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UNIVERSITY OF COLORADO
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November 21, 1975

TO: Mr. R. H. Demuth, Chairman, IBPGR Executive Committee
Dr. G. de Bakker
Prof. A. H. Bunting
Dr. A. B. Joshi
Dr. W. F. Kugler
Dr. L. M. Roberts

Mr. R. Pichel, Chief, FAO/AGPE

FROM: David J. Rogers

RE: GRCIDS 1975 Progress Report and GRCIDS 1977 Contract Proposal (AGPE:IBPGR/75/42)

The attached Progress Report summarizes the work of the staff of the Taximetrics Laboratory in executing the GRCIDS 1975 projects. I would like to use this report as a basis to prepare the Progress Report to the full board. No doubt there are certain points which need clarification or further development. I seek your advice in the development of the full report. We would like to send out the report to the Board four (4) weeks before the meeting in February. Because we refer to the draft of the GRCIDS 1976 Contract in this report, it should be read in conjunction with this paper. Copies of the draft of the GRCIDS 1976 Contract will be available at the meeting.

Aside from the Progress Report itself, I would like to make some comments on GRCIDS and its role in the work of the IBPGR and FAO. First, I want to explain the place of GRCIDS in our work at the Taximetrics Laboratory. Conceptually, the Taximetrics Laboratory is devoted to the essential aspects of Systematic Economic Botany. This involves the investigation of the plant scientist's intuitive pattern recognition

process and then developing flexible but more formal methods to assist him, and the transfer of these systematic methods to others. The application of these methods to real research problems is a goal of importance to me. Most of the Taximetrics Laboratory emphasis has been on methods to make the discipline of taxonomy useful to economic botanists, especially for crop plants.

This work also encompasses the very important problem of methods of analysis to determine the role of a plant (or crop) in a given economic system (analogous to an ecological niche). This includes the nature of change in that role as the economic system changes.

I have been working on genetic resources for a long time with most of my work focused on Manihot. This work has not yet been completed, although certain plateaus have been reached. The GRCIDS work began shortly after I completed my basic work on Manihot.

I intend to continue my work in Systematic Economic Botany. The GRCIDS concept, to me, provided a means of combining my research interests in practical and useful systems development and transfer with the economic importance of genetic resources in continual crop improvement. It presented a means through which practical and useful methods of systematic botany would be of use to the agricultural scientists. It is also, in part, an opportunity to develop and institutionalize the immediately useful and practical applications of one's research.

Here, my associate directors, Gil Hersh and Jay April, lend their talent and energy. (It is also interesting that they have pursued similar problems in a different discipline--economics, management and the theory of organization--all artifacts of the biological process.) GRCIDS is a

challenge to us for these reasons, and we are committed to make it work as a flexible and responsive system.

We fully understand that the central GRCIDS mission is to assist in the continuous formation of genetic resources data bases and to facilitate their effective use. One of our principle functions is to develop effective methods to meet this mission. It is pioneering work.

As we have worked with scientists and administrators at the national and international centers, we have come to understand that there are very few competent individuals to implement GRCIDS. It is very important that we address the problem of training individuals in methods of data base formation and use. We have begun to describe these methods and to develop training strategies. We can make some of our personnel available to assist in training, but the Board must consider problems of training implementation.

Further, our work in the past year, most of it in close collaboration with working scientists and administrators at the international centers, shows that the entire GRCIDS, as initially defined and presented to you several times, goes beyond the mission statement of the IBPGR. It is important to take note of this. Nonetheless, the central portion of the GRCIDS concept serves the Board well.

I want to continue working closely with FAO and the IBPGR, specifically using the GRCIDS concept to meet the Board's mission statement. I wish, however, to pursue--with other support, possibly from CGIAR--those aspects that are external to the IBPGR mission statement, but which are systematically and closely related. I ask for the opportunity to inform you of these endeavors and our findings as we continue our work.

