

9310236(17)
PD.AAC-843-F1

ANNUAL REPORT: UNIVERSITY OF MINNESOTA--
USAID COOPERATIVE AGREEMENT

by

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November 8, 1977

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I. INTRODUCTION

This is an interim report on the cooperative agreement AID/ta-CA-1. This report focuses on the major tasks performed to date, in process and tasks remaining to be performed over the life of the contract. The report is organized by discussing each objective of the contract separately. First a brief review of accomplishments to date are stated. Then, the tasks in process and those remaining to be performed are presented. Each section is concluded by discussing the sequence and expected duration of each task and problems, if any, that have arisen and their likely consequences.

II. OBJECTIVE I: Advance the analytical framework of the present agricultural planning and sector analysis activities of Tunisian Ministry of Agriculture

II.1 Tasks Completed, in Process and Tasks to be Performed

The tasks performed to date are: (a) the correction of data and inconsistent specifications in the Tunisian agricultural sector analysis model (ASA), (b) with the help of Walter Kennes, the modification and respecification of the tree crops subsector, (c) the specification of Cobb-Douglas production functions for each of four different wheat varieties in place of the previous and fewer production activities of two varieties. These modifications were made and the ASA model was used to derive a base solution for the year 1976 (table 1). The results for the year 1976 are, for all practical purposes, similar to the results obtained earlier. This

Table 1. Comparison of Previous to Recent Results of Tunisia ASA Model

	QUANTITIES, 1000's qx.						
	Previous Results	Recent Results	Actual	Deviation		Previous Results	Recent Results
				Previous Results	Recent Results		
Cereals							
Hard Wheat	6490.7	6488.	7000.	-509.3	-512.0	.93	.93
Soft Wheat	3038.7	3120.	1800.	1230.0	1320.0	1.69	1.73
Barley	1323.1	2098.	2700.	-1377.0	-602.0	.49	.77
Vegetables							
Tomatoes	2946.5	2734.	2500.	446.5	234.0	1.18	1.09
Potatoes	2177.9	1300.	1000.	277.9	300.0	1.28	1.3
Peppers	1107.7	991.	1000.	107.7	-9.0	1.11	.99
Artichokes	99.7	97.	130.	-30.3	-33.0	.76	.75
Melons	2096.0	2000.	2500.	-404.	-500.0	.84	.80
Tree Crops							
Olives	8402.2	8351.6	8700.	-297.8	-348.4	.97	.96
Citrus	1281.8	1281.8	1628.	-347.0	-347.0	.79	.79
Apricots	307.5	307.5	290.	17.5	17.5	1.06	1.06
Almonds	449.8	359.8	240.	209.8	119.8	1.87	1.50
Dates	600.0	600.0	450.	150.0	150.0	1.33	1.33
Livestock							
Beef	318.4	321.1	286.	32.4	35.1	1.11	1.13
Mutton	343.2	343.2	325.	18.2	18.2	1.06	1.06

suggests that the errors discovered were not serious. It also suggests that respecification (b) and (c) above, while increasing the flexibility of the model for policy analysis, did not appreciably alter the predictive capability of the model. However, these steps had to be performed before attention could be directed to more fundamental questions of data up-dating and the model respecifications called for in Objective 4.

The tasks in process are (a) reestimation of the rainfall parameters of the wheat production functions to correct for the large deviations in model estimates of hard and soft wheat production (table 1) and (b) redesign of the ASA matrix generator. While the first task is self explanatory, the second requires some discussion. A matrix generator is a computer program designed to accept data in a "compact" format and generate, in the computer, the data input required by the linear programming code to specify and solve the ASA model. The existing (present) generator was developed primarily by FAO. The problem with the generator is that it is too "automatic" and complicated. For instance, the simulation of policy alternatives requires changes in the model that are consistent with these policy simulations. However, the present generator is sufficiently complicated that it is especially difficult to instruct the generator in a way to produce the required changes in the model. Evidence supporting this contention can be provided by both FAO and Mr. Thabet. This problem is further aggravated by the lack of a manual stating the use of the generator. Consequently, a new generator which is less automatic though easier to employ is in the process of development. Accompanying the generator will be a manual giving detailed instructions on its use. In addition to completing the above, the major task that remains to be performed is improving the predictive accuracy of the model. This

involves incorporating the yield-rainfall estimates forthcoming from the tasks mentioned above. If this does not correct for the large errors in estimated wheat production other model specification changes will be considered. The first of which is to modify the cereal land allocation constraints.

