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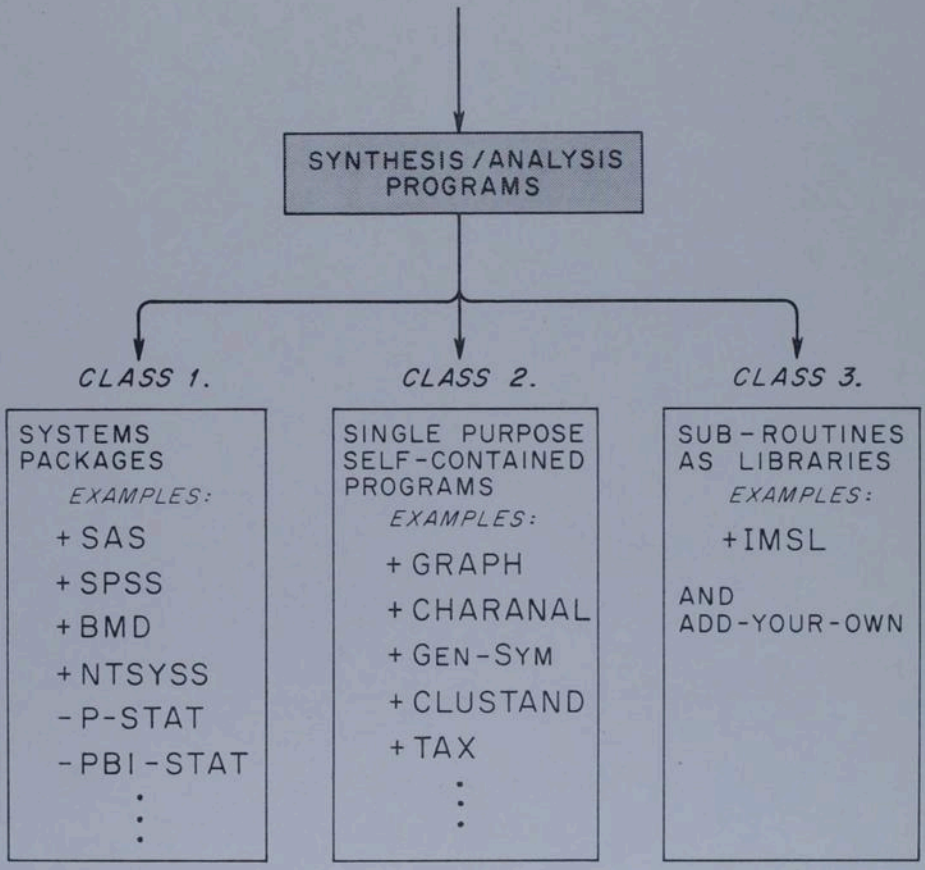
About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

GR/CIDS PROJECT

EXIS DEVELOPMENT

S.A.D. SYSTEMS DIAGRAM 1.



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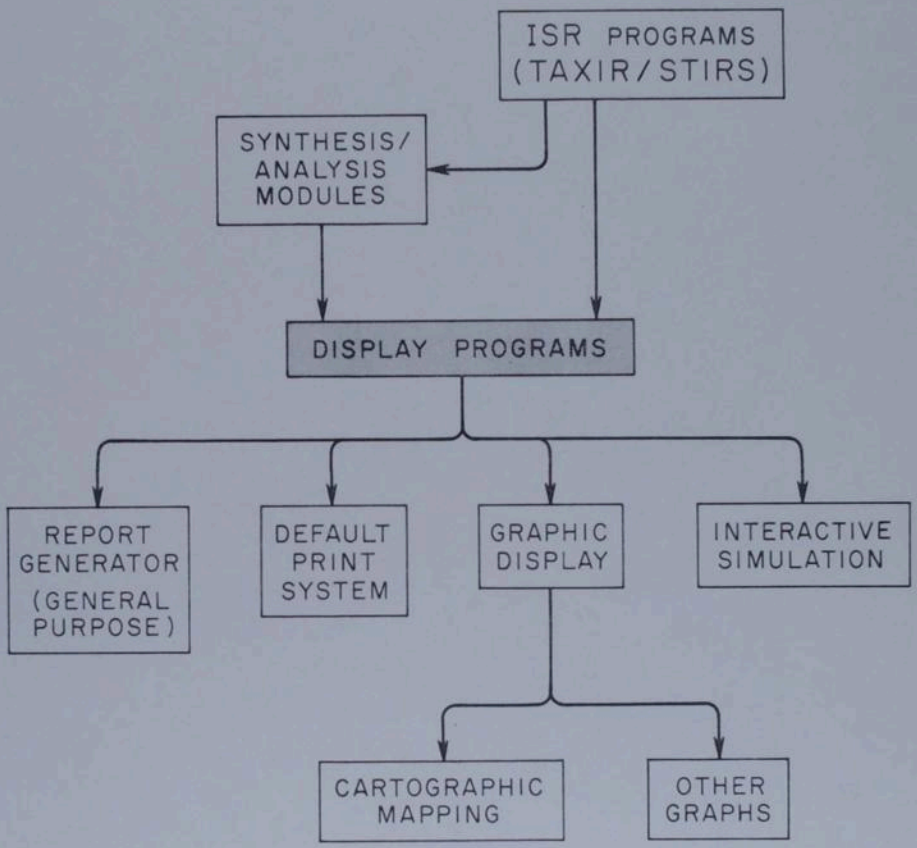
GR/CIDS PROJECT

EXIS DEVELOPMENT

S.A.D. SYSTEMS DIAGRAM 2.