One last point that needs constant re-emphasis, is that the development and effective implementation of a systems concept such as GRCIDS (and I do not mean only the computer related aspects) are difficult and costly. Only a portion of the cost is related to technical aspects. Most of the difficulty and a large portion of the costs are related to getting all groups to a point where they seek mutual cooperation, and are willing to pay the price necessary for such cooperation. Please believe me, to get data on genetic resources often requires less of a technician than an expert negotiator and teacher. The team has been able to accomplish some of this in 1975, and will continue to do so in 1976 and 1977. We look forward to the assistance of the newly formed Advisory Committee on GRCIDS.

AGPE:IBPGR/75/42

GRCIDS 1975 PROGRESS REPORT AND GRCIDS 1977 CONTRACT PROPOSAL

TO

THE EXECUTIVE COMMITTEE OF THE
INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

AND

THE FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS (AGPE)

DECEMBER 1-3, 1975

ROME, ITALY

David J. Rogers
Project Director
Crop Ecology and Genetic Resources Unit
Plant Production and Protection Division
Food and Agriculture Organization of the United Nations

Gilbert N. Hersh and Jay E. April
Associate Directors
Taximetrics Laboratory
Genetic Resources and Bionomic Systems Program
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I. 1975 PROGRESS REPORT

Two areas of the GRCIDS 1975 concept are reported below:

1. Formation of genetic resources data bases and use of computer assisted methods for processing and communicating information derived from them;

2. Analysis, planning and development of data/information processing and communication needs within the genetic resources network.

These are described in the text and three tables which follow. 1975 was a year of learning and explanation. The GRCIDS concept was presented to the CGIAR Centers, to several national centers and at several international meetings and workshops. Criticism and advice from over 200 investigators and adminstrators in the crop and plant science community have assisted in the development of the GRCIDS concept and in indicating work program priorities for effective GRCIDS implementation.

Genetic Resources data base and computer assisted methods projects were undertaken with several centers. In addition to immediately placing genetic resources data into a useable information system, these projects provided both GRCIDS staff members and cooperating Center personnel with:

(1) better insight and awareness of the problems and feasible solutions for GRCIDS in operating institutions;

(2) a cooperative training experience for staff members, which has accelerated GRCIDS staff development in a field with few trained and experienced personnel.

The driving strategy behind undertaking these projects has been to get on with the work, with the methods, systems and personnel at hand; to learn from the work experience; and to improve the methods, systems and ability of personnel to get on with more of the same work.

Table I displays by CROP, genetic resources data which have been processed in joint projects between centers and the GRCIDS Project during 1975. There is also data from FAO about centers and individual investigators which is not crop related. This information provides a working basis for further network analysis of data requirements.

Note that in Table I pilot data bases marked with an asterisk (*), will most likely be expanded to full data bases in 1976. Also note that each data base must be updated, and thus none of this information should be treated as static or "complete". It is a grave mistake to put up the backlog data without concern for continuous data flow. The GRCIDS will be useless in a few years without a provision for continuous updating. We have provided specific data base formation assistance from various sources for several projects including the projects on maize, potatoes, peanuts, and wheat.

Table 1: Genetic Resources Data in Process or Processed

Crop	Center	Country	Type	# of Items	# of Descriptors	Initial Data From Card	Tape	Non-Machine Readable	Language of Descriptors
Bean	CIAT	Colombia	Full DB	8656	36		XX		Spanish
	CIAT	Colombia	Pilot DB	100	37	XX			Spanish
	CIAT	Colombia	Pilot DB*	929	66		XX		Spanish
	USDA	USA	Pilot DB	1500	30		XX		English
Barley	USDA	USA	Pilot DB	1500	42		XX		English
Cassava	CIAT	Colombia	Full DB	2016	35			XX	English
	Taxlab	USA	Full DB	6000	45			XX	English
Chick pea	ICRISAT	India	Pilot DB*	300	28			XX	English
Cowpea	IITA	Nigeria	Full DB	4232	50	XX			English
Guar	NSSL	USA	Full DB	1134	74		XX		English
Maize	CIMMYT	Mexico	Full DB	9000	30		XX		English
	EMBRAPA	Brasil	Pilot DB	89	47			XX	Portuguese
	ICA	Colombia	Pilot DB	100	37	XX			Spanish
	ICA	Colombia	Full DB	3653	42		XX		Spanish
	PCIM	Peru	Pilot DB	98	64		XX		Spanish
	PCIM	Peru	Full DB	6275			XX		
	INIA	Mexico	Pilot DB	96	52	XX			Spanish
	CIMMYT	Mexico	Full DB	11030	23		XX		English
	EUCARPIA	Southern Maize Com.	Pilot DB*	1500	30			XX	English
	PBI	UK	Pilot DB*				XX		English
Peanut	Florida	USA	Pilot DB	100	35			XX	English
Pigeon pea	ICRISAT	India	Pilot DB*	300	24			XX	English
Potato	CIP	Peru	Full DB	2292	37			XX	English
	CIP	Peru	Full DB	1400	15			XX	English
	CIP	Peru	Pilot DB	200	50			XX	English
	CPC	UK	Pilot DB	152	14			XX	English
	USDA	USA	Pilot DB	200	25	XX			English