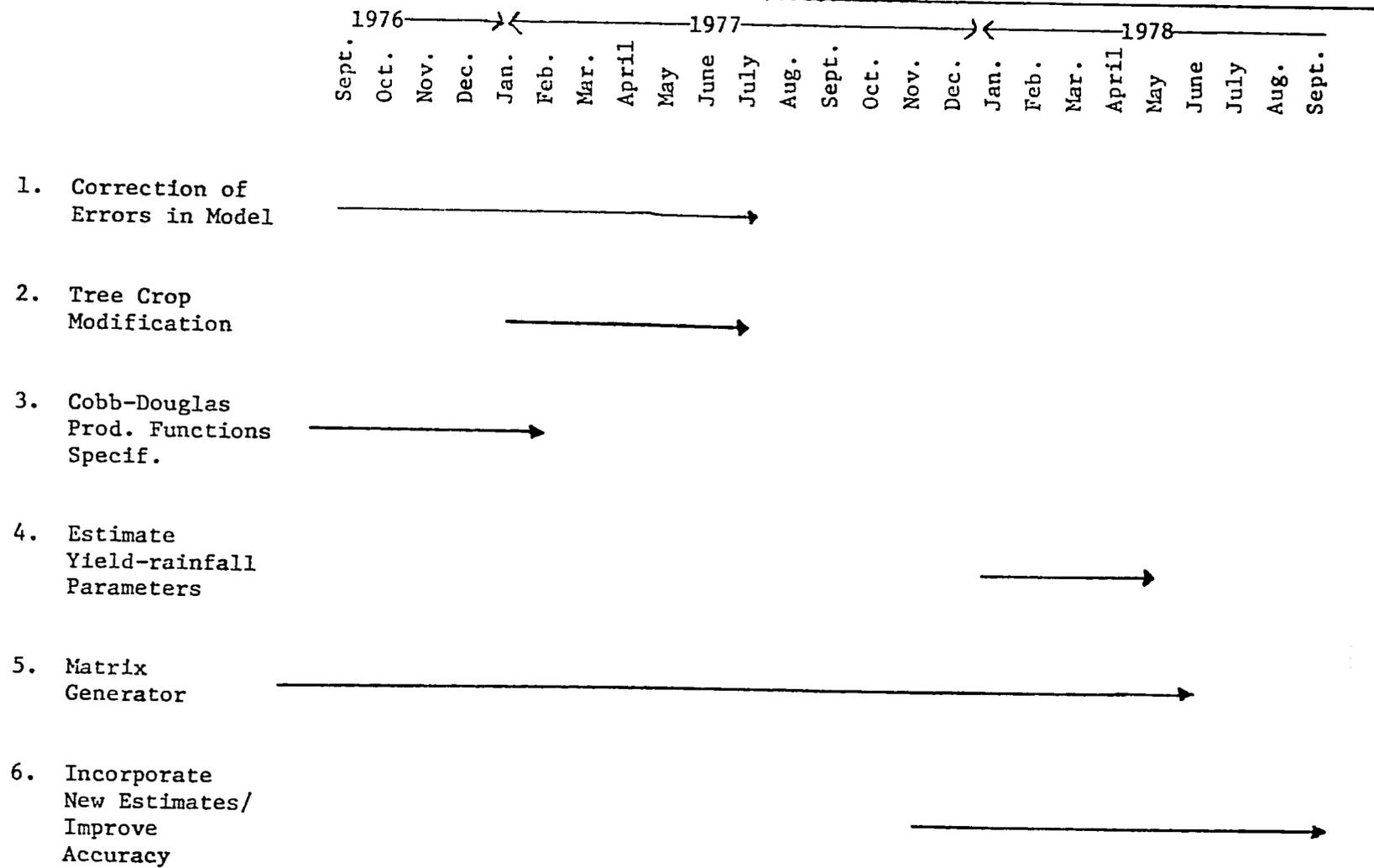
II.2 Effectuating Objective 1

Mr. Boubaker Thabet, currently at Oklahoma State University, has scheduled about two weeks at the University of Minnesota during the month of January-February. This period of time will be devoted to familiarizing himself with the changes and corrections that have been made in the model. During this time, he will become familiar with the matrix generator being developed, concentrate on its use for the ASA model and its general use in the design of other types of mathematical programming models.^{1/}

The overview of time allocation to the various tasks discussed above is presented in Table (2). Yield-rainfall parameter estimates will get underway at a later date, as indicated, in order to draw on the "new" data collected by Nygaard under objective 3. The last category, incorporating new estimates/improving predictive accuracy, has actually been underway with the accomplishment of earlier tasks. However, more intensive efforts will commence later when the analytical results are forthcoming from Nygaard's risk-uncertainty analysis and all model respecifications have been completed.

^{1/} The matrix generator is not problem specific. Therefore, it can be applied to any type of linear programming problem. The generator also handles the specification of nonlinear functions into a linear programming format, as well as options to assist in model "debugging" modification and extension.

Table 2. Tasks to be Performed for the Completion of Objective 1



III. OBJECTIVE 2: This objective is currently stated as: assist in the Tunisian Ministry of Agriculture the process of sector analysis using the improved analytical framework developed.

Based on discussions with the Technical Assistance Bureau, Office of Agriculture/Economics, Tunisian and USAID mission personnel in Tunisia the above terms "assist in" denote a connotation different from that intended. Consequently, we propose the following change in objective 2 where it should be pointed out, that the proposed change has little effect on the procedures previously stated to accomplish it.

2. To assess, on behalf of the Technical Assistance Bureau, the potential role of ASA methodology and its potential usefulness (or lack thereof) within the Tunisian agricultural sector.