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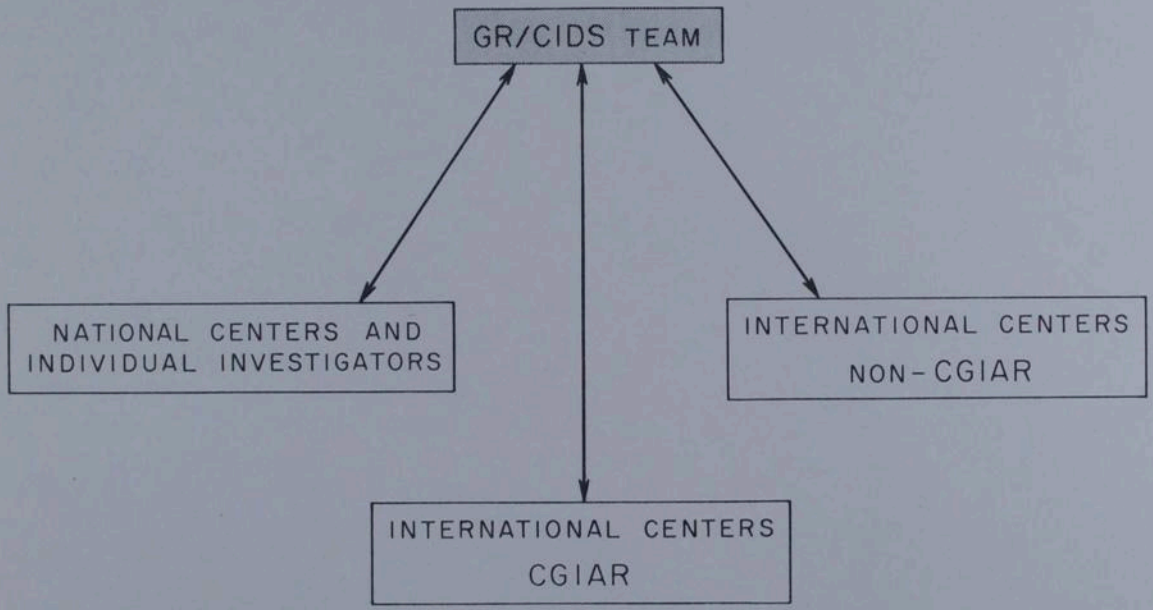
GR/CIDS INTERACTION WITH CENTERS

INFORMATION SYSTEMS REQUIREMENTS: CROP SPECIFIC

EXAMPLE: *TOMATOES*



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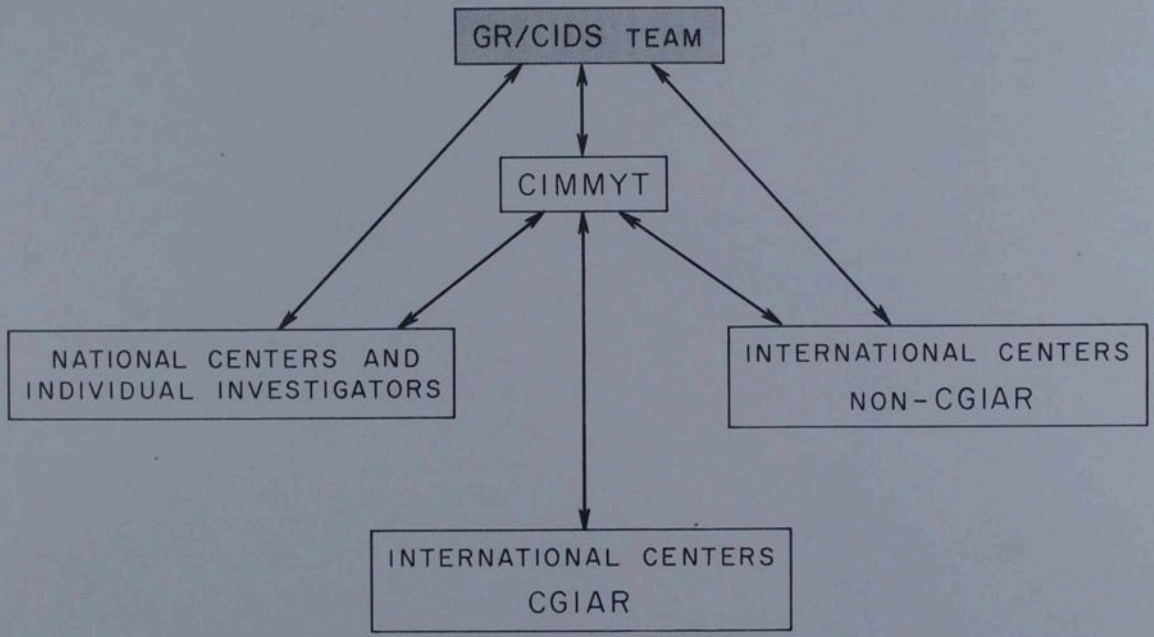
GR/CIDS INTERACTION WITH CENTERS

INFORMATION SYSTEMS REQUIREMENTS: CROP SPECIFIC

EXAMPLE: *MAIZE*



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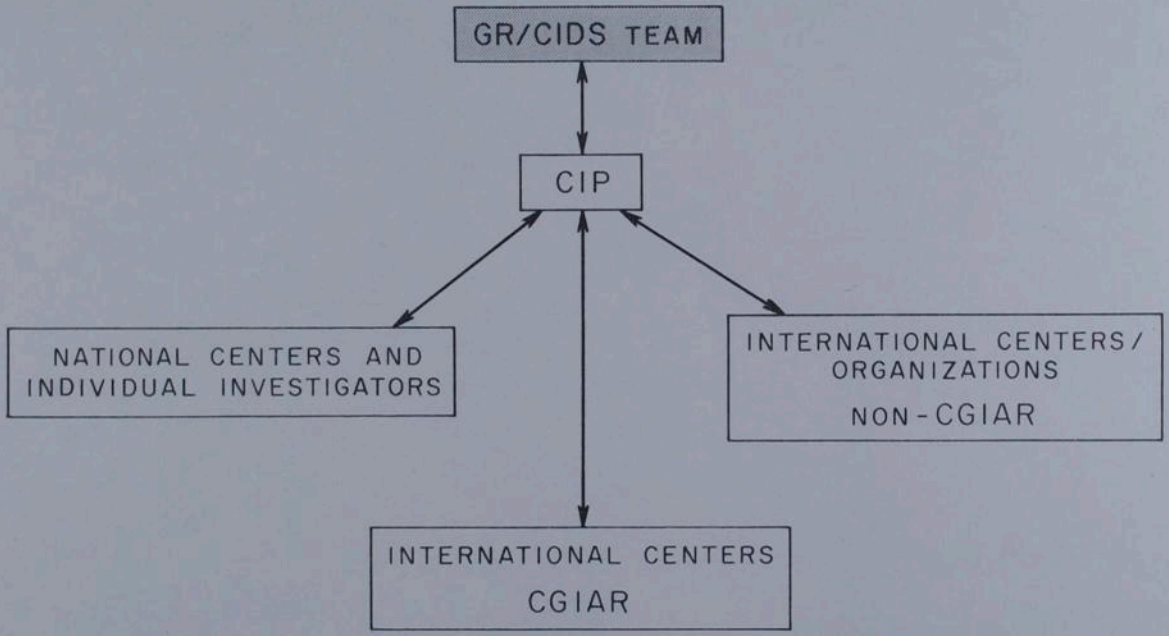
GR/CIDS INTERACTION WITH CENTERS

