

CIAT
BUREAU DE DOCUMENTATION

The Biometry Unit: Its new role at CIAT

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CONTENT

1. Role
2. Personnel and their responsibilities
3. Training plan for existing personnel-1993/1994
 - In Biometrical methods
 - In new computing technology
4. Budget requirements for 1993
5. Physical requirements: Office space, microcomputers/terminal connections.

The Biometry Unit: Its new role at CIAT

1. ROLE

The Biometry Unit is a research support Unit of advisory and methodological nature reporting to the DDG for the Natural Resources Management Division.

Its new responsibilities include:

- a) Advice in biometrical methods at the different stages of the research process: experimental design, data analysis methodologies, interpretation of results, their generalization capacity and final presentation.
- b) Involvement in collaborative methodological studies and specific data analysis projects with researchers.
- c) Identify and invite external Biometrician Consultants to provide guidelines on the implementation of new methodologies required by the new CIAT. Areas of interest include:
 - a) Design and analysis of intercropping experimentation;
 - b) Quantitative genetics;
 - c) Spatial variability techniques;
 - d) Design and analysis of agro-silvo-pastoral experiments; and
 - e) Simulation and mathematical modelling.
- d) Involvement in collaborative projects between CIAT and north-american or european universities or with other advanced research institutions, in order to implement these new methodological areas.
- e) Training in biometrical methods/statistical data analysis techniques to CIAT research personnel.

Activities a) and b) will be carried out by the Unit Head and a small core-budgeted team of Statistical Consultants. In this respect, the Unit will give priority to biometrical areas identified as "high and medium demand areas" according to the study "Biometry needs: demand and supply" carried out amongst CIAT researchers in November-December 1992. They are: a) Design of crop experiments; b) General Linear Model Techniques: univariate and multivariate; c) other multivariate techniques (reduction of dimensionality, classification, ordination; d) Techniques for the analysis of non-normal response variables; e) Sample survey design and analysis; f) Non linear model fitting and g) Categorical data analysis techniques.

Activities c) and d) will be implemented through externally-funded projects. Activity e) can be implemented through a combination of efforts between the Unit permanent staff and external Biometrician Consultants.

2. PERSONNEL AND THEIR RESPONSIBILITIES

Table 1 shows the core-budgeted personnel of the Biometry Unit for 1993. Responsibilities assigned to biometricians are a function of CIAT "data domains" needs combined with the person specific technical expertise. Biometricians are normally assigned to "projects" within data domains. Their contribution, apart from methodological advice, are the conduction of methodological studies relevant to a particular research discipline within a data domain. With the recent reduction of personnel in the Biometry Unit, the ratio biometrician researcher is of 12 principal researchers per biometrician: Table 2 shows the number of principal researchers within each "data domain". Table 3 shows the type of biometrical methods most widely required by each data domain and the biometricians assigned to support them.

In order to cope with demand, and given the reduction of Biometry personnel, the biometricians priority will be on statistical/mathematical consulting, involvement in collaborative methodological studies with CIAT scientists and training to CIAT research personnel. Support on day-to-day data processing/data analysis of experiments or data analysis of students thesis will not be provided by the Biometry Unit anymore-this responsibility would need to be assumed by the respecting Program or Unit.

3. TRAINING PLAN FOR EXISTING PERSONNEL-1993/1994

There are two types of training required by the biometricians during the next two years to better serve CIAT scientific community: a) In biometrical methods: new methods or deeper training in presently used methods. b) In new computing technology: UNIX, Novell, access to new operating systems, new graphics software, etc.

Proposed training plan for 1993-1994

a) **Advanced training in Biometrical methods**

As training in advanced statistical/biometrical methods is not easy to get in Colombia, it is important to expose the Unit personnel to training offered by advanced institutions abroad. For example, sources (that I know) for short-period advanced training in Statistics/Mathematics/ Simulation applied to agricultural research, are: " The Institute for Professional Education", based in Arlington, Virginia, which offers a series of 2 to 3 weeks courses through the year in three places: Washington, San Francisco and Chicago (see attached catalog for the 1993 program). The other source is SAS Institute, whose statistical courses are offered either in NCSU or during the 3 days previous to the Annual Meeting of the International SAS Users Group (SUGI). SUGI 1993 will take place in New York, May 9-12 institutes, as the Dept. of Statistics, University of Reading, U.K. or statistics Departments of USA universities offer formal training courses, but they are of longer duration (4-9 weeks).

In Colombia, courses and seminars on statistics are offered by Universidad Nacional de Colombia-Departamento de Estadística, Universidad de los Andes-Facultad de Ingeniería and during the Simposio Nacional de Estadística, held annually (this year it will be held in Bogotá, between June 7-11, 1993). These events are useful opportunities for CIAT biometricians to revise and update concepts as well as to share and learn experiences from colleagues.