 - a. The major thrust of the proposed effort will be to systematically document the development of the agricultural sector model and its use to date for economic analysis purposes as well as within the planning process. The evolution of the agricultural planning process, its changes and current structure to date will be documented in order that a critical evaluation can be made of ASA modelling methodology to meet the needs of Tunisian planning requirements. It should be pointed out that this assessment is not an evaluation of the Tunisian planning process. An assessment will be made of current and future term planning requirements which might influence the institutionalization of the ASA model within the Tunisian planning structure. These results--the documentation of the ASA model, development, the evolution of the Tunisian agricultural planning process and methodological factors influencing institutionalization of ASA techniques within the planning process--will be included in a monograph drafted by the Cooperator. The monograph shall also serve as a "case study guide" to efforts of this kind in other countries.
 - b. Upon completion of the document, further dissemination of project results will take place both in the U.S. and Tunisia. Both formal and informal discussions will be held with U.S. Government, university and foreign national personnel during the project life to communicate project results and their implications for ASA institutionalization in governmental planning processes.

III.1 Tasks Performed

The tasks performed to date are: (a) collection of data and other

the last 12-18 months, (b) a literature search, (c) drafting of papers, and the presentation of seminars regarding problems of institutionalizing other ASA techniques in on-going planning processes and, (d) development of tentative detailed outline of the monograph. Information on model development was collected during Roe's October 1976, July 1977 visits to Tunisia and through correspondence with Boubâker Thabet and Mr. Rene Vours, an IBRD employee stationed in DPAEEP. Literature bearing on institutionalization problems and issues has been collected and reviewed. While this task has been essentially completed, it is, nevertheless, a never-ending process.

The two papers "Issues Relating to the Adoption of Agricultural Sector Analysis Methods by Policy-Decision Making Authorities in LDC's" and "Agricultural Sector Analysis Model Design and Public Policy Making Infrastructure: An Examination of Interdependencies" have been written and presented by Klein and Roe at conferences on this subject for purposes of obtaining reviews and feedback to our views on institutionalization problems. In addition, a colloquim at Temple University and a seminar in USDA/ERS/CED was also given on these subjects. These papers, when modified and expanded, will become important parts of the monograph.