INFORMATION SYSTEMS REQUIREMENTS: CROP SPECIFIC

EXAMPLE: *POTATOES*



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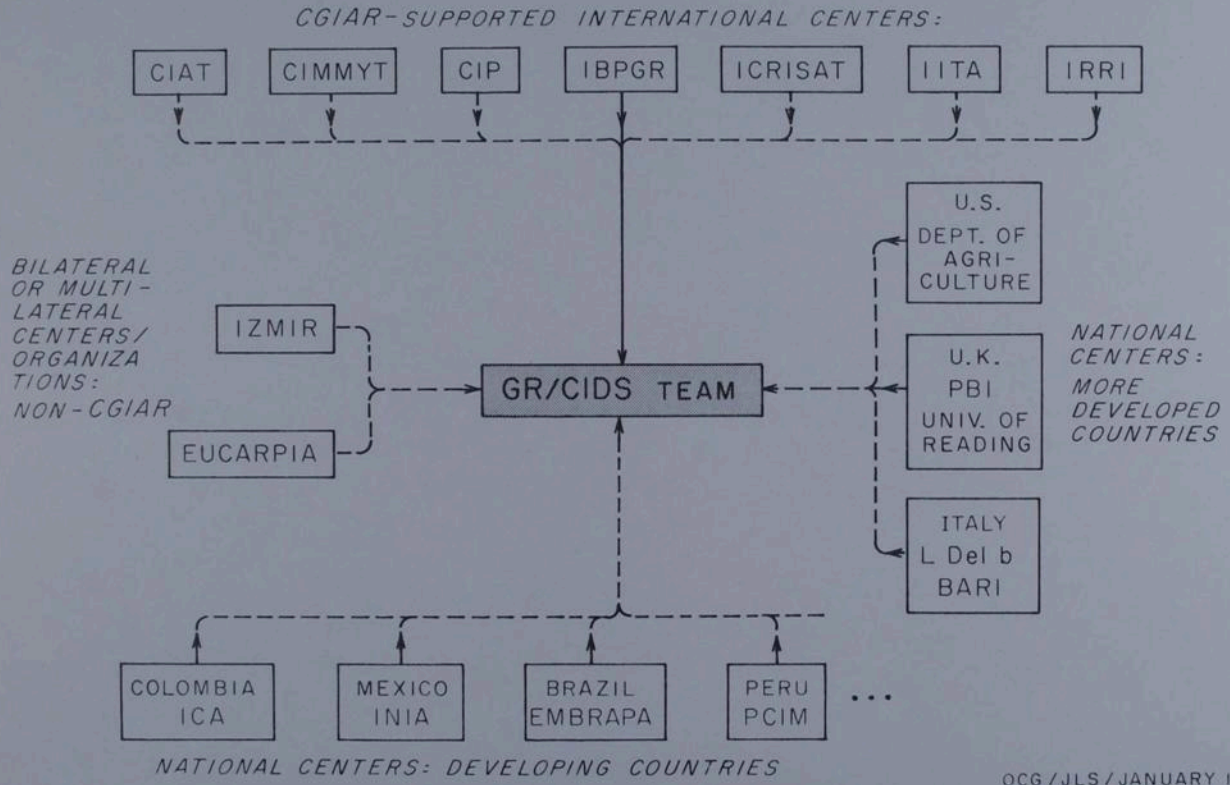
GR/CIDS INTERACTION WITH CENTERS

INFORMATION SYSTEMS REQUIREMENTS FOR INDIVIDUAL CENTERS



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GR/CIDS PROJECT

MONITORING/EVALUATION FUNCTIONS

Ⓐ EXPLORATION/COLLECTION

- GENOTYPIC-GEOGRAPHIC COVERAGE (PROBABLE VARIABILITY COLLECTED)
- TAXONOMIC (AND FUNCTIONAL) CLASSIFICATION
- COLLECTION PLANNING, SCHEDULING AND EXECUTION WITH VERY LIMITED RESOURCES

Ⓑ MAINTENANCE-GERM PLASM/HERBARIUM

- GERM PLASM STORAGE AND INITIAL VIABILITY TESTING
  - REJUVENATION
  - ACCESS
  - MULTIPLICATION
  - DOCUMENTATION
    - + PLANT CHARACTERISTICS
    - + MAINTENANCE HISTORY
    - + REFERENCE TO LITERATURE
- HERBARIUM SPECIMEN STORAGE
  - ANNOTATION VALIDITY
  - ACCESS
  - DOCUMENTATION

Ⓒ IMPROVEMENT (BREEDING ALL METHODS)

- FORMATION OF IMPROVEMENT OBJECTIVE FUNCTION WITH CONSTRAINTS
- SCREENING FIELD TRIALS
- SELECTION FOR CROSSES
- PEDIGREE HISTORY
- COMPLEX GENOTYPIC-ENVIRONMENTAL INTERACTION ANALYSIS

Ⓓ INTRODUCTION

- LOCAL ADAPTABILITY
- FARMING SYSTEMS METHODS ADAPTATION
- PROBABLE PEST AND ENVIRONMENTAL REACTIONS

Ⓔ UTILIZATION

- EXPECTED CHANGES TO FARMING SYSTEMS IN TARGET AREA
- EFFECT ON SOCIO-ECONOMICS IN EXTENDED TARGET AREA

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GR/CIDS PROJECT

GR/CIDS DEFINED

GENETIC RESOURCES

BROADLY DEFINED CONCEPT

- COMMUNICATION

  FLOW, RECEIPT AND DISSEMINATION OF BOTH DATA AND INFORMATION TO BE USED AT DECISION POINTS
  - INTRA-CENTER: CROP SPECIFIC
  - INTER-CENTER: FUNCTION SPECIFIC

- INFORMATION

  PROCESSING OF RAW DATA TO GAIN INFORMATION FOR USE AT DECISION POINTS

- DOCUMENTATION

  SYSTEMATIC RECORDING, ABSTRACTING, STORAGE AND RETRIEVAL OF DATA AND INFORMATION FROM A NUMBER OF REPOSITORIES FOR FURTHER PROCESSING AND COMMUNICATION

- SYSTEM

  A FORMAL, CONSISTENT, WELL UNDERSTOOD BUT FLEXIBLE SET OF RULES, PROCEDURES, FORMS, CHANNELS, ETC. FOR ACCOMPLISHING THE ABOVE INTERFUNCTIONS

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GR/CIDS PROJECT

TRANSFER COORDINATION

EXIS IMPLEMENTATION

- EXIS SYSTEMS INSTALLATION / COMPUTER
  - SERVICE BUREAU GR/CIDS CENTER
  - SERVICE BUREAU IN CENTER'S AREA
    - + UNIVERSITY
    - ± GOVERNMENT COMPUTER
    - + COMMERCIAL SERVICE BUREAU
    - + COMMERCIAL COM NET
  - CENTER'S HARDWARE
    - + LARGE SCALE COMPUTER (ANY MFG.)
    - + "MINI" COMPUTER (MINIMUM 32K 16 BIT WORDS, DOS)
- SYSTEMS INTEGRATION
- ORIENTATION AND TRAINING
  - MANUAL AND DOCUMENTATION PREPARATION AND DISTRIBUTION
- DATA BASE PREPARATION
  - ON-SITE ASSISTANCE
- EXIS OPERATIONS

