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LARGE AREA CROP INVENTORY EXPERIMENT (LACIE)

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CROP INVENTORY
LARGE AREA EXPERIMENT
LACIE

NASA NOAA USDA

Level 3 Baseline

LACIE

INFORMATION EVALUATION (IE)

IMPLEMENTATION/OPERATIONS PLAN

NOTICE: THIS IS A BASELINED LEVEL 3 DOCUMENT CONTROLLED BY THE LACIE LEVEL 3 CHANGE CONTROL BOARD. ANY PROPOSED CHANGES SHOULD BE DOCUMENTED ON AN RECP FORM AND TRANSMITTED TO R. B. MACDONALD, LACIE MANAGER, NASA-JSC, CODE TF, HOUSTON, TEXAS 77058.

National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER

Houston, Texas

SEPTEMBER, 1976

REVISIONS

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F O R E W O R D

This document defines the Implementation/Operations Plan for the evaluation of information pertaining to wheat area, yield, and production generated by the Crop Assessment Subsystem (CAS) of the Large Area Crop Inventory Experiment (LACIE). This document is valid through Phase III of LACIE.

This is a controlled LACIE document. Changes, additions or deletions to this document are controlled by the Level 3 LACIE Change Control Board (CCB). Direct all inquiries to R.B. Mac Donald, NASA-JSC, LACIE Project Manager.

Approved by:

for R.B. MacDonald, LACIE Manager

for J.D. Murphy, Deputy Manager
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ACRONYMS AND TERMS

AA	Accuracy Assessment
AES	Application Evaluation System
CAR	CAS Country Annual Report
CAS	Crop Assessment Subsystem
CMR	CAS Monthly Report
CUR	CAS Unscheduled Report
ERS	Economic Research Service
FAS	Foreign Agricultural Service
ICD	Interface Control Document
IE	Information Evaluation
IESG	Interagency Executive Steering Group
IMR	Information Evaluation Monthly Report
IUR	Information Evaluation Unscheduled Report
LACIE	Large Area Crop Inventory Experiment
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
RSURTF	Remote Sensing User Requirements Task Force
SRS	Statistical Reporting Service
USDA	United States Department of Agriculture

SECTION 1.0
INTRODUCTION

This document presents the Implementation/Operations Plan for the evaluation of information pertaining to wheat area, yield, and production generated by the Large Area Crop Inventory Experiment (LACIE) Application Evaluation System (AES). Information Evaluation (IE) will be performed at the U.S. Department of Agriculture (USDA) LACIE Headquarters with prime responsibility within the USDA and participation by the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA). Within this function the USDA will be responsible for the evaluation of the timeliness and utility of the acreage, yield, and production information produced by the AES (see section 3.4.1.1, LACIE Project Plan, August 1975, LACIE-C00605).

1.1 AGENCY ROLES

USDA participation in the IE function will include a full-time USDA LACIE IE staff (USDA IE) and selected reviewer/advisors from participating USDA user agencies and staffs. Details of NASA and NOAA participation have been proposed which encompass the roles and responsibilities specified herein (see section 3.1, 3.3.2.2, and 3.3.2.3). This document will be revised to incorporate any changes in these roles and responsibilities jointly agreed to by NOAA, NASA, and the USDA.

1.2 SPECIFIC USDA IE RESPONSIBILITIES

Within the general IE function, the USDA is responsible for the following (see section 3.4.1.2 of the LACIE Project Plan):

A. Evaluating the timeliness and utility of area, yield, and production information produced within the LACIE AES.

B. For setting forth the USDA policy as related to release of area, yield, and production information produced within the LACIE AES to all organizations or individuals not in direct support of the LACIE AES.

C. For definition of the systems specifications necessary to support the design of an applications system within the USDA.

D. For integrating information produced within the LACIE AES into ongoing operational activities associated with the appropriate functional agencies and services within the USDA.

E. For performing benefit/cost analysis of acreage, yield, and production information produced within the LACIE AES.

F. For analysis and evaluation of the applicability of the LACIE AES to the derivation of area, yield, and production information pertaining to crops other than wheat.

1.3 SCOPE

While the USDA responsibilities detailed in section 1.2 fall within the general information evaluation function, this Plan will be limited to the task of evaluating the timeliness and utility of AES scheduled and unscheduled reports as information for potential USDA user agencies and staff groups, and integrating AES wheat crop information into ongoing USDA activies.

The other USDA responsibilities detailed in Section 1.2 are being met as follows:

USDA policy relating to release of AES crop data has been established under Appendix I to the LACIE Management Guidelines and approved by the Interagency Executive Steering Group (IESG) on November 5, 1975. Benefit/cost analysis plans are inder development and are to be documented by March 15, 1976, according to the LACIE Schedule Level 1 dated October 1, 1975. Advanced system design will be a LACIE-Houston project for which the USDA IE staff will provide support as requested. An analysis of the applicability of the AES to the derivation of information on crops other than wheat will mainly be an outgrowth of efforts for the separation of

confusion crops from wheat within the AES. Where appropriate in the evaluation of AES crop reports, IE may raise questions, request additional information, or offer suggestions to provide inputs related to these other USDA responsibilities.

