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THE ECONOMICS OF FIELD-SCALE ALFALFA PRODUCTION ON EAST TEXAS COASTAL PLAIN SOILS

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Background. Growth of alfalfa in research trials indicated the potential for successful field-scale production. A grant from the USDA Southern Region Sustainable Agriculture Research and Education Program in 1999 provided the funding to evaluate alfalfa production on five-plus acre field sites. Stakeholders had agreed to cooperate in this program if the grant proposal was funded. Preliminary on-site evaluation of potential locations on each ranch included collecting 0- to 6-in depth soil samples and samples of soil to four-feet deep by one-foot depths. Preliminary analysis of the depth samples for pH, observation of the internal drainage, and consultation with the ranch owner were used to select the site for alfalfa. The pH of the one-foot depth samples had to be 5.5 or higher and the site had to be well drained. Each selected site was treated with limestone to raise the pH into the range of 6.8 to 7.0. Sites were disked to eliminate bermudagrass and fertilized with a blend containing phosphorus, potassium, magnesium, sulfur, and boron. Some nitrogen was included because the fertilizer blend included diammonium phosphate (18-46-0) applied to provide between 100 to 120 lb of P_2O_5 /acre, depending on the soil test P level in respective fields. The surface soil in each field was firmed by packing with a weighted roller to prepare it for seeding. Roundup herbicide was applied if needed for weed control. Amerigraze 702 and GrazeKing alfalfa varieties were seeded on each site, with each variety covering half of the acreage. Four one meter-square samples of each variety were collected to estimate yield before each harvest of the alfalfa. These samples were oven dried and yields were adjusted to 12-percent moisture hay on a per acre basis. Records were maintained for all operations conducted to produce alfalfa on each stakeholder site.

Research Findings. The costs and returns calculated for each alfalfa production site are shown in Table 1. The cost of establishing alfalfa on each site ranged from \$225 to \$353 per acre. Establishment costs varied by \$153 per acre across sites. This large variation was mainly due to increased amounts of limestone needed to correct soil pH and to site-selective weed control using Roundup. Other operations included in establishment costs were soil sample analysis, disking and other seedbed preparation activities, planting, fertilizers, pest control, and alfalfa seed planted at 25 lbs per acre. Limestone was estimated to cost \$28 per ton spread on the field and alfalfa seed was priced at \$3.70 per pound. Fertilizer costs varied between \$48 and \$80 per acre depending on the initial soil fertility levels at each site. Fencing to prevent cattle entry into these field trials varied by site and was not included in the establishment cost.

In Table 1, with the price of alfalfa hay at \$135/ton, the value of alfalfa produced is shown for years one and two. The net return per acre is calculated by subtracting annual production expenses, custom haying, hauling, and interest charges, and establishment costs that were prorated over five years except for the KC site. Annual production expenses included fertilizer, herbicides, insecticides, and cost of machinery that included fuel and lubrication, repairs, and labor. Net return per acre in year 1 varied between \$304.61 and \$171.74 and between \$367.30 and a -\$47.31 in year two. Except for the KC site, net return per acre was higher in the second year compared to the seedling year mainly due to greater yield of hay. Alfalfa on the KC site steadily declined in year 2, possibly due to excess soil wetness. The KC site alfalfa was terminated by disking after the third cutting the second year and the cost of establishment was prorated over only two years, leaving this site with a net loss of \$47.31 the second year.

Application. With the projected net loss of \$47.31 in year 2, the KC site had a two-year combined net income of \$124.43. The two-year total estimated net return per acre on the remaining four sites ranged from \$671.91 to \$443.34 with the establishment costs prorated over five years. These data from field production verify the increased economic opportunity provided by production of alfalfa as a hay crop compared to the more important grass hay crops produced.

Table 1. Economic production estimates for alfalfa grown on five-plus acre SARE field sites.

	GRIFFIN	PRUD'HOMME	TAYLOR	RILEY	KC
Establishment Cost	\$225.02	\$252.63	\$326.13	\$352.65	\$250.71
Year 1 (2000) Hay Value [†]	676.35	599.40	546.75	544.05	604.80
Production Expenses	164.88	94.88	110.97	151.05	159.83
Haying, Hauling & Interest	136.86	119.24	109.74	110.82	122.87
Overhead, 5-Year Prorated	70.00	75.53	90.23	95.53	150.36
Net Return / Acre	304.61	309.75	235.81	186.65	171.74
Year 2 (2001) Hay Value [†]	720.90	700.65	664.20	621.00	319.95
Production Expenses	139.19	135.63	136.38	143.45	149.31
Haying, Hauling & Interest	144.41	140.37	133.38	125.34	67.59
Overhead, 5-Year Prorated	70.00	75.53	90.23	95.53	150.36
Net Return / Acre	367.30	349.12	304.21	256.69	-47.31
2 YR TOTAL NET RETURN/ACRE	\$671.91	\$658.87	\$540.02	\$443.34	\$124.43

[†] Alfalfa valued at \$135 per ton of 12% moisture hay.