MULTI-CENTER OPERATIONS

- WORLD CROP BASE
- REGIONAL BASE
- INTERNATIONAL TRAINING OF GR/CIDS PERSONNEL
- INTERNATIONAL BACKUP OF GR/CIDS PERSONNEL
- INTERNATIONAL WORKSHOPS AND CONFERENCES

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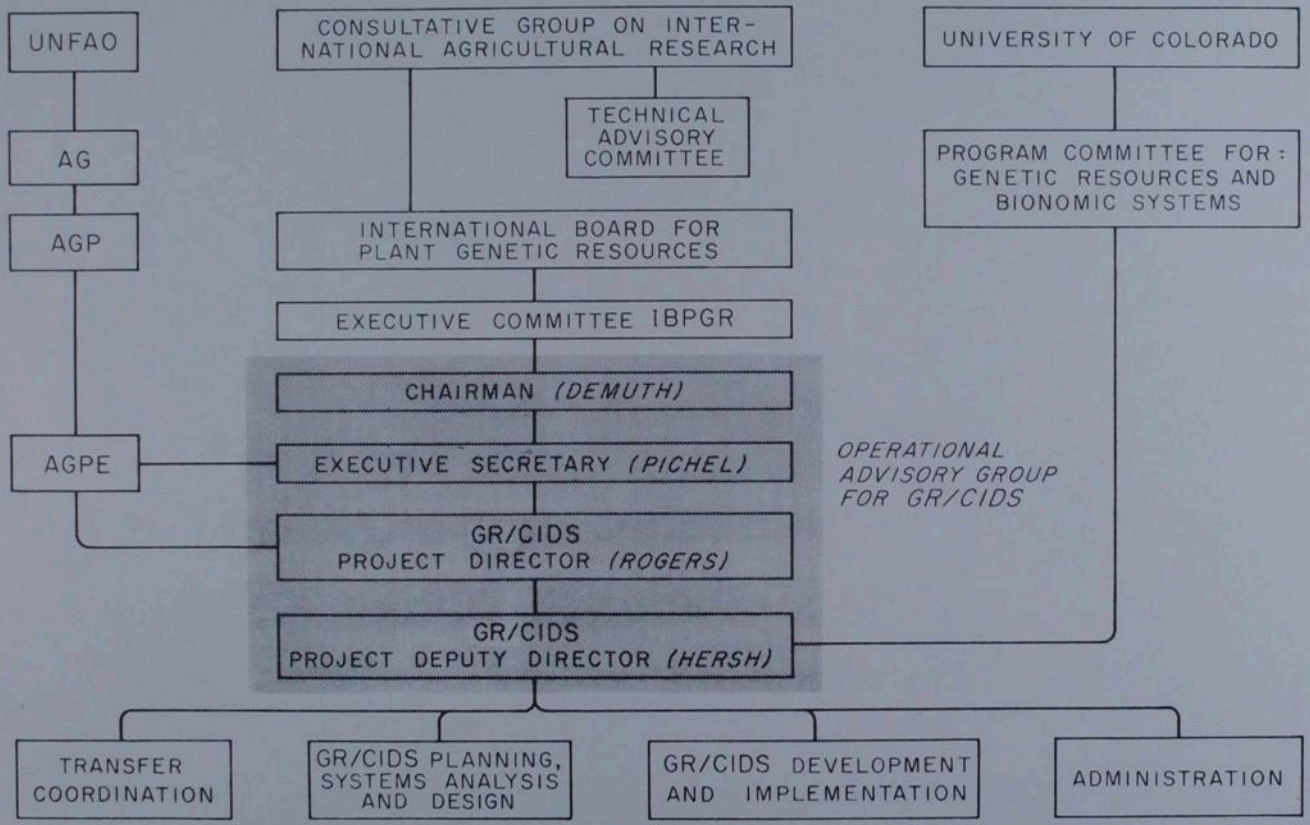
ORGANIZATIONAL CHART FOR GR/CIDS PROJECT



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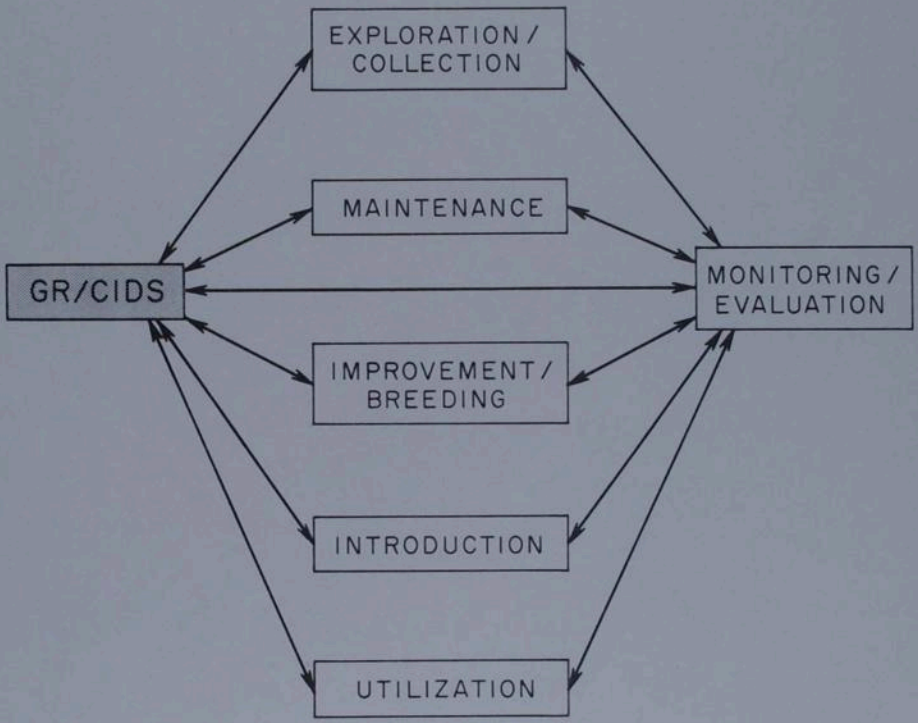
GR/CIDS PROJECT

APPROACH TO FUNCTIONAL ANALYSIS 2.