1.4 ORGANIZATIONAL STRUCTURE

The evaluation of AES scheduled and unscheduled reports will be done by the IE reports evaluation team. This team will consist of NOAA and NASA participants, the USDA LACIE IE staff and selected reviewer/advisors from the USDA Remote Sensing User Requirements Task Force (RSURTF), and potential USDA user agencies. The report evaluation effort will be led by the USDA LACIE IE staff.

1.5 OBJECTIVES

With respect to AES reports evaluation, IE objectives are as follows:

A. To evaluate the utility of AES scheduled and unscheduled crop reports where utility includes timeliness, continuity, objectivity, completeness, and accuracy -- including precision and consistent differences and compatibility with USDA crop reporting practices for such things as units of measure and levels of aggregation (see section 3 of the USDA User Requirements, dated October 1975).

B. To report the results of these evaluations to Level 3 Management via Accuracy Assessment (AA) for

the purposes of (1) providing a measure of their potential value as information to the USDA, (2) suggesting improvements in format, frequency, accuracy or objectivity of AES reports, and (3) recommending changes related to the use of LACIE-type crop information in ongoing USDA program activities.

C. To provide USDA, NASA, and NOAA management with evaluation results for their use in monitoring LACIE progress toward fulfillment of the USDA User Requirements.

D. To involve representative specialists from potential USDA user agencies in the report evaluation process for the purpose of developing user agency commentary on the potential utility of LACIE-type crop information in ongoing USDA program activities.

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SECTION 2.0

OVERALL APPROACH

IE will evaluate the reports produced by AES-CAS, both currently as they are received and again at the end of the growing season. These evaluations will be based on information received from AES, other LACIE elements, USDA User Requirements, official USDA crop production estimates, and such other information as foreign government crop reports, FAO reports, and trade news reports. NOAA and NASA will participate in the evaluation, and assistance will be obtained from USDA cooperating agencies and the RSURTF. Detailed requirements of reports are shown in Section 4 of the CAS-IE ICD, revised December 1975, LACIE C00709.

The evaluations will be documented in scheduled and unscheduled reports called IE Monthly Reports (IMR) and IE Unscheduled Reports (IUR) (CAS-IE ICD, Section 5). These reports are directed to AA, to the LACIE Manager, to the CAS Manager, to LACIE Level 2 Management, and to such USDA agencies as may require them. Summaries of these reports may also be directed to Level 1 Management.

2.1 DESCRIPTION OF THE IE REPORT

Each IE Report shall contain at least the following:

1. A table of contents
2. A summary of the report
3. An introduction

4. A copy of the CMR checklist
5. A list of acronyms and special terms
6. Statistical comparisons
7. Comments
8. Requests for additional data or for changes in the CMR, as required

2.1.1 Table of Contents

This will index the contents of the IMR/IUR down to subsection level.

2.1.2 Summary

This will be constructed so that it can serve as a stand-alone executive summary. It will both identify the geographic and temporal area of the CMR, and contain summary statements as to the relative timeliness, accuracy, precision, and general utility of the LACIE estimates in the CMR or CUR.

2.1.3 Introduction

This will identify the CMR/CUR being evaluated as to area of coverage, as to dates of preparation and of receipt by IE, and as to the identity of the review teams.

2.1.4 Checklist

An annotated copy of the checklist submitted with the CMR will be enclosed here.

2.1.5 Acronyms and Special Terms

This will have a maximum of three parts. Part 1 will always be the list of acronyms and special terms as submitted by CAS with the CMR. Parts 2 and 3 will be optional and will consist of terms to be added to or deleted from the CAS list of acronyms and special terms in the future.

2.1.6 Statistical Comparisons

This section of the IE Report will include descriptions of the following material.

2.1.6.1 USDA Estimates

This will be a description of the USDA estimates used by IE for comparative purposes.

2.1.6.2 Statistical Tests

This will include a description of the statistical tests employed.

2.1.6.3 Evaluation

This will include both tables of statistical comparisons and commentary to identify any significant differences which may be present.

2.1.7 Comments

IE commentary on the LACIE Crop Report will deal with the putative utility to USDA, as defined in Section 2.2, of the report, and possible explanations for any large

differences between LACIE estimates and USDA values for the same item.

2.1.8 Requests for Additional Data

Any requests by IE for additional data to be supplied by CAS, or for any changes in the CMR shall appear in this Seciton.

2.2 EVALUATION OF UTILITY

The IE Evaluation Team will evaluate utility to potential USDA users. Factors to be considered in evaluating utility will include timeliness and continuity, objectivity, completeness and accuracy of LACIE reports. These evaluations will be documented in the IE reports.