Table 1 (continued)

Crop	Center	Country	Type	# of Items	# of Descriptors	Initial Data From: Card	Tape	Non-Machine Readable	Language of Descriptors
Rice	IRRI	Philippines	Pilot DB*	8628	48			XX	English
Sorghum	ICRISAT	India	Pilot DB*	300	24			XX	English
Wheat	Centro Nat. de Pesquisa de Trigo	Brasil	Pilot DB*	64	50			XX	English
	PBI	UK	Pilot DB*	428	14		XX		English
	FAL	Germany	Full DB	1200	35		XX		German trans. to English
	Bari	Italy	Pilot DB*	39	49	XX			English
	USDA	USA	Full DB	32710	13		XX		English
	Aegean Agric. Center	Turkey	Full DB	2208	44	XX			English
NON CROP DATA BASES									
GR Personnel Contact List		Various	Full DB	1020	13			XX	English
FAO Questionnaire		Various	Full DB	2490	13			XX	English
FAO Col. Ref.		Various	Full DB	1245	9			XX	English
FAO Storage Fac.		Various	Pilot DB*	27	19			XX	English
FAO Personnel		Various	Pilot	1353	10			XX	English
CROP DATA BASES BEING ANALYSED									
Cotton	ICA	Colombia	Pilot DB					XX	Spanish
Oil Palm	MARDI/NIFOR	Nigeria	Pilot DB					XX	English
Rice (Cali Weekly Study)	IRRI	Philippines	Pilot DB				XX		English
Wheat (Screen Nursery Data)	CIMMYT	Various	Full DB			XX			Spanish

Table 1 (continued)

FAO DATA BASES BEING ANALYSED (all non-machine readable format)

Global Storage Facilities (questionnaire)

Climatic

World Maize Workers

World List of Plant Breeders

Summaries of High Yielding Varieties

Newsletter Survey Questionnaires

Table 2 reports joint projects by CENTER for the various crops. It combines information on data base formation, content analysis, communication of data and various computer assisted methods to accomplish this work. The reports in the table are given for CGIAR funded centers. Please note that crop priorities of wheat, maize, rice, sorghum and millet were established after much of this work was done. Our original attempts were to have introductory projects with each international center.

Several other projects in progress are:

1. Discussions with the following groups who are considering the adoption of the GRCIDS concept, including EXIR.
   a. USDA/ARS. GRCIDS methods will be used to facilitate the US-USSR germplasm exchange.
   b. ARC, United Kingdom
   c. EMBRAPA, Brazil
   d. INIA, Mexico
   e. PCIM, Peru
   f. FAL, West Germany
2. Follow-up discussions with the following groups who are using earlier versions of TAXIR.
   a. Central Office for the Plant Gene Resources of Canada, Ottawa, Canada
   b. Australian Wheat Collection, Tamsworth, Australia
   c. Laboratorio del Germoplasma, Bari, Italy
   d. INTSOY, Urbana, Illinois

   Work will continue with the above groups on GRCIDS related matters,

including the update of EXIR where required. EXIR has been transferred for use on several computers: IBM 360 and 370, PDP 10, PDP 11, CDC 6000 Series, CDC Cyber 70 and Data General Nova, and work is underway on Burroughs 5000 and Univac 1100 Series*. The system has been installed at several centers; during 1976 we will upgrade the older version of EXIR (TAXIR) at centers now using it. Also, in 1976, the modular and documented EXIR will be available for use on CDC, IBM, Data General and DEC (PDP)* equipment. The older, fully documented CDC version is currently available on request.

