STATISTICS IN CUBA: AN OVERVIEW OF ITS DEVELOPMENT

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ABSTRACT
This paper presents a sketch of the development of teaching, research and applications of statistics in Cuba. Some clues for understanding the historical process are given.

KEYWORDs: applications, biostatistics, investigations, teaching

MSC: 62-02 (Statistics research exposition)

RESUMEN
Este trabajo hace una presentación del desarrollo de la docencia, la investigación y las aplicaciones de la estadística en Cuba. Algunos datos clave, para comprender esto como un proceso histórico, son dados,

1. A NEEDED INTRODUCTION

The 20th of May of 1902 Cuba became an independent Republic. A provisional administration of the government of the USA stayed in Cuba from the end of the Cuban-American-Spaniard War, in 1898, up to that moment. From then on, the existence of complicated interlinks of the relationships Cuba-USA have been present in our history, with its shades and colors.

The real development of professional statisticians in Cuba took place after 1959. Hence, American statisticians did not played a direct role in the development of Cuban statisticians. 111 years after the Declaration of Cuban Independence, a group of American statisticians, affiliated to the American Statistical Association (ASA), and Cuban statisticians, affiliated to Sociedad Cubana de Matemática y Computación, shared experiences in teaching and research, and knew each other in the gathering activities. That encounter is historical for us, and for the scientific community as well.

May be I am the oldest Cuban statistician. Being a boy, I worked in the Cuban Telephone Company, renamed as Compañia Cubana de Teléfonos after its nationalization, as what was then considered an "office boy". Some years beyond, I was in charge of developing the statistical analysis of the data on Labor and Quality Control generated in the company. In that epoch, the enterprises gave special facilities to their workers for studying. I decided obtaining a university diploma. My inabilities for manual work are well known. Therefore it is not surprising that I did not select a technical specialization, as many other co-workers did. On the other hand, Humanities were dangerous, for my eclectic mind. Hence, Science was my field. I decided to study mathematics for specializing in the new branch named mathematical statistics. Thanks God it was a wise decision. Miguel Jimenez also worked in that company and studied Pure Mathematics. We both were advanced students and taught while studying. He was a senior student when I started, and was my professor of Mathematical Analysis in my second year. After graduation we obtained a place in the university.

Those were times of foundations. I had the privilege of being in several foundational meetings and of having large talks with important actors of the development of applied mathematics in Cuba. Hence, I have a lot of first hand information on the development of statistics in Cuba. I have given several talks on that theme in Cuba and abroad, where my points of view on the past and my previsions of the future, together with my unsolicited advice, colored the stories. In this article I try to give only an overview, which is less folkloric than my talks. Hence it is somewhat colorless, but I expect it be interesting for the new generations.

The motivation of these lines has its roots in the meeting with the ASA. I was asked to give a talk on the research and teaching of statistics in my university. Some of my colleagues, younger of course, were not

aware of certain historical clues and suggested me writing them. I expect this paper would be a starting point, for whatever it could be useful. I looked within my notes, souvenirs and internet sites for providing this overview. Most of the information is based on conversations with key figures as Salvador Vilaseca, Eduardo Dorticós , Eduardo Rodríguez, Antonio Bebelagua, Cecilia Campagná and some others. The trustiness of some of my asseverations can not be documented. There is scarce information and the founders, able to sustain or deny them are dead. My young colleagues, ex-alumnae most of them, are more intelligent than my generation. I am still living and those founders are dead. Most of them have never being recognized as they must have been. It is an insurmountable fault of my generation. Serving this paper, as a motive for providing materials for attributing them the honor they deserve, would be my greatest reward. Documents on the work developed by institutions, as Instituto de Desarrollo de la Salud, Instituto Cubano de Investigaciones de Opinión de la Demanda Interna and Instituto de Investigaciones Económicas are almost inexistent. They not longer exist as institutions but others ones are active and the situation with history will be similar in the future.

I hope other statisticians will dedicate some of their time to compiling and writing, for having evidence of what has happened in their areas, before the cruelest of all the Germans, Alzheimer, erase our memories. May be this is a task for being promoted by the Sociedad de Matemática y Computación.

2. SOME INTRODUCTORY REMARKS

The importance of statistics is well known. Jesus Christ was born in Bethlehem because of the census Augusto Imperator organized. The paths of God are indecipherable, that was the objective cause that the biblical prophecy has been accomplished. Cuban revolutionary history also has connexions with statistics. Consider that both Alexander von Humboldt and Arango y Parreño used edited official statistics in the data analysis of population, production etc., for deriving the ideas that sustained the need of introducing deep changes in the economy of Cuba. The Marxist axiom: "…when production relationships do not allow the development of the productive forces, they must be changed" hold true, and the Revolution against colonialism looked for economic changes as well as political liberty.