GENETIC RESOURCES FUNCTIONS



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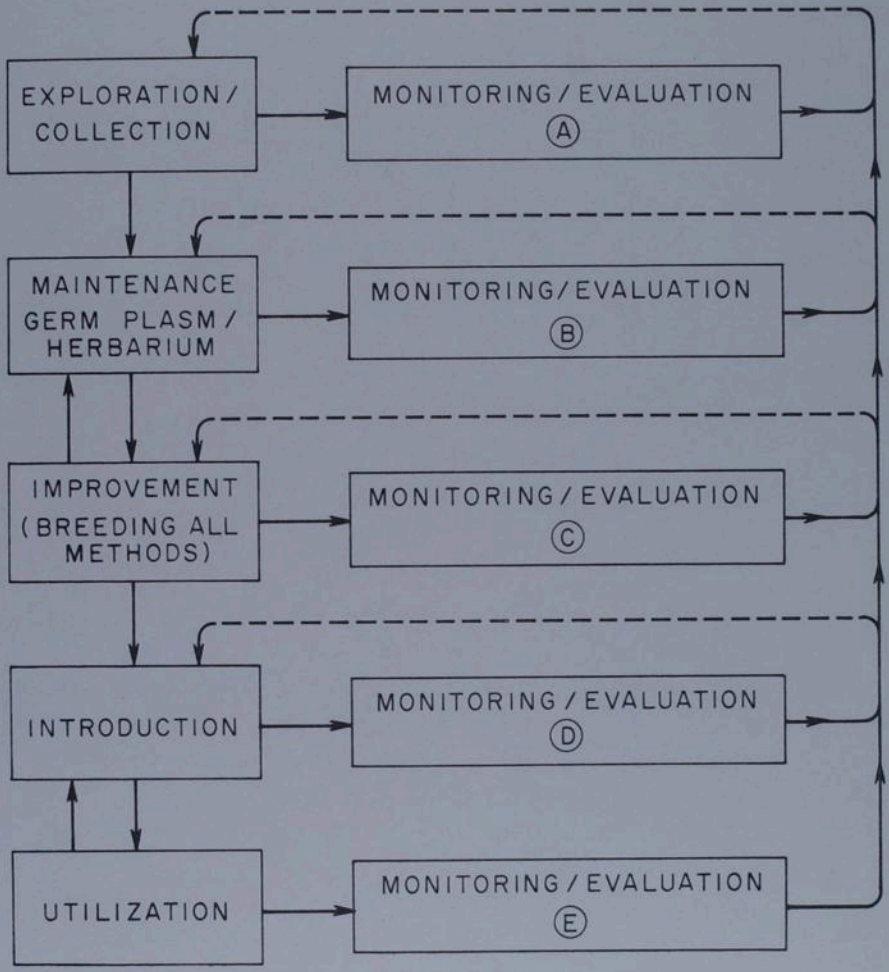
GR/CIDS PROJECT

APPROACH TO FUNCTIONAL ANALYSIS 1.

INFORMATION / MATERIAL FLOWS



NOTE: ↑ *= FLOW TYPE, % FLOW, VALIDITY - VALUE*

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DATA--INFORMATION--ASSIMILATION FLOW

Usual User Concerns

USUAL ENTRY POINTS (BY ASSUMED PRIORITY)

1. DATA PROCESSING MODELS
   WHICH ARE A SUBSET OF WHAT IS NOW TERMED PATTERN PROCESSING (RECOGNITION) MODELS

2. INFORMATION DISPLAY
   USUALLY IN THE FORM OF REPORTS, CATALOGS AND LISTINGS

3. LIMITATION ON THE NUMBER OF CHARACTERS/VARIABLES/FACTORS HANDLED--THUS USED

4. DATA STORAGE
   USUALLY LOCKED IN WHEN DATA MASS EXCEEDS CERTAIN COMPLEXITY LIMITS OR AMOUNTS

5. DATA RETRIEVED
   USUALLY NOT WELL THOUGHT THROUGH BEYOND CERTAIN DATA COMPLEXITY OR AMOUNTS

6. RIGOROUS MEASUREMENT STANDARDS

7. RIGOROUS CHARACTER/FACTOR/DESCRIPTOR/ATTRIBUTE EVALUATION AND VALIDITY TESTING

8. PROCESS OF DATA AND INFORMATION TRANSFER

9. THE FORMAL FLOW OF DATA AND INFORMATION INTO AND WITHIN A CENTER. (HERE "FORMAL" MEANS AN INTEGRATED, COMPLETE, PRE-PROGRAMMED FLOW AND PROCESSING SYSTEM)

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DATA--INFORMATION--ASSIMILATION FLOW

GRCIDS APPROACH

THE BASIC APPROACH IS TO ADVOCATE THE ENTIRE DATA-INFORMATION-ASSIMILATION PROCESS AS AN INTEGRAL SYSTEM:

1. WITHIN AN INSTITUTION
2. THROUGHOUT AND ACROSS ALL GENETIC RESOURCES FUNCTIONS
3. INTERNAL TO EVERY SCIENTIFIC OPERATION

THE APPROACH IS THAT OF A COMPARATIVE SYSTEMS ANALYSIS BY WHICH AN ANALYSIS IS MADE OF THE EXTANT INFORMATION SYSTEM. THIS IS DONE IN CLOSE ASSOCIATION WITH THE SYSTEMS USERS. THEN TO JOINTLY DISCOVER, BY EXAMPLE, POINTS WHEREIN THE PRESENT INFORMATION SYSTEM CAN BE CHANGED.

IN ORDER TO ACHIEVE THIS, HOWEVER, FIRST ATTENTION MUST BE GIVEN TO USER-PERCEIVED NEEDS, WHILE CALLING HIS ATTENTION TO OTHER SYSTEMS REQUIREMENTS. USUALLY, SETS OF INDIVIDUALLY PERCEIVED NEEDS MUST BE CLUSTERED.

IT IS ALSO NECESSARY, IN FACT IMPERATIVE TO FIND AND ANALYZE RESISTANCE TO THE IMPLEMENTATION OF AN EFFECTIVE INTEGRATED INFORMATION SYSTEM, ESPECIALLY IF THE SYSTEM IS COMPUTER-ASSISTED.

IN ORDER TO ASSURE EFFECTIVE USE OF AN INTEGRATED SYSTEM, IT MUST BECOME AN EFFECTIVE PART OF A PROGRAM'S OR A CENTER'S TOTAL OPERATIONS AND NOT VIEWED AS AN "ADD-ON".

THE FOLLOWING SLIDE PRESENTS A MODEL OF THE DATA-INFORMATION-ASSIMILATION PROCESS IN GENERAL. IT IS SUBJECT FOR DISCUSSION.