2.2.1 Timeliness

IE will evaluate timeliness with respect to the following:

2.2.1.1 AES adherence to the reporting schedule detailed in the CAS-IE Interface Control Document (ICD).

2.2.1.2 Currency of spectral and meteorologic data used in AES monthly reports as detailed in the CAS-IE ICD, Section 4.1.

2.2.1.3 The potential impact of AES unscheduled reports on current LACIE crop estimates and/or USDA agency programs.

2.2.2 Continuity

IE checks for continuity will include the following:

2.2.2.1 Does the existing AES reporting schedule provide adequate continuity?

2.2.2.2 Does AES comply with the Schedule?

2.2.2.3 How do sources of crop information currently used by USDA compare with LACIE for continuity?

2.2.3 Objectivity

IE will analyze and comment on input data quality problems or operating procedures which might impact on the objectivity of AES crop estimates, e.g., the use of FAS attache reports as a basis for the weekly weather summaries prepared by NOAA for use by AI personnel.

2.2.4 Completeness

To enable an evaluation of the utility of AES crop estimates, certain details are required in the scheduled crop reports (see CAS-IE ICD, Section 4). IE will examine AES crop reports to see:

2.2.4.1 That they contain:

1. Crop estimates tables.
2. Narrative.
3. Element checklist
4. Acronyms and terms.

2.2.4.2 That each section is completed according to the specifications in the CAS-IE ICD, Section 4.

2.2.4.3 That the narrative explains deviations from prescribed timeliness, format, completeness, and input data accuracy as detailed in the CAS-IE ICD, Section 4.

2.2.4.4 That the narrative identifies and offers possible explanations for major deviations in area or yield estimates from earlier reports or from a historic pattern.

2.2.4.5 That the reports indicate the proportions of spectral-based data and historic-based data used to develop area estimates.

2.2.4.6 That reports contain basic statistical descriptors such as standard deviations or standard errors, coefficients of variation, sample sizes, and the like which pertain to the AES estimates presented in the crop tables.

2.2.4.7 That reports identify the biostages and calendar dates which coincide with the acquisition of the spectral and meteorological data represented by the respective reports.

2.2.4.8 That reports are reasonably capable of being used as stand-alone documents.

2.2.5 <u>Reliability--Accuracy and Precision</u>

IE will comment upon the accuracy and precision (as defined below) of the LACIE estimates of area, yield and production.

2.2.5.1 Definitions

Accuracy -- How close does the estimate come to the value it is intended to measure? Also, in repeated trials, what is the probability that the LACIE estimate will consistently be above or below the target value?

Precision -- In repeated trials, how much scatter might one expect to find in the estimates.

2.2.5.2 Domestic Estimates

LACIE estimates of wheat area, yield and production for (portions of) the United States will be evaluated with respect to estimates for corresponding areas as published by the Statistical Reporting Service, USDA, and with respect to the accuracy requirements listed in the USDA User Requirements, Sections 2.4.2, 2.4.3, and 2.5 (also see Table A-I, page A-12, Appendix A of this document.) This will include an evaluation of the extent and of the significance of any differences. Preliminary LACIE estimates will be compared with USDA estimates made at the same stage of crop development as a means of tracking differences. Then at the end of the season, the preliminary LACIE estimates will be compared with USDA estimates made at the same stage of crop development as a means of tracking differences. Also at the end of the season, the preliminary LACIE estimates will be compared with the final USDA estimates.

2.2.5.3 Foreign Estimates

The availability and objectivity of USDA or other independent estimates for foreign wheat area, yield and production has traditionally varied by country. Also, there is no current mandatory USDA release schedule for such estimates.

Canada:

The LACIE early season estimate for spring wheat area in the indicator region will be compared with the official Canadian June Intended Acreages Report for Project guidance only. This will not represent a measure of LACIE accuracy.

The September CMR on area estimate will be compared with the Canadian Preliminary Estimate of Acreages as an indication of LACIE accuracy even though there is no basis for confidence limits on the data from Canada. There is no Canadian estimate for wheat yield or production scheduled until the November report which is listed in the Official Field Crop Reporting Calendar as "date uncertain". Therefore, LACIE yield and production estimated for Canada will be evaluated on a subjective basis.

IE will also keep a tracking record of LACIE estimates and USDA/FAS or other independent estimates for comparison with a January 1977 Canadian "final" area, yield and production report.

USSR:

LACIE estimates of area, yield, and production for the USSR winter and spring wheat indicator regions will be tracked

along with any available independent estimates for the corresponding regions which might become available. Whenever an official estimate becomes available the progress of LACIE estimates and any independent estimates will be compared with the official estimates as a measure of accuracy.

In addition to the above tracking approach, Commodity/country experts in FAS and ERS will be asked to furnish subjective opinions on the accuracy of the LACIE Canadian and USSR estimates after the initial evaluation by IE. These will be incorporated in followup IUR's or the next succeeding IMR for that country.

2.2.6 Compatibility

IE will compare AES reporting systems with those of the FAS, the Economic Research Service (ERS), and SRS published crop estimates to determine general compatibility or harmony. This will include such items as units of measurement and level of aggregation. IE may also review future needs of USDA program areas.