Table 4 shows the proposed training plan for 1993-1994 in biometrical methods.

b) **Training in the new computing technology**

Biometricians will need to be trained on how to access scientific software, such as SAS, GENSTAT, ORACLE and Graphical Software, through the new operating systems of the CIAT Wide Area Network (UNIX operating system, presumably) and Local Area Networks (Novell Netware 3.11 operating system, presumably).

The training courses, their content, dates, duration and costs will be defined after final decisions are made by CIAT and the person from University of Georgia responsible for the Network design. However, an estimated budget amount needs to be kept for this very important training during 1993 and 1994.

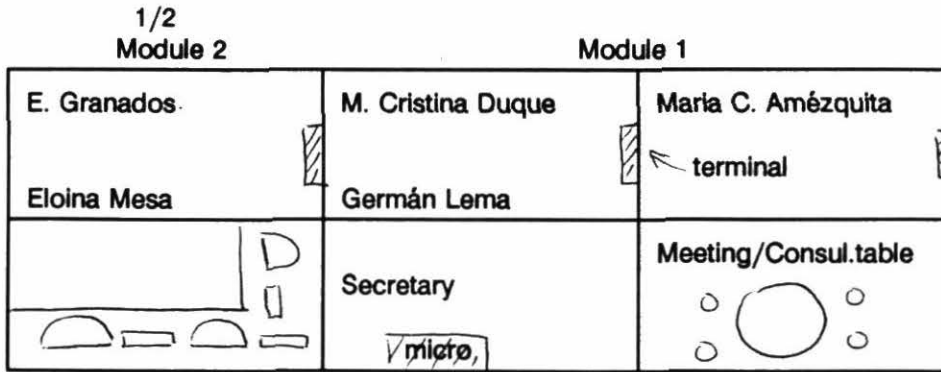
4. BUDGET REQUIREMENTS 1993-1994

Table 5 shows budget requirements for the new Biometry Unit to allow it to cope with stated objectives. It includes operational budget and capital budget estimates for the next two years.

5.

PHYSICAL REQUIREMENTS FOR THE BIOMETRY UNIT

Office Space: 2 modules (of those in office Building 1)
 1½ for core-budgeted personnel + equipment
 ½ to keep an office for External Consultant (optional)



Existing equipment of common use for the biometricians
 2 graphic terminals
 2 printers
 1 micro
 1 plotter (Hewlett Packard 7550)

Terminal/micro connections to the IBM 4361 (6 in total)

- 1 terminal in each office + 2 graphic terminals. (These will need to be replaced by micros sometime in 1993)
- 1 micro (1) connected to the mainframe

Furniture: If we can't move our furniture from the previous offices, then new furniture would need to be acquired.

Table 1: Biometry Unit Personnel 1993 (core budget)

POSITION	NAME	DEGREE
Unit Head	María Cristina Amézquita	Ms and Dipl. in Mathematical/Statistics
Secretary	Marta Carvajal	
Statistical Consultants	Eduardo Granados	Ms. Mathematical Statistics
	Eloina Mesa	Ms. Mathematical Statistics
	Myriam Cristina Duque	Bs. Mathematics
	Germán Lema	Bs. Industrial Engineering

Table 2: Distribution of CIAT researchers (core and external budgets) by "data domain".

DATA DOMAIN	PROGRAM UNIT												TOTAL
	BEANS	CASSAVA	FORAGES	RICE	SAVANNA	FOREST MARGINS	HILLSIDES	GRU	BRU/VRU	SISTER INSTITUTIONS PROJECTS			
										CIMMYT	INTSORMIL	IBPGR	
1. Genetics, genotypex environment interaction	6	4	5	5	-	-	-	1	-	3	1	1	26
2. Plant protection/IPM	2	3	1½	1½	-	-	-	-	-	-	-	-	8
3. Soil-pant/physiology/agronomy	1	2	1	2	3	-	-	-	-	-	-	-	9
4. Advanced biology (VRU, BRU)	-	-	-	-	-	-	-	-	6	-	-	-	6
5. Forage/crop systems. Grassland ecology Plant-animal interactions. Animal nutrition	-	-	1	-	3	1	1	-	-	-	-	-	6
6. Socio-economics/Seed production	1	1	-	½	½	-	1	-	-	-	-	-	4
TOTAL	10	10	8½	9	6½	1	2	1	6	3	1	1	59