FOLLOWING IS A LIST OF PERCEIVED USER PROBLEMS, IN THE ORDER USUALLY STRESSED AS USER PRIORITY.

(CONT'D)

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DATA--INFORMATION--ASSIMILATION FLOW

GRCIDS APPROACH (CONT'D)

THIS IS THEN FOLLOWED BY A BRIEF DISCUSSION OF EXIS AS A BASIC COMPUTER-ASSISTED INFORMATION SYSTEM.

THE ESSENTIAL PROBLEM CONFRONTING US AT THIS WORKSHOP IS TO DISCUSS:

1. THE CONTINUED DESIGN OF EXIS TO MEET PERCEIVED, ASSUMED AND LATENT INFORMATION NEEDS WITHIN A CENTER
2. THE MEANS BY WHICH EXIS CAN BE INSTALLED IN G.R. CENTERS WITH EMPHASIS ON THE CENTER'S NEEDS AS WELL AS THOSE SPECIFIED BY THE IBPGR (EXPLORATION, COLLECTION, MAINTENANCE, AND EXCHANGE OF PLANT GENETIC RESOURCES)
3. THE MEANS BY WHICH AN INTERNATIONAL CENTER FOR GRCIDS MIGHT SERVE INDIVIDUAL CENTERS AND THE INTERNATIONAL G.R. COMMUNITY

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DISCUSSION OF THE PROBLEM OF STANDARDS

ONE OF OUR PRIMARY ASSUMPTIONS IS THAT A COMPATIBLE INFORMATION SYSTEM WELL INTEGRATED INTO THE OPERATION OF GENETIC RESOURCES CENTERS WILL ASSIST BOTH THE CENTERS AS WELL AS THE INTERNATIONAL G.R. COMMUNITY. OF COURSE THE SYSTEM MUST BE FLEXIBLE ENOUGH TO ALLOW FOR WIDE VARIATION OF USER NEEDS WITHIN A CENTER AND AMONG CENTERS.

HOWEVER, THE PROBLEMS OF STANDARDS FOR DATA AND INFORMATION CAPTURE, RECORDING, FLOW AND PROCESSING MUST BE DISCUSSED AND RESOLVED IN ORDER TO ASSURE COMMUNICATION OF VALID AND USEFUL INFORMATION AMONG G.R. WORKERS.

STANDARDS SHOULD BE DETERMINED WITH RESPECT TO:

A. DATA/INFORMATION

1. MINIMUM DESCRIPTIVE CHARACTERISTICS OBSERVED AND RECORDED
2. ALLOWABLE METHODS AND PRECISION FOR MEASURING CHARACTERISTICS OBSERVED
3. RECORDING STANDARDS FOR OBSERVATIONS
4. FORMAT FOR THE COMMUNICATION OF REQUESTS FOR DATA OR INFORMATION AND SUBSEQUENT RESPONSE
5. DESIRED PROCEDURES FOR AN INTERNATIONAL DATA INFORMATION CENTER
6. THESE BECOME EVEN MORE IMPORTANT WHEN CONSIDERING MULTI-DISCIPLINARY ASPECTS OF FUTURE G.R. WORK--THAT WITH GEOGRAPHERS, CLIMATOLOGISTS, ETC.

B. GERM PLASM

1. MINIMUM COLLECTION METHODS FOR GERM PLASM
2. MINIMUM CONDITIONS FOR THE MAINTENANCE OF GERM PLASM
3. MINIMUM STANDARDS FOR SHIPPING, QUARANTINE, RECEIVING AND INTRODUCING GERM PLASM

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ACCORDS

ASSUMING WE HAVE SOMETHING OR CAN DEVELOP SOMETHING USEFUL, HOW CAN WE PROCEED TO WORK WITH YOUR ORGANIZATIONS--IN EFFECT DEVELOP A JOINT PROGRAM OF WORK TO BE PRESENTED TO YOUR ORGANIZATIONS' POLICY MAKERS.

WE WISH TO USE EACH OF YOUR INSTITUTIONS AS A LABORATORY FOR OUR WORK, ASSURING A FINAL PRODUCT. WHAT IS THE BEST WAY TO PROCEED IN GENERAL AND IN EACH CASE--ALL OF THIS IS EXPERIMENTAL.

1. THE TRANSFER PROBLEM
   HOW TO TRAIN AND ORIENT PERSONNEL
   - -HERE
   - -OUR PEOPLE IN YOUR ORGANIZATION
   - -BOTH
   - -STUDENTS
   - -PROFESSIONALS

2. SYSTEM ANALYSIS
   - -INTERVIEWS AND OBSERVATIONS
   - -QUESTIONNAIRES
   - -DEMONSTRATIONS
   - -HERE
   - -ANOTHER CENTRAL POINT
   - -AT YOUR ORGANIZATION
   - -ALL OF THE ABOVE

3. DESIGN-FEEDBACK
   HOW TO ASSUME
   - -ON SITE
   - -JOINT (GROUP MEETINGS)
   - -INDIVIDUAL MEETINGS
   - -CORRESPONDENCE
   - -ALL OF THE ABOVE

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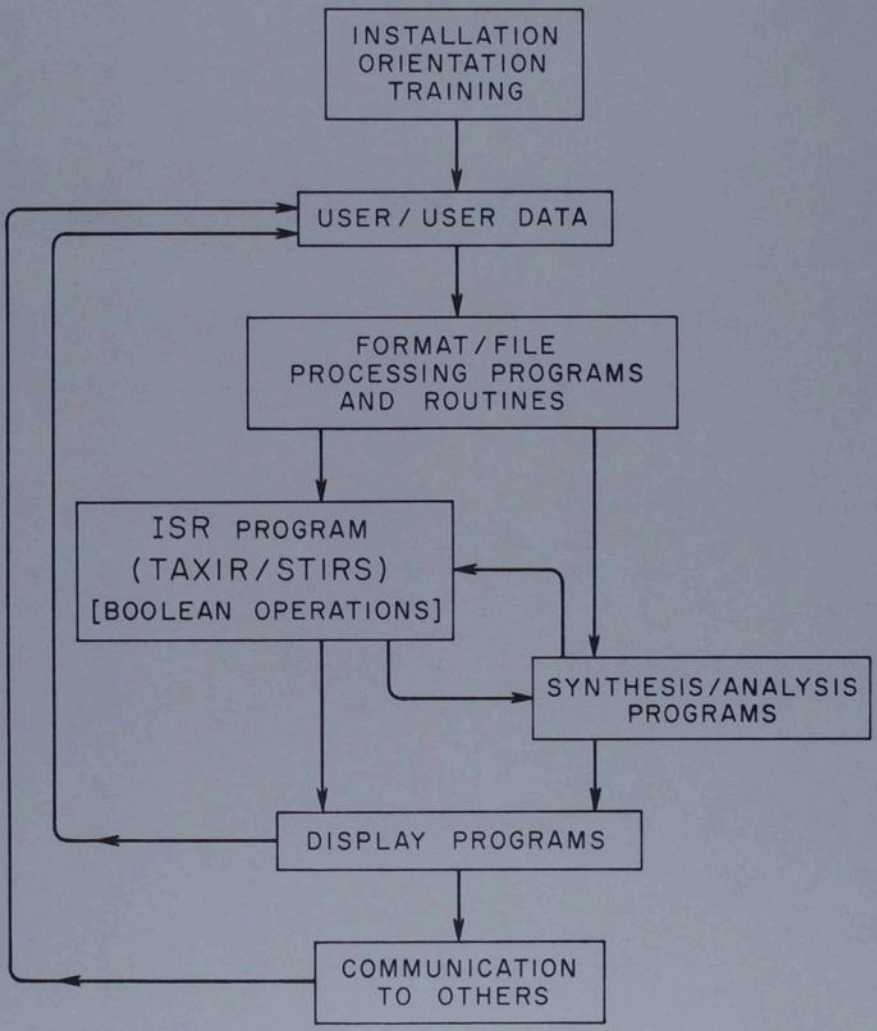
GR/CIDS PROJECT