2.3 INTEGRATION INTO ONGOING PROGRAMS

IE will evaluate the methods for and the feasibility of integrating LACIE-developed estimates into appropriate USDA user agencies. The operational approach will include involving user agency representatives in the report evaluation process.

2.4 ORGANIZATIONAL INTERFACES

2.4.1 CAS-IE Reporting Interface

The Crop Assessment Subsystem (CAS) of AES will be the supplier of AES crop reports to IE. The CAS-IE ICD regulates this reporting interface.

2.4.2 IE Evaluations of AES Crop Reports

IE evaluations of AES crop reports service three feedback loops.

2.4.2.1 Feedback to LACIE Level 3 Management

This will provide the LACIE Manager, the AA, and the CAS Manager with a means of monitoring subsystem performance in comparison with existing reporting methods and identifying areas of possible improvement in the LACIE process. The CAS-IE ICD regulates this interface.

2.4.2.2 Feedback to NOAA, NASA, and USDA Management

This loop will be via the respective Level 2 Managers. It will provide the agencies with a means of monitoring LACIE performance. Since this essentially will be a staff function, there will be no interface control required.

2.4.2.3 Feedback to USDA Agencies and Staffs

This loop will facilitate interaction with USDA agencies and staffs in the evaluation process to provide commentary relating to USDA needs, to facilitate the integration of LACIE crop estimates into ongoing USDA program activities, and ultimately to increase their awareness and interest

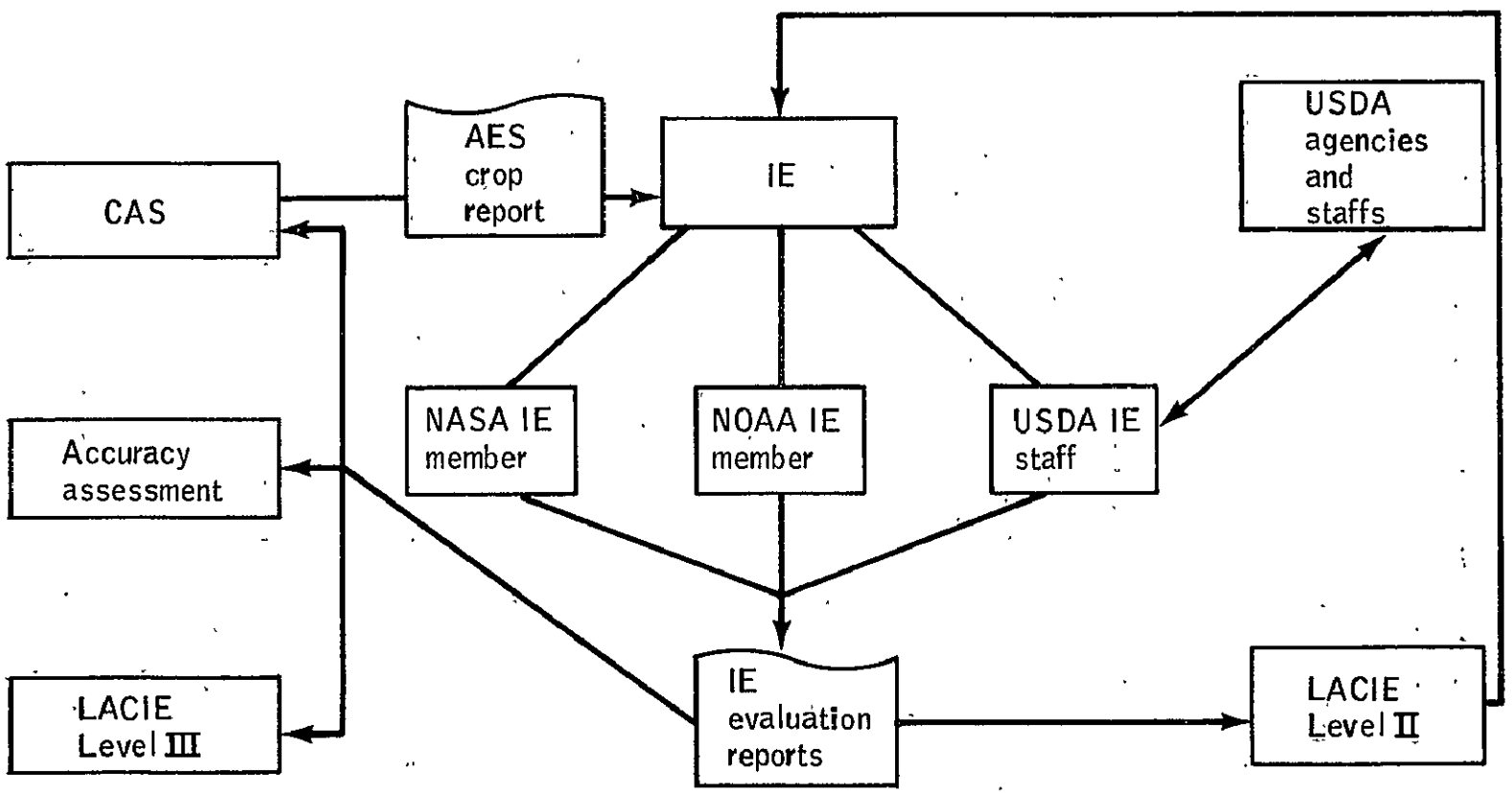

Figure 2-1.- LACIE information evaluation functional flow chart.

in the LACIE product. Internal USDA procedures will govern this interface.

