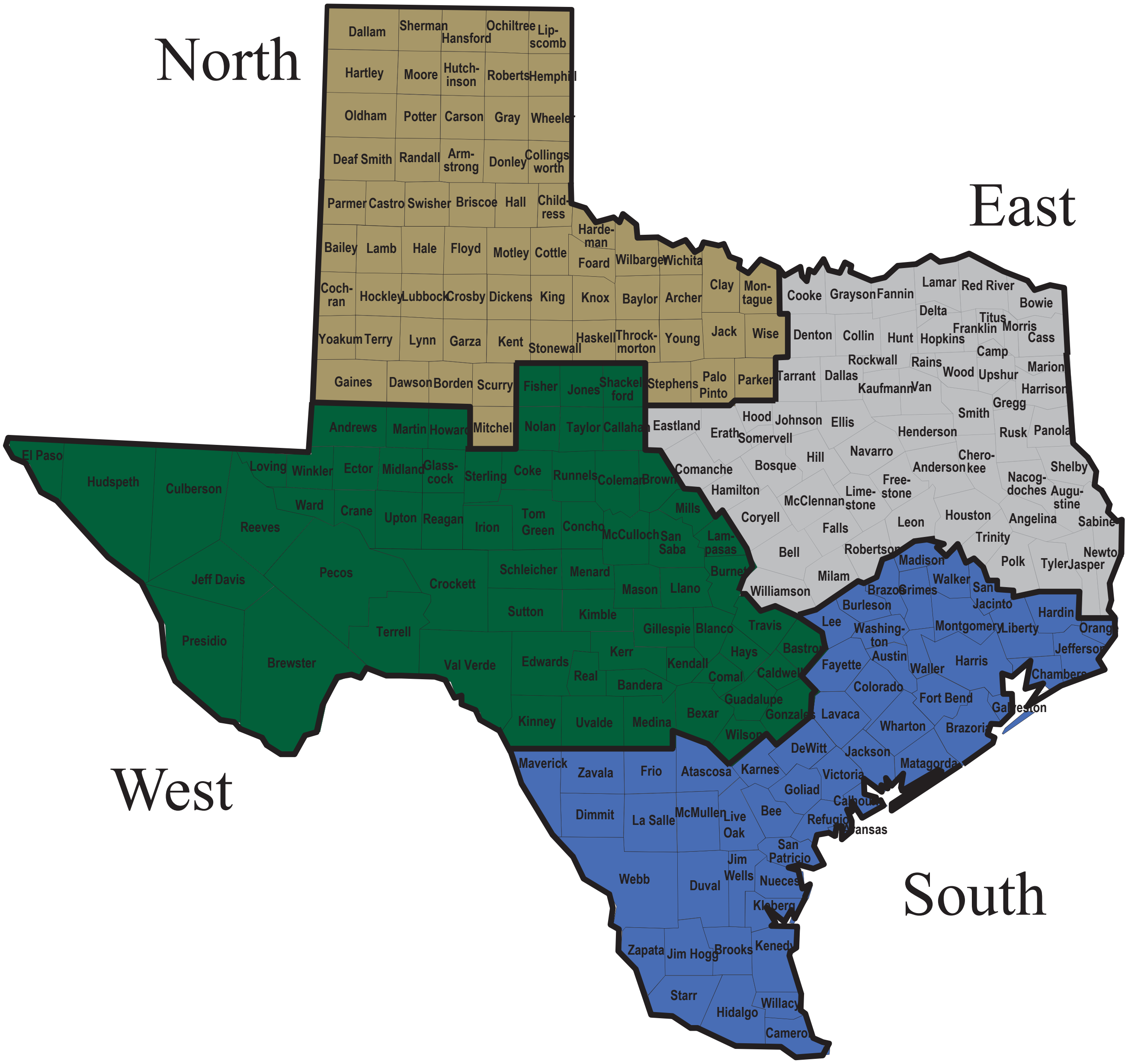
The data presented in this publication represent the responses of a survey conducted from January through May of 2020 by the Texas A&M AgriLife Extension Service, Department of Agricultural Economics. Survey respondents include both providers and users of custom services, and data reflect the prices paid for typical farm and ranch custom operations. Survey sampling and methodology were changed in 2011. Prior Texas Custom Rate Statistics Reports may not be directly comparable to reports of 2011 and after.

The survey data and publication include rates for tractor rental, row crop field operations, harvesting, hay baling, various land improvements, and livestock services. Inclusions and exclusions are noted in each section, but typically materials are not included in the rates listed. For each rate, five statistics are reported: number of responses, average rate, minimum, maximum, and most common. For rates where no common responses are recorded, the most common statistic will indicate N/A. Some custom rates are charged based on a set of factors rather than a single rate. For example, wheat harvesting may be priced at a rate/acre + rate/bushel + overage charge for yield over a specified level. For these combination rates, we simply report the statistics of each individual factor.

Reliability of rates and statistics reported are highly dependent on the number of responses in each category. Categories were left blank if fewer than three useable responses were collected. Data are presented on a regional and statewide level only. Geographic regions (North, East, West, and South) are based on combinations of administrative districts of the Texas A&M AgriLife Extension Service.

The survey coordinating team extends its gratitude to the survey respondents that took the time to complete and return the survey, as well as the AgriLife Extension County Agents and Specialists that supported the survey process.

Texas Custom Rates Survey Regions



2020 Texas Agricultural Custom Rates

Survey Methodology

The 2020 Texas Agricultural Custom Rates Survey was developed to provide information regarding typical prices paid/charged for custom agricultural services or operations.

The sampling of agricultural custom service providers and users was developed with the assistance of the entire Texas A&M AgriLife Extension Service network across the State. On a county basis individuals were selected for their anticipated knowledge of custom rates in the area and/or participation in past surveys. A total of 1043 individuals across the four regions were invited to participate. A combination of traditional mailed surveys (705) and email only invitations (338) was used. A reminder postcard was sent two weeks after the first mailing. A second survey was mailed a month after the first to individuals that had not responded initially. Where available, email reminders and invitations accompanied each physical mailing. Participants were asked to voluntarily provide information on only the custom rates with which they were familiar. Valid responses were received from 22.3% (233) of the original 1043 sample.

In addition to the mail and email survey samples, the online survey was published through a variety of sources inviting public participation. Valid survey responses were collected from 110 individuals not connected to the original sample.

A total of 343 usable responses were collected and analyzed for publication. Prior to publication, the survey data was reviewed and a minimal number of responses were eliminated to avoid unreasonable price ranges.

2020 Texas Agricultural Custom Rates, Sample and Response by Region

	Hard Copy Mailed Survey				Email Solicitation Only					
		Usable Response								
	Sample	Paper	Internet	Response Rate	Sample	Usable Response	Response Rate	**Overall Response Rate**	Public Internet Response	**Total Usable Response**
North	170	41	4	26.5%	98	12	12.2%	21.3%	24	81
East	136	40	4	32.4%	101	16	15.8%	25.3%	40	100
West	226	47	3	22.1%	66	10	15.2%	20.5%	19	79
South	173	37	7	25.4%	73	12	16.4%	22.8%	27	83
Total	**705**	**165**	**18**	**26.0%**	**338**	**50**	**14.8%**	**22.3%**	**110**	**343**

TRACTOR RENTAL

Tractor only, excluding cost of operator and fuel

		North	East	West	South	State
Tractor Only: Less than 100 h.p.	Responses	5	13	10	8	36
Rate per Hour	Average	39.00	51.73	60.38	45.88	51.06
	Minimum	20.00	20.00	15.00	25.00	15.00
	Maximum	60.00	150.00	125.00	65.00	150.00
	Most Common	#N/A	50.00	100.00	50.00	50.00
Tractor Only: 100 to 149 h.p.	Responses	5	10	7	13	35
Rate per Hour	Average	51.96	54.20	74.93	69.58	63.74
	Minimum	29.80	20.00	17.00	35.00	17.00
	Maximum	85.00	125.00	137.50	130.00	137.50
	Most Common	#N/A	45.00	100.00	75.00	50.00
Tractor Only: 150 to 250 h.p.	Responses	13	11	5	9	38
Rate per Hour	Average	62.54	58.91	82.50	75.83	67.26
	Minimum	30.00	25.00	30.00	30.00	25.00
	Maximum	155.00	125.00	162.50	110.00	162.50
	Most Common	85.00	55.00	#N/A	100.00	55.00
Tractor Only: More than 250 h.p.	Responses	11	10	8	6	35
Rate per Hour	Average	74.75	111.20	116.88	110.00	100.84
	Minimum	25.00	27.00	40.00	60.00	25.00
	Maximum	200.00	350.00	200.00	150.00	350.00
	Most Common	25.00	70.00	200.00	150.00	70.00

LAND TILLAGE OPERATIONS
Including cost of operator, machine and fuel

		North	East	West	South	State
Moldboard: Shallow (less than 12 inches) Rate per Acre	Responses	6	6	6	7	25
	Average	21.67	20.83	17.50	23.71	21.04
	Minimum	8.00	20.00	12.00	6.00	6.00
	Maximum	50.00	25.00	22.00	30.00	50.00
	Most Common	15.00	20.00	22.00	30.00	20.00
Moldboard: Deep (deeper than 12 inches) Rate per Acre	Responses	6	6	6	9	27
	Average	26.33	25.25	24.00	30.00	26.80
	Minimum	10.00	17.50	18.00	7.00	7.00
	Maximum	50.00	30.00	30.00	50.00	50.00
	Most Common	#N/A	30.00	25.00	35.00	30.00
Surface chisel (3 to 8 inches) Rate per Acre	Responses	27	16	16	10	69
	Average	14.39	16.44	18.69	14.60	15.89
	Minimum	10.00	15.00	10.00	3.00	3.00
	Maximum	25.00	20.00	35.00	22.00	35.00
	Most Common	12.00	15.00	15.00	20.00	15.00
Deep chisel (deeper than 8 inches) Rate per Acre	Responses	21	10	9	10	50
	Average	19.07	18.35	18.39	23.50	19.69
	Minimum	10.00	15.00	12.00	10.00	10.00
	Maximum	35.00	25.00	30.00	35.00	35.00
	Most Common	16.00	15.00	16.00	30.00	15.00
Tandem disc Rate per Acre	Responses	27	26	21	19	93
	Average	14.87	18.21	16.17	22.05	17.56
	Minimum	10.00	10.00	8.00	8.00	8.00
	Maximum	30.00	65.00	35.00	80.00	80.00
	Most Common	15.00	15.00	12.00	20.00	15.00
Offset disc Rate per Acre	Responses	13	12	12	15	52
	Average	15.04	18.58	18.58	28.60	20.59
	Minimum	4.50	10.00	10.00	12.00	4.50
	Maximum	25.00	25.00	35.00	80.00	80.00
	Most Common	15.00	15.00	10.00	15.00	15.00

2020 Texas Agricultural Custom Rates

Number of Survey Responses and Rates ($) per Unit for Regions of Texas

LAND TILLAGE OPERATIONS

Including cost of operator, machine and fuel

Operation		North	East	West	South	State
Field cultivator (spring tooth harrow) Rate per Acre	Responses	22	20	14	12	68
	Average	13.50	13.83	12.56	13.33	13.37
	Minimum	8.00	10.00	8.00	6.00	6.00
	Maximum	25.00	20.00	18.00	20.00	25.00
	Most Common	15.00	15.00	10.00	15.00	15.00
Listing / Shaping Beds Rate per Acre	Responses	10	4	5	5	24
	Average	12.30	14.50	13.20	14.20	13.25
	Minimum	10.00	10.00	9.00	10.00	9.00
	Maximum	15.00	20.00	18.00	20.00	20.00
	Most Common	10.00	10.00	#N/A	#N/A	10.00
Sand fighter Rate per Acre	Responses	10	2	5	3	20
	Average	9.60		8.80	8.67	9.30
	Minimum	5.00		4.00	8.00	4.00
	Maximum	15.00		14.00	10.00	15.00
	Most Common	12.00		8.00	8.00	8.00
Rotary hoe Rate per Acre	Responses	14	2	6	4	26
	Average	9.14		9.33	10.25	9.42
	Minimum	5.00		4.00	8.00	4.00
	Maximum	15.00		14.00	15.00	15.00
	Most Common	8.00		10.00	8.00	10.00
Row crop cultivator Rate per Acre	Responses	11	4	4	5	24
	Average	12.45	9.50	14.00	11.00	11.92
	Minimum	8.00	8.00	10.00	8.00	8.00
	Maximum	15.00	10.00	18.00	15.00	18.00
	Most Common	15.00	10.00	#N/A	10.00	10.00

LAND TILLAGE OPERATIONS

Including cost of operator, machine and fuel

		North	East	West	South	State
Stalk destruction (cutter)	Responses	10	7	3	6	26
Rate per Acre	Average	10.79	17.57	10.67	17.50	14.15
	Minimum	5.00	10.00	7.00	10.00	5.00
	Maximum	20.00	25.00	15.00	40.00	40.00
	Most Common	8.00	15.00	#N/A	10.00	10.00
Stalk destruction (shredder)	Responses	10	15	9	7	41
Rate per Acre	Average	12.80	20.33	12.67	19.43	16.66
	Minimum	6.00	15.00	5.00	12.00	5.00
	Maximum	20.00	40.00	20.00	40.00	40.00
	Most Common	12.00	15.00	15.00	12.00	15.00
Strip Till	Responses	15	5	7	6	33
Rate per Acre	Average	19.13	18.00	19.14	15.00	18.21
	Minimum	12.00	10.00	12.00	10.00	10.00
	Maximum	30.00	20.00	25.00	20.00	30.00
	Most Common	20.00	20.00	20.00	#N/A	20.00

2020 Texas Agricultural Custom Rates

Number of Survey Responses and Rates ($) per Unit for Regions of Texas

PLANTING OPERATIONS

Including operator, machine and fuel; Excluding seed and materials

Planting and Chemical Application
Row Crops
Rate per Acre

	North	East	West	South	State
Responses	13	11	3	4	31
Average	19.96	22.05	21.00	19.50	20.74
Minimum	14.00	12.00	18.00	16.00	12.00
Maximum	28.00	50.00	25.00	25.00	50.00
Most Common	18.00	22.00	#N/A	#N/A	25.00

Planting Only
Row Crops
Rate per Acre

	North	East	West	South	State
Responses	23	12	10	7	52
Average	16.40	17.79	13.90	15.29	16.09
Minimum	10.00	14.00	8.00	12.00	8.00
Maximum	25.75	20.00	20.00	20.00	25.75
Most Common	18.00	20.00	10.00	15.00	20.00

Planting and Chemical Application
No till: Row crops
Rate per Acre

	North	East	West	South	State
Responses	7	5	1	1	14
Average	19.14	23.60			20.64
Minimum	14.00	22.00			14.00
Maximum	24.00	25.00			25.00
Most Common	18.00	25.00			22.00

Planting Only
No till: Row crops
Rate per Acre

	North	East	West	South	State
Responses	17	8	5	2	32
Average	16.53	20.38	17.20		17.25
Minimum	12.00	15.00	10.00		5.00
Maximum	25.00	30.00	24.00		30.00
Most Common	20.00	20.00	20.00		20.00

Planting and Chemical Application
No till: Drilling
Rate per Acre

	North	East	West	South	State
Responses	9	2	2	0	13
Average	18.67				18.69
Minimum	14.00				14.00
Maximum	25.00				25.00
Most Common	18.00				25.00

Planting Only
No till: Drilling
Rate per Acre

	North	East	West	South	State
Responses	21	15	8	4	48
Average	16.90	19.50	18.25	21.25	18.30
Minimum	10.00	10.00	10.00	10.00	10.00
Maximum	35.00	40.00	35.00	25.00	40.00
Most Common	18.00	20.00	10.00	25.00	20.00

PLANTING OPERATIONS

Including operator, machine and fuel; Excluding seed and materials

		North	East	West	South	State
Planting Only peanuts Rate per Acre	Responses	4	1	2	1	8
	Average	15.25				14.88
	Minimum	14.00				10.00
	Maximum	18.00				20.00
	Most Common	14.00				14.00
Drilling: Small grains, sudan, grain sorghum, ryegrass, soybeans, beans Rate per Acre	Responses	30	22	21	9	82
	Average	14.88	15.32	15.26	19.78	15.63
	Minimum	7.50	10.00	3.00	10.00	3.00
	Maximum	25.00	25.00	35.00	40.00	40.00
	Most Common	15.00	15.00	10.00	10.00	15.00
Drilling: Alfalfa and other legumes Rate per Acre	Responses	6	7	3	3	19
	Average	16.17	22.14	18.33	23.33	19.84
	Minimum	14.00	20.00	12.00	10.00	10.00
	Maximum	20.00	25.00	23.00	40.00	40.00
	Most Common	14.00	20.00	#N/A	#N/A	20.00
Grass seeding Rate per Acre	Responses	13	12	9	10	44
	Average	21.54	32.45	29.44	22.00	26.24
	Minimum	7.00	10.00	14.00	10.00	7.00
	Maximum	60.00	100.00	65.00	60.00	100.00
	Most Common	20.00	25.00	#N/A	10.00	25.00
Sprigging bermuda grass (does not include cost of sprigs) Rate per Acre	Responses	4	17	3	12	36
	Average	26.00	70.59	58.33	91.58	71.61
	Minimum	12.00	20.00	30.00	24.00	12.00
	Maximum	60.00	175.00	100.00	300.00	300.00
	Most Common	#N/A	50.00	#N/A	50.00	50.00

