

COMPREHENSIVE RESEARCH ON RICE
ANNUAL REPORT

January 1, 1981 - December 31, 1981

PROJECT TITLE: "An Economic Analysis of Residue Management Alternatives to Open-Field Burning of Rice Straw in the Sacramento Valley Air Basin"

PROJECT LEADER AND PRINCIPAL UC INVESTIGATOR:

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LEVEL OF 1980 FUNDING: \$11,725

OBJECTIVES AND EXPERIMENTS CONDUCTED BY LOCATION TO ACCOMPLISH OBJECTIVES:

The general objective of this research project is to evaluate proposed crop residue management schemes and policies for implementation which might serve as alternatives to dependence on open-field burning of rice straw as currently conducted in the Sacramento Valley Air Basin (SVAB). This involves the quantitative evaluation of expected economic impacts on rice producers and on the rice-related agricultural economy of alternative strategies for rice straw management in the SVAB.

This on-going research is being conducted primarily within the Department of Agricultural Economics at UC Davis. However, both data and technical assistance have been obtained from a number of sources outside this department, including: The California Air Resources Board, U.S. Bureau of Reclamation, CIC Research, Inc. (rice farmer survey data from an ARB-sponsored project), U.S. Department of Agriculture, California Crop and Livestock Reporting Service, California Department of Water Resources, several individual irrigation and water districts in the Sacramento Valley, rice farmer members of the Rice Research Board (an informal telephone survey), Sacramento Valley County Farm Advisors, Auslam and Associates, and members of the Departments of Plant Pathology, Agricultural Engineering, and Agronomy and Range Science at UCD.

SUMMARY OF 1981 RESEARCH (MAJOR ACCOMPLISHMENTS) BY OBJECTIVES:

The primary general objective is to evaluate expected economic impacts on rice producers and on the rice-related agricultural economy of alternative strategies to rice straw management in the Sacramento Valley Air Basin. Major accomplishments under specific research tasks are summarized as follows:

1. Cost of Production budgets for rice (for the 1980 growing season) have been revised and finalized. Budget modifications to estimate rice growing

costs have been undertaken and are nearly completed. These estimate the costs under conditions of: (1) open-field burning, (2) various straw-harvest operations, and (3) different systems for soil incorporation, for use in developing appropriate cost of production and other technical information for the optimization model.

2. Cost of production data for potential substitute or alternate crops in the rice-growing areas of the Sacramento Valley have been developed for use in the optimization model.

3. Information on soils in the rice-growing areas has been collected and definition of soil groups (homogeneous with respect to factors influencing the feasibility of growing substitute crops and the feasibility of soil incorporation) is nearing completion. This analysis involves combining information on the physical characteristics of soils with empirical evidence of historical cropping patterns on particular soil groups.

4. The mathematical programming model (in both linear programming and quadratic programming formats) has been specified and derived demands for the relevant crops have been determined; definition of cropping activities and development of the model's constraints are nearly finished. This optimization model will be used to estimate both changes in net revenues of rice producers and the relative magnitude of substitution of other crops for rice (i.e., shifts in cropping patterns) which might result if rice straw disposal costs increase due to greater restrictions on open-field burning.

5. It has been determined that the California Agricultural Resources Model (CARM), which has been developed at the Giannini Foundation, will be available to help determine likely regional and/or statewide impacts. CARM can estimate how changes in the Sacramento Valley's rice industry might influence producer incomes and cropping patterns on a broader regional or statewide basis. The California Department of Water Resources multi-regional and statewide Input/Output models may also be useful in estimation of direct and indirect impacts ("ripple effects" or multipliers) on the regional economy resulting from changes in the Valley's rice industry.

PUBLICATIONS OR REPORTS:

There have been no publications or reports issued in 1981. Upon completion of this project during the first half of 1982, a final report detailing the findings and empirical results of this research project will be issued.

CONCISE GENERAL SUMMARY OF CURRENT YEAR'S RESULTS:

Cost of production budgets have been completed for potential substitute crops and for rice under various assumptions regarding straw disposal. Much work has been done on defining soils groups for the rice growing area, and final specification of the optimization model which will estimate producer income effects and shifts in cropping patterns is almost complete. A great deal of useful information has been obtained and analyzed; this will be presented and the empirical results of the quantitative analysis being undertaken will appear in the final report upon completion of the project.