2.5 FACILITIES TO BE USED

IE sees no need for substantial facilities in addition to those already allotted.

2.6 COORDINATION AND SCHEDULE TRACKING

IE will maintain a detailed log of incoming and outgoing communications and reports containing LACIE data to provide coordinaiton and schedule tracking with respect to the CAS-IE interface.

2.7 CONSTRAINTS WHICH MAKE THIS APPROACH NECESSARY

USDA crop production reporting systems and requirements are described in the USDA User Requirements document. Constraints include:

A. Present and planned data processing capabilities of the USDA.

B. Statutory requirements on the FAS and SRS for estimating foreign and domestic crop production.

C. USDA program area needs for reliable timely world crop estimates.

2.8 FLOW DIAGRAM

A simplified explanation of IE interfaces and operational flow is provided by the flow chart (fig. 2-1). A more detailed flow chart is shown in Section 1.2 of the CAS-IE ICD.

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SECTION 3.0
OPERATIONAL PROCEDURES

This section presents the agency roles, resource needs, evaluation procedures, and reporting of results of the evaluation of AES crop information.

3.1 AGENCY ROLES

3.1.1 USDA IE Staff

The USDA IE staff will have the lead responsibility in IE and will coordinate the interagency efforts. It will evaluate the utility of AES reports to potential USDA users and document the results of the evaluation and recommendations concerning the utility of AES crop reports as information. It will coordinate and track IE reporting to AA.

3.1.2 NASA IE Member

The NASA IE member will develop comments on AES crop reports with respect to wheat area inputs provided to CAS, and CAS's use of those inputs for their utility as information to users.

3.1.3 NOAA IE Member

The NOAA IE member will develop comments on AES crop reports with respect to wheat yield inputs provided CAS, and CAS's use of those inputs for their utility as information to users.

3.1.4 USDA User Agency and RSURTF Reviewers

USDA User Agency and RSURTF representatives who have

been designated as LACIE crop report reviewers will cooperate with the USDA IE staff in the evaluation process as agreed to within the USDA.

3.2 RESOURCE NEEDS

The main resource needs for IE will be files of published and unpublished United States and foreign wheat crop estimates. The USDA IE staff, with assistance from the Technical Support Group, will create and maintain these files in USDA LACIE Headquarters offices. They will encompass at least one full crop year and will consist of all pertinent SRS and independent United States crop estimating service releases; all FAS, ERS, and non-USDA releases pertaining to foreign wheat estimates; and all unpublished FAS weekly foreign wheat estimates that were current as of the first of each month. Published and unpublished USDA estimates will be in the IE system by the day that the Maximum Protection Period expires for the corresponding CMR. The IE staff will create and maintain a file of all LACIE crop reports, activity and management reports, and management control documents. The crop reports and activity and management reports will be maintained on a current basis with as many of the preceding reports kept on file as can be obtained on a retroactive basis. A complete set of management control documents will be obtained. In addition, the IE staff will build a file of technical reference material.

A partial listing of the resources to be maintained is shown in Appendix B of this document.

3.3 INFORMATION EVALUATION PROCEDURES AND REPORTS

3.3.1 Coordination of Evaluation

The USDA IE staff will have the lead responsibility for the information evaluation team and will call and chair meetings, furnish meeting space, and copy, assemble, and distribute the combined evaluation reports. The staff will also have the lead responsibility for the preparation of the reports as shown in Sections 3.3.2.1 and 3.3.2.3.

NASA and NOAA will conduct evaluations of AES reports and contribute to the IE reports as described in Sections 3.3.2.2 and 3.3.2.3. These details are subject to agreement between the USDA IE staff and the respective agencies.

Details of involving USDA user agencies and the RSURTF will be coordinated by the USDA LACIE Project Manager or his designee.

3.3.2 Evaluation of AES Monthly Crop Reports (CMR's)

As soon as the Maximum Protection Period for a report has expired, preliminary evaluation of the CMR will begin. Unless other arrangements have been made, a copy of the crop report will be immediately sent by FAS messenger to NOAA and NASA IE team members for their preliminary evaluation.

3.3.2.1 Preliminary Evaluation by USDA IE Staff

The USDA IE staff will perform a preliminary evaluation of the AES monthly crop report (CMR) for its utility to potential USDA users according to the criteria described in Section 2.2. They will document the results in a report according to the provisions of Section 5.1 of the CAS-IE ICD. The procedures for comparing LACIE crop estimates with current USDA estimates and a sample table of comparisons are shown in Appendix A. Each IE report will include at least the items cited in Section 2.1.

