COOPERATION IN RESEARCH AND IN TEACHING STATISTICS IN ARGENTINA

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The return to democracy in the countries of South America has favored cooperation in education, science and culture. Many scientists emigrated because of military governments, but many of them returned, either temporarily or with the purpose of being reinstalled in their respective countries. This fact contributed to the strengthening of inter-country cooperation that began informally and slowly has become institutionalized. Different activities of Scientific Societies, personal relationships among their members and, occasionally, cooperative programs at state level promoting regional meetings, have supported that inter-country cooperation. These activities are very important for developing human resources. This is the main reason to encourage countries to organize meetings and research programs bringing together their statisticians.

INTRODUCTION

The return to democracy in the countries of South America has favored cooperation in education, science and culture. Many scientists emigrated because of military governments, but many of them returned, either temporarily or with the purpose of being reinstalled in their respective countries. This fact contributed to the strengthening of inter-country cooperation that began informally and slowly has becoming institutionalized. Different activities of Scientific Societies, personal relationships among their members and, occasionally, cooperative programs at state level promoting regional meetings, have supported that inter-country cooperation. These activities are very important for developing human resources.

This presentation will highlight the importance of the above activities in the formation of human resources and will suggest several proposals to increase the statistical participation of members of the different countries of our region.

Some of the main problems that affect teaching and research in Statistics in the South American countries, are:

- Difficulty access to bibliography, didactic materials and technology at the University level;
- Misuse of advanced calculators and computers at the different educational levels;
- Emphasis on probability theory rather than data analysis;
- Use of inadequate textbooks for applied statistics;
- Strong mathematical background of statistics teachers;
- Lack of investment on important issues; and
- Recognition of experts by inappropriate governmental authorities.

COOPERATION AMONG INSTITUTIONS

The statistical cooperation among South American institutions and researchers has been increasing in recent years. This cooperation has covered several fields, among them, we can mention:

- *Compositional Data*: Nélida Winzer, member of the Argentine Statistical Society (SAE) and first president of Argentine Group of Biometry has joint projects with Gonzalo Pereira (Univ. of La República, Montevideo, Uruguay). She also corresponds with Dr. Vera Pawlowsky research group (Univ. of Gerona-Spain). Pawlowsky gave a course at Bahía Blanca, Buenos Aires (Bs.As.) in 2000 and continues her cooperation. Winzer, also, has others projects with Patagonic Universities and advises junior researchers at the Universidad Nacional del Centro (Tandil-Bs As.). Some students are enrolling in the recently created Masters program on Applied Statistics at the Universidad del Comahue.
- *Ecology*: David Almorza Gomar (Univ. of Cádiz-Spain) has been working on this topic during ten years with Rafael Boggio (Univ. Nacional of La Plata).