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*Control Data Corporation (CDC)

International Business Machines (IBM)

Data General Corporation (DG)

Digital Equipment Corporation (DEC)

TABLE 2: SUMMARY OF PROJECTS WITH CGIAR FUNDED CENTERS (centers listed in alphabetical order)

Center	Crop/Project	Status of Project
CIAT Colombia	Beans	General working germplasm collection, November 1975; agreement to do pilot using EXIR as an interactive system for genetic resources data base analysis and communication[1]; discussion on EXIR implementation at CIAT for the full data base work deferred pending crop priority specification for beans and funding for this work.
	Cassava	General working germplasm collection of cultivars. Agreement to do in 1976 Pilot using EXIR as an interactive system for genetic resources data base analysis and communication[1].
	Personnel Training	GRCIDS methods; especially regarding EXIR. Presently deferred until funding problems can be clarified.
CIMMYT Mexico	Maize (1)	General working germplasm collection; assistance in data base formation; description definition (adaptation of Leningrad Workshop resolutions); use of EXIR as an interactive system for genetic resources data base analysis and communication[1];germplasm catalog.
	Maize (2)	Beginning study of CIMMYT/Maize germplasm committee linked to other maize germplasm centers; to include procedures for descriptor definition and compatibility, data flow coordination, etc..
	Maize (3)	Study of present and potential role of formal germplasm collection in actual operation of CIMMYT program; a specific case of the use of formal germplasm collections in center programs. (The considerable, asystematic use of "informal" collections which are <u>not</u> part of the formal germplasm bank presents a problem, as yet unresolved.)

Table 2 (continued)

Center	Crop/Project	Status of Project
CIMMYT (continued)	Maize (4)	Transfer of programs to minicomputer at CIMMYT for International Progeny Testing Trials and Experimental Variety Trails; requested by CIMMYT to study links to germplasm banks and use of these programs for bank germplasm evaluation; addresses systems links of formal germplasm collection to overall CIMMYT maize mission; demonstration of EXIR on minicomputer for germplasm collection access and maintenance.
	Wheat (1)	Assistance in the preparation of breeders' working collection (a few thousand lines) and the use of EXIR on the minicomputer.
	Wheat (2)	A cost effectiveness examination of the computer program RAPID for use in general international wheat germplasm evaluation.
	Wheat (3)	An investigation into the connection between formal base germplasm collection, such as USDA Small Grains, and the breeders' working collection at CIMMYT, with a reverse flow of materials and data.
CIP Peru	Potatoes (1) (Solanum)	General working germplasm collection; as collection develops, pilot using EXIR as an interactive system for genetic resources data base analysis and communication.[1]
	Potatoes (2) (Solanum)	Collection from breeders of pest/disease evaluation data (a subset of general working collection). Assistance in development, querying and communication.
	Potatoes (3) (Solanum)	Participation in March 1976 at the Planning Conference on Exploration and Maintenance of Potato Germ Plasm Resources.

Table 2 (continued)

Center	Crop/Project	Status of Project
ICARDA Lebanon	No Contact	
ICRISAT India	Sorghum	General working germplasm collection; pilot using EXIR as interactive system for genetic resources data base analysis and communication.[1]
	Chick peas	
	Pigeon peas	
	Ground nuts	Through International Conference held in Florida (Germplasm Preservation and Genotype Evaluation in Arachis)
IITA Nigeria	Vigna	General working germplasm collection; pilot using EXIR as an interactive system for genetic resources data base analysis and communication[1]; possible catalog update.
	Yams	Request for assistance deferred.
IRRI Philippines	Rice	General working germplasm collection; pilot using EXIR as an interactive system for genetic resources data base analysis and communication[1]; request for full data base
AVRDC Taiwan	No Contact	

In order to explain and promote GRCIDS and the Genetic Resources Network, to discover effective means to work with diverse centers, and to discover the real problems centers have with respect to genetic resources utilization, we have conducted or participated in seminars, workshops, symposium, site visits, discussions, etc. Many have resulted in pilot projects, or agreements to continue work jointly.