Number of Survey Responses and Rates ($) per Unit for Regions of Texas

APPLICATION OF FERTILIZER AND LIME

Including operator, machine and fuel; Excluding materials

		North	East	West	South	State
Anhydrous ammonia	Responses	7	11	1	0	19
Rate per Acre	Average	13.50	17.77			16.84
	Minimum	5.00	12.00			5.00
	Maximum	20.00	25.00			30.00
	Most Common	15.00	15.00			15.00
Dry mixed fertilizer	Responses	20	36	13	21	90
Rate per Acre	Average	8.66	9.70	9.77	11.74	9.96
	Minimum	4.00	3.00	4.00	4.25	3.00
	Maximum	30.60	50.00	28.00	50.00	50.00
	Most Common	5.00	5.00	8.00	8.00	5.00
Liquid fertilizer	Responses	21	29	21	22	93
Rate per Acre	Average	6.14	7.90	7.76	10.75	8.15
	Minimum	5.00	3.00	3.50	4.50	3.00
	Maximum	15.00	25.00	15.00	30.00	30.00
	Most Common	5.00	5.00	8.00	10.00	5.00
Aerial application of fertilizer	Responses	6	8	2	5	21
Rate per Acre	Average	7.59	8.19		9.20	8.12
	Minimum	5.00	6.00		5.00	5.00
	Maximum	13.51	10.00		12.00	13.51
	Most Common	#N/A	8.00		10.00	7.50
Lime application	Responses	6	12	2	7	27
Rate per Ton	Average	21.00	23.21		19.14	20.87
	Minimum	5.00	5.00		10.00	5.00
	Maximum	45.00	75.00		40.00	75.00
	Most Common	5.00	20.00		10.00	10.00
Manure/compost spreading	Responses	6	11	1	2	20
Rate per Ton	Average	6.29	15.84			14.70
	Minimum	3.50	4.25			3.50
	Maximum	18.00	35.00			55.00
	Most Common	3.50	10.00			10.00

APPLICATION OF CHEMICALS

Including operator, machine and fuel; Excluding materials

		North	East	West	South	State
Insecticides and fungicides	Responses	14	10	4	10	38
Flat Rate Aerial Application	Average	6.71	7.30	7.13	7.60	7.14
Rate per Acre	Minimum	5.00	6.00	6.00	5.00	5.00
	Maximum	10.00	9.00	8.00	10.00	10.00
	Most Common	7.00	8.00	8.00	8.00	8.00
Insecticides and fungicides	Responses	24	30	12	23	89
Flat Rate Ground Application	Average	6.61	7.61	8.42	8.70	7.73
Rate per Acre	Minimum	4.50	3.00	5.00	5.00	3.00
	Maximum	15.00	25.00	16.00	20.00	25.00
	Most Common	6.00	6.00	6.00	6.00	6.00
Herbicides	Responses	17	10	4	10	41
Flat Rate Aerial Application	Average	6.65	8.00	6.88	7.25	7.15
Rate per Acre	Minimum	5.00	6.00	6.00	5.00	5.00
	Maximum	12.00	15.00	8.00	9.00	15.00
	Most Common	7.00	6.00	#N/A	8.00	6.00
Herbicides	Responses	30	38	20	33	121
Flat Rate Ground Application	Average	7.07	10.11	11.25	12.59	10.22
Rate per Acre	Minimum	4.00	3.00	5.00	5.00	3.00
	Maximum	25.00	40.00	32.00	50.00	50.00
	Most Common	6.00	6.00	8.00	7.00	6.00
Plant growth regulators/defoliants	Responses	12	6	4	6	28
Flat Rate Aerial Application	Average	6.42	8.17	6.88	7.00	6.98
Rate per Acre	Minimum	5.00	8.00	6.00	5.00	5.00
	Maximum	7.00	9.00	8.00	8.50	9.00
	Most Common	7.00	8.00	#N/A	#N/A	8.00
Plant growth regulators/defoliants	Responses	21	19	8	12	60
Flat Rate Ground Application	Average	5.94	7.51	8.38	8.58	7.29
Rate per Acre	Minimum	4.50	3.00	5.00	5.00	3.00
	Maximum	8.00	25.00	16.00	15.00	25.00
	Most Common	6.00	6.00	6.00	10.00	6.00

COTTON HARVESTING

Including operator, machine and fuel

		North	East	West	South	State
Stripping cotton	Responses	20	7	6	4	37
Rate per Lint Pound	Average	0.09	0.11	0.11	0.11	0.10
	Minimum	0.08	0.06	0.08	0.10	0.06
	Maximum	0.15	0.15	0.15	0.12	0.15
	Most Common	0.08	0.10	0.10	0.10	0.08
Stripping cotton (with on board module building)	Responses	10	3	5	4	22
Rate per Lint Pound	Average	0.12	0.11	0.11	0.12	0.12
	Minimum	0.10	0.09	0.10	0.11	0.09
	Maximum	0.14	0.13	0.12	0.13	0.14
	Most Common	0.12	#N/A	0.12	0.11	0.12
Picking cotton	Responses	2	2	2	5	11
Rate per Lint Pound	Average				0.12	0.13
	Minimum				0.10	0.09
	Maximum				0.14	0.20
	Most Common				0.12	0.12
Picking cotton (with on board module building)	Responses	3	3	3	10	19
Rate per Lint Pound	Average	0.15	0.13	0.12	0.13	0.13
	Minimum	0.14	0.12	0.10	0.12	0.10
	Maximum	0.18	0.15	0.14	0.14	0.18
	Most Common	0.14	#N/A	#N/A	0.14	0.14

COTTON GINNING

Including operator, machine and fuel

		North	East	West	South	State
Ginning cotton (one price)	Responses	4	1	1	2	8
Rate per CWT of Seed Cotton	Average	2.80				2.97
	Minimum	2.50				2.30
	Maximum	2.95				5.00
	Most Common	#N/A				2.50

		North	East	West	South	State
Two price cotton ginning	Responses	2	2	4	0	8
a. Ginning cotton	Average			2.74		2.69
Rate per CWT of Seed Cotton	Minimum			2.50		2.15
	Maximum			3.25		3.25
	Most Common			2.50		2.50

		North	East	West	South	State
Two price cotton ginning	Responses	3	2	4	0	9
b. Bagging and ties	Average	13.22		10.63		11.27
Rate per Bale	Minimum	8.00		5.00		5.00
	Maximum	19.15		15.00		19.15
	Most Common	#N/A		15.00		15.00

PEANUT HARVESTING

Including operator, machine and fuel

		North	East	West	South	State
Peanut Harvesting	Responses	3	1	0	0	4
a. Dig and Shake	Average	20.67				23.00
Rate per Acre	Minimum	12.00				12.00
	Maximum	25.00				30.00
	Most Common	25.00				25.00

		North	East	West	South	State
Peanut Harvesting	Responses	2	0	0	2	4
b. Combining and hauling:	Average					33.75
Flat Rate (no extra charges)	Minimum					20.00
Rate per Ton (field weight)	Maximum					50.00
	Most Common					20.00

FLAT RATE COMBINING AND HAULING

Including operator, machine and fuel

		North	East	West	South	State
Combining and hauling:	Responses	8	5	4	4	21
Flat Rate (no extra charges)	Average	0.35	0.41	0.49	0.65	0.45
Corn	Minimum	0.20	0.25	0.25	0.23	0.20
Rate per Bushel	Maximum	0.60	0.50	0.65	0.85	0.85
	Most Common	0.35	0.45	0.65	#N/A	0.25
Combining and hauling:	Responses	7	4	3	4	18
Flat Rate (no extra charges)	Average	0.32	0.39	0.37	0.72	0.43
Grain sorghum	Minimum	0.22	0.25	0.22	0.56	0.22
Rate per Bushel	Maximum	0.50	0.55	0.65	0.80	0.80
	Most Common	0.25	#N/A	#N/A	0.80	0.25
Combining and hauling:	Responses	1	6	1	0	8
Flat Rate (no extra charges)	Average		0.55			0.58
Soybeans	Minimum		0.30			0.25
Rate per Bushel	Maximum		1.00			1.10
	Most Common		0.30			0.30
Combining and hauling:	Responses	9	7	5	1	22
Flat Rate (no extra charges)	Average	0.42	0.45	0.22		0.40
Wheat and other small grains	Minimum	0.25	0.25	0.15		0.15
Rate per Bushel	Maximum	1.00	0.75	0.25		1.00
	Most Common	0.25	0.25	0.25		0.25
Hauling Only	Responses	6	6	3	4	19
All Grain	Average	6.33	3.92	4.17	3.00	4.53
Rate per Loaded Mile	Minimum	3.00	3.50	3.50	1.00	1.00
	Maximum	12.00	4.50	5.00	5.00	12.00
	Most Common	4.50	4.00	#N/A	#N/A	4.00

COMBINING AND HAULING CORN

Including operator, machine and fuel

Combining and hauling Corn
Reported as Combination of per Acre rate, hauling, plus overage

		North	East	West	South	State
a. Rate per Acre	Responses	4	13	3	6	26
	Average	33.75	26.50	26.33	31.67	28.79
	Minimum	25.00	20.00	24.00	18.00	18.00
	Maximum	40.00	30.00	30.00	40.00	40.00
	Most Common	40.00	25.00	#N/A	35.00	30.00
b. Hauling per Bushel	Responses	3	9	2	5	19
	Average	0.35	0.22		0.28	0.26
	Minimum	0.25	0.15		0.17	0.15
	Maximum	0.50	0.30		0.60	0.60
	Most Common	#N/A	0.15		#N/A	0.25
c. Overage Rate per Bushel	Responses	1	1	0	1	3
	Average					0.24
	Minimum					0.20
	Maximum					0.32
	Most Common					0.20
d. Overage charged on yields over:	Responses	2	1	0	2	5
	Average					104.00
	Minimum					40.00
	Maximum					140.00
	Most Common					100.00

COMBINING AND HAULING GRAIN SORGHUM

Including operator, machine and fuel

Combining and hauling Grain Sorghum
Reported as Combination of per Acre rate, hauling, plus overage

		North	East	West	South	State
a. Rate per Acre	Responses	10	11	6	7	34
	Average	24.50	25.41	23.33	30.71	25.87
	Minimum	20.00	20.00	18.00	25.00	18.00
	Maximum	30.00	30.00	30.00	40.00	40.00
	Most Common	24.00	25.00	#N/A	30.00	25.00
b. Hauling per Bushel	Responses	7	6	3	6	22
	Average	0.25	0.22	0.24	0.31	0.26
	Minimum	0.12	0.10	0.23	0.17	0.10
	Maximum	0.35	0.30	0.25	0.60	0.60
	Most Common	0.25	0.30	0.25	0.20	0.25
c. Overage Rate per Bushel	Responses	4	1	1	0	6
	Average	0.24				0.23
	Minimum	0.20				0.20
	Maximum	0.26				0.26
	Most Common	0.24				0.20
d. Overage charged on yields over:	Responses	5	1	1	1	8
	Average	49.80				68.63
	Minimum	20.00				20.00
	Maximum	125.00				150.00
	Most Common	40.00				40.00

COMBINING AND HAULING SOYBEANS

Including operator, machine and fuel

Combining and hauling Soybeans
Reported as Combination of per Acre rate, hauling, plus overage

		North	East	West	South	State
a. Rate per Acre	Responses	2	9	0	0	11
	Average		28.61			30.23
	Minimum		25.00			25.00
	Maximum		35.00			40.00
	Most Common		30.00			30.00
b. Hauling per Bushel	Responses	2	6	0	0	8
	Average		0.30			0.33
	Minimum		0.10			0.10
	Maximum		0.50			0.50
	Most Common		0.30			0.30
c. Overage Rate per Bushel	Responses	0	1	0	0	1
	Average					
	Minimum					
	Maximum					
	Most Common					
d. Overage charged on yields over:	Responses	1	1	0	0	2
	Average					
	Minimum					
	Maximum					
	Most Common					

COMBINING AND HAULING WHEAT/OTHER SMALL GRAINS

Including operator, machine and fuel		North	East	West	South	State

Combining and hauling Wheat and other small grains
Reported as Combination of per Acre rate, hauling, plus overage

		North	East	West	South	State
a. Rate per Acre	Responses	15	18	9	4	46
	Average	24.33	25.47	22.89	27.00	24.73
	Minimum	22.00	20.00	18.00	25.00	18.00
	Maximum	26.00	30.00	30.00	30.00	30.00
	Most Common	24.00	25.00	22.00	#N/A	25.00
b. Hauling per Bushel	Responses	13	11	7	2	33
	Average	0.24	0.25	0.25		0.24
	Minimum	0.12	0.10	0.22		0.10
	Maximum	0.40	0.50	0.30		0.50
	Most Common	0.25	0.30	0.25		0.25
c. Overage Rate per Bushel	Responses	13	2	3	1	19
	Average	0.23		0.23		0.23
	Minimum	0.10		0.22		0.10
	Maximum	0.26		0.25		0.26
	Most Common	0.24		#N/A		0.24
d. Overage charged on yields over:	Responses	13	2	3	1	19
	Average	23.69		24.00		27.63
	Minimum	10.00		20.00		10.00
	Maximum	60.00		30.00		60.00
	Most Common	20.00		#N/A		20.00

HAY CUTTING AND BALING OPERATIONS

Including operator, machine and fuel

Complete Haying Job (mow, condition, rake, and bale)
For various type/size bales
Excluding Hauling

		North	East	West	South	State
Small Square Bales	Responses	7	24	9	17	57
Twine or Wire Tie	Average	2.61	2.27	2.53	2.48	2.42
Rate per Bale	Minimum	1.00	1.00	1.75	1.25	1.00
	Maximum	6.00	3.00	3.75	5.00	6.00
	Most Common	2.00	2.00	2.00	2.50	2.00
Round Bales	Responses	6	32	12	21	71
Less than 1500 lbs	Average	24.17	25.66	29.58	27.38	26.70
Twine or Wire Tie	Minimum	15.00	18.00	20.00	20.00	15.00
Rate per Bale	Maximum	35.00	35.00	40.00	40.00	40.00
	Most Common	25.00	25.00	35.00	28.00	25.00
Round Bales	Responses	4	13	4	15	36
Over 1500 lbs	Average	27.00	28.35	26.00	29.07	28.24
Twine or Wire Tie	Minimum	20.00	24.00	20.00	20.00	20.00
Rate per Bale	Maximum	35.00	35.00	32.00	40.00	40.00
	Most Common	#N/A	30.00	#N/A	30.00	30.00
Round Bales	Responses	13	38	19	18	88
Less than 1500 lbs	Average	26.38	26.26	27.92	28.17	27.03
Full Wrap	Minimum	14.00	15.00	18.00	24.00	14.00
Rate per Bale	Maximum	35.00	38.00	35.00	35.00	38.00
	Most Common	25.00	25.00	30.00	25.00	25.00
Round Bales	Responses	10	19	10	18	57
Over 1500 lbs	Average	29.08	29.11	27.55	29.94	29.09
Full Wrap	Minimum	25.00	22.00	20.00	25.00	20.00
Rate per Bale	Maximum	35.00	45.00	35.00	38.00	45.00
	Most Common	30.00	30.00	25.00	27.00	30.00

