Appendix B: MODEL DESCRIPTION

A stochastic simulation model was used to evaluate and compare the implications of the options for producing gasohol and modifying current commodity programs on economic variables characterizing U.S. corn and soybean markets, FEEDSIM, a model of U.S. corn and soybean markets is comprised of annual production, demand, and Government program components, and incorporates interaction in supply and demand for both commodities. Because FEEDSIM is documented in detail elsewhere, only those modifications that were necessary to address the gasohol policy options are discussed here. Those modifications include incorporating: 1) the commitment by CCC to supply grain to alcohol distillers, 2) the subsidy needed to make alcohol production competitive, and 3) the impacts on soybean demand resulting from increased supplies of distillers dried grain.

The gasohol program alternatives analyzed here require a corn supply commitment equivalent to that needed to produce 1, 2, 3, or 4 billion gal of alcohol — 385, 769, 1,154, and 1,538 million bu of corn, respectively. These amounts can be compared to the 460 million bu of corn that a previous study estimates could have been produced on corn acreage withdrawn from production in 1978.2

The alternative levels of supply commitment are purchased and sold by CCC. This modification is incorporated in the stocks component of the model by specifying that CCC make available that amount of grain from either inventories accumulated through nonrecourse loan defaults or purchases from the market, which equal the difference between the levels of supply commitment and quantity defaulted. CCC is charged the loan rate for grain withdrawn from inventories and the market price for grain purchased from the market.

The per bushel corn price used to calculate CCC revenues is that required to make gasohol competitive with gasoline—$0.75/gal in 1979 This amount is increased 10 percent annually in following years to reflect rising gasoline prices. The subsidy for gasohol production is equal to the difference between the average price CCC is charged for the grain supply commitment and the price for grain that makes gasohol production competitive.

The process of grain to alcohol conversion also results in the production of distillers dried grain — a protein source that substitutes for soybean meal at a rate of 2 to 1.* Each bushel of grain used in gasohol production reduces domestic soybean demand by 0,19 bu.**

'Forrest D Holland and Ronald I Meek hot *FEEDSIM Description and Computer Program Documentation* Agricultura l Experiment Station, Purdue University Sta Bul No 2.21, March 1979

S Barber, et a l The Potential of Produc ing Energy From Agricul ture () TA contractor report May l 979 The anal} sis reported here does not incorporate wheat that could have been prod u ced on a creage with draw n t rom production in 1978 The study cited estimates t h is amount to be 220 MI l l ion bu Research conducted by the authors found that annual supply com m itments of th isleve l resulted in substantial dislocation in the wheat sec tor

* Distillers dried grain requires additional processing from the corn sl urry I t is highly competitive with soybean meal and more t ransportable than the corn slurry

* *Modifications Incorporated in the model specify full utilization of the distillers grain -i\ a protein substitute for soybean meal While this is not l i kel v, the mod ific at ion was done in t his m a nner to illust rate the most severe case it is more l ikel v that some ot the d istillers grai n wou ld be ted wet as a c orn substitute To the extent that t he c om substitution occurred, soybean demand wou ldbe diminishe d less than indicated in these results The results shown here should be interpreted with this t actor under con-sideration Other lim lt at ions of the mode l include the exclu sion ot acre-ago responses t rom ot her feedgrains and other sources of adj u stment that ma} in the long run a mel l orate the increased demand l evels a nd stock-holding by al ohol distillers to butter severe supply and demand condi tions