EXIS DEVELOPMENT

SYSTEMS DIAGRAM



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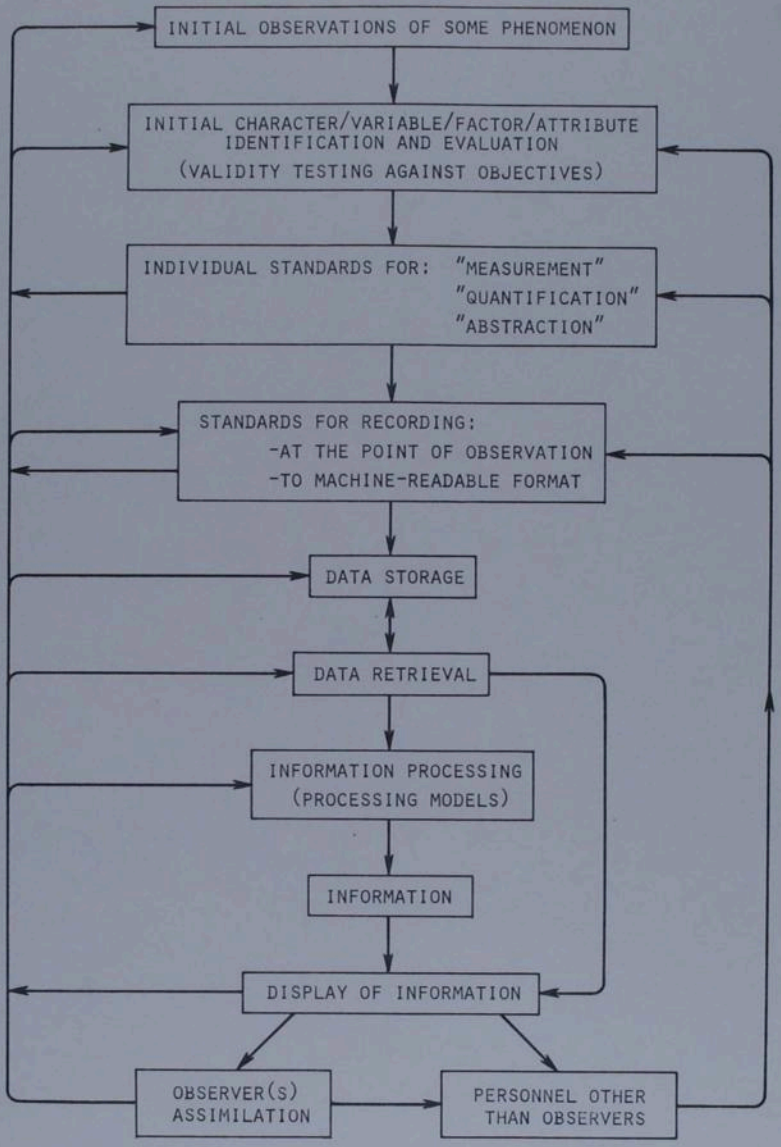
DATA--INFORMATION--ASSIMILATION FLOW

DIAGRAM



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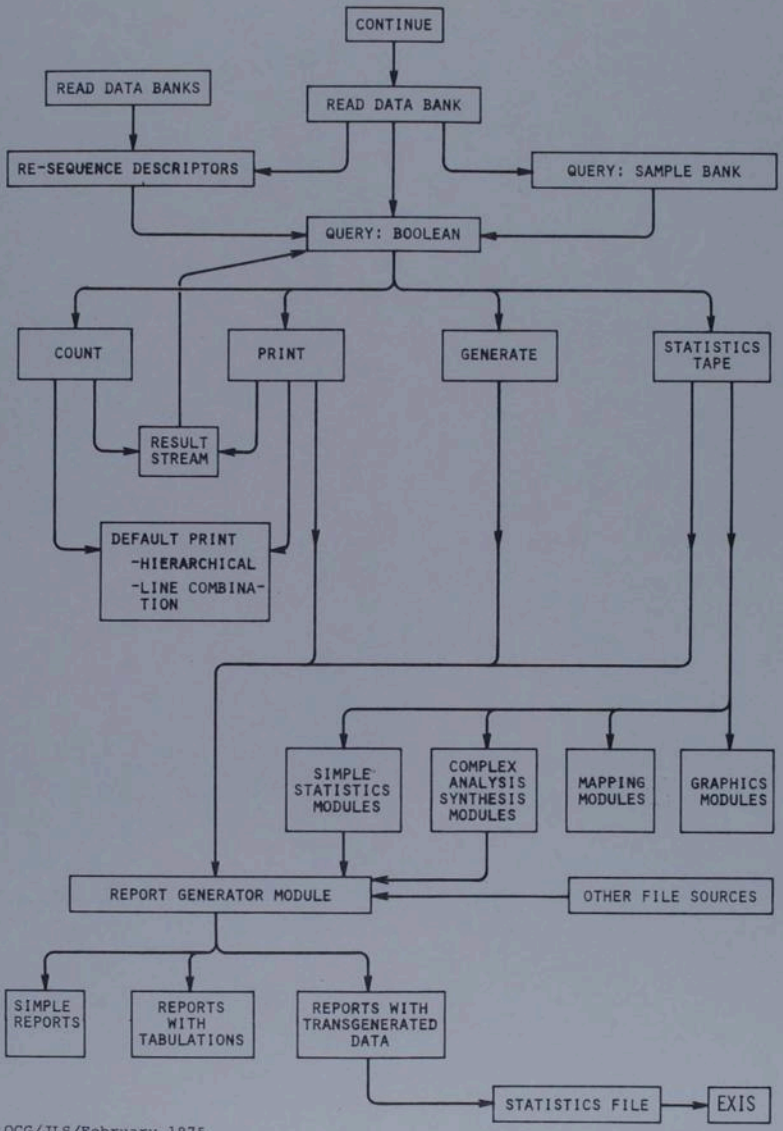
EXIS FLOW