HAY BALING OPERATIONS

Including operator, machine and fuel

Hay Baling Only
For various type/size bales
Excluding Hauling

		North	East	West	South	State
Small Square Bales Twine or Wire Tie Rate per Bale	Responses	1	13	8	11	33
	Average		1.18	1.44	1.31	1.28
	Minimum		0.75	1.00	0.63	0.63
	Maximum		1.50	2.00	2.00	2.00
	Most Common		1.50	1.50	1.00	1.00
Round Bales Less than 1500 lbs Twine or Wire Tie Rate per Bale	Responses	3	20	5	13	41
	Average	11.33	16.30	20.20	15.31	16.10
	Minimum	8.00	8.50	18.00	10.00	8.00
	Maximum	16.00	30.00	25.00	20.00	30.00
	Most Common	#N/A	15.00	18.00	15.00	15.00
Round Bales Over 1500 lbs Twine or Wire Tie Rate per Bale	Responses	3	13	2	9	27
	Average	17.33	16.42		17.17	17.30
	Minimum	15.00	12.00		12.50	12.00
	Maximum	20.00	25.00		25.00	27.00
	Most Common	#N/A	15.00		16.00	15.00
Round Bales Less than 1500 lbs Full Wrap Rate per Bale	Responses	8	22	8	13	51
	Average	15.94	15.86	19.38	16.15	16.50
	Minimum	14.00	10.00	11.00	12.00	10.00
	Maximum	20.00	25.00	30.00	28.00	30.00
	Most Common	15.00	15.00	20.00	12.00	15.00
Round Bales Over 1500 lbs Full Wrap Rate per Bale	Responses	4	12	2	12	30
	Average	18.75	18.33		16.33	17.47
	Minimum	10.00	11.00		15.00	10.00
	Maximum	25.00	35.00		20.00	35.00
	Most Common	25.00	15.00		15.00	15.00

2020 Texas Agricultural Custom Rates

Number of Survey Responses and Rates ($) per Unit for Regions of Texas

HAY HAULING

Including operator, machine and fuel

Hauling hay (field to storage):
Small Square Bales
Rate per Bale

	North	East	West	South	State
Responses	4	14	5	11	34
Average	1.76	1.01	1.55	1.25	1.25
Minimum	1.00	0.50	0.50	0.50	0.50
Maximum	2.05	1.50	2.50	2.00	2.50
Most Common	2.00	1.00	#N/A	1.00	1.00

Hauling hay (field to storage):
Round Bales, less than 1500 lbs.
Rate per Bale

	North	East	West	South	State
Responses	10	27	9	16	62
Average	5.60	5.30	5.56	5.47	5.43
Minimum	2.00	2.00	3.00	3.00	2.00
Maximum	10.00	10.00	10.00	10.00	10.00
Most Common	5.00	5.00	5.00	5.00	5.00

Hauling hay (field to storage):
Round Bales, over 1500 lbs.
Rate per Bale

	North	East	West	South	State
Responses	7	11	4	10	32
Average	6.71	6.09	6.75	4.55	5.83
Minimum	2.00	2.50	3.00	2.00	2.00
Maximum	15.00	10.00	10.00	7.00	15.00
Most Common	4.00	5.00	#N/A	5.00	5.00

Flat Rate Hay Hauling
Semi-Trailer
Rate per Loaded Mile

	North	East	West	South	State
Responses	4	12	5	10	31
Average	4.06	3.96	4.20	4.38	4.15
Minimum	3.25	3.50	3.75	3.00	3.00
Maximum	4.50	5.00	5.00	7.00	7.00
Most Common	4.50	4.00	4.00	4.00	4.00

Flat Rate Hay Hauling
Other Trailers
Rate per Loaded Mile

	North	East	West	South	State
Responses	3	11	4	7	25
Average	5.67	3.35	4.06	2.90	3.62
Minimum	4.00	0.85	3.00	0.50	0.50
Maximum	8.00	7.50	5.00	4.50	8.00
Most Common	#N/A	3.00	#N/A	4.00	3.00

SILAGE HARVEST AND HAULING

Including operator, machine and fuel

		North	East	West	South	State
Silage Harvest	Responses	2	4	0	0	6
Rate per Ton	Average		6.88			7.29
	Minimum		4.50			4.50
	Maximum		9.25			9.25
	Most Common		#N/A			8.00
Silage Hauling	Responses	0	3	0	0	3
Rate per Ton	Average		3.00			3.00
	Minimum		1.50			1.50
	Maximum		4.00			4.00
	Most Common		#N/A			#N/A
Silage, Complete Job	Responses	2	5	0	0	7
(chop, haul, pack)	Average		11.00			11.86
Rate per Ton	Minimum		7.00			7.00
	Maximum		13.00			16.00
	Most Common		12.00			12.00

2020 Texas Agricultural Custom Rates

Number of Survey Responses and Rates ($) per Unit for Regions of Texas

FARM OR RANCH LAND IMPROVEMENT OPERATIONS

Including operator, machine and fuel

		North	East	West	South	State
Bulldozer, Land clearing	Responses	16	30	19	23	88
Rate per Hour	Average	124.84	132.67	147.00	120.65	131.20
	Minimum	90.00	50.00	70.00	75.00	50.00
	Maximum	175.00	350.00	300.00	200.00	350.00
	Most Common	125.00	100.00	150.00	100.00	100.00
Bulldozer, Clearing 50' fire breaks	Responses	7	11	9	9	36
Rate per Hour	Average	118.14	130.00	125.56	140.56	129.22
	Minimum	42.00	30.00	85.00	75.00	30.00
	Maximum	155.00	200.00	175.00	200.00	200.00
	Most Common	125.00	100.00	125.00	140.00	125.00
Bulldozer, Root plowing	Responses	4	10	3	13	30
Rate per Hour	Average	138.75	160.00	145.00	139.62	146.83
	Minimum	120.00	30.00	90.00	75.00	30.00
	Maximum	155.00	350.00	175.00	200.00	350.00
	Most Common	#N/A	125.00	#N/A	110.00	150.00
Bulldozer, Rake and stack	Responses	7	9	8	13	37
Rate per Hour	Average	123.93	132.78	134.38	135.00	132.23
	Minimum	100.00	30.00	45.00	75.00	30.00
	Maximum	155.00	220.00	180.00	200.00	220.00
	Most Common	100.00	125.00	#N/A	130.00	125.00
Bulldozer, Heavy offset plowing	Responses	3	9	2	10	24
Rate per Hour	Average	145.00	144.44		152.50	147.08
	Minimum	130.00	30.00		110.00	30.00
	Maximum	155.00	350.00		200.00	350.00
	Most Common	#N/A	125.00		200.00	200.00
Terracing	Responses	6	11	4	4	25
Rate per Hour	Average	138.33	127.73	96.25	136.25	126.60
	Minimum	125.00	30.00	50.00	85.00	30.00
	Maximum	155.00	200.00	120.00	200.00	200.00
	Most Common	125.00	100.00	#N/A	#N/A	125.00

FARM OR RANCH LAND IMPROVEMENT OPERATIONS

Including operator, machine and fuel

		North	East	West	South	State
Leveling	Responses	4	11	5	8	28
Rate per Hour	Average	132.50	108.64	136.00	138.13	125.36
	Minimum	100.00	25.00	110.00	75.00	25.00
	Maximum	155.00	200.00	180.00	200.00	200.00
	Most Common	#N/A	100.00	110.00	140.00	100.00
Stock tank construction	Responses	12	14	9	16	51
and/or maintenance	Average	126.04	132.50	130.56	142.19	133.68
Rate per Hour	Minimum	100.00	100.00	80.00	100.00	80.00
	Maximum	155.00	200.00	200.00	200.00	200.00
	Most Common	125.00	100.00	#N/A	120.00	100.00
Grubbing (Approx. 40 small	Responses	4	5	10	7	26
trees/shrubs per acre)	Average	231.25	98.00	145.60	177.86	158.31
Rate per Acre	Minimum	125.00	50.00	25.00	90.00	25.00
	Maximum	500.00	150.00	500.00	500.00	500.00
	Most Common	125.00	#N/A	#N/A	90.00	125.00
Excavator	Responses	7	6	7	7	27
Rate per Acre	Average	200.00	115.00	209.29	114.43	161.33
	Minimum	120.00	50.00	90.00	6.00	6.00
	Maximum	380.00	150.00	400.00	175.00	400.00
	Most Common	150.00	125.00	#N/A	140.00	120.00
Pasture shredding	Responses	10	22	9	23	64
Rate per Acre	Average	31.45	27.59	47.00	20.17	28.26
	Minimum	8.00	10.00	18.00	4.00	4.00
	Maximum	85.00	65.00	100.00	65.00	100.00
	Most Common	20.00	20.00	20.00	20.00	20.00
Pasture aeration	Responses	6	11	10	14	41
Rate per Acre	Average	31.50	23.45	37.10	38.93	33.24
	Minimum	14.00	15.00	9.00	6.00	6.00
	Maximum	85.00	50.00	100.00	120.00	120.00
	Most Common	20.00	15.00	15.00	20.00	15.00

FARM OR RANCH LAND IMPROVEMENT OPERATIONS

Including operator, machine and fuel

		North	East	West	South	State
Brush Spraying Aerial Application Rate per Acre	Responses	6	3	12	5	26
	Average	18.25	13.67	24.40	11.00	19.17
	Minimum	6.50	9.00	6.00	6.00	6.00
	Maximum	36.00	18.00	49.00	15.00	49.00
	Most Common	#N/A	#N/A	10.00	10.00	10.00
Brush Spraying Ground Application Rate per Acre	Responses	0	9	3	13	25
	Average		14.67	14.50	10.69	12.58
	Minimum		6.00	5.50	5.00	5.00
	Maximum		30.00	32.00	20.00	32.00
	Most Common		15.00	#N/A	8.00	15.00
Brush Spraying Individual Plant Treatment Rate per Acre	Responses	3	7	5	5	20
	Average	85.00	51.86	65.00	101.60	72.55
	Minimum	25.00	4.00	15.00	20.00	4.00
	Maximum	200.00	200.00	200.00	250.00	250.00
	Most Common	#N/A	25.00	#N/A	#N/A	25.00
Prescribed Burning Complete Operation Rate per perimeter mile	Responses	1	1	2	0	4
	Average					863
	Minimum					500
	Maximum					1,700
	Most Common					500
Prescribed Burning Complete Operation Rate per Burn Plan Acre	Responses	1	3	1	2	7
	Average		76.67			42.57
	Minimum		30.00			8.00
	Maximum		150.00			150.00
	Most Common		#N/A			#N/A

FENCING AND MISCELLANEOUS LIVESTOCK OPERATIONS

Including operator, machine and fuel

		North	East	West	South	State
Fence building (including materials)	Responses	20	22	10	16	68
4 to 6 wire with steel posts	Average	9,614	11,725	13,080	12,827	11,563
Rate per Mile	Minimum	1,500	2,000	7,392	4,000	1,500
	Maximum	23,000	21,120	21,120	30,500	30,500
	Most Common	10,000	7,500	#N/A	13,200	10,000
Fence building (including materials)	Responses	0	6	3	10	19
4 to 6 wire with wood posts	Average		14,353	13,819	13,643	13,895
Rate per Mile	Minimum		6,500	11,088	6,500	6,500
	Maximum		22,440	16,368	25,000	25,000
	Most Common		#N/A	#N/A	#N/A	10,560
Fence building (including materials)	Responses	0	2	5	5	12
Deer-proof fencing	Average			25,943	28,400	26,996
8-foot with steel posts	Minimum			23,760	18,000	10,000
Rate per Mile	Maximum			27,456	52,000	52,000
	Most Common			#N/A	20,000	20,000
Fence building (including materials)	Responses	1	3	15	6	25
Net wire	Average		18,640	15,902	21,307	17,172
Rate per Mile	Minimum		15,000	7,920	12,000	7,000
	Maximum		25,080	23,000	41,000	41,000
	Most Common		#N/A	15,840	12,000	15,840

LIVESTOCK OPERATIONS

Including labor and equipment

		North	East	West	South	State
Cattle Grazing Lease Contract (cattle care not included) Rate per Pound of Gain	Responses	15	10	3	3	31
	Average	0.52	0.46	0.58	0.20	0.48
	Minimum	0.40	0.20	0.50	0.10	0.10
	Maximum	0.60	0.55	0.65	0.25	0.65
	Most Common	0.55	0.55	#N/A	0.25	0.55
Cattle Day Labor for weaning, branding, etc. (Labor provides mount) Rate per Day	Responses	27	28	29	32	116
	Average	163.37	170.14	154.40	190.47	170.24
	Minimum	96.00	80.00	100.00	75.00	75.00
	Maximum	250.00	600.00	300.00	400.00	600.00
	Most Common	150.00	150.00	150.00	150.00	150.00
Small grains, stocker cattle care (including mount) Rate per Head per Month	Responses	6	5	0	4	15
	Average	9.00	18.70		22.50	15.83
	Minimum	3.00	3.50		8.00	3.00
	Maximum	20.00	40.00		40.00	40.00
	Most Common	3.00	15.00		#N/A	20.00
Cattle: Artificial Insemination Rate per Head	Responses	4	9	4	11	28
	Average	63.75	27.56	32.00	44.82	40.14
	Minimum	10.00	10.00	3.00	8.00	3.00
	Maximum	200.00	85.00	100.00	100.00	200.00
	Most Common	#N/A	10.00	#N/A	25.00	10.00
Cattle: Pregnancy Testing Rate per Head	Responses	13	17	10	14	54
	Average	6.81	6.35	6.51	11.57	7.85
	Minimum	4.00	3.00	3.00	3.00	3.00
	Maximum	15.00	15.00	18.00	35.00	35.00
	Most Common	5.00	5.00	3.00	10.00	5.00
Cattle: Spraying Rate per Head	Responses	1	5	3	4	13
	Average		4.20	1.50	11.00	5.58
	Minimum		2.00	0.50	4.00	0.50
	Maximum		10.00	3.00	20.00	20.00
	Most Common		2.00	#N/A	10.00	10.00
Cattle Processing (dehorning, branding, castrating, vaccinating, deworming) Rate per Head	Responses	9	16	6	12	43
	Average	5.72	16.97	12.50	44.96	21.80
	Minimum	2.00	2.50	3.00	2.00	2.00
	Maximum	12.50	100.00	25.00	175.00	175.00
	Most Common	2.00	15.00	15.00	10.00	15.00

Number of Survey Responses and Rates ($) per Unit for Regions of Texas

LIVESTOCK OPERATIONS

Including labor and equipment

		North	East	West	South	State
Sheep Shearing	Responses	1	0	7	1	9
Rate per Head	Average			4.21		5.36
	Minimum			3.00		3.00
	Maximum			6.00		15.00
	Most Common			3.00		3.75
Sheep Tagging	Responses	1	3	4	1	9
Rate per Head	Average		2.33	2.31		2.86
	Minimum		2.00	2.00		2.00
	Maximum		3.00	3.00		6.00
	Most Common		2.00	2.00		2.00

CATTLE HAULING

Including labor and equipment

		North	East	West	South	State
Cattle hauling	Responses	13	9	9	11	42
Semi-Truck & Trailer (18-wheeler)	Average	4.31	3.78	3.87	4.12	4.05
Rate per Loaded Mile	Minimum	2.50	3.00	2.50	3.00	2.50
	Maximum	6.00	5.00	5.00	6.00	6.00
	Most Common	4.00	3.75	4.00	4.00	4.00
Cattle hauling	Responses	10	25	13	14	62
All other Trucks and Trailers	Average	3.21	2.89	4.09	4.39	3.53
Rate per Loaded Mile	Minimum	1.50	0.58	1.50	2.50	0.58
	Maximum	4.00	4.25	10.00	10.00	10.00
	Most Common	3.00	3.00	3.00	3.00	3.00

CONSULTING SERVICES

		North	East	West	South	State
Crop Production Consulting Services	Responses	8	6	1	7	22
Rate per Acre	Average	6.94	9.17		8.29	8.30
	Minimum	3.00	2.00		3.00	2.00
	Maximum	10.00	22.00		15.00	22.00
	Most Common	10.00	10.00		#N/A	10.00
Crop Marketing Consulting Services	Responses	3	4	0	2	9
Rate per Acre	Average	4.50	2.59			3.21
	Minimum	1.50	2.00			1.50
	Maximum	7.00	3.00			7.00
	Most Common	#N/A	#N/A			2.00
Predator Management Services	Responses	2	0	3	2	7
Rate per Acre	Average			1.08		6.75
	Minimum			0.10		0.10
	Maximum			3.00		25.00
	Most Common			#N/A		#N/A

Measuring Nutrient Removal, Calculating Nutrient Budgets

Nutrient removal is the quantity of nutrients removed in plant material harvested from the field. All plant material contains quantities of the following elements: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sulfur (S), boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), nickel (Ni), and zinc (Zn). The first six elements, N, P, K, Ca, Mg, and S, are taken up in greater quantities by plants and are termed **macronutrients**. They are present in concentrations of percent (%). The remaining nutrients are present in smaller concentrations, parts per million (ppm), and are therefore referred to as **micronutrients**. Directly measuring nutrient removal requires measuring how much biomass is removed from the field as well as the concentrations of nutrients in that biomass.

Nutrient removal is commonly estimated from measured yields and published nutrient concentrations. For instance, the P removal rate of corn grain has been estimated by multiplying 0.37 lb P_2O_5 bu^{-1} by the yield in bushels per acre. However, there are inaccuracies involved with using average concentrations. For grains, much of this uncertainty comes from the use of a volumetric measurement (bushel) rather than a mass measurement. For forages, nutrient removal coefficients usually do not specify how much moisture is assumed to exist.