From these meetings several general problems have emerged. Those dealing specifically within the range of the IBPGR mission statement are discussed below. GRCIDS as a concept subsumes these problems and certain broader ones which are not covered here. These needs are systematically linked, and we have dealt with several in past presentations; some of these points are covered in the draft of the GRCIDS 1976 Contract.

The basic attitude is one of interest in the exploration, maintenance and utilization of genetic resources as broadly defined (often species of cultivated plants, primitive cultivars; advanced lines and advanced breeding stocks). The operational word is utilization and systems methods should be devised to assure effective access to these collections. This basically includes flexible data flow and processing, systematic germplasm evaluation and ready access to germplasm.

Implicit are systematically and carefully operated collection centers, an effective data access and reporting system, and well planned and systematically executed exploration and collection. Further, there is a need for international crop genetic resource reference books defining the methods of evaluation used for all plant characteristics, and eventually reference standards for crop evaluation and data reporting

procedures and methods. At almost all centers there is a lack of personnel already trained to make GRCIDS operational.

Further, and possibly of the greatest importance, we have learned through experience that cooperation with and among centers is mostly political and administrative in nature--not technical. Substantial resource commitments are needed to establish the working relationships with and among centers before technical problems can be solved. This is true even under "ideal" cooperative circumstances.

Access to data and germplasm; real interest to share data and germplasm; real interest to integrate germplasm collections into the mainstream of work at centers; the desire to learn new methods; and means of funding continued operations pose the most serious administrative and policy problems. These can only be addressed in time, with carefully planned demonstrations and extensive working contacts.

The following table is representative of the contacts we have made to build a framework for Genetic Resources Network Analysis.

TABLE 3: The GR NETWORK/ANALYSIS-PLANNING AND DEVELOPMENT FOR DATA/INFORMATION NEEDS

CROP	ACTIVITY	LOCATION	REPRESENTATION
Maize	Workshop	GRCIDS Maize Workshop Boulder, Colorado	CIMMYT, CIAT, FAO, EUCARPIA (north & South)
	Symposium	International Maize Symposium Urbana, Illinois	CIMMYT, EUCARPIA, IITA
	Discussion	Urbana, Illinois	William Brown, Major Goodman, George Sprague
	Discussion	CIMMYT El Batan, Mexico	E. Sprague, Director CIMMYT Maize Program Maize Program Staff
	EXIR Demonstration	CIMMYT El Batan	Maize Program Staff
	Discussion	CIMMYT El Batan	Peter Walker, Biometrics, CIMMYT
Wheat	Workshop	Regional Wheat Workshop: For Establishment of Southern Cone Cooperative Program in South America Passo Fundo, Brazil	FAO, IICA, UNDP
	Workshop	GRCIDS Wheat Workshop Boulder, Colorado	CIMYMT, EUCARPIA
	Symposium	IBPGR Symposium on Wheat Genetic Resources Leningrad, USSR	USSR scientists FAO
Rice	Site Visit/ Discussions	IRRI Philippines	IRRI staff members N. Brady,
	Discussion	Boulder, Colorado	K. Gomez, Systems Analyst, IRRI
Sorghum	Paper presented/ Workshop	International Sorghum Workshop Puerto Rico	USAID (Sponsor)

TABLE 3 (continued)