III.2 Tasks in Process and Tasks to be Performed

Tasks in process are (a) documentation of the process by which the fifth plan was developed, (b) collection of data and information relating to (i) the policy instruments at the discretion of the Ministries of Agriculture, finance and national economy and (ii) the "Linkages" between these ministries as they pertain to constraints and the sharing of "joint" discretion over policy instrument manipulation, (iii) the process of setting policy objectives, and (iv) the mechanism of program implimentation in the Ministry of Agriculture, (c) assess the implications of the above information on ASA model design, implications for its usefulness in the

planning process, and strategies for its implementation. Additional data collection on (a) and (b) above is to be obtained from Mr. Vours upon his return to the IBRD, Thabet, Ben Senia and FAO later this year and early next year.

Upon completion of the above tasks the first draft of the over-all monograph will commence.

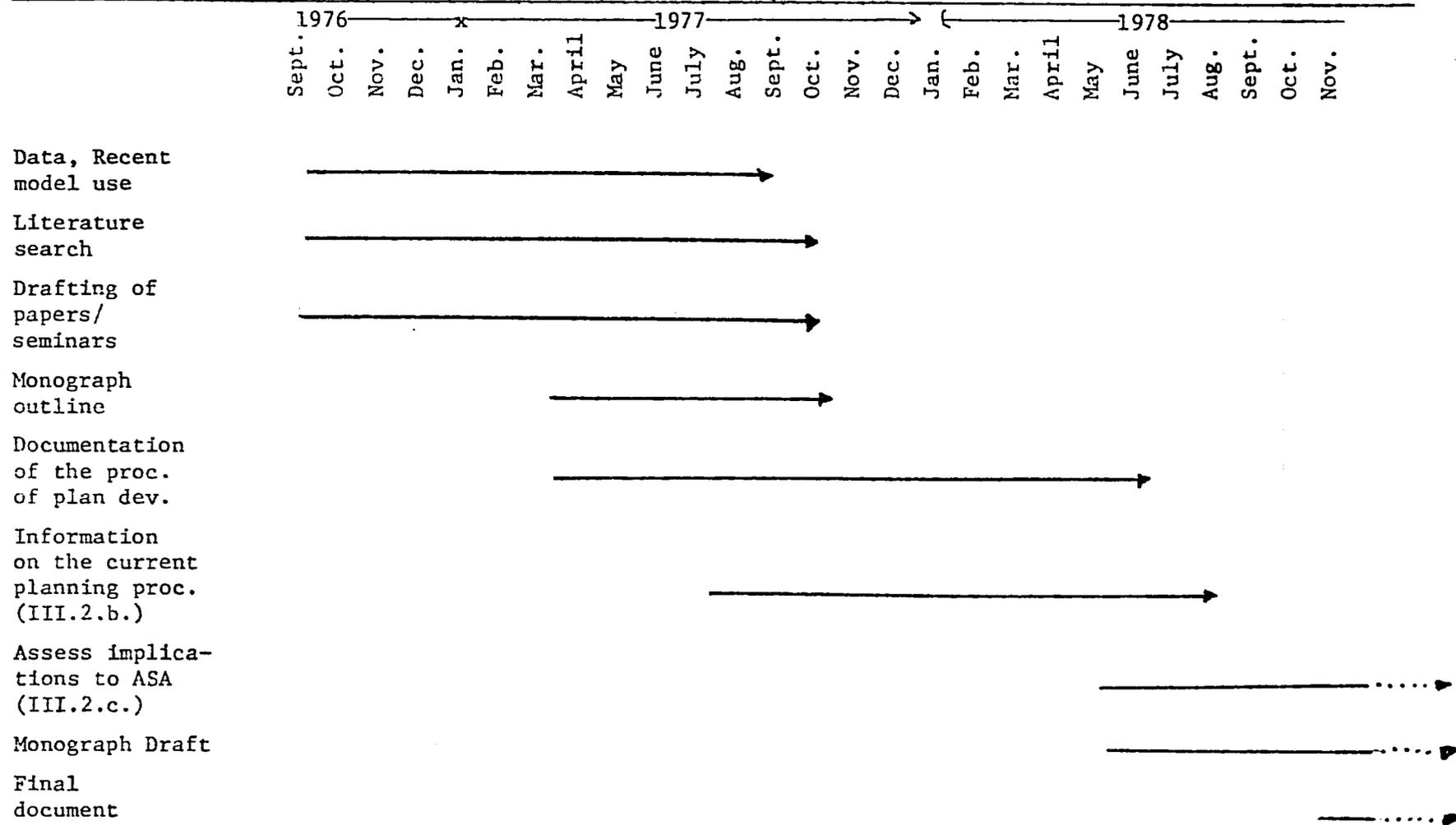
III.3 Time Sequence of Task Accomplishment