Nutrient removal estimates are most often used to calculate **partial nutrient budgets**, where total applications are compared with total removals. Such budgets are partial because losses from erosion, runoff, and leaching are not considered, nor are additions from atmospheric deposition, sediment deposition, or collection of runoff from other areas. Partial nutrient budgets have implications for soil test levels of immobile nutrients. Positive budgets result when application rates exceed those of removal, and under such conditions, soil test levels are expected to rise. Negative budgets result when application rates are less than removal

Summary

Nutrient removal is the quantity of nutrient removed from a specified area. Commonly, farmers and advisers use published removal rates (on a yield unit basis) to estimate such quantities. However, measurements may be taken on the farm to improve evaluations and provide opportunities to further examine and evaluate nutrient management practices. The measurements that are essential to calculating nutrient removal are:

- harvest area
- weight of moist plant material
- moisture content of harvested plant portions
- nutrient concentration.

Guidance is provided for using these measurements to calculate dry matter yield and nutrient removal. In addition, nutrient budgets are discussed, along with their evaluation using soil test data. In the last section, two examples are provided. The first considers a farming operation that produces forage for internal use. The second guides the reader through measurements and calculations used on a grain farm.

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and are expected to draw down soil test levels. Finally, balanced budgets, where applications equal removal, are expected to keep soil test levels of immobile nutrients fairly stable. Consequently, nutrient rates that balance nutrient budgets are referred to as **maintenance applications**.

Natural resource professionals can measure, rather than estimate, nutrient removals themselves on the farm. There are a couple of reasons for doing so. First, measured removals reflect variations in varieties, hybrids, and management practices used in a given area and are expected to be more accurate than generalized estimates. Second, collecting such information provides new ways for advisers and farmers to work together, increasing communication and providing new opportunities to improve management practices.

Periodically calculating nutrient budgets from locally collected information provides a check on whether or not implemented practices are meeting management objectives. Although nutrient budgets are most commonly used in operations where manure scheduling and distribution are the primary issues, they are useful in all production settings.

In this chapter, guidance is provided for accomplishing two tasks:

- measuring nutrient removal rates
- calculating nutrient budgets over time

We focus on approaches that can be used on the farm and we limit our discussion to forage and grain crops.

Measuring Components of Nutrient Removal

Measurements needed for calculate nutrient removal rates are:

- harvest area
- weight of moist plant material harvested from the area
- moisture content of plant material
- nutrient concentration of plant material

The first three measurements are used to determine how much total dry matter (DM) was harvested from a known area. Dry matter is plant material that contains 0% moisture. Its weight is termed **dry weight**. The amount of DM removed per acre is needed because nutrient concentrations determined by a laboratory are reported on a DM basis (Mills and Jones, 1996). At harvest, plant material contains some amount of moisture, so its weight is referred to as **wet weight**.

Determining the amount of moisture in the harvested plant material makes it possible to subtract the weight of water and find the DM yield per acre.

Measuring Harvest Area

Knowing the exact area harvested is crucial to accurately determining yield. A common approach to determining field size is to use the global positioning system (GPS). A vehicle equipped with a differentially corrected GPS receiver coupled with a computer running mapping software is driven around the border of the area to be measured. Geographic information system (GIS) software is then used to calculate the area within the border outlined by the vehicle. Another GIS-based method is to import aerial photographs into GIS software and outline the area using polygon drawing tools. Of the two, field measurements are expected to be more accurate, since driving the field border can reveal areas that cannot be farmed and that may not have been detectable from an aerial photograph, particularly if the photograph is not recent.

Measuring Wet Weight

To determine DM yield, wet weight of plant material must first be measured.

Equipment for Forage

Often, forage is not weighed. Many times, forage producers are not concerned with the weight of the harvested material but instead pay attention to the number of bales or the approximate volume of hay or silage. This is typically the case when forage is produced and used within the same farming operation. However, when forage is produced for markets off the farm, its price is determined by weight. A recent investigation into the accuracy of estimating the weight of a bale showed that estimates were off an average of 16% and tended to underestimate bale weights (Yohn et al., 2007). Therefore, to improve estimates of nutrient removal, accurate determinations of weight are needed.

Scales. The most accurate equipment for measuring forage wet weight is a scale, which should be properly calibrated. If a scale is not available on the farm, neighbors or grain elevators are possibilities. For measuring large bales or many small bales, a platform truck scale is a good option. If individual small bales are weighed, less expensive scales can be used, such as large animal scales.

Forage Wagons with No Scale. When no scale exists, weight can be approximated from volume (Wiersma and Holmes, 2000). The internal length and width of a wagon are measured and height marks made at half-foot intervals. When the wagon is filled, the height of forage is recorded, and forage volume calculated. Volume is converted to DM weight using a table of average DM density (pounds DM per cubic foot of forage). Average density values for the first cutting of alfalfa, second and subsequent cuttings of alfalfa, red clover, grass, oat, and corn are 5.7, 5.0, 5.5, 4.6, 5.0, and 5.0 lb DM ft^{-3}, respectively (Wiersma and Holmes, 2000). Considerable uncertainty exists with this method, and it should be noted that DM is **estimated weight**, rather than wet weight.

Tractor Hydraulics as Scales. This method was developed by Yohn et al. (2007). The approach calibrates hydraulic pressure to weight. First, gauges are installed in hydraulic lines to measure pressure. For instance, gauges can be placed in lines leading to the two cylinders of a front end loader. To calibrate, objects of a known weight, such as seed bags or tractor weights, are progressively added. Each time more weight is added, the pressure is recorded. This allows pressure to be related to weight. During calibration, the weight used should cover the range expected for the plant material to be weighed. As an example, for round bales, up to 1500 pounds may be needed in the calibration. Once calibrated, hydraulic pressure associated with lifting each bale to a specific height can be converted to weight.

Equipment for Grain

Grain yields can be measured with a platform truck scale, grain cart scale, or yield monitor.

Collecting Samples for Moisture Determination

Collecting representative samples is a critical step for accurately assessing plant moisture content. Samples for moisture analysis should be collected when the sample is weighed.

Forage Samples

Ideally, a separate sample should be taken from each weighed load, separated by lot. A lot is forage harvested within one day from one field and from a specific variety or hybrid. To collect a forage sample, a core sampler is recommended (Brusewitz et al., 1993; Undersander et al., 2005). Each sample should consist of 10 to 12 cores that are composited into a single sample from which a smaller portion is taken for moisture determination.

Grain Samples

Two primary approaches are used to collect grain samples (GIPSA, 2006, 2001). The first one is taking a sample from a moving stream of grain. The second approach is collecting samples from grain at rest, such as a truck, combine hopper, or bin. Taking a sample from flowing grain can be done with a large coffee can held to one side of the stream. A minimum of three such samples per load is suggested. For grain at rest, a hand probe is recommended, taken at specific locations and angles, depending on the length of the probe and the type of container being sampled. At least two probes should be used for a hopper trailer.

Measuring Moisture Content

Various methods exist for determining the moisture content of plant material. Different equipment and techniques exist for forage and grain.

Forage Moisture

For forages, moisture can be determined either by measuring the weight difference of a sample after drying or by using an electronic moisture meter.

In commercial laboratories, forage moisture is calculated directly by weighing the wet weight of the sample, drying the sample in a forced-air oven at 176°F until a stable weight is obtained (Mills and Jones, 1996), and calculating moisture content as follows:

$$\text{Moisture (\%)} = \frac{\text{wet weight (g)} - \text{dry weight (g)}}{\text{wet weight (g)}} \times 100\% \qquad [1]$$

On the farm, other options exist for drying samples. A microwave oven procedure was developed by Farmer and Brusewitz (1980) and has been made available online by Chamliss (2002). In this procedure, a 100-g sample (wet weight), cut into 1-inch pieces, is placed in a microwave oven, along with a 10- to 16-oz. glass of water. The microwave oven is then run on high setting for 5 minutes, the sample removed, and weighed again. The glass is then emptied and refilled with fresh water and placed back in the microwave. The sample is returned to the oven and the microwave run on high for 2 minutes. Changing water and running the microwave for 2 minutes is done repeatedly until the sample weight stabilizes.

Moisture can also be determined on-farm with a Koster forage moisture tester (Koster Crop Tester, Inc., Brunswick, OH). This tester is a self-contained electrical forced-air dryer. The sample is placed in the specimen container that comes with the dryer. The sample is then dried for 30 minutes and weighed again. Subsequently, the sample is dried in 10-minute increments until the weight stabilizes.

The electronic moisture meter is an indirect measurement of moisture. The instrument actually measures either electrical conductance or resistance and converts that information to moisture as a percent of wet weight.

Studies have been conducted to determine the accuracy of various on-farm approaches to measuring the moisture of forages. The Prairie Agricultural Machinery Institute tested the Koster forage moisture tester on alfalfa and corn silage and found it to have acceptable accuracy (3%) when compared with a standard oven-dry method (Prairie Agric. Machinery Inst., 1981). Oetzel et al. (1993) tested the microwave oven, the Koster forage moisture tester, and an electronic moisture meter on samples of alfalfa, corn silage, and high-moisture shelled corn. They found that all three of the measurements had good reproducibility. For alfalfa, all three underestimated moisture when compared with the standard oven-dry method but had an acceptable error rate of about 6.4%. For corn silage, the microwave oven and Koster forage moisture tester underestimated moisture content, with the Koster tester doing so significantly and with a nominally acceptable error rate of 9.4%. The electronic moisture tester gave inaccurate results, with a total error of 19.6%, and consistently overestimated corn silage moisture. It was thought by the authors that such inaccuracy may have been attributable to the heterogeneous nature of the corn silage material. For high-moisture shelled corn, a much more homogeneous material, the electronic moisture meter was the most accurate, with an error of 1.25%.

[1] Trade names are included for the benefit of the reader and do not imply endorsement of or preference for the product listed by the author or SSSA.

Both the microwave oven and the Koster tester underdried the corn, with the Koster tester not drying as much as the microwave oven, resulting in greater error. The error of the microwave was acceptable (2.1%), while that of the Koster tester was marginally so (9.7%). Brusewitz et al. (1993) reviewed the various methods and concluded that the microwave oven was almost as accurate as the reference oven and therefore recommended its use for drying samples. They determined that moisture meters for corn silage were inaccurate, in agreement with Oetzel et al. (1993), but could be accurate for hay if calibrated with results from a microwave oven.

Grain Moisture

For grains, moisture meters are the most common approach for determining moisture content. These meters work in principle like those described for forages.

The accuracy of the moisture meter should be checked periodically by comparing readings from the moisture meter with those from a meter used at a grain elevator (Hurburgh and Wilcke, 1995). If a moisture sensor is coupled to a yield monitor on the combine, calibration involves reading the average moisture of a load and comparing it with the average moisture of several samples taken from that load, measured with a separate moisture meter.

Calculating Dry Matter Yield

Harvest area, wet weight, and moisture are all used to calculate DM yield. First, DM weight is calculated as:

$$\text{DM weight (lb)} = \text{weight wet (lb)} - \left(\text{wet weight (lb)} \times \frac{\text{moisture (\%)}}{100\%}\right) \quad [2]$$

Second, DM yield is determined by dividing DM weight by the harvest area:

$$\text{DM yield (lb acre}^{-1}) = \frac{\text{DM weight (lb)}}{\text{area harvested (acres)}} \quad [3]$$

Measurements for Forage

Forage Removed from the Field. Each load hauled from the field should be sampled and weighed. The DM yield is calculated by adding up the DM weights of all loads and dividing by the area harvested, according to Eq. [3]. If partial loads from two different fields are combined into a single load, estimate the portion of the load attributable to each field.

Forage Stored in the Field. When bales are stored in the field, gather a few representative bales from each lot to create a load and divide the total DM weight of the load by the number of bales to get the average DM weight per bale, as shown in Eq. [4]. Multiply the average DM bale weight by the number of bales stored in the field.

$$\text{Avg. DM weight of a bale (lb bale}^{-1}) = \frac{\text{DM weight of a load (lb)}}{\text{number of bales in a load (bales)}} \quad [4]$$

Measurements for Grain

Yield Monitor. In cases where yield monitors are used, data are recorded by field and load within the field. This feature is available with or without a GPS receiver. When yield monitors have been properly calibrated, total wet weight of grain and moisture can be recorded for either individual loads or the field. Equation [2–3] can then be used to calculate DM yield.

Truck Trailer. The number of truck trailer loads leaving a field can be used to estimate total wet weight by weighing each load on a platform scale. When a load contains grain from more than one field, estimating the percent volume occupied by the grain from each field allows the load weight to be partitioned to each field.

Grain Cart with a Scale. Wet weight can also be measured with grain carts equipped with scales. Weights and moisture percentages of individual loads are recorded and separated by field.

Measuring Nutrient Concentration

Nutrient analyses of plant material need to be conducted by a reputable laboratory with good quality control procedures and participating in the North American Proficiency Testing Program (http://www.naptprogram.org/). Such laboratories will have instructions for storing samples before submission. Many also have protocols for collecting samples. Generally, plant samples should be placed in polyethylene freezer bags and stored in a freezer until they can be submitted.

The results provided by the laboratory will have different concentration units for different elements. For the macronutrients, N, P, K, Ca, Mg, and S, concentrations are reported as a percentage of the DM weight of the sample. For the remaining micronutrients, parts per million units are used.

Calculating Nutrient Removal

Nutrient removal calculations for elements will differ based on the units used to report their concentrations. Differences also exist for P and K because practitioners use the oxide forms of these elements, P_2O_5 and K_2O, rather than the elemental form reported by the laboratory. All calculations use the DM yield calculated in Eq. [3].

Concentrations Reported in Units of Percent

Nitrogen, Calcium, Magnesium, Sulfur

Calculating nutrient removal for these elements is performed by dividing the percent elemental nutrient concentration by 100 and multiplying the quotient by the DM :

$$\text{Nutrient removal (lb acre}^{-1}\text{)} = \text{DM yield (lb acre}^{-1}\text{)} \times \frac{\text{concentration (\%)}}{100\%} \qquad [5]$$

Phosphorus

This calculation is the same as Eq. [5], except that a conversion factor (2.29) has been included that transforms elemental P content to P_2O_5 content.

$$\text{Nutrient removal (lb } P_2O_5 \text{ acre}^{-1}) = \text{DM yield (lb acre}^{-1}) \times \frac{\text{P concentration (\%)}}{100\%} \times 2.29 \quad [6]$$

Potassium

Like P, this equation contains a factor (1.20) that converts elemental K to K_2O.

$$\text{Nutrient removal (lb } K_2O \text{ acre}^{-1}) = \text{DM yield (lb acre}^{-1}) \times \frac{\text{K concentration (\%)}}{100\%} \times 1.20 \quad [7]$$

Concentrations Reported in Units of Parts per Million

This calculation works for all the micronutrients: B, Cl, Cu, Fe, Mn, Mo, Ni, and Zn.

$$\text{Nutrient removal (lb acre}^{-1}) = \text{DM yield (lb acre}^{-1}) \times \frac{\text{concentration (ppm)}}{1{,}000{,}000} \quad [8]$$

It should be noted that while Ni has recently been recognized as an essential element, it is not routinely analyzed in commercial soil testing laboratories. As an additional note, nutrient removal rates of all micronutrients are small.

Converting Published Removal Coefficients to a Dry Matter Basis

In some cases, DM yield may be known or estimated, but nutrient concentrations are not measured. In such cases, the only alternative is to use published nutrient removal rates. Published estimates are in pounds of nutrient per yield unit of the crop considered.

Forage

Published coefficients for forages are in units of pounds per ton. Many published coefficients do not specify the moisture content. Table 1 provides values that can be used in such cases (Koelsch et al., 2004).

Table 1. Dry matter content used to report nutrient removal per ton (Koelsch et al., 2004).

Crop	DM content per ton
	%
All hay	85
Alfalfa silage, mid-bloom	40
Barley straw	90
Corn silage	35
Corn stover	85
Oat straw	90
Rye straw	90
Small grain silage, dough stage	35
Sorghum silage	30
Sorghum-sudan silage	30
Sorghum stover	80
Wheat straw	90

To convert published removal coefficients from a moist basis to a DM basis, the following equation is used. The published nutrient removal rate is divided by the DM content estimated in Table 1, and the quotient then multiplied by 100. The result will be a larger number because a ton of DM will contain more nutrients than a ton of moist plant material where some of the weight is water.

$$\text{Nutrient removal rate}\left[\text{lb (ton DM)}^{-1}\right] = \left(\frac{\text{nutrient removal rate}\left[\text{lb (moist ton)}^{-1}\right]}{\text{DM content}\left[\text{\% (moist ton)}^{-1}\right]}\right)\times 100\%\ \text{DM (ton DM)}^{-1} \quad [9]$$

For example, if a published removal coefficient is 3.1 lb P_2O_5 (moist ton)$^{-1}$ for corn silage at 65% moisture, this is equivalent to:

$$P_2O_5\ \text{removal rate}\left[\text{lb (ton DM)}^{-1}\right] = \left[\frac{3.1\ \text{lb}\ P_2O_5\ \text{(moist ton)}^{-1}}{35\ \text{\% DM (moist ton)}^{-1}}\right]\times 100\%\ \text{DM (ton DM)}^{-1} = 8.9\ \text{lb}\ P_2O_5\ \text{(ton DM)}^{-1}$$

This value can then be multiplied by the DM yield to estimate nutrient removal.