CROP	ACTIVITY	LOCATION	REPRESENTATION
Sorghum	Discussion	Illinois	J.R.Harlan
	Site Visit/ Discussions	India	R. Cummings and program personnel ICRISAT
	Discussions	US	J. Estes, Systems Analyst, ICRISAT
	Discussions (on link with GRCIDS on Literature Search Program on Sorghum)	US	D. Myren of USAID
Beans	Site Visit/ Workshop	Genetic Improvement of Dry Beans and Germplasm Resources, Cali, Colombia	CIAT (Sponsor)
	Discussions	Boulder, Colorado	CIAT program staff
	Workshop	Bean Improvement Cooperative East Lansing, Michigan	CIAT
Peanuts	Exir demonstration/ paper presented/ workshop	Germplasm Preservation and Genotype Evaluation in Arachis (peanuts) Gainsville, Florida	IRRI
Cassava	Paper presented/ Site Visit	Nigeria	S.K.Hahn and staff, IITA
	Site Visit	Colombia	J. Cock and K. Kwano, CIAT
Potatoes	Site Visit/ Discussions	Peru	R. Sawyer, P.R.Rowe, C. Ochoa, CIP
	Discussions	Boulder, Colorado	P.R.Rowe and P. Jatala, CIP
General Crops	Paper presented/ Symposium	Plant Germplasm Coordinating Committee, El Paso, Texas	USDA/ARS (Sponsor)
	Paper presented/ Symposium	Crop Production Division Contractors Meeting	USAID (Sponsor)

TABLE 3 (continued)

CROP	ACTIVITY	LOCATION	REPRESENTATION
General crops (Continued)	Paper presented/ Symposium	Expert Consultation on Agricultural Research in Latin America, Panama City, Panama	FAO/IICA (Sponsor), UNDP, CIAT, CIP, CIMMYT, ROCKEFELLER, WHO, WORLD BANK, CGIAR
	Paper presented/ Symposium	XXI Annual Reunion of PCCMCA San Salvador, El Salvador	CIMMYT, IICA, ROCKEFELLER
General non-crop	Discussion	Mexico	CGIAR/TAC members J. Crawford, H. Pereira, V. Ruttan, W. Hopper, W. Treitz, P. Oram, B. Webster

It is important that a clear understanding of policy and administrative problems be had, if the Genetic Resources Network is to develop and continue. Further, the real technical Genetic Resources data/information problems that concern centers must be understood. We have attempted to discover these problems and to demonstrate how they affect the system operation of centers and relations among centers. This has been done in an attempt to develop and implement solutions so that the primary mission of the IBPGR can be fulfilled. It is necessary to be aware of other problems which will make futile the IBPGR efforts if not solved. These problems may be external to the IBPGR mission statement, but will impinge on the effectiveness of the IBPGR. If IBPGR resources are not used tc solve them,other resources should be found. Most of these problems are general across all centers with specific ramifications in each center.

From the experiences of 1975, we have draft training papers on genetic resources data base formation, processing and communication. This work will be completed during the balance of 1975 and early 1976, to become a set of reference and training papers for GRCIDS. We are also working on specific training strategies for center personnel to assist in the work of data base formation.

The Board should carefully note that the time and resources needed to overcome these problems should not be underestimated; nor should the Board overestimate the "interest and expressed desire" of centers to fully and openly participate in all genetic resources activities. Careful study and thought should be given to the network concept and

to the formation of strategies to increase the operating stability and effectiveness of the network. We will be able to provide information on this as we work on our primary mission.

Footnote

[1]using EXIR as an interactive system [(A)] for genetic resources data base analysis[(B)] and communication.[(C)]

(A) interactive system:

A data base system has two principle components: the data base processor and the data base.

The data base processor is usually a set of computer programs. A user communicates to these programs through a "language." As with any language, there are a set of rules and a vocabulary to structure commands. In systems like EXIR the language is simple yet powerful and very similar to a natural language. A user who is not a programmer can easily learn to handle it.

The data base contains the user's data. The data is structured according to the rules of the data base processor. In EXIR, great flexibility is permitted in the structure of the data. (Most machine readable data can be accommodated.)

The concept of an interactive system is built into EXIR. The user can write a series of commands that will be executed by the data base processor on the data base. The result of one command can then be operated on by another command. In this fashion the user can "interact" with the data base.

In the past, germplasm catalogs, even if computer generated, have been static. The catalog is a representation of the data base and the individual working with the data base. If he wishes to ask questions of the data, he must process it himself with pencil, a paper and patience.

With systems such as EXIR, a user can look at a general catalog (or, as in the CIMMYT project, a list of what the data base contains), form his questions and resubmit them. He then will receive reports tailored to his questions and his needs. This process eliminates quantities of information which are not wanted--answering a complaint of most users of computer generated information.