3.3.2.2 Preliminary Evaluation by NASA and NOAA

Concurrent with the preliminary evaluation by USDA NOAA and NASA will prepare independent preliminary evaluation comments on the report. These comments will concentrate on, but not be limited to, each agency's respective area of major responsibility within LACIE (see Sections 3.1.2 and 3.1.3). As appropriate, each will address the general subject of episodic events capabilities.

The content of the NASA and NOAA evaluation will be incorporated into a joint report by the USDA IE staff.

3.3.2.3 Final Evaluation of CMR

At the discretion of the IE team, follow-up evaluation reports may be developed. These will appear as Information Evaluation Unscheduled Reports (IUR). These

may be prepared and submitted jointly or individually. (CAS-IE ICD, Sections 5.1 and 5.2)

3.3.3 Evaluation of Other AES Reports

AES reports, in addition to the CMR, include CAS unscheduled reports (CUR) and CAS country annual reports (CAR) -- described in the CAS-IE ICD, Sections 4.2 and 4.3. There are no prescribed evaluation procedures for these reports. CUR's by their nature will vary in content. The evaluation of CAR's will generally provide input to the project end of phase evaluations and will be guided by the requirements of those evaluations at the discretion of the IE team.

3.3.4 Review by Potential USDA User Agencies and Staffs

Review of LACIE crop reports and IE evaluations will be governed by internal USDA procedures agreed to by the appropriate USDA representatives. Appropriate comments and suggestions by USDA user agencies and staffs will be incorporated into an IUR.

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SECTION 4.0

IMPLEMENTATION SCHEDULES FOR ASSIGNED TASKS

IE will conform to the Reporting Schedule detailed in the CAS-IE ICD in performing its reports evaluation function. Calendar dates are dictated by the following constraints:

A. SRS release dates for Unites States crop reports.

B. Crop data protection requirements.

C. Estimates of the minimum time required by supporting LACIE systems and subsystems to perform their assigned tasks.

SECTION 5.0

REFERENCES

1. LACIE Project Plan, sections 3.4.1.1 and 3.4.1.2, August 1975, LACIE-C00605.

2. USDA User Requirements, October 1975.

3. CAS-IE Interface Control Document December 1975, LACIE C00709.

4. LACIE Level 1 Schedule, October 1, 1975.

5. Appendix I, LACIE Management Guidelines, approved November 5, 1975.

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APPENDIX A

IE EVALUATION PROCEDURES

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SECTION A1.0

OBJECTIVES

IE will examine the AES crop estimates in order to:

A. Determine if there are significant differences between the AES estimate(s) and the current USDA estimates of the same item.

B. Determine if the relative standard errors are so large that LACIE estimates are in danger of exceeding the USDA User Requirements for accuracy and precision when aggregated to the country level. These requirements are shown in tables 3-1 and 3-2 of the USDA User Requirements, published October 1975.

SECTION A2.0

INDEPENDENT ESTIMATES

The statistical comparisons made by IE (see fig. A-1 as an example) shall treat the current USDA estimates as though they were without any sampling, forecast, or estimation error. This is because there is a definite problem in obtaining valid estimates of the sampling or estimation errors for either the United States or for other countries. However, IE will attempt to obtain, and to include in comments regarding utility of the estimates, approximations of the coefficient of variation of the differences between historic forecasts for the same date and the final estimates.

Comparisons with any available estimates from other reputable sources may be furnished when the differences between the LACIE and USDA estimates are large. This, however, should not be taken to imply that either the LACIE or USDA estimate is more realistic.

A2.1 IN-SEASON MONTHLY EVALUATIONS

During the growing season, evaluations of LACIE estimates will be based on comparisons of current LACIE estimates to current USDA estimates for the same item. Where appropriate, LACIE estimates will also be compared with sources of foreign estimates used by USDA in making the official USDA estimate. Figure A-1 is an example of the form that will be completed for these comparisons.

A2.1.1 Approach

USDA User Requirements indicate that domestic LACIE estimates for Phases II and III should achieve a reliability of at least 15 percent for the initial estimate and at least 10 percent for mid-season and later estimates (table A-1). The guidelines for foreign estimates are less stringent (see table A-II).

A2.1.2 USDA Estimates Used

For the United States, the current published SRS estimate will be the USDA estimate compared with LACIE estimates for evaluations during the growing season. For other countries, the most recent FAS working estimates will be compared with LACIE foreign estimates.

A2.2 POST-HARVEST AND FINAL EVALUATIONS

A2.2.1 Approach

LACIE estimates made throughout the growing season will be compared with post-harvest and final USDA estimates to test compliance with the accuracy requirements shown in tables A-I and A-II and levied in the USDA User Requirements.