Grain

Published coefficients for grain are in units of pounds per bushel. When the only information available on farm is pounds DM harvested, these coefficients must be converted from volumetric to gravimetric measurements, corrected for moisture. This is accomplished by dividing the published nutrient removal rate by the amount of DM in a bushel, estimated in Table 2 (Hirning et al., 1987):

$$\text{Nutrient removal rate}\left[\text{lb (lb DM)}^{-1}\right] = \left\{\frac{\text{nutrient removal rate}\left[\text{lb (moist bu)}^{-1}\right]}{\text{DM weight}\left[\text{lb DM (moist bu)}^{-1}\right]}\right\} \quad [10]$$

Table 2. Commonly used test weights and moisture percentages of various grains (Hirning et al., 1987).

Crop	Test weight	Moisture	Dry matter
	lb bu^{-1}	%	lb bu^{-1}
Barley	48.00	14.50	41.04
Corn	56.00	15.50	47.32
Flax	56.00	9.00	50.96
Oats	32.00	14.00	27.52
Rye	56.00	14.00	48.16
Sorghum	55.00	14.00	47.30
Soybean	60.00	13.00	52.20
Sunflower	100.00	10.00	90.00
Wheat	60.00	13.50	51.90

For instance, a nutrient removal rate of 0.38 lb P_2O_5 bu $^{-1}$ corn grain at 15.5% moisture is equivalent to:

$$P_2O_5 \text{ removal rate}\left[\text{lb (lb DM)}^{-1}\right] = \left[\frac{0.38 \text{ lb } P_2O_5 \text{ (moist bu)}^{-1}}{47.32 \text{ lb DM (moist bu)}^{-1}}\right] = 0.0080 \text{ lb } P_2O_5 \text{ (lb DM)}^{-1}$$

Once this value has been calculated, it can be multiplied by DM yield to estimate nutrient removal.

Comparing On-Farm Nutrient Removal Rates with Published Values

It is always a good idea to compare the values generated on the farm to published estimates (Table 3). Often, it is difficult to find published estimates for both macro- and micronutrients. Some sources that have such information are Jacobsen et al. (2005), Mitchell (1999), and Zublena (1991). Such a comparison helps ensure that the numbers being generated on the farm are reasonable. If large discrepancies are found, a check may be needed of the calculations, equipment, or procedures.

Table 3. Nutrient removal coefficients for various crops (Murrell, 2005).

Crop	Unit	Nutrient removal		
		N	P_2O_5	K_2O
		———— lb unit^{-1} ————		
Alfalfa	ton	51	12	49
Alsike clover	ton	41	11	54
Barley grain	bu	0.99	0.4	0.32
Barley straw	bu	0.4	0.16	1.2
Barley straw	ton	13	5.1	39
Beans, dry	bu	3	0.79	0.92
Birdsfoot trefoil	ton	45	11	42
Bluegrass	ton	30	12	46
Bromegrass	ton	32	10	46
Buckwheat	bu	0.83	0.25	0.22
Canola	bu	1.9	1.2	2.0
Corn grain	bu	0.90	0.38	0.27
Corn stover	bu	0.45	0.16	1.1
Corn stover	ton	16	5.8	40
Corn silage	bu	1.6	0.51	1.2
Corn silage	ton	9.7	3.1	7.3
Fescue	ton	37	12	54
Flax grain	bu	2.5	0.7	0.6
Flax straw	bu	0.7	0.16	2.2
Millet	bu	1.4	0.4	0.4
Mint	lb oil	1.9	1.1	4.5
Oat grain	bu	0.77	0.28	0.19
Oat straw	bu	0.31	0.16	0.94
Oat straw	ton	12	6.3	37
Oat silage	ton	9.0	11	45
Orchardgrass	ton	36	13	54
Potato tuber	cwt	0.32	0.12	0.55
Potato vine	cwt	0.2	0.05	0.3
Red clover	ton	45	12	42
Reed canarygrass	ton	28	9.7	44
Rye grain	bu	1.4	0.46	0.31
Rye straw	bu	0.8	0.21	1.5
Rye straw	ton	12	3.0	22
Ryegrass	ton	43	12	43
Sorghum grain	bu	0.66	0.39	0.27
Sorghum stover	bu	0.56	0.16	0.83
Sorghum stover	ton	28	8.3	42
Sorghum-sudan	ton	30	9.5	34
Soybean grain	bu	3.8	0.84	1.3
Soybean stover	bu	1.1	0.24	1.0
Soybean stover	ton	40	8.8	37
Soybean hay	ton	45	11	25

Sugarbeet root	ton	3.7	2.2	7.3
Sugarbeet top	ton	7.4	4.0	20
Sunflower grain	cwt	2.7	0.97	0.90
Sunflower stover	cwt	2.8	0.24	4.1
Sunflower stover	ton	23	2.0	34
Switchgrass	ton	22	12	58
Timothy	ton	25	11	42
Tobacco (leaves)	cwt	3.6	0.90	5.7
Vetch	ton	57	15	49
Wheat grain	bu	1.5	0.60	0.34
Wheat straw	bu	0.7	0.16	1.2
Wheat straw	ton	14	3.3	24

Forage

Concentrations Reported in Units of Percent

Nitrogen, Ca, Mg, S. The concentrations of these nutrients are converted to removal rates per ton of DM using Eq. [11].

$$\text{Nutrient removal rate}\left[\text{lb (ton DM)}^{-1}\right] = \left(\frac{\text{concentration (\%)}}{100\%}\right)\times 2000 \text{ lb (ton DM)}^{-1} \quad [11]$$

Phosphorus. This calculation is the same as Eq. [11] except that an additional factor (2.29) has been included to convert elemental P content to P_2O_5.

$$\text{Nutrient removal rate}\left[\text{lb } P_2O_5 \text{ (ton DM)}^{-1}\right] = \left(\frac{\text{P concentration (\%)}}{100\%}\right)\times 2000 \text{ lb (ton DM)}^{-1}\times 2.29 \quad [12]$$

Potassium. This equation contains a factor (1.20) that converts elemental K to K_2O.

$$\text{Nutrient removal rate}\left[\text{lb } K_2O \text{ (ton DM)}^{-1}\right] = \left(\frac{\text{K concentration (\%)}}{100\%}\right)\times 2000 \text{ lb (ton DM)}^{-1}\times 1.20 \quad [13]$$

Concentrations Reported in Units of Parts per Million

This calculation works for all the micronutrients: B, Cl, Cu, Fe, Mn, Mo, Ni, and Zn.

$$\text{Nutrient removal rate}\left[\text{lb (ton DM)}^{-1}\right] = \left(\frac{\text{concentration (ppm)}}{1{,}000{,}000}\right) \times 2000\ \text{lb (ton DM)}^{-1} \qquad [14]$$

It is important to remember that the results of Eq. [11–14] are for a ton of DM and may be higher than published estimates that assume some moisture is in the ton of harvested forage (less than 100% DM in a ton). To adjust the removal rates in Eq. [11–14] for the assumed DM contents in Table 1, use the following equation. The results from this equation can be compared with published estimates of nutrient removal.

$$\text{Nutrient removal rate}\left[\text{lb (ton at a specified DM \%)}^{-1}\right] = \text{nutrient removal rate}\left[\text{lb (ton DM)}^{-1}\right] \times \frac{\text{DM content (\%)}}{100\%} \qquad [15]$$

Grain

Published coefficients for grain are in units of pounds per bushel. Since bushel is a volumetric measure, the weight of DM in a bushel must be calculated from test weight and moisture measurements. Test weight is the pounds of grain per Winchester bushel (2150.42 in^3).

There are many instruments that measure test weight. Test weight is normally recorded to the nearest half-pound per bushel (0.5 lb bu^{-1}). Some meters are capable of measuring test weight as well as moisture. Other instruments simply measure test weight and must be used in combination with a separate moisture meter.

Grain elevators will also take grain samples and analyze them for moisture and test weight. To ensure the most accurate measurements, take the samples to the elevator soon after harvest. Both moisture and test weight can change over time.

In cases where test weight and moisture are not measured, commonly accepted values can be used (Table 2).

The DM content of a bushel of grain is found using:

$$\text{Bushel DM weight (lb DM bu}^{-1}) = \text{test weight (lb bu}^{-1}) - \left[\text{test weight (lb bu}^{-1}) \times \left(\frac{\text{grain moisture (\%)}}{100\%}\right)\right] \quad [16]$$

Concentrations Reported in Units of Percent

Nitrogen, Ca, Mg, S. The concentrations of these nutrients are converted to nutrient removal rates per bushel using Eq. [17].

$$\text{Nutrient removal rate (lb bu}^{-1}) = \left(\frac{\text{concentration (\%)}}{100\%}\right) \times \text{bushel DM weight (lb DM bu}^{-1}) \quad [17]$$

Phosphorus. This equation includes the factor needed (2.29) to elemental P content to P_2O_5.

$$\text{Nutrient removal rate (lb } P_2O_5 \text{ bu}^{-1}) = \left(\frac{\text{P concentration (\%)}}{100\%}\right) \times \text{bushel DM weight (lb DM bu}^{-1}) \times 2.29 \quad [18]$$

Potassium. This equation uses the factor 1.20 to convert elemental K to K_2O.

$$\text{Nutrient removal rate (lb } K_2O \text{ bu}^{-1}) = \left(\frac{\text{K concentration (\%)}}{100\%}\right) \times \text{bushel DM weight (lb DM bu}^{-1}) \times 1.20 \quad [19]$$

Concentrations Reported in Units of Parts per Million

This calculation works for all the micronutrients: B, Cl, Cu, Fe, Mn, Mo, Ni, and Zn.

$$\text{Nutrient removal rate (lb bu}^{-1}) = \left[\frac{\text{conentration (ppm)}}{1{,}000{,}000}\right] \times \text{ bushel DM weight (lb DM bu}^{-1}) \quad [20]$$

Calculating Partial Nutrient Budgets of Immobile Nutrients

A partial nutrient budget compares nutrient additions to nutrient removals within a specified time period. Many nutrient recommendation systems use nutrient removal as the first approximation of the application rate needed to maintain soil test levels of immobile nutrients, like P and K, over time.

The general formula for calculating a budget is given below. The minimum interval should include nutrient applications and the removal of those nutrients by all of the crops for which the applications were intended. Figure 1 illustrates this concept. For instance, in a corn–soybean rotation, producers often apply P and K once every 2 years. Such an application would be denoted “nutrient applications for Crops 1 and 2” or “nutrient applications for Crops 3 and 4” in Fig. 1. All applications are included, such as small rates of seed-placed fertilizer. To calculate the

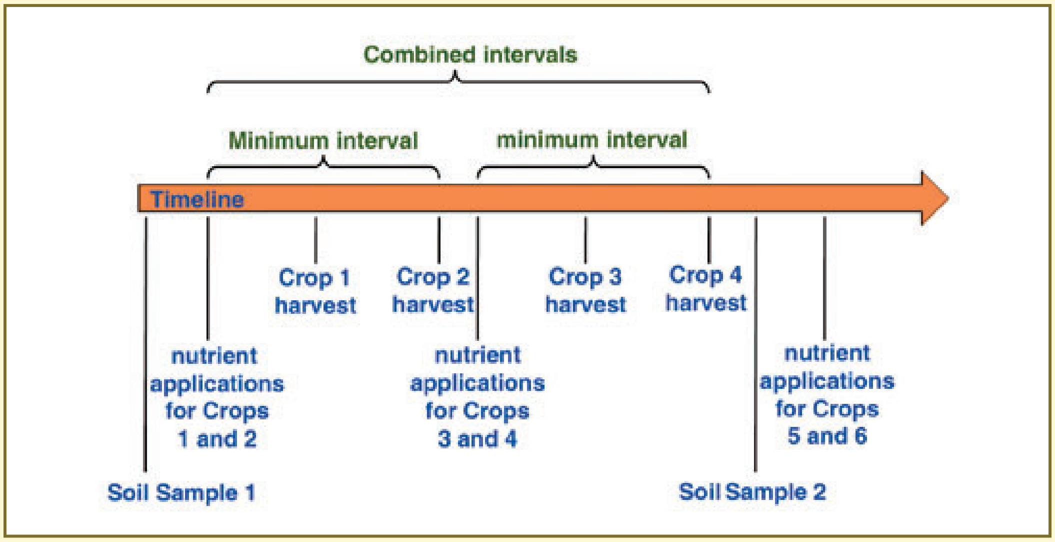


Fig. 1. Time line demonstrating the minimum and combined intervals suggested for calculating nutrient budgets.

nutrient budget, the P and K removed by the corn–soybean rotation is subtracted from the total P and K applied:

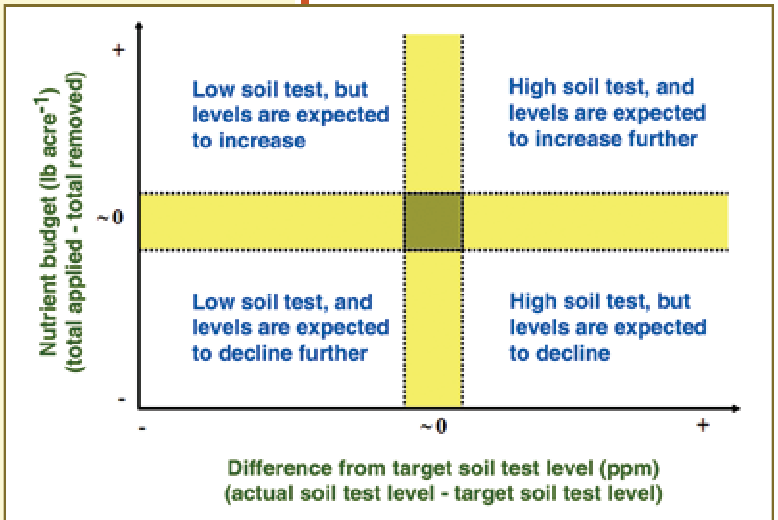
$$\text{Nutrient budget (lb acre}^{-1}) = \text{sum of all nutrient additions (lb acre}^{-1}) - \text{sum of all nutrient removals (lb acre}^{-1}) \quad [21]$$

Once the budget for the minimum interval is known, it can be evaluated with soil test information. Using soil test data may change the time frame considered in the budget. The most recent soil test should be identified. All minimum intervals completed since the soil test was taken should be considered. Keeping with the corn–soybean rotation, Fig. 2 indicates that there have been two minimum intervals completed since the first soil sample was taken. In cases where the most recent soil test has no completed minimum intervals after it, the previous soil test should be used or future nutrient removal estimates made that allow the interval to be completed.

The appropriate soil test is compared with target levels (Fig. 2). Such a comparison is made simply by subtracting target levels from soil test measurements. A positive difference indicates that current levels exceed target levels, while a negative difference indicates the opposite. A difference approximately equal to zero indicates that levels have reached targets. Some margin for error needs to be considered, indicated by the gray areas in Fig. 2.

Once soil test levels have been compared with targets, they are used to evaluate nutrient budgets. Such a comparison produces the quadrants in Fig. 2. Starting in the upper left-hand corner of this figure, if a positive nutrient budget exists when soil test levels are below target levels, the budget is in the appropriate direction, since it is expected that soil test levels will increase with time. Conversely, a positive budget would not be appropriate for the upper right-hand corner of Fig. 2. In this case, soil test levels are already too high and are likely to increase in the future, unless the soil has a high fixation capacity. Moving to the lower left-hand corner, an unsuitable situation is identified where soil test levels are lower than desired, but nutrient removals exceed nutrient applications. Such a situation would be expected to further deplete nutrients from the soil. If soil tests are already very low, depletion may not be reflected by further reductions in soil test levels. Finally, in the lower right-hand corner, the negative budget depicted is appropriate for a soil testing higher than desired. The negative budget is expected to draw down soil nutrients over time, bringing soil test levels back into the desired range. In the center of the diagram is a shaded box. This may be considered a nutrient management target, where soil test levels are in the desired range and budgets are approximately balanced.

Fig. 2. A diagram showing how nutrient budgets and soil test information can be used together to evaluate nutrient management programs.