Table 3: Biometricians responsibilities 1993

DATA DOMAIN	BIOMETRICAL AREAS (mostly used in each data domain)	BIOMETRICIANS RESPONSIBLE
1. Genetics, genotypex environment interaction (26)	<ul style="list-style-type: none"> - Genotypes Environment interaction techniques: univariate and multivariate - Other Multivariate techniques (reduction of dimension, classification, ordination) - Categorical data analysis - GLM and GLMM techniques 	Eduardo Granados María Cristina Amézquita Eloina Mesa
2. Plant protection/IPM (8)	<ul style="list-style-type: none"> - Analysis of non-normal distributions - Sampling strategies - Categorical data analysis 	Myriam Cristina Duque
3. Soil-plant/physiology/agronomy (9)	<ul style="list-style-type: none"> - Exp. design of all types - Non linear models - GLM techniques 	Germán Lema
4. Advanced biology: VRU, BRU (6)	<ul style="list-style-type: none"> - Special designs in Biotechnology - Multivariate methods for the analysis of electrophoretic patterns and other applications - Categorical data analysis 	Myriam C. Duque María Cristina Amézquita
5. Grassland Ecology Forage/crop systems Plant-animal interactions Animal-based research (6)	<ul style="list-style-type: none"> - Non conventional designs (non-orthogonal, change-over, incomplete, etc.) - Non-linear model fitting - Multivariate methods - GLM techniques 	María Cristina Amézquita Germán Lema
6. Socio-economics Seed production (4)	<ul style="list-style-type: none"> - Sampling survey design/analysis - Non-parametric methods - Exploratory data analysis/descriptive statistics/diagnostic studies 	Eloina Mesa
Total no. of researchers: 59		

Table 4: Training plan in advanced biometrical methods for Biometry Unit personnel

COURSE	INSTITUTE, PLACE AND DATE	INSCRIPTION COST PER PERSON (US\$)	COST OF TICKETS, HOTEL, FOOD ³⁾ (US\$)	PARTICIPANT
1993				
1. "Analysis of Messy Data" (5 days)	IPE, Washington, D.C. March 29-April 2/93	1,450.00	2,313.00	E. Granados
2. "Methods for Categorical Data Analysis" (3 days)	IPE, Washington, D.C. March 31-April 2/93	995.00	1,953.00	M.C. Amézquita
3. IIª reunión de la Red de Biometristas para América Latina y el Caribe. Tema 1: "Diseño/análisis de experimentos agroforestales" Tema 2: "Genética Estadística"	CATIE, Turrialba, Costa Rica Junio 28-Julio 2	person/100.00	2,107.60	G. Lama Eloina Mesa M.C. Duque
Total Costs for 1993		2,745.00	6,373.60	
Grand total			9,018.60	
1994				
1. "Design and Analysis of Experiments" (3 days) or "Modern Methods in Experimentation: Blending the best Experiment Design Techniques" (4 days) (to be decided after consultation with the lecturers)	IPE, Washington, March, 1994 (dates to be confirmed)	995.00 (3 days) or 1,250.00 (4 days)	2,313.00	M.C. Amézquita
2. "Applied Multivariate Methods" (3 days)	IPE, Washington, June, 1994 (dates to be confirmed)	995.00	1,953.00	Eloina Mesa
3. "Simulation Modelling for Decision Making" (3 days)	IPE, Washington, Sept. 1994 (dates to be confirmed)	995.00	2,133.00	M.C. Amézquita
Total Costs for 1994		2,985.00	6,199.00	
Grand total			9,184.00	

¹⁾ IPE = The "Institute for Professional Education", based in Arlington, Virginia
2300 Clarendon Blvd. Suite 403. Arlington, Virginia 22201. Fax (703)-257-8703

²⁾ SAS = Statistical Analysis System. SAS Institute is based in Raleigh, N.C.

³⁾ Estimated costs for tickets, accommodation and food for each trip

TRIP	TICKET (US\$)/PERSON	HOTEL + TAX PER DAY (US\$)/PERSON	FOOD/DAY (US\$)/PERSON	NO. OF DAYS	TOTAL COST (US\$)/PERSON
1. Cali-Washington-Cali	1,232.97	120	60	6 days or 5 days	2,313.00 1,953.00
2. Cali-Turrialba-Cali	352.60	25	25	7 (June 27-July 3)	702.60

Table 5: Budget requirements 1993-1994

Operational Budget		
ITEM	1993 (US\$)	1994 (US\$)
- Overtime	-	-
- Temporary Staff	-	-
- Lab Supplies	-	-
- Office Supplies	4,000	4,000
- Other Supplies (equipment supplies)	4,000	4,000
- Services	-	-
- Telecoms	1,500	1,500
- National Travel	2,000	2,800
- International Travel/Training abroad	10,000	10,000
- Training in new Computing Technology 2 courses/person/year (US\$500/course/person approx. (ex. cost of ORACLE courses)	5,000	5,000
- External Consultants	11,300 ^{1\}	22,600 ^{2\}
TOTAL	37,800	49,100
^{1\} 15 days/year at US\$500/day = 7,500 Hotel/food (US\$120/day) = 1,800 Tickets (approx.) = 2,000 TOTAL 11,300		^{2\} 30 days/year
<p>Capital budget 1993: 5 micros to replace the 4 terminal of the 4361 + 1 micro for the Secretary US\$ 2500/micro = US\$12,500.00</p> <p>1994: none for the moment</p>		