Table 3 provides our estimate of the sequence of task accomplishment, and highlights a problem we foresee in fulfilling objective 2 at the current completion date of the contract. Because of the unexpected difficulty encountered in obtaining the information discussed in III.2 above, the time required to obtain this information has been increased and delayed the planned initiation of the first draft of the monograph by about six months. Some of the circumstances causing the delay in data collection is explained in "Tunisian Response to Current and Proposed In-country Activity of TAB-University of Minnesota Cooperative Agreement AID/ta-CA-1" drafted 7/28/77. The time delay however, will not affect funding requirements.

IV. OBJECTIVE 3: Perform a specific risk and uncertainty analysis on factors affecting small farmers decisions to continue with a known technique or practice.

The tasks for accomplishing this objective are broadly categorized for our purposes here as follows: a) Literature review, initial theoretical and empirical model development; b) Development of project agreements with the host institution (INAT); c) Farm level questionnaire design and pretesting, sample selection; d) Farm level survey; e) Data summary and

Table 3. Tasks to be Performed for the Completion of Objective 2



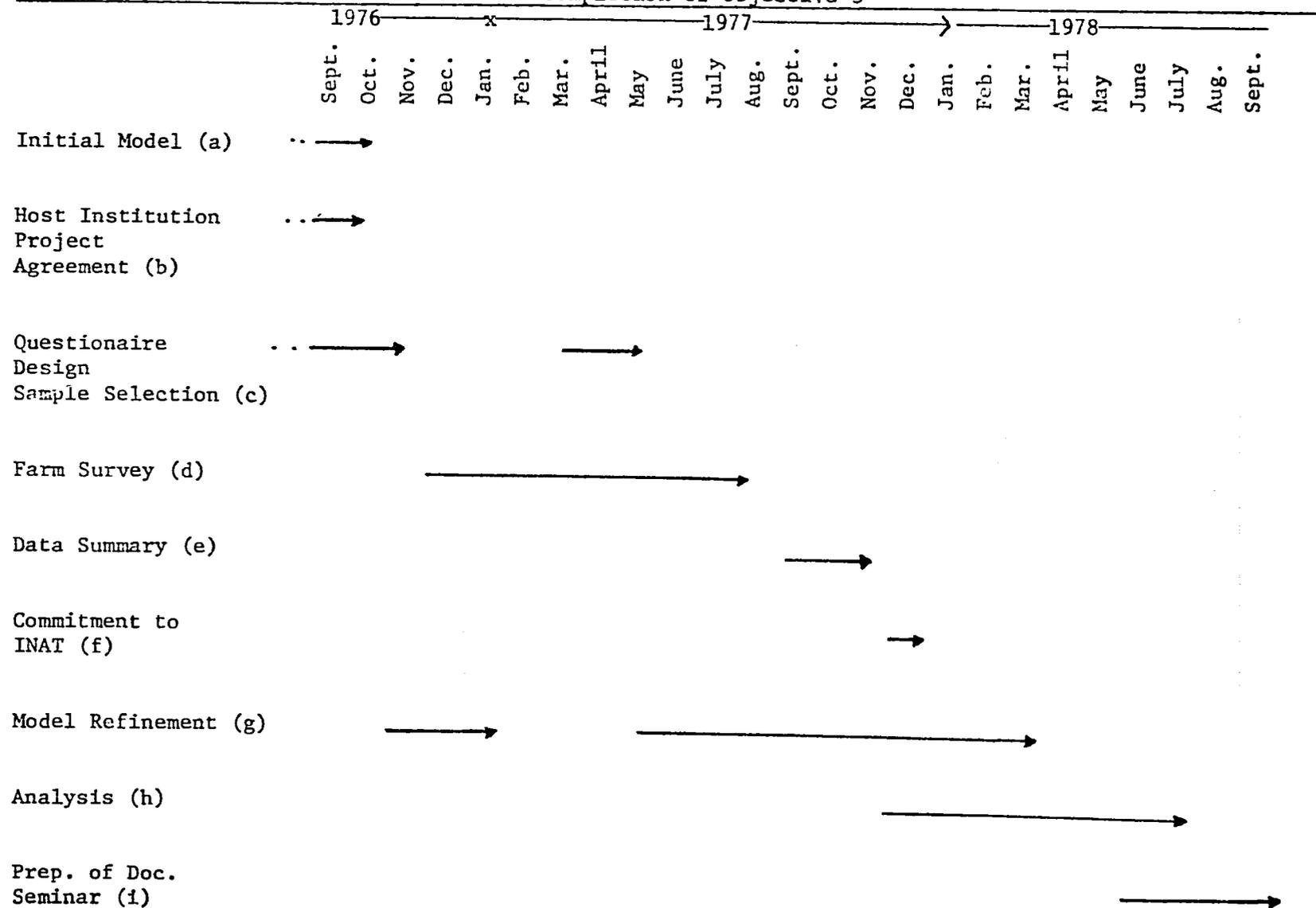
data processing in computer file; f) meeting of data commitment to INAT; g) theoretical and empirical model refinement; h) analysis and i) preparation of documents for INAT in particular and other interested researchers in DPAEEP.