A2.2.2 Estimates To Be Compared With LACIE

The USDA estimates of area, yield, and production of wheat for post-harvest evaluation of LACIE estimates for the United States will be the "final" SRS estimates for individual states as published in the December 1 Crop Production Report, to be issued about December 10. However, preliminary evaluations may be performed using the SRS estimates for winter wheat as published in the August 1 Crop Production Report, or for spring wheat as published in the October 1 Crop Production Report. Estimates of acreage, yield, and production at the county and crop reporting district level may also be used as and when published by the individual SRS state offices.

For other countries, the LACIE monthly and final estimates will be compared with the "best" post-harvest estimates or area, production and yield known to USDA.

SECTION A3.0

LACIE OUTPUT STATISTICS.

Details of output statistics required from LACIE are shown in the CAS-IE ICD, section 4.

SECTION A4.0

EVALUATION

The following will be performed for each LACIE estimate which can be matched with a USDA estimate of the same quantity.

A4.1 SIGNIFICANT DIFFERENCES IN LEVEL OF ESTIMATE

Any difference between the LACIE estimate and the independent estimate which has an absolute value larger than 1.645 standard errors of the LACIE estimate is to be flagged as a significantly large difference. Such a difference does not necessarily imply that the LACIE estimate is grossly in error. However, all such occurrences will be included in the evaluation report for possible action by the LACIE AES in Houston.

A4.2 STANDARD ERRORS OF THE ESTIMATE

To ensure that the LACIE estimates aggregated to the national level meet the criteria for accuracy as stated in tables A-I and A-II, it is only necessary to ensure that the relative standard errors or coefficients of variation of the estimates for any particular subregion do not exceed some critical value. A set of optimally derived critical values for the major crop reporting districts in the 9-state Great Plains region of the United States is given in table A-III. The details of the construction of table A-III are given in section 5 of this Appendix. Similar tables will be

constructed for other countries for use by IE, as appropriate, but will not be included in this document.

SECTION A5.0

TECHNICAL NOTES

5.1 CONSTRUCTION OF TABLE A-III

Given that specified number (n_i) of sample segments have been allocated to k different subregions in accordance with an optimum sampling plan, and given that the total number (n) of sample segments allocated is such that estimates produced by the sample survey would have at least a specified level of accuracy, then a first approximation to the level of accuracy that should be expected for any subregion i can be computed as:

$CV_i = CV_r \sqrt{n_r / n_i}$, where

CV_i is the expected coefficient of variation for estimates from sub-region i.

CV_r is the specified coefficient of variation (measure of accuracy) for the region,

n_r is the total number of samples <u>allocated</u> to the region, and

n^i is the number of samples <u>allocated</u> to the i subregion.

For the LACIE, the CV that would just meet the specified levels of accuracy at the regional level can be

determined as follows. The USDA User Requirements for LACIE allow relative errors as large as 10 or 15 percent for different types of estimates in different countries and at different times of the crop season. Interpreting these accuracy requirements in terms of a 90 percent probability statement leads to the conclusion that the largest permitted relative error for production should be divided by 1.645. Since the CV of the production estimate is computed as:

$$CV^2_{prod} = CV^2_{area} + CV^2_{yield} + (CV_{area} \times CV_{yield})^2$$

it will be seen that CV_{prod} must be at least as large as CV_{area} or CV_{yield}. Further, if we assume that the area and yield estimates contribute equally to the variance of the production estimate, then we can compute optimum values as

$$CV_{area} = CV_{yield} = \quad -2 + \sqrt{4 + 4CV^2_{prod}} \quad /2$$

TABLE A-I.- ACCURACY OF LACIE ESTIMATES FOR THE UNITED STATES AS COMPARED WITH THE FINAL USDA ESTIMATE[a]

LACIE estimates	Phase I (1975-1976) estimate, percent	Phase II (1975-1976) estimate, percent	Phase III (1976-1977) estimate, percent
Initial			
Planted area	±20	±15	±15
Yield	±20	±15	±15
Production	±20	±15	±15
Mid-season			
Planted area	±15	±10	±10
Yield	±15	±10	±10
Production	±15	±10	±10
Post-harvest			
Harvested area	±10	±10	±10
Yield	±10	±10	±10
Production	±10	±10	±10
Final			
Harvested acres	±10	±10	±10
Yield	±10	±10	±10
Production	±10	±10	±10

[a]Source: table 3.1 of USDA User Requirements, October 1975.

TABLE A-II.- ACCURACY OF LACIE ESTIMATES FOR OTHER COUNTRIES AS COMPARED WITH THE FINAL USDA ESTIMATES FOR EACH COUNTRY[a]

LACIE estimates	Phase II estimate, percent	Phase III estimate, percent
Initial		
Planted area	±20	±15
Yield	±20	±15
Production	±15	±10
Mid-stage		
Area	±20	±15
Yield	±20	±15
Production	±15	±10
Pre-harvest		
Area	±20	±15
Yield	±20	±15
Production	±15	±10
Final		
Area	±15	±10
Yield	±15	±10
Production	±10	±10

[a]Source: table 3.2 of USDA User Requirements, October 1975.