Example Calculations

Forage Example

« Sample Calculation 1

A college student has come back to the family dairy farm during the summer. She wants to take the knowledge she has gained to improve the operation wherever it is needed. Her father has always spent most of his time with the livestock, but she is more interested in the crop side of the business. They have a few hundred cows and a few hundred acres. To manage needed feed and manure applications, alfalfa is grown for three years, followed by two years of corn grown for silage. The typical practice on these fields is to apply 25 tons of dairy manure per acre before alfalfa seeding. After the third year of alfalfa, the first year of corn is grown and receives P with the seed at planting. After this corn is harvested, another 25 tons of dairy manure per acre are applied, and corn is grown again a second year. Phosphorus is again applied with the seed. Each application of P with the seed is 40 lb P_2O_5 acre^{-1}. Applications of P and K with each 25 ton acre^{-1} manure application are 130 lb P_2O_5 and 270 lb K_2O acre^{-1}. The student calculates that over the 5-year period, total applications are typically 340 lb P_2O_5 and 540 lb K_2O acre^{-1}.

In the past, her father didn't keep track of the number of tons of forage removed from a field. Instead, he knew about how many acres needed to be planted to each crop to keep enough feed available for the operation as it changed size over time. Consequently, published removal values in units of pounds per ton weren't particularly useful for keeping track of nutrient removal, so he never did it. The family doesn't have a scale on the farm that's big enough to weigh forage boxes (wagons). The student decides that the next time forage is removed from a field, she will keep track of the number and volume of each load. She creates marks near the top of each forage box at half foot intervals and measures the internal dimensions. These measurements allow her to estimate volume (cubic feet) of forage loads at various heights in the boxes. She also decides that initially, she'll use the rough estimate of 5.0 lb DM ft^{-3} provided by Wiersma and Holmes (2000).

When harvest time arrives, the student decides to record data from two fields: one grown to alfalfa and one grown to corn silage. In the alfalfa field, she counts and adds up all of the volumes of alfalfa taken from each field by each box, then multiplies the total volume by 5.0 lb DM ft^{-3}. She does this for each of three cuttings of alfalfa during the season. She estimates that the total DM removed from the 50-acre field during the season was 450,000 lb. Using Eq. [3], she converts the total DM production to DM yield:

$$\text{DM yield (lb acre}^{-1}) = \frac{450{,}000 \text{ lb}}{50 \text{ acres}} = 9{,}000 \text{ lb acre}^{-1}\text{, or } 4.5 \text{ tons acre}^{-1}$$

On the field grown to corn silage, she followed the same procedure during harvest, counting the number of forage boxes and estimating their volume, then converting the results to estimates of DM yield. For the 60-acre field, she estimated that 315,000 lb of DM was harvested, which amounted to 5250 lb DM acre^{-1}, or 2.63 tons acre^{-1}.

Now that she has some yield estimates, she wants to use some of the published removal rates to estimate the nutrient removal by alfalfa and corn silage. The removal rates she finds are 12 lb P_2O_5 and 50 lb K_2O ton^{-1} for alfalfa and 3.1 lb P_2O_5 and 7.3 lb K_2O ton^{-1} for corn silage. The moisture of plant material for these estimates is not given, so she assumes, using Table 1, that corn silage is 35% DM and that alfalfa is 85%. With these assumptions, she converts the published coefficients from a moist to a DM basis, using Eq. [9]. For alfalfa, she finds for P that:

$$P_2O_5 \text{ removal rate } \left[\text{lb (ton DM)}^{-1}\right] =$$

$$\left[\frac{12 \text{ lb } P_2O_5 \text{ (moist ton)}^{-1})}{85\% \text{ (moist ton)}^{-1}}\right] \times 100\% \text{ DM (ton DM)}^{-1} =$$

$$14 \text{ lb } P_2O_5 \text{ (ton DM)}^{-1}$$

Using the same method, she calculates that the K_2O removal for alfalfa is 59 lb K_2O ton^{-1}. Similarly, she finds that for a DM ton of corn silage, 8.9 lb P_2O_5 and 21 lb K_2O are removed.

Next she estimates nutrient removal for the alfalfa and corn silage crops just harvested. She does this by multiplying the removal rates by the DM yield. For instance, for alfalfa P removal, she calculates:

$$P_2O_5 \text{ removal (lb } P_2O_5 \text{ acre}^{-1}) =$$
$$\left[14 \text{ lb } P_2O_5 \text{ (ton DM)}^{-1}\right]\left(4.5 \text{ tons DM acre}^{-1}\right) =$$
$$63 \text{ lb } P_2O_5 \text{ acre}^{-1}$$

Similarly, she calculates that alfalfa has also removed 266 lb K_2O acre^{-1}. She estimates that the corn silage removed 23 lb P_2O_5 and 55 lb K_2O acre^{-1}.

She then decides to do some further estimating. Using the values she just calculated, she examines a five-year nutrient budget that considers the manure applications they typically make and the nutrients removed. Since she doesn't have yield information for past crops, she uses the information she has and substitutes it for the missing years in her budget. She assumes that the 63 lb P_2O_5 and 266 lb K_2O acre^{-1} estimated for this year's alfalfa crop is removed in each of the three years it is grown. This gives a total estimated removal rate for alfalfa in the crop rotation of 189 lb P_2O_5 and 798 lb K_2O acre^{-1}. In the same manner, she estimates that the two years of corn silage removes a total of 46 lb P_2O_5 and 110 lb K_2O acre^{-1}. Summing these together for the five-year period, she gets 235 lb P_2O_5 and 908 lb K_2O acre^{-1}. When she uses Eq. [21] to compare these removals to the total nutrient application rates during this period (340 lb P_2O_5 and 540 lb K_2O), she finds that the P budget is positive (105 lb P_2O_5 acre^{-1}) and the K budget is negative (−368 lb K_2O acre^{-1}). Examining the last soil test that was taken, she sees that soil test P levels on some fields are approaching levels where different P management strategies may need to be employed. She also notices that soil test K levels were not as high as they should be, and with negative budgets, they aren't expected to get any higher unless supplemental K is added.

Using the information she has gained, she intends to do some tissue sampling in the future, rather than rely solely on estimated removal rates. She also feels that the farming operation may want to devise some system for keeping better track of DM removal from the fields, so that better plans can be put in place to manage nutrients.

Sample Calculation 2 »

Grain Example

A farmer is using a grain moisture meter, a portable grain scale used for measuring test weight, and a grain cart fitted with a scale. In the last load harvested, the scale reads 35,101 lb. After taking the reading, the farmer begins to transfer grain from the cart to the truck hopper. During the transfer, he takes three flow samples and dumps each one into a separate bucket. He then mixes the grain in each bucket and takes representative samples. On each sample, he measures moisture and test weight and then averages the three readings together. He finds the average moisture to be 21.3% and the test weight to be 60.5 lb bu^{-1}. Using Eq. [2], he calculates his DM weight in the load to be:

$$\text{DM weight (lb)} = 35{,}101\ \text{lb} - \left(35{,}101\ \text{lb} \times \frac{21.3\%}{100\%}\right) = 27{,}624\ \text{lb}$$

When he adds this to the DM weights from the other 11 grain cart loads from the field, he gets a total of 342,000 lb. Using Eq. [3] he finds the DM yield:

$$\text{DM yield (lb acre}^{-1}) = \frac{342{,}000\ \text{lb}}{40\ \text{acres}} = 8550\ \text{lb acre}^{-1}$$

Last, he uses the moisture and test weight data to calculate the amount of DM in a bushel of his grain, according to Eq. [16]:

$$\text{Bushel DM weight (lb DM bu}^{-1}) =$$
$$60.5\ \text{lb bu}^{-1} - \left[60.5\ \text{lb bu}^{-1} \times \left(\frac{21.3\%}{100\%}\right)\right] = 47.6\ \text{lb DM bu}^{-1}$$

The farmer then combines the grain in all three buckets, takes a representative sample, and sends it off to the laboratory.

A few days later, he receives analytical results. He is particularly interested in the results for N (1.89%), P (0.29%), K (0.40%), and Zn (17 ppm). To calculate the removal of these nutrients from the DM yield, the farmer uses Eq. [5–8]:

$$\text{N removal (lb acre}^{-1}) =$$

$$8550 \text{ lb acre}^{-1} \times \frac{1.89\%}{100\%} = 162 \text{ lb N acre}^{-1}$$

$$P_2O_5 \text{ removal (lb } P_2O_5 \text{ acre}^{-1}) =$$

$$8550 \text{ lb acre}^{-1} \times \frac{0.29\%}{100\%} \times 2.29 = 57 \text{ lb } P_2O_5 \text{ acre}^{-1}$$

$$K_2O \text{ removal (lb } K_2O \text{ acre}^{-1}) =$$

$$8550 \text{ lb acre}^{-1} \times \frac{0.40\%}{100\%} \times 1.20 = 41 \text{ lb } K_2O \text{ acre}^{-1}$$

$$\text{Zn removal (lb acre}^{-1}) =$$

$$8550 \text{ lb acre}^{-1} \times \frac{17 \text{ ppm}}{1{,}000{,}000} = 0.14 \text{ lb Zn acre}^{-1}$$

The farmer wants to compare his rates of removal with those published by others, just to see how different his are. Using Eq. [17–20] he calculates:

$$\text{N removal rate (lb bu}^{-1}) =$$

$$\left(\frac{1.89\%}{100\%}\right) \times 47.6 \text{ lb DM bu}^{-1} = 0.900 \text{ lb N bu}^{-1}$$

$$P_2O_5 \text{ removal rate (lb } P_2O_5 \text{ bu}^{-1}) =$$

$$\left(\frac{0.29\%}{100\%}\right) \times 47.6 \text{ lb DM bu}^{-1} \times 2.29 = 0.32 \text{ lb } P_2O_5 \text{ bu}^{-1}$$

$$K_2O \text{ removal rate (lb } K_2O \text{ bu}^{-1}) =$$

$$\left(\frac{0.40\%}{100\%}\right) \times 47.6 \text{ lb DM bu}^{-1} \times 1.20 = 0.23 \text{ lb } K_2O \text{ bu}^{-1}$$

$$\text{Zn removal rate (lb bu}^{-1}) =$$

$$\left(\frac{17 \text{ ppm}}{1{,}000{,}000}\right) \times 47.6 \text{ lb DM bu}^{-1} = 0.0008 \text{ lb Zn bu}^{-1}$$

He finds that his values for N and Zn are close to published estimates, but his values for P and K are a bit lower, but reasonable.

Finally, the farmer wants to examine the P and K nutrient budgets for the field. He uses a corn–soybean rotation. The last sample he took was three years ago. Since that time, he has grown two corn crops and one soybean crop.

He plans to do soil sampling again next year after soybean harvest. He knows that the budget won't be complete until he factors in the removal for next year's soybean crop. Even so, he wants to see where the field is now and predict where it might be after next year.

Since the farmer already measured the nutrient removal for this year's corn crop, he needs only to calculate removal for the soybean and corn crops from the previous two years. Because this was the first year he took grain samples, he doesn't have his own nutrient removal rates to use. Consequently, he uses standard estimates from the Cooperative Extension Service in his state. For corn grain, he uses removal rates of 0.38 lb P_2O_5 bu^{-1} and 0.27 lb K_2O bu^{-1}. For soybean grain, he uses 0.84 lb P_2O_5 bu^{-1} and 1.3 lb K_2O bu^{-1}. His records on the field show that corn grain yield two years ago was 200 bu acre^{-1} and that soybean yield last year was 60 bu acre^{-1}. Multiplying the standard removal coefficients by these grain yields estimates P_2O_5 and K_2O removal by the corn two years ago to have been 76 lb P_2O_5 and 54 lb K_2O acre^{-1}. The soybean crop last year removed 50 lb P_2O_5 acre and 78 lb lb K_2O acre^{-1}. So for the last three years, the amount of P_2O_5 removed is 183 lb P_2O_5 acre^{-1}, found by summing 76 lb P_2O_5 acre^{-1} (corn 2 yr ago) + 50 lb P_2O_5 acre^{-1} (soybean last year) + 57 lb P_2O_5 acre^{-1} (corn this year). Similarly, K_2O removal has been 173 lb K_2O acre^{-1}.

The farmer next examines the amount of nutrients he applied. Two and a half years ago, in the fall before the corn crop was grown, he had his fertilizer dealer apply 200 lb acre^{-1} of 10–52–0 (104 lb P_2O_5 acre^{-1}) and 200 lb 0–0-60 (120 lb K_2O acre^{-1}). Last year, he had the same amount applied again after soybean harvest. So, the total for the two applications is 208 lb P_2O_5 and 240 lb K_2O acre^{-1}.

To evaluate his current nutrient budget, he subtracts the total amount of nutrients removed from the total applied. For P_2O_5 this is 208 lb P_2O_5 acre^{-1} − 183 lb P_2O_5 acre^{-1} = 25 lb P_2O_5 acre^{-1}. For K_2O, the budget is 240 lb K_2O acre^{-1} − 173 lb K_2O acre^{-1} = 67 lb K_2O acre^{-1}. So right now, budgets for both nutrients are positive. Because no more nutrient applications are planned before next year's soybean crop, the farmer wants to predict what the budgets will be after that crop is harvested. Again using standard estimates and a predicted yield of 60 bu acre^{-1} (the same as the last soybean crop harvested), the predicted removal is 50 lb P_2O_5 acre^{-1}

and 78 lb K_2O acre^{-1} for next year. When these values are added to the current nutrient budget, the results are −25 lb P_2O_5 acre^{-1} and −11 lb K_2O acre^{-1}.

The farmer also looks at the soil test results from samples taken three years ago. According to the laboratory report, P levels were lower than the farmer and the adviser felt they should be, but K levels were about right. While the budgets for both nutrients are negative, the one for K is not far from being balanced. The farmer feels that the budget for K is probably within error of being balanced. However, the negative P budget is of concern, because it will not build soil tests to desired levels.

General Comments

It is advisable to take several samples to get an estimate of the average nutrient removal rates under the management practices encountered. Don't put too much weight on just a few samples. If you are unsure of your analyses, standard, published removal rates may always be used. Always keep good records, and be sure to retain laboratory analysis sheets, as well as moisture and test weights if available. The more analyses you collect, the better your average estimate of local nutrient removal rates will become.

Supplemental information about the samples may also prove useful when interpreting analysis results. If possible, gather information about manure application history, cropping history, soil test levels, hybrid/variety, planting date, and any other information you think may impact nutrient removal rates in your area.

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Deducting Farm Expenses: An Overview

Farmers, like other business owners, may deduct "ordinary and necessary expenses paid . . . in carrying on any trade or business." IRC § 162. In agriculture, these ordinary and necessary expenses include car and truck expenses, fertilizer, seed, rent, insurance, fuel, and other costs of operating a farm. Schedule F itemizes many of these expenses in Part II. Those properly deductible expenses not separately listed on the Form are reported on line 32. Following is a summary of several key expense deductions for farmers.

Car and Truck Expenses

Farmers, like other business owners, have the option to either (1) deduct the actual cost of operating a truck or car in their business or (2) deduct the standard mileage rate for each mile of business use.

Actual Cost

Those taxpayers who choose the actual cost method may deduct those expenses related to the business use of the vehicle. These include gasoline, oil, repairs, license tags, insurance, and depreciation (subject to certain limits). Farmers choosing this method must keep good records of these expenses. (See *Depreciation* section below for rules for depreciating various vehicles used in the farm business).

Standard Mileage Rate

The standard mileage rate for 2019 is 58 cents per mile (57.5 cents in 2020). Taxpayers that operate five or more cars or light trucks at the same time are not eligible to use the standard mileage rate. **Nor can the standard mileage rate be used if the owner has taken an IRC § 179 or other depreciation deduction for the vehicle.**

When vehicles are used for both personal and business purposes, the taxpayer may take deductions only for the percentage of use attributable to the business. This requires detailed recordkeeping. Farmers, however, have a special rule under which they can claim 75% of the use of a car or light truck as business use without any allocation records. Treas. Reg. § 1.274-6T(b). The rule applies if the taxpayer used the vehicle during most of the normal business day directly in connection with the business of farming. A farmer chooses this method of substantiating business use the first year the vehicle is placed in service. Once that choice is made, it cannot be changed.

A farmer who uses his vehicle more than 75% for business purposes should keep records of business use vs. personal use. He may then deduct the actual percentage of expenses applicable to the business use.

Conservation

Active farmers may be able to presently deduct the cost of conservation practices implemented as part of an NRCS-approved (or comparable state-approved) plan. Farmers can elect the IRC § 175 soil and water conservation deduction (which is taken in the year the improvements are made) for conservation expenditures in an amount up to 25 percent of the farmer's gross income from farming. The deduction can only be taken for improvements made on "land used for farming." Excess amounts may be carried forward to future tax years. Once the farmer makes this expense election, it is the only method available to claim soil and conservation expenses. If the farmer stops farming or dies before the full cost has been deducted, any unused deduction is lost. It cannot then be capitalized to reduce any gain upon the sale of the farm. Landowners who are not eligible for the deduction must capitalize the expenses (add them to the basis of the property).