Although the term interactive usually applies to a momentary response between the user and the computer, it may be correct in the world of genetic resources to expand its time framework (through the international mail or FAO pouch, for example). An interactive system means that a user, with the assistance of an easy to use data base processor, can address a data base and get reports he specifically desires.

(B) data base analysis:

There are two types of data base analyses:

i. analysis of data base structure, content and sources
ii. analysis of relationships or patterns of the content in the data base

Through an understanding of the data base, and knowledge of what is needed in the genetic resources community, actual germplasm evaluation can be effectively planned and executed. By specific analysis of the data bases from several centers for a specific crop, it becomes possible to know what descriptors are used, how they are defined and points of agreement and divergence. This provides basic and important information of what is used to assist crop committees and crop coordinating centers in preparing crop reference manuals and then descriptor and data reporting standards.

Although the latter, ii, is of considerable importance we will not cover it in this report. We have presented information on this previously.

Experimentation with reporting, publishing and communicating data on genetic resources is of exceptional importance. In the past there have either been unusable data or too much data. The balance must be found and the methods of effective communication developed and used.

(C) communication:

The process by which (1) information on genetic resources is distributed to and among interested people and, how (2) individuals or groups make their specific interest or needs for such information known to others, have not been studied nor really improved over the past several years. The central problems are to anticipate the basic type and format of information needed and to develop an effective channel to transmit this information. In addressing the communication problem, existing procedures or means are used first in an attempt to make them more effective. Pilot work is underway with CIMMYT to explore various reporting and catalog procedures. Further, there are discussions with FAO for the improvement in the strategy to get subscribers and more frequent publication of the pioneering Crop Genetic Resources Newsletter.

II. GRCIDS 1977 CONTRACT PROPOSAL

It is difficult to specify a statement of work for 1977 at this time. However, we assume that the methods and level of work will be similar to 1976 with the following changes:

Proposed Statement of Work

a) Crops: The work begun in the 1976 GRCIDS contract on wheat, rice, maize, millet and sorghum will continue as first priority. The IBPGR will specify other crop priorities as they are assigned and work will begin on these as resources permit.

b) Computer Assisted Methods: Emphasis will be placed on program maintenance and transfer to users' computers rather than on program development.

c) Joint Work Program With FAO: The joint work program with FAO developed during 1976 will continue with strong emphasis on GRCIDS coordination with National Centers. Depending on FAO resources availability, certain GRCIDS responsibilities may be assumed by FAO.

d) Training: Emphasis will be placed on training. Considerable coordinating assistance is expected from FAO (c, above). Note, however, that the budget does not contain funds for trainee expenses or support.

Budget: GRCIDS 1977

The structure of the proposed core GRCIDS budget remains about the same as in 1976 contract with the following changes:

a) an increment in salaries and all direct costs of 10%

b) changes in fringe benefit structure for employees due to University requirements.

CORE GRCIDS 1977 BUDGET REQUEST

A. TOTAL JOINTLY REQUESTED FROM IBPGR/FAO*

	1976	1977	% increment over 1976
Salaries and all direct costs	$398,000	$438,000	+10%
Personnel Fringe Benefits	11,000	28,000	+155%
TOTAL	$409,000	$466,000	+13.9%

B. IBPGR/FAO SHARE BREAKDOWN

	1976	1977
IBPGR	$352,000	$398,000**
FAO/AGP	57,000	67,000***
TOTAL	$409,000	$466,000

*Since the GRCIDS Contract is written and administered by FAO, and since the FAO contributes regular programme funds to the contract, FAO Fiscal personnel suggested a single combined contract. We are following that recommendation here. These figures do not include, however, the FAO regular program contribution of consultants' costs, backstopping, or participation of FAO regular program staff. These FAO contributed resources will be covered in the joint Taximetrics Laboratory/ FAO work program.

**In September, 1974, a Five Year GRCIDS Plan and projected budget was presented to IBPGR. At that time, it was very difficult to present solid figures, but at least the projection provided a measure of the level of resource needs. The projection did not take into consideration changes in fringe benefit structure for employees due to University rules. Please note that the current request is 7.8% higher than the 1974 projection.

***The FAO projection is only 2% higher than the plan presented in June, 1974.