TABLE A-III.- OPTIMALLY DERIVED COEFFICIENTS OF VARIATION FOR LACIE ESTIMATES OF WHEAT YIELD, AREA, AND PRODUCTION IN THE GREAT PLAINS STATES

State or region	Optimal level of accuracy			
	10%		15%	
	Area/yld., percent	Prod., percent	Area/yld., percent	Prod., percent
U.S.	4.30	6.08	6.44	9.12
9 Great Plains States	5.35	7.57	8.01	11.35
5 Winter Wheat States	6.99	9.90	10.48	14.86
Colorado	19.01	27.12	28.21	40.68
Kansas	11.80	16.74	17.62	25.11
Nebraska	18.19	25.93	27.02	38.90
Oklahoma	17.03	24.26	25.33	36.39
Texas	15.41	21.92	22.95	32.88
2 Mixed Wheat States	11.21	15.91	16.76	23.86
Montana	13.94	19.81	20.79	29.71
South Dakota	18.72	26.71	27.80	40.06
2 Spring Wheat States	12.24	17.37	18.27	26.06
Minnesota	29.46	42.55	43.17	63.83
North Dakota	13.40	19.03	19.99	28.55

For CAS Monthly Report dated _____
Retain under Restricted Access until _____
Today's date _____

Information Evaluation Comparisons of Standard USDA Crop Estimates and LACIE Estimates

CAS Monthly Report No. _____

USDA Publication: _____

Type of Wheat: Winter ( )
Spring ( )

Est.: Area ( )
Yield ( )
Prod. ( )

Code I.D.	USDA est.	LACIE estimates			Comparisons					
		Value	S.E.	C.V.	USDA/ LACIE	USDA LACIE dif.	Dif./S.E. of LACIE	√ if ratio exceeds 1.645	Max. allowable C.V.	√ if C.V. not acceptable

Figure A-1.- Information evaluation comparisons of standard USDA crop estimates and LACIE estimates.

APPENDIX B

PARTIAL LISTING OF IE

INFORMATION RESOURCE FILES

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A. LACIE Management Control Documents

1. Memo of Understanding, USDA-NOAA-NASA, 9/1/74.
2. Memo of Understanding, FAS-ARS-ASCS-ERS-SCS-SRS.
3. USDA Secretary's Memorandum 1870, 4/8/75.
4. Assistant Secretary Yeutter's Memo to Agency Heads, 4/8/75.
5. LACIE Project Plan.
6. LACIE Operations Plan.
7. LACIE Documentation Plan.
8. USDA User Requirements.
9. LACIE Baseline Requirements Documents.
10. LACIE Interface Control Documents.
11. LACIE Implementation Plans.
12. USDA LACIE Administrative Guidelines.
13. Others.

B. LACIE Reports

1. CAS Monthly Reports.
2. CAS Unscheduled Reports.
3. CAS Country Annual Reports.
4. IE Monthly Reports.
5. IE Unscheduled Reports.
6. LACIE Management Reports.
7. LACIE Operations Bulletins (weekly).

8. LACIE Activity Reports.

9. Others.

C. Foreign Crop Reports

1. Agricultural Attache Reports (Grains) (mostly quarterly).
2. Agricultural Attache Telegrams (TOFAS) on Grains.
3. U.S. Embassy Cables (Grains).
4. FAS Circulars (Grains) (Unscheduled).
5. FAS M Series Publications (Grains) (Unscheduled).
6. Foreign Agriculture Magazine (weekly).
7. FAS World Agricultural Production and Trade (monthly).
8. FAS Unpublished Wheat Crop Estimates (weekly).
9. Department of State Airgrams.
10. FAS Weekly Highlights Report.
11. USDA Interagency Commodity Estimates Committee Report (Wheat).
12. ERS Weekly Highlights Report.
13. ERS Wheat Situation Report.
14. Reuters News Service Grain Market Report.
15. London Public Ledger.
16. TOEPFER Report (Hamburg).
17. Canadian (DBS) Wheat Crop Reports.
18. FAO Reports.
19. US-USSR Secretariat Reports.

D. U.S. Wheat Crop Reports

1. SRS December Crop Production.
2. SRS Seeded Acreage and Indicated Production of Winter Wheat - December.
3. SRS Annual Summary: Acreage, Yield, and Production.
4. SRS January 1 Prospective Plantings - Spring Wheat.
5. SRS March Prospective Plantings - Durum Wheat.
6. SRS May Crop Production.
7. SRS June Crop Production.
8. SRS June Acreage.
9. SRS July Crop Production.
10. SRS August Crop Production.
11. SRS September Crop Production.
12. SRS October Crop Production.
13. SRS County Estimates.
14. SRS Selected State Office Releases Showing Crop Reporting District Data.
15. SRS Weekly Weather Crop Bulletin.
16. United States Agricultural Census.

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