The tasks completed are (a) through (d) above. The farm level survey consisted of two parts. The first survey, encompassing 140 cereal producing farms was taken at seed-bed preparation time, Nov.-March 1977. The sample chosen is a subsample of a previous survey conducted for the 1973/74 crop year. The second survey of the same 140 farms was taken during and just after harvest, June-July, 1977. Tasks in progress are (e) and (g) above. Tasks remaining are (f), (h) and (i).

The time sequence for completing the tasks underway and yet to be performed are listed in Table 4 below. The short-term commitments to the host institution, INAT, is one of providing them with (a) a computer print-out of the data and (b) the data on computer cards and in a format that will assist them to perform their own analysis if they so wish. Theoretical model refinement, (refinement of the maintained hypotheses) and refinements in the corresponding empirical (statistical) model will continue to be made as the data is analyzed. The analysis (h) is expected to begin in November-December and continue through June. It is expected that approximately three to four months will be required to prepare the appropriate documents detailing the analysis and the implications and conclusion it implies.

V. OBJECTIVE 4: Integrate the results of the risk and uncertainty analysis into the institutionalized framework of agricultural sector analysis.

Table 4. Tasks to be Performed for the Completion of Objective 3



The major tasks required in this case include (a) specification of risk and/or rate of adoption equations in the ASA model and (b) the up-dating of the production functions and/ or their respecification (depending on the analysis of the 1977 production data), (c) testing the consequences of these changes in the ASA model, (d) the preparation of document(s) relating to the significance of these changes in the results obtained by the ASA model. The initiation of these tasks awaits the partial completion of the tasks (g) through (i), table 5. The sequence and duration of time required to complete these tasks appear in table 5. The time required to test the new specifications (a) and (b) in the ASA model is difficult to predict. This follows because it is unknown whether or not this will improve or reduce the models predictive capacity. If it decreases the models predictive capacity, then it may be necessary to investigate other specifications in the model.

Table 5: Tasks to be Performed for the Completion of Objective 4

	1978					
	April	May	June	July	August	September
Specification of Risk and/or Rate of Adoption	→					
Updating of Production Fnts &/or their Respecifications	→					
Test new significance in ASA model	→					
Preparation of Documents			→			