The IRC § 175 deduction is only available to taxpayers "engaged in the business of farming." IRC § 175(a). A taxpayer is engaged in the business of farming if he "cultivates, operates, or manages a farm for gain or profit, either as owner or tenant." Treas. Reg. § § 1.175–3. A taxpayer who receives a rental (either in cash or in kind) which is based upon farm production is engaged in the business of farming for purposes of the conservation deduction. However, a taxpayer who receives a fixed rental (without reference to production) is engaged in the business of farming only if he participates to a material extent in the operation or management of the farm. A taxpayer engaged in forestry or the growing of timber is *not* engaged in the business of farming; nor is a person cultivating or operating a farm for recreation or pleasure rather than a profit.

Eligible Expenses

IRC § 175 allows eligible taxpayers to deduct certain expenses for:

- Soil or water conservation,
- Prevention of erosion of land used in farming, or
- Endangered species recovery

Specifically, these expenses can include.

- The treatment or movement of earth, including leveling, conditioning, grading, terracing, contour furrowing, and the restoration of soil fertility.

- The construction, control, and protection of diversion channels, drainage ditches, irrigation ditches, earthen dams, and watercourses, outlets, and ponds
- The eradication of brush
- The planting of windbreaks

See IRS Publication 225, *Conservation Expenses*

Example

Karl farmed his ground for 20 years before cash renting it to his neighbor. Karl no longer participates in the farming activities on his land. In 2020, Karl spent $20,000 on an NRCS-approved terracing and grading project. He wants to deduct these expenses on his 2020 return.

Response:

Because Karl is a cash rent landlord who does not materially participate in the farming activities, he may not take advantage of the IRC §175 deduction. Instead, he must add the $20,000 cost to the basis of his property.

Note that the IRC § 175 deduction is also not available for the purchase of depreciable assets (those that have a useful life). Furthermore, the cost of seed and other “ordinary and necessary” business expenses would be deductible in the year expended as ordinary business expenses, apart from IRC § 175. Cost sharing or incentive payments received to implement these conservation programs would then be taxed as ordinary income.

If a landowner who has taken a soil or water conservation deduction sells his property after holding it for five years or less, he or she will have to pay ordinary income taxes on the gain from the sale, up to the amount of the past deduction. If the property was held for less than 10 years, but more than five, that ordinary income rate is assessed against only a percentage of the prior deduction amount.

Depreciation and Cost Recovery

Depreciation

Farmers are allowed to depreciate assets over a period of years, based upon a recovery period for each type of asset. The Modified Accelerated Cost Recovery System (MACRS) is used to recover the basis of most business and investment property placed in service after 1986. MACRS consists of the General Depreciation System (GDS) and the Alternative Depreciation System (ADS). Farming taxpayers use GDS unless they are required to use ADS, most typically because they’ve opted out of the uniform capitalization rules. Beginning in 2018, farming and ranching property, if within the 3-, 5-, 7-, and 10-year recovery periods, is generally depreciated using the 200 percent declining balance method with half-year convention. Farmers may elect, however, to depreciate this property using the 150 percent declining balance method. Property in the 15- and 20-year recovery periods continue to use 150 percent declining balance method with half-year convention.

The following chart, reprinted from the 2019 IRS Publication 225, details recovery periods for standard farming assets.

Table 7-1. **Farm Property Recovery Periods**

Assets	Recovery Period in Years	
	GDS	ADS
Agricultural structures (single purpose)	10	15
Automobiles	5	5
Calculators and copiers	5	6
Cattle (dairy or breeding)	5	7
Communication equipment[1]	7	10
Computer and peripheral equipment	5	5
Drainage facilities	15	20
Farm buildings[2]	20	25
New farm machinery and equipment[3]	5	10
Used farm machinery and equipment	7	10
Fences (agricultural)	7	10
Goats and sheep (breeding)	5	5
Grain bin	7	10
Hogs (breeding)	3	3
Horses (age when placed in service)		
Breeding and working (12 years or less)	7	10
Breeding and working (more than 12 years)	3	10
Racing horses (more than 2 years)	3	12
Horticultural structures (single purpose)	10	15
Logging machinery and equipment[4]	5	6
Nonresidential real property	39[5]	40
Office furniture, fixtures, and equipment (not calculators, copiers, or typewriters)	7	10
Paved lots	15	20
Residential rental property	27.5	40
Tractor units (over-the-road)	3	4
Trees or vines bearing fruit or nuts	10	20
Truck (heavy duty, unloaded weight 13,000 lbs. or more)	5	6
Truck (actual weight less than 13,000 lbs.)	5	5
Water wells	15	20

[1] Not including communication equipment listed in other classes.
[2] Not including single-purpose agricultural or horticultural structures.
[3] Not including grain bin, cotton ginning, asset fence, or other land improvement and the original use starts with you and placed in service after December 31, 2017.
[4] Used by logging and sawmill operators for cutting of timber.
[5] For property placed in service after May 12, 1993; for property placed in service before May 13, 1993, the recovery period is 31.5 years.

Section 179

The PATH Act permanently extended an enhanced "section 179" deduction for 2015 and beyond. The Tax Cuts and Jobs Act (TCJA) further enhanced this deduction. For 2019, farmers and small businesses could deduct up to $1,020.000 of the tax basis of certain business property or equipment placed into service that year. Once qualifying purchases reached a threshold of $2,550,000 in 2019, the amount of the deduction was reduced, dollar-for-dollar for each dollar above the threshold. The section 179 deduction, as well as the threshold, are indexed for inflation. For 2020, the amounts are $1,040,000 of tax basis and $2,590,000 for the investment threshold limit.

The section 179 deduction applies to both new and used business equipment. Because it applies to 15-year property or less, it does not apply to farm buildings, but can be used for single purpose agricultural structures, such as a hog barn.

In addition to setting a higher deduction amount, the PATH Act also made permanent a provision allowing revocation of the Section 179 election on an amended return without IRS consent. Once the election is revoked, it cannot again be elected again for the same tax year.

Additional First Year Depreciation (Bonus Depreciation)

The TJCA increased additional first-year depreciation, also called bonus depreciation, by increasing the allowable amount to 100%, with a phase-down to sunset in 2026. Under this provision, producers can claim an additional first-year tax deduction equal to 100 percent of the value of qualifying property placed into service after September 27, 2017 through December 31, 2022. Congress then reduced the depreciation amount to 80 percent in 2023, 60 percent in 2024, 40 percent in 2025, and 20 percent in 2026. Bonus depreciation is slated to disappear altogether for property placed into service in 2027 or later, except for certain longer production property and aircraft which have an additional year of bonus depreciation available until December 31, 2027.

The bonus depreciation deduction, which is available for new *and* used property (under TCJA) property, applies to farm buildings, in addition to equipment. Unlike the §179 expense allowance, there is no limit on the overall amount of bonus depreciation that a producer may claim. If an item of property qualifies for both §179 expensing and bonus depreciation, the §179 expensing amount is computed first, and then bonus depreciation is taken based on the item's remaining income tax basis. It is also important to note that §179 expensing is based on when the taxpayer's tax year begins, whereas bonus depreciation is tied to the calendar year.

It is helpful to realize that expensing under §179 is an "election in" and the presumption of tax law is that the farmer/rancher uses bonus depreciation, thus it is an "election out" of using bonus depreciation. The election not to use bonus depreciation is made on a class by class basis and affects all assets purchased within the class, Farmers cannot modiry their bonus depreciation choices on an amended return.

Trees and Vines.

The PATH Act also provided a special election to farmers who plant trees or vines that bear fruits or nuts. Following the TCJA farmers may choose to deduct 100 percent of the cost of planting those trees or vines in the year of planting. This rule applies to both farmers who have elected out of the Uniform Capitalization Rules (UNICAP) and those who have not. Without this special provision, bonus depreciation is not available to farmers who have elected out of UNICAP. Likewise, without this special provision, all tree and vine farmers are required to capitalize planting costs, rather than deduct them. This special provision is only in place through 2026. Like other bonus depreciation provisions, it is phased-out for property placed into service after 2022:

2023 – 80%

2024 – 60%

2025 – 40%

2026 – 20%

2027 – 0%

Vehicles.

The TCJA allows $8,000 in additional first-year depreciation for passenger automobiles placed in service in 2019 to 2022. This amount is ratably reduced to by the applicable percentage amount until sunset after December 31, 2026..

Depreciation of Vehicles

IRC §280F(a) imposes dollar limitations on the depreciation deductions that can be taken on passenger vehicles. Passenger vehicles, by definition, weigh 6,000 lbs. gross vehicle weight or less. IRS Rev. Proc. 2019-26 set the 2019 limits as follows.

Depreciation limits for light-duty trucks and vans placed in service in 2019 for which bonus depreciation is taken are as follows:

- 1st Tax Year $ 18,100
- 2nd Tax Year $ 16,100
- 3rd Tax Year $ 9,700
- Each Succeeding Year $ 5,760

Depreciation limits for light-duty trucks and vans placed in service in 2019 for which bonus depreciation is not taken are as follows:

- 1st Tax Year $ 10,100
- 2nd Tax Year $ 16,100
- 3rd Tax Year $ 9,700
- Each Succeeding Year $ 5,760

Depreciation limits for passenger cars placed in service in 2019 for which bonus depreciation is taken are as follows:

- 1st Tax Year $ 18,100
- 2nd Tax Year $ 16,100
- 3rd Tax Year $ 9,700
- Each Succeeding Year $ 5,760

Depreciation limits for passenger cars placed in service in 2019 for which bonus depreciation is not taken are as follows:

- 1st Tax Year $ 10,100
- 2nd Tax Year $ 16,100
- 3rd Tax Year $ 9,700
- Each Succeeding Year $ 5,760

SUVs with a gross vehicle weight rating above 6,000 lbs. are not subject to depreciation limits. They are, however, limited to a $25,500 IRC §179 deduction for 2019 (25,900 in 2020). No depreciation or §179 limits apply to SUVs with a GVW more than 14,000 lbs. Trucks and vans with a GVW rating above 6,000 lbs., but not more than 14,000 lbs., generally have the same limits: no depreciation limitation, but a $25,500 IRC §179 deduction. These vehicles, however, are not subject to the §179 $25,500 limit if any of the following exceptions apply:

- The vehicle is designed to have a seating capacity of more than nine persons behind the driver's seat;
- The vehicle is equipped with a cargo area at least 6 feet in interior length that is an open area or is designed for use as an open area but is enclosed by a cap and is not readily accessible directly from the passenger compartment; or
- The vehicle has an integral enclosure, fully enclosing the driver compartment and load-carrying device, does not have seating behind the driver's seat, and has no body section protruding more than 30 inches ahead of the leading edge of the windshield.

Example One

Libby purchased an SUV in February of 2019 for $45,000 as her primary farming vehicle. She is able to document 100 percent business use through travel logs. The SUV has a GVW of 8,000 lbs.

Libby can expense the SUV as follows:

$45,000

– $25,500 (Section 179)

= $19,500

-$19,500 (Bonus Depreciation)

$0

0 MACRS Depreciation (five-year, 150% DB)

=$0

Libby can deduct all of the $45,000 purchase in the first year using both section 179 and bonus. Alternatively, Libby can use 100% bonus to accomplish the same outcome for 2019.

Example Two

Instead of purchasing an SUV, Libby purchased a long-bed pickup truck with a GVW more than 6,000 lbs. Now, Libby is subject to no §179 deduction, and can immediately expense the entire purchase (assuming she has not used the $1,020,000 §179 deduction for other purchases).

Example Three

Libby decides to purchase a light-duty pickup truck instead. In this case, her entire deduction first year deduction will be limited to $18,100 in 2019.

Example Four

Now suppose Libby purchases a used light-duty pickup truck. Because bonus depreciation applies to used purchases too, Libby’s 2019 first year deductions are limited to $18,100 if used 100% for business.

Fertilizer and Lime

Under IRC § 180, taxpayers engaged in the business of farming may elect to immediately expense the cost of fertilizer and lime (where the benefits last substantially more than one year), rather than to capitalize the expense and depreciate it over the term of its useful life. The election is for one year only, but once such an election is made (by reporting the fertilizer and lime deduction on Schedule F, Line 17), it may not be revoked without the consent of the IRS. This provision applies both to tenants and landlords if the rent is based upon production. Cash rent landlords who do not materially participate in the farming operation may not take advantage of this tax benefit. It is also important to note that this deduction applies only to “land used in farming,” which is defined as land used “by the taxpayer or his tenant for the production of crops, fruits, or other agricultural products or for the sustenance of livestock.” Initial land preparation costs cannot be deducted.

Note that the amount of the fertilizer and lime deduction may be limited by the rule that restricts deductions for prepaid farm supplies to 50 percent of all other deductible farm expenses for the year. See Prepaid Supplies below.

If the farmer later sells the farmland for which the cost of the fertilizer or lime has been deducted, he or she must report the amount of the sales price attributable to the unused fertilizer or lime as ordinary income.

Interest

Interest paid on farm mortgages and other farming-related loans is deductible on Line 21 of Schedule F as an ordinary and necessary business expense. For cash method and accrual method farmers, interest is deductible in the year it is paid or accrued respectively. IRC §461(g)(1).

Rent or Lease Payments

Cash land rent paid by a tenant is generally deductible on line 24b of Schedule F in the year it is paid. See note in *Prepaying Expenses* section below regarding prepaying rental expenses. Crop share rent is not deductible. Equipment rental payments made by a farmer are deductible on line 24a of Schedule F.

Supplies / Repairs and Maintenance

Farmers may generally deduct the cost of materials and supplies in the year in which they are purchased. Treas. Reg. § 1.162-3; Treas. Reg. § § 1.162-12. This would include deducting the cost of fuel, tools, and feed. Farmers may also generally deduct most expenses incurred for the repair and maintenance of their farm property. This would include deducting expenses for activities such as repairing the roof of a farm building or painting a fence. Expenditures that substantially prolong the life of property (restore), increase its value (betterment), or adapt it to a different use, however, must generally be capitalized, not deducted. Distinguishing capital expenditures from supplies, repairs, maintenance, and other deductible business expenses is sometimes a difficult process.

De Minimis Safe Harbor under Tangible Property Regulations

IRS issued the Tangible Property Regulations (T.D. 9636), effective January 1, 2014, to distinguish capital expenditures from supplies, repairs, maintenance, and other deductible business expenses.

Treas. Reg.§ 1.263(a)-1 also provides taxpayers with an option to elect to apply a de minimis safe harbor to amounts paid to acquire or produce tangible property. If this election is made, the taxpayer need not determine whether every small dollar expenditure for the acquisition of property is properly deductible or capitalized under the complex acquisition and improvement rules of the regulations. Instead, the taxpayer must deduct every purchase up to the amount of the safe harbor elected.

For taxpayers without an applicable financial statement, the safe harbor amount for tax years beginning in and after 2017 is $2,500. If the taxpayer has an accounting procedure in place to expense such amounts, he or she can make the annual election. This election is not an accounting method change, but is made by attaching a statement to a timely filed original return. Once made for a particular tax year, every purchase of tangible property falling within the range of the election must be expensed. A taxpayer cannot choose to apply the safe harbor to some items and not to others.

When a taxpayer elects the de minimis safe harbor, the amount paid is not treated as a capital expenditure, as a repair, or as materials and supplies. Instead, the taxpayer deducts the amount of the purchase under Treas. Reg. §1.162-1, provided that the expense otherwise constitutes an "ordinary and necessary" business expense. If the items to be deducted don't fit into an expense category included on Schedule F, they can be listed on line 32 as "other expenses."

Generally, a taxpayer may not file an amended return to either make or revoke the election for the de minimis safe harbor. It is important to note that if a taxpayer later sells property expensed under the safe harbor at a gain, the taxpayer must pay ordinary income tax on the entire sale price. This is not considered IRC § 1221 or § 1231property. These sales would be reported on Form 4797 (Part II) (Sales of Business Property). If the property was not held for sale in the ordinary course or inventory, the gain should not be subject to self-employment tax.

Seeds and Plants

Farmers may generally deduct the cost of seeds and plants used to produce a crop for sale. This deduction is taken on line 26 of Schedule F. This rule does not apply to plants with a pre-productive period of more than two years (i.e. trees and vines). Costs for these types of plants must generally be capitalized, not deducted as an ordinary business expense. Under the TCJA, farmers with gross incomes of $26,000,000 or less in 2019 are not subject to the UNICAP rules under IRC §263A and may generally deduct new plantings. See IRS Rev. Proc. 2020-13 for details regarding a farmer wanting to use the new exemption in the same year an election is in place through which a farmer elected out of UNICAP rules.