- *Epidemiology*: Shrikant Bangdiwala (School of Public Health of Univ. of North Carolina-USA) frequently visits the Universidad Nacional of Tucumán to cooperate with some researchers from the Medical School there.
- *Experimental Design:* Viviana Lencina (Univ. Nacional of Tucumán) got her Ph. D. working on Mixed Models with Julio Da Mota Singer at the Universidad of Sao Paulo–Brazil. Edgardo Rodríguez (Univ. Nacional del Centro-Bs.As.) has also worked on this field with the cooperation of the Instituto Nacional de Investigación Agraria-Madrid. Julio Di Rienzo, Mónica Balzarini, and Walter Robledo (Univ. Nacional of Córdoba) have taught at the Universidad of Bio-Bio, Universidad of Santiago, Chile and Instituto Tecnológico of Monterrey (Mexico). They also cooperate with Francisco Casanoves at the Centro de Agronomía Tropical para la Investigación y la Enseñanza. (Costa Rica).
- *Generalized Linear Models*: Ana María Sfer (Univ. Nacional of Tucumán) has finished his doctoral thesis under the direction of Stephen E. Fienberg of Carnegie Mellon University. She also participates in the Education Programme Juárez Lincoln Marti directed by Jorge Luis Romeu. Stella Salvatierra, now in Spain, and Maria Isabel Giannini got their Master's of Science at the Carnegie Mellon University.
- *Genomics:* Sergio Bramardi has informal cooperation with Emilio Carbonell (Univ. Politécnica of Valencia.- IVIA). A new software *InfoGen* is being developed by Monica Balzarini and Julio Di Rienzo.
- *Geostatistics*: Angela Diblasi (Univ. Nacional of Cuyo) has had ties with Universidad of Gerona, where she taught a course in January 2002. She also participated in a workshop of Exploratory Spatial Data at Portsmouth, England and a project financed by the government of Spain to teach Geoestatistics at the Universidad of Gerona, Spain in 2004. Carmen Saurina offered a course at Mendoza in March, 2004. Laura Giménez (Univ. Nacional del Nordeste-Arg.) has contacts with Sydney Rosa Vieira (Instituto Agronómico-Univ. of Campinas-Brazil) and Universidad of La Coruña-Spain.
- *Image Analysis*: Oscar Bustos (Univ. Nacional of Córdoba-Arg.) and Elsa E. Moschetti (Universidad Nacional of Río Cuarto) work together with Alejandro Frery (Univ. Estatal of Alagoas –Brazil).
- *Linguistics*: Ricardo Maronna (Univ. of La Plata-Bs.As) has joint work with Antonio Galvez (Univ. of Sao Paulo-Brazil).
- *Longitudinal Analyis*: Mirta Santana was invited to teach at the Universidad Carlos IIIª – Madrid. Pilar Díaz (Univ. Nacional of Córdoba) has a project with Adriano Decarli (Univ. of Milan, Italy).
- *Multivariate Methods:* G. Boente and A. Bianco (Univ. of Buenos Aires) have joint projects with W.González Manteiga (Univ. Santiago of Compostela), and Ana Pires and Isabel Rodríguez (Instituto Superior Técnico de Lisboa). Nélida Winzer (Univ. Nacional del Sur) is working with Purificación Galindo (Univ. of Salamanca).
- *Quality Control*: Marta Quaglino and José Alberto Pagura from (Univ. Nacional of Rosario), who got their Ph.D. at the Universidad Politécnica of Valencia-Spain, are working with the cooperation of Rafael Romero Villafranca (Univ. Politécnica of Valencia-Spain).
- *Regression Models*: Raúl Martínez has contacts with Ben Jorgensen (Dannmark), his advisor at IMPA - Rio de Janeiro-Brazil.
- *Regression Trees*: Ricardo Fraiman (Univ. of San Andrés - Arg and Univ. de la República Uruguay) works with Mariela Sued and Pablo Ferrari (Univ. of Buenos Aires).
- *Robust Methods*: Victor Yohai (Universidad of Buenos Aires) works with Alfio Marazzi (Lausanne University), Daniel Peña (Univ. Carlos III) and Matías Salibian Barrera (Vancouver University -Canada). Graciela Boente with Wenceslao González Manteiga (Univ. of Santiago de Compostela).
- *Sampling*: Marcela D´Urso (Univ. of Tucumán) works on Complex Sampling with Sergio Muñoz of the Universidad of Temuco-Chile.
- *Teaching Statistics*: María Inés Rodríguez (Univ. Nacional of Río Cuarto) is developing her doctoral thesis through a distance programme of the Instituto Politécnico Nacional de México, under direction of Angustias Vallecillos of the Universidad de Granada, Spain. She also keeps correspondence with Armando Albert (Instituto Tecnológico de Monterrey-

Mexico). César Aguirre (Univ. Nacional of Misiones) cooperates with Sue Gordon, Peter Petocz and Anne Reid (Sidney University) in the research: "Statistics Teachers" concerning ideas about teaching and learning statistics at the University. Liliana Mabel Tauber, who obtained her Ph D. under direction of Carmen Batanero works now at the Univ.del Litoral .