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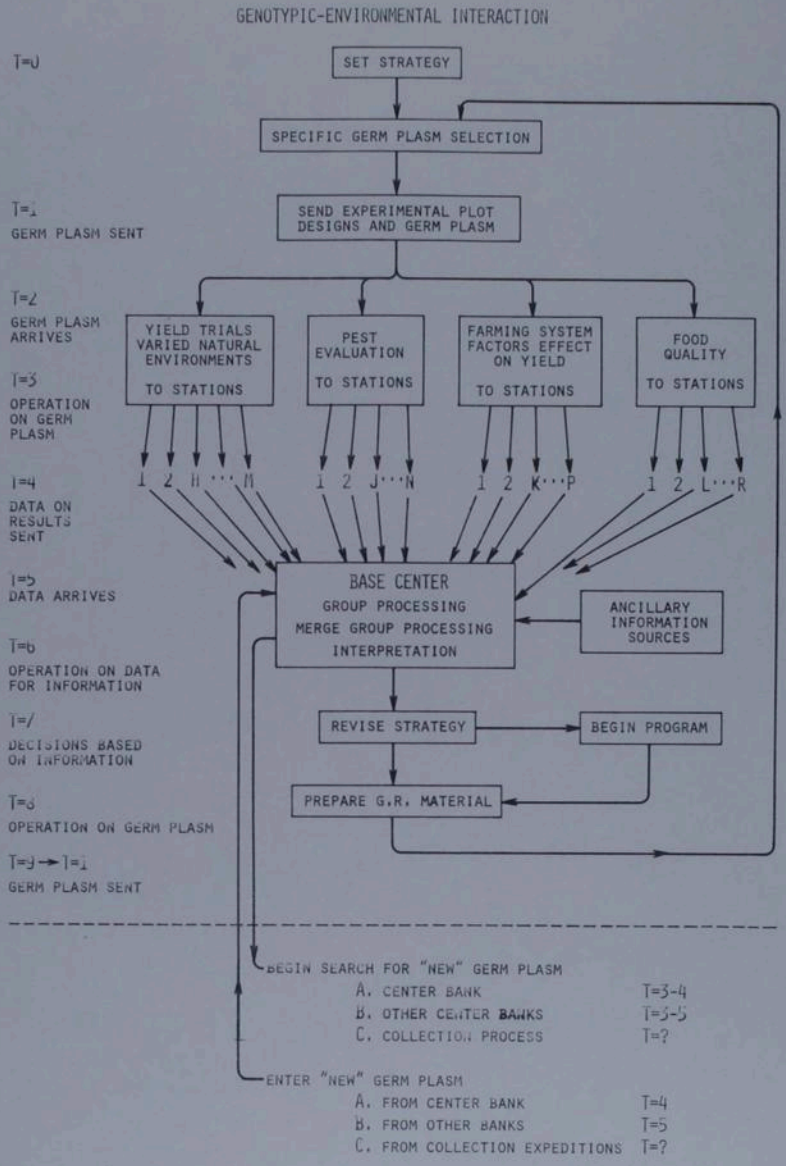

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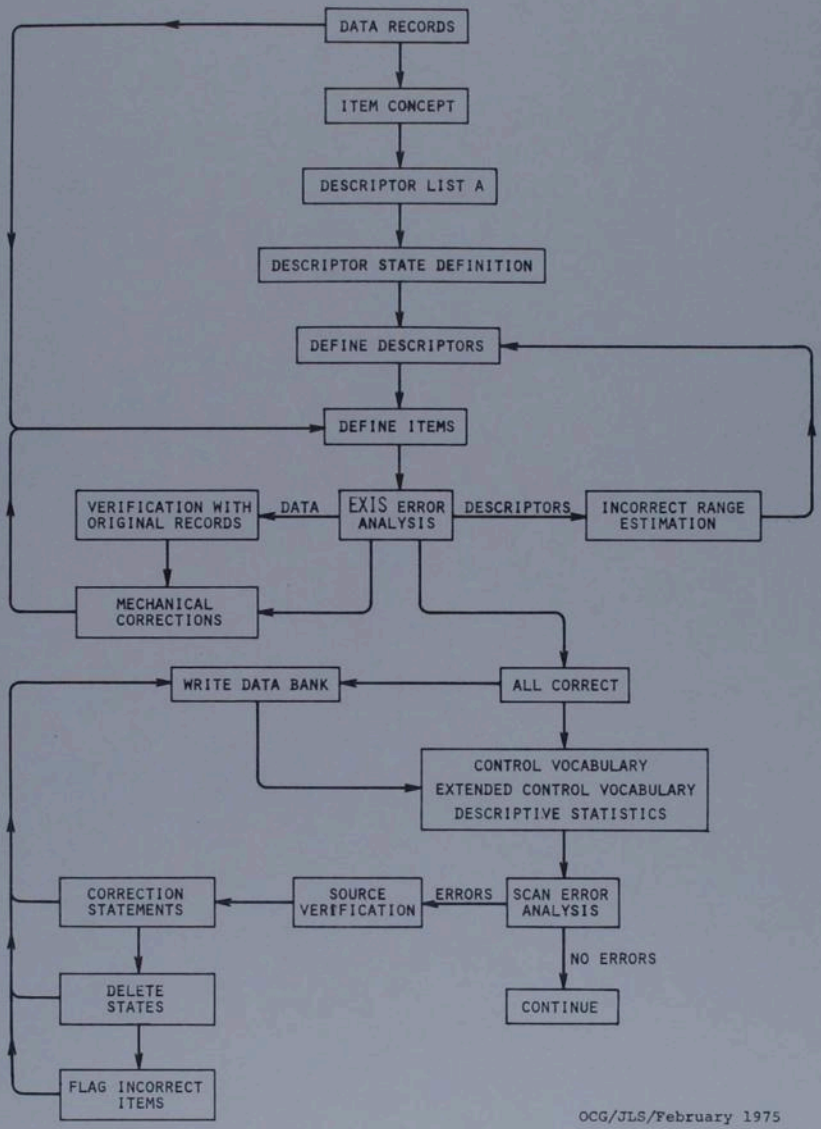

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