Taxes

A farmer can generally deduct the following types of taxes on line 29 of Schedule F:

- Real estate and personal property taxes on farm business assets
- FICA taxes paid to match the amount withheld for employees
- Federal unemployment taxes on farm employees
- Federal use taxes paid on highway motor vehicles used for farming

Note that state or local sales taxes imposed on the purchase of capital assets for use in farming operations must be capitalized, not deducted.

Prepaying Expenses

Cash-method taxpayers generally can deduct their expenses for the year in which they pay them. IRC § 461(a); Treas. Reg. § 1.461-1(a)(1). Some limits to deductions, however, occur with respect to the *prepayment* of expenses.

50% Limit

Cash basis farmers are generally allowed to prepay the cost of farm supplies such as feed, seed, and fertilizer by purchasing them in one year, even though they will not use the supplies until the following year. This allows farmers to shift deductions to an earlier tax year. The amount of the allowable deduction for prepaid expenses is limited by IRC § 464. Under this provision, the prepaid farm expenses may not exceed 50% of other deductible farm expenses (including depreciation), unless one of the following exceptions is met:

- The prepaid farm supplies expense is more than 50% of the other deductible farm expenses because of a change in business operations caused by unusual circumstances.
- The total prepaid farm supplies expense for the preceding 3 tax years is less than 50% of the total other deductible farm expenses for those 3 tax years.

To qualify for an exception, the taxpayer must also be "farm-related," meaning that one of the following must apply:

- Taxpayer's principal residence is on a farm,
- Taxpayer's principal occupation of farming, or
- Taxpayer is a member of the family of a taxpayer who meets one of the above requirements

Note: *In Agro-Jal Farming Enterprises, Inc. et al. v. Comm.*, 145 T.C. No. 5 (2015), the Tax Court stated that the 50% limitation applies narrowly to "feed, seed, fertilizer, or other similar farm supplies." In other words, prepayments for farm supplies falling outside of that category (in the case of *Agro-Jal*, packing materials) may not be subject to that limitation.

If the prepaid farm supply expenses exceed 50 percent of all other expenses (and an exception does not apply), the amount of the expense deduction in excess of 50 percent must be deduced in the later tax year. In other words, the excess must be deducted when the supplies are actually used or consumed.

Note: "Farm syndicates" are not allowed to deduct seed, feed, fertilizer or other similar farm supplies until actually used or consumed. IRC § 464(c)(1) defines "farm syndicate" as:

(A) a partnership or any other enterprise other than a corporation which is not an S corporation engaged in the trade or business of farming, if at any time interests in such partnership or enterprise have been offered for sale in any offering required to be registered with any Federal or State agency having authority to regulate the offering of securities for sale, or

(B) a partnership or any other enterprise other than a corporation which is not an S corporation engaged in the trade or business of farming, if more than 35 percent of the losses during any period are allocable to limited partners or limited entrepreneurs.

The term "farming" for purposes of IRC § 464 means "the cultivation of land or the raising or harvesting of any agricultural or horticultural commodity including the raising, shearing, feeding, caring for, training, and management of animals." Farming does not include timber for this purpose.

Note: IRC §461(g)(1) requires that cash method farmers deduct interest only in the year accrued and paid.

Other Requirements

In addition to the above limitation, the cost of supplies bought in the current year for use in the following year is deductible by a cash basis taxpayer in the current year only if: (1) the expenditure is a payment for the purchase rather than a mere deposit ((2) the prepayment is made for a business purpose and not merely for tax avoidance; and (3) the deduction in the taxable year of prepayment does not result in a material distortion of income. Rev. Rul. 79-229; *Heinold v. Commissioner*, TC Memo 1979-496.

The material distortion of income test should met if the taxpayer meets the conditions of Treas. Reg. § 1.263(a)-4(f), issued in 2004. Under this regulation, a cash basis taxpayer may deduct (rather than capitalize) expenses where the benefits do not extend beyond the earlier of:

- 12 months after the taxpayer first realizes the right or benefit or
- The end of the tax year following the year in which the payment occurs.

Although Rev. Rul. 79-229 specifically discussed prepaid livestock feed expenses, IRS applies these requirements to prepayments for all farm supply expenses. *See, e.g. Farmer's Audit Technique Guide*, Chapter 4, Expenses, 2006.

Example

Ryan, a cash method farmer, has paid $24,000 in deductible farm expenses at the end of 2020. He wants to prepay some seed and chemical expenses to deduct against some extra income he received this year. What is the maximum amount of expenses he can prepay for 2021 and deduct in 2020? What happens if he prepays $20,000?

Answer: As long as other requirements are met, Ryan may deduct $12,000 in qualifying, prepaid expenses in 2020. If he prepays $20,000, he may deduct $12,000 in 2020 and the other $8,000 in 2021.

Basis after Death

In *Backemeyer v. Commissioner*, 147 T.C. No. 17 (Dec. 8, 2016), the tax court explored the interplay between prepaid expenses and the step-up in basis. A farmer prepaid input expenses for the following crop year before he passed away. His wife inherited his property, including the seed, fertilizer, and herbicides, with a stepped-up basis. The IRS argued that the wife could not again deduct the cost of those inputs when she used them to plant a crop. The IRS argued that the tax benefit rule would require recapture of the earlier deduction. The Tax Court disagreed, finding that the estate tax effectively "recaptures" IRC § 162 deductions by way of its normal operation, obviating any need to separately apply the tax benefit rule. Even though this farmer's estate did not owe any estate tax, the fair market value of the inputs was considered for purposes of determining whether such liability existed. Recapturing the deduction could effectively result in a "double taxation" of the value of the farm input.

Part 403 - Federal Tax Treatment of Soil and Water Conservation Expenditures under 26 U.S.C. 175

Part 403.0 - Purpose

This section defines the policy of the USDA Natural Resources Conservation Service (NRCS) relating to Section 175 of the Internal Revenue Code.

Part 403.1 - Effect of the Law

Section 175 provides information on conservation expenses that may be eligible for deduction by farmers, which are not chargeable to their capital account.

Part 403.2 - Requirements

A soil conservation plan approved by NRCS for the area in which the land is located, or

A plan approved by a comparable state conservation agency, for example, a forestry management plan.

Part 403.3 - Eligibility

In general, a taxpayer engaged in the business of farming

The expenditures must be on land used in farming (defined as land used before or simultaneously with the expenditures as described in Exhibit 403.5, section 175 (c)(1), by the taxpayer or his tenant, for the production of crops, fruits, or other agricultural products or for the sustenance of livestock

Allowable expenditures, Section 175(c)(1) defines allowable expenditures as those incurred for the treatment of or moving earth, including but not limited to,

- Leveling, grading and terracing
- Contour furrowing
- Construction, control, and protection of diversion channels, drainage ditches, earthen dams, watercourses, outlets and ponds 403.3(c)(4)
- The eradication of brush
- The planting of windbreaks
- Nonallowable expenditures, Section 175(c)(1) and Section 175(c)(3)(B) include the following:
- The purchase, construction, installation, or improvement of structures, appliances, or facilities which are of a character which is subject to the allowance for depreciation provided in Section 167 of the Internal Revenue Code.
- Any amount which is allowable as a deduction without regard to Section 175.
- Any expenditures in connection with the draining or filling of wetlands or land preparation for center pivot irrigation systems.

Part 403.4 - NRCS Responsibility and Policy

Conservation Plans
NRCS has no responsibility under Section 175. However, NRCS' policy (resources permitting) is to assist farmers and

ranchers in developing conservation plans for the purpose of conserving, protecting, or developing soil, water and related resources. The fact that a conservation plan may also be used as a basis for Federal income tax deductions under Section 175 of the Internal Revenue Code is incidental. Therefore, requests to develop conservation plans after the installation of soil and water conservation practices solely for tax purposes shall be given low priority.

No Conservation Plan
If no NRCS conservation plan has been prepared and resources are limited (at the time), the farmer should be referred to his or her comparable State agency.

Tax Information
This section is a general discussion of Section 175. For detailed information see Exhibit 403.5.

NRCS employees may inform farmers that expenditures for certain soil and water conservation practices may be deductible as expenses, at no time should the employee interpret the United States Internal Revenue Code or provide tax advice. Farmers and ranchers who have any questions should contact their tax advisor or the Internal Revenue Service.

IRS form 8645 can be obtained from the IRS.

Part 403.5 - Preparation of County Plans
[Laws in effect as of January 16, 1996]
[Document not affected by Public Laws enacted between January 16, 1996 and August 28, 1996]
[CITE: 26USC175]

TITLE 26--INTERNAL REVENUE CODE
Subtitle A--Income Taxes
CHAPTER 1--NORMAL TAXES AND SURTAXES
Subchapter B--Computation of Taxable Income
PART VI--ITEMIZED DEDUCTIONS FOR INDIVIDUALS AND CORPORATIONS
Sec. 175. Soil and water conservation expenditures

(a) In general
A taxpayer engaged in the business of farming may treat expenditures which are paid or incurred by him during the taxable year for the purpose of soil or water conservation in respect of land used in farming, or for the prevention of erosion of land used in farming, as expenses which are not chargeable to capital account. The expenditures so treated shall be allowed as a deduction.

(b) Limitation
The amount deductible under subsection (a) for any taxable year shall not exceed 25 percent of the gross income derived from farming during the taxable year. If for any taxable year the total of the expenditures treated as expenses which are not chargeable to capital account exceeds 25 percent of the gross income derived from farming during the taxable year, such excess shall be deductible for succeeding taxable years in order of time; but the amount deductible under this section for any one such succeeding taxable year (including the expenditures actually paid or incurred during the taxable year) shall not exceed 25 percent of the gross income derived from farming during the taxable year.

(c) Definitions
For purposes of subsection (a)

(1) The term ``expenditures which are paid or incurred by him during the taxable year for the purpose of soil or water conservation in respect of land used in farming, or for the prevention of erosion of land used in farming'' means expenditures paid or incurred for the treatment or moving of earth, including (but not limited to) leveling, grading and terracing, contour furrowing, the construction, control, and protection of diversion channels, drainage ditches, earthen dams, watercourses, outlets, and ponds, the eradication of brush, and the planting of windbreaks. Such term does not include--

(A) the purchase, construction, installation, or improvement of structures, appliances, or facilities which are of a character which is subject to the allowance for depreciation provided in section 167, or

(B) any amount paid or incurred which is allowable as a deduction without regard to this section. Notwithstanding the preceding sentences, such term also includes any amount, not otherwise allowable as a deduction, paid or incurred to satisfy any part of an assessment levied by a soil or water conservation or drainage district to defray expenditures made by such district

(i) which, if paid or incurred by the taxpayer, would without regard to this sentence constitute expenditures deductible under this section, or

(ii) for property of a character subject to the allowance for depreciation provided in section 167 and used in the soil or water conservation or drainage district's business as such (to the extent that the taxpayer's share of the assessment levied on the members of the district for such property does not exceed 10 percent of such assessment).

(2) The term ``land used in farming'' means land used (before or simultaneously with the expenditures described in paragraph (1)) by the taxpayer or his tenant for the production of crops, fruits, or other agricultural products or for the sustenance of livestock.

(3) Additional limitations

(A) Expenditures must be consistent with soil conservation plan. Notwithstanding any other provision of this section, subsection (a) shall not apply to any expenditures unless such expenditures are consistent with

(i) the plan (if any) approved by the Soil Conservation Service of the Department of Agriculture for the area in which the land is located, or

(ii) if there is no plan described in clause (i), any soil conservation plan of a comparable State agency.

(B) Certain wetland, etc., activities not qualified.

Subsection (a) shall not apply to any expenditures in connection with the draining or filling of wetlands or land preparation for center pivot irrigation systems.

(d) When method may be adopted

(1) Without consent A taxpayer may, without the consent of the Secretary, adopt the method provided in this section for his first taxable year

(A) which begins after December 31, 1953, and ends after August 16, 1954, and

(B) for which expenditures described in subsection (a) are paid or incurred.

(2) With consent A taxpayer may, with the consent of the Secretary, adopt at any time the method provided in this section.

(e) Scope
The method adopted under this section shall apply to all expenditures described in subsection (a). The method adopted shall be adhered to in computing taxable income for the taxable year and for all subsequent taxable years unless, with the approval of the Secretary, a change to a different method is authorized with respect to part or all of such expenditures.

(f) Rules applicable to assessments for depreciable property

(1) Amounts treated as paid or incurred over 9-year period In the case of an assessment levied to defray expenditures for property described in clause (ii) of the last sentence of subsection (c)(1), if the amount of such assessment paid or incurred by the taxpayer during the taxable year (determined without the application of this paragraph) is in excess of an amount equal to 10 percent of the aggregate amounts which have been and will be assessed as the taxpayer's share of the expenditures by the district for such property, and if such excess is more than $500, the entire excess shall be treated as paid or incurred ratably over each of the 9 succeeding taxable years.

(2) Disposition of land during 9-year period If paragraph (1) applies to an assessment and the land with respect to which such assessment was made is sold or otherwise disposed of by the taxpayer (other than by the reason of his death) during the 9 succeeding taxable years, any amount of the excess described in paragraph (1) which has not been treated as paid or incurred for a taxable year ending on or before the sale or other disposition shall be added to the adjusted basis of such land immediately prior to its sale or other disposition and shall not thereafter be treated as paid or incurred ratably under paragraph (1).

(3) Disposition by reason of death If paragraph (1) applies to an assessment and the taxpayer dies during the 9 succeeding taxable years, any amount of the excess described in paragraph (1) which has not been treated as paid or incurred for a taxable year ending before his death shall be treated as paid or incurred in the taxable year in which he dies.

(Aug. 16, 1954, ch. 736, 68A Stat. 67; Oct. 22, 1968, Pub. L. 90-630, Sec. 5(a), (b), 82 Stat. 1329; Oct. 4, 1976, Pub. L. 94-455, title XIX, Secs. 1901(a)(30), 1906(b)(13)(A), 90 Stat. 1769, 1834; Oct. 22, 1986, Pub. L. 99-514, title IV, Sec. 401(a), 100 Stat. 2221.)

[GM_180_403 - - October 2006]

Pasture Fertilization

Fertilization

Many factors impact the decision to fertilize pastures. They include:

- the variation of rainfall across the state;
- varying types of grazing systems;
- irrigation or the lack of irrigation;
- type of livestock being produced;
- different management objectives.

In general, the addition of fertilizer will improve forage quantity and quality. Table 1 shows that the fertilized plots consistently produced more forage during both dry and wet seasons than non-fertilized plots.

The way in which a producer utilizes forage determines if it is profitable to fertilize. Table 2 demonstrates the amount of nutrients removed from soil by different forage management alternatives.

One ton of grass hay will remove about 50 pounds of nitrogen, 15 pounds of phosphorus, 40 pounds of potassium, 5 pounds of sulfur and 3 pounds of magnesium from the soil. These nutrients, mined from soils, must be replaced by nutrients from commercial fertilizers or manures. Forage production will be reduced if nutrients are not replaced. In low fertility soils, desirable forages may slowly die and be replaced by weeds or brush.

Nitrogen, when added to soils, causes an acidic reaction and, in sandy areas of Texas, will contribute to low pH. Liming will be necessary to raise the pH to prevent growth problems and also increase nutrient absorption.

When plants have adequate available nutrients, growth is not slowed.

Under any moisture situation, grasses must have sufficient plant nutrients available to produce maximum forage levels. Adequate fertilization also causes grasses to be more water efficient. Numerous research and county forage demonstrations have shown that, without fertilization, 16 to 20 inches of water are necessary to produce 1 ton of low quality forage. With adequate fertilization, plant growth is not restricted by a nutrient deficiency and the grass can produce 1 ton of good quality forage with only 4 to 6 inches of water.

Table 1. Forage management in Brazos County Pasture.*

Treatment	Dry matter (lbs.) Per acre 1990-dry season	Dry matter (lbs.) Per acre 1991-wet season
Early herbicide-fertilized	2142	8322
Early herbicide-unfertilized	1330	4988

Late herbicide-fertilized	881	7610
Late herbicide-unfertilized	477	4896
Shredding-fertilized	577	5088
Shredding-unfertilized	341	4787
Fertilizer only-no weed control	645	2587
Unfertilized and no weed control	377	1385

***Evaluations conducted by David Bade, Extension Forage Specialist, the Texas A&M University System.**

Table 2. Nutrients removed by different forage management alternative.

Nutrient	Nutrients (lbs./acre) removed to produce 500 lbs. beef/acre	Nutrients (lbs./acre) removed to produce 6 tons of hay/acre
Nitrogen	18	300
Phosphorus	9	60
Potassium	1	240