Since 1991, the CLATSE (Congreso Latinoamericano de Sociedades de Estadística.) meeting has been jointly organized by the Argentine Society of Statistic (SAE) and Chilean Society of Statistic (SOCHE). Sessions on teaching statistics at all levels were organized during the IVth. CLATSE carried out at Mendoza (Argentina). These sessions were opened by Professor María Gabriella Ottaviani (Univ. of Sapienza, Rome, Italy), at that moment president of IASE. She talked about "International Perspectives on Teaching Statistics." The conference was followed by an important number of assistants, some IASE members among them, who participated in the final discussions. Since then, a meeting on Statistical Education has taken place in our Societies.

I was in charge of coordinating a Round Table opened by Gabriella Ottaviani in which Martha Aliaga (The University of Michigan, U.S.A.) explained her experimental method for teaching statistics with graphic calculators at University level. Elsa Servi, head of the School of Statistics at the Universidad Nacional of Rosario, presented an actual view of problems and projects, and Pilar Iglesias (Univ. Católica of Chile) spoke about methodology of teaching statistics just introduced at Chilean schools.

Since 1999 "Teaching Statistics" has a place in the annual meetings of Argentine Society (SAE) and Argentine Biometrics Group (GAB). Carmen Batanero and Angustias Vallecillos Jiménez (Univ. of Granada. Spain), Samprit Chatterjee (Stern School of Business-New York University), Shrikant Bangdiwala (School of Public Health of University of North Carolina) and Martha Aliaga (The University of Michigan, U.S.A.) have been invited to participate in sections refering to teaching statistics at the different levels.

An Argentine program of the Ministry of Education allowed graduates in Statistics at the Universidad Nacional of Rosario to go to the United States and Canada for a Master's program. Javier Bussi, went to Michigan University, Gonzalo Marí to University of Carleton (Canada); María G. Borgognone to University of Iowa (USA). Now they all are teaching in graduate and postgraduate courses at the Univ. of Rosario.

Camilo Dagum (Univ. of Bologna, Italy), Luis Escobar, (Louisiana State University, USA), José E. Corrente, (Univ. of Sao Paulo, Brazil), Emilio Carbonell (IVIA, Spain), Sergio Muñoz (Univ. of La Frontera, Chile), Geert Molenberghs. (Center of Statistics, Diepenbeek, Belgium), Pablo Ferrari (IME, Univ. of Sao Paulo, Brazil), Clarice García Borges Demetrio (ESALQ, Univ. of Sao Paulo, Brazil), Bryan Manly (University of New Zealand), Adriano Decarli (Statistica Medica e Biometria, Univ. of Milán, Italy), Luis Ambrosio Flores (Univ. Politécnica de Madrid, Spain), K. Ruben Gabriel (Rochester University, USA), Laura Plá, (Univ. Nacional Francisco of Miranda, Venezuela), Raúl Macchiavelli, (Univ. of Puerto Rico), Michel Mouchart (Univ. Católica of Lovaina, Belgium), Guido del Pino (Univ. Católica of Chile) and Claudio Silva (Chile) have participated in Argentine meetings giving lectures or minicourses.

How to teach statistics? Who should decide how to teach statistics? Continuous training, use of new technologies and software are constantly in discussion in every statistical meeting. The International Association for Statistical Education (IASE) celebrates its 15th anniversary and some of the ISI recommendations made in 1976 have been accomplished. For example, the production of comprehensible university textbooks with applications connected to "real life," the publication of a Journal to assist teachers at the different levels, the organisation of general meetings and the organisation of Round Tables for experts in statistical education which encourage the definition of high school and university programmes.

Cooperation among the different countries is very important for developing human resources. This is the main reason to encourage other countries to integrate into CLATSE to make geographic distances shorter and be able to consolidate a special chapter dedicated to the teaching of Statistics.

During CLATSE V, held at Concepción-Chile, a preliminary list of people was identified but the communication has been very poor. However, recently, a statistical *yahoogroup* appeared on line to share information, experience and opinions. This should be the main goal: better communication.

Up to now, there has not been too much governmental cooperation among the countries. It is very important to stimulate it. This can be done sharing information and allowing participation of resarchers from different countries in joint meetings and projects. These tasks, of course, corresponds to the different Statistical Societies.

Now it is a good moment to engage ourselves in promoting more communication in an official way. Some activities, like poster competitions or Olympics in statistics will help with this task.

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