Distribution of responsibilities by Biometrician

Biometrician: María Cristina Amézquita

PROGRAM/UNIT	SECTION	PRINCIPAL STAFF	ASSISTENT STATISTICIAN OR STAT. TECHNICIAN
BEANS	Genotipe x Environment	1. O. Voysest	María C. Valencia
FORAGES	Program Leader	2. P. Kerridge	Gerardo Ramírez
	Animal Nutrition	3. C. Lascano	-
	Germplasm	4. B. Maas	Belisario Hincapié
	Pathology	5. S. Kelemu	-
RICE	Biotechnology	6. Z. Lentini	-
	Breeding	7. C. Martínez	H. Fabio Ramírez
	Breeding	8. M. Chatel	-
INGER		9. F. Cuevas	-
	Genetics-Secano	10. E. Guimaraes	Elsy Lasprilla
SAVANNA	Production Systems	11. R. Vera	Carlos Saa
FOREST MARGINS	Program Leader	12. NN	-
GRU	Unit Leader	13. NN	Mercedes Andrade
VRU	Unit Leader	14. F. Morales	-
		14. L. Calvert	-

Biometrician: Eduardo Granados

PROGRAM/UNIT	SECTION	PRINCIPAL STAFF	ASSISTENT STATISTICIAN OR STAT. TECHNICIAN
BEANS	Genetics-Andes	1. J. Kornegay	Patricia Lucero
	Germplasm characterization	2. E.. Beebe	Iván Ochoa
	Genetics-Southern Cone	3. S. Singh	Henry Terán
	Physiology	4. J. White	-
CASSAVA	Utilization	5. C. Wheatley	Jorge Iván Orrego
	Pathology	6. C. Lozano	Alonso Bermúdez
FORAGES	Entomology (1/2 time)	7. S. Lapointe	-
RICE	Entomology (1/2 time)	7. S. Lapointe	-
	Physiology	8. A. Fisher	-
	Pathology	9. F. Correa	-
SAVANNA	Physiology	10. M. Fisher	-
BRU	Biotechnology	11. J. Thome	-
CIMMYT	Leader	12. S. Pandei	Luz H. Vinasco
		13. H. Ceballos	Luz H. Vinasco

Biometrician: Eloina Mesa

PROGRAM/UNIT	SECTION	PRINCIPAL STAFF	ASSISTENT STATISTICIAN OR STAT. TECHNICIAN
CASSAVA	Genotypex x Environment	1. C. Iglesias	Nelson Morante
	Genetics	2. M. Bonierbale	-
	Physiology	3. M. El-Sharkawi	-
	Agronomy	4. K. Mueller	-
SAVANNA	Ecology	5. G. Rippstein	-
	Cropping Systems	6. M. Ayarza	-
	Soil-Plant-N	7. R. Thomas	-
	Soils-Organic Matter	8. A. Gijnsman	-
	Soil-Plant	9. D. Friesen	-
IBPGR	Project Leader	10.K. Okada	-
INTSORMIL	Project Leader	11. G. Muñoz	-

Biometrician: Myriam Cristina Duque

PROGRAM/UNIT	SECTION	PRINCIPAL STAFF	ASSISTENT STATISTICIAN OR STAT. TECHNICIAN
BEANS	Entomology	1. C. Cardona	-
	Pathology	2. M. Pastor-Corrales	J. L. Cabrera
	Economics	3. D. Pachico	C. Correa
CASSAVA	Biotechnology	4. A. Thro	-
	Entomology	5. A. Bellotti	Gustavo Trujillo
	Entomology	6. A. Braun	José Rubén Escobar
	Economics	7. G. Henry	NN
RICE	Economics	8. A. Ramírez	A. Monsalve
SAVANNA	Economics	9. NN	-
BRU	Leader	10. W. Roca	-
	Biotechnology	11. J. Mayer	-

Biometrician: Germán Lema

PROGRAM/UNIT	SECTION	PRINCIPAL STAFF	ASSISTENT STATISTICIAN OR STAT. TECHNICIAN
FORAGES	Seed production	1. J. Ferguson	-
	Genetics	2. J. Miles	-
	RIEPT	3. P. Argel	Gerardo Ramírez
	RIEPT	4. G. Keller Grein	Gerardo Ramírez
	RIEPT	5. E. Pizarro	Gerardo Ramírez
	Soil/Plant	6. I. Rao	-
RICE	Physiology	7. K. Okada	-
SAVANNA	Rice-Pastures	8. J.I. Sanz	-
HILLSIDES	Program Leader	9. J. Ashby	-
	Agronomy	10. R. Moreno	-
	Cropping Systems	11. R. Knapp	-