Cuban physicians studied in France and USA during the colonial period. The practice of using statistics was known by them in the XIX century. Carlos J. Finlay, a Cuban renowned physician, discovered that the Yellow Fever was transmitted by mosquitoes. He used statistical data for establishing the existence of a direct relationship between the epochal abundance of mosquitoes and the increase of the number of cases and proclaimed that Caridad del Cobre suggested him the idea that Aedes Aegipty was the vehicle. When Cuba became an independent republic, the Secretaria de Salubridad (Health Secretary) included in its structure a Department of Statistics (1903) headed by Dr. Jorge Le Roy Cassá. In 1905 he presented "Estadística Sanitaria en Cuba" at the I Congreso Nacional de Medicina, published in 1909- Estadística Sanitaria y Demográfica de la República de Cuba Estudios Estadísticos de enfermedades: Cáncer, gripe, difteria, paludismo. It was followed by Estudios de población: infantil mortalidad, matrimonios, etc. He produced and analyzed Diagrams, Tables and used tools of Descriptive Statistics. Note that by that time inferential statistics was being developed (Pearson and the correlation coefficient, Galton and regression theory, Spearman and the rank-correlation, Biometrika was founded etc.). Then it is not a surprise that Cuban medical research used and uses profusely statistics in their research.

In the period 1930-1960 the renowned Cuban professor Levi-Marrero studied Cuban economic data and derived some kind of correlations. His studies sustained that Cuban economy worked satisfactorily only if the correlation between sugar production and the number of cows was high and positive. This was very important and constituted for years a "curse" because the analysis of the economy of the country did not need of other variables for explaining crisis. He used historical data and derived a simple rule (an axioma?): "Cuban economy behaves well if hold the one-to-one relations "tons of sugar produced-number of habitants" and "number of cows-number of habitants". That is, for each inhabitant must correspond a ton of sugar and a cow for having a healthy economy. Contemporary Kolmogorov was developing his axiomatic, Fisher was developing modern statistics from his labor in Rohthamsted and Neymann established the fact that only random sampling allowed to developed statistical inferences.

The exchange between Cuba and USA of students supported that the enterprises used the advertising techniques commonly used in marketing research. Cuban publicity agencies were constituted and it is clear that they developed the classic opinion polls using judgmental sampling. During the XX century, before 1962 these agencies were specialized in developing social inquiries and analyzed the obtained data statistically.

Some of these reports appeared in journals as Bohemia, see de la Osa (2005). The Cuban Telephone Company had a department of statistics which was headed by an English statistician.

During the fifties of the XX century Cuba had a strong development of businesses and economics. There was a stability coming from the second half of the forties. The analysis of the government and enterprises relied in statistical analysis. In the Banco Nacional de Cuba and in the Ministerio de Hacienda economists, as Drs. Cepero Bonilla and Rufo López Fresquet, developed statistical studies for developing predictions based on time series analysis. The production of sugar was the main source of income of the country. International market studies were developed for fixing the expected prices and the quotas of sugar and coffee production. Commissions of the government, the sugar mill owners and the trade union made this prospection using statistics, looking for obtaining a consensus. It is well known the work, developed yearl,y of the usual troika formed by Regino Boti (government) , Julio Lobo (mill owners) and Jacinto Torrás (Trade Union).

When Cuba decided to become a socialist country Dr. Ernesto Guevara pointed out the need of using mathematical methods in the economy and the industries. He quoted, being President of the Banco Nacional: "…important issues are the base of the triumph of advanced countries, as higher mathematics and statistics. They practically do not exist in Cuba: for start obtaining the needed statistics, we found that we have no statisticians." The decision of forming the statisticians coming from mathematics did not follow the usual line of other socialist countries where the role of mathematics in the economy was uncommon.

It is clear that mathematics were used by engineers with success. Look at the big buildings constructed in the fifties (FOCSA building for example) and in other superb engineering constructions (take the bridges and roads).

3. ANTECEDENTS OF THE DEVELOPMENT OF STATISTICAL GROUPS

3.1. Agronomy

The studies on Agronomy n the Universidad de la Habana started in 1900. In 1904 was founded the Estación Central Agronómica de Santiago de las Vegas (ECASV) with the aims of modernizing the agriculture R. Johnston, who worked previously in ECASV and J. Navarro-Taquillac, who was graduated in France, were chairs in Agronomy. See Novo et al (2009). The studies developed then looked for improving the seeds and the management, the use of statistics was absent.

The Ministry of Agriculture (MINAGRI) centralized the management and technological innovation in agriculture during the period 1959-1960 and from 1976 up to now. From 1960 to 1976 the function of MINAGRI were assumed by Instituto Nacional de la Reforma Agraria. One of the main objectives of these institutions was to increase the agricultural production. The government promoted the establishment of a system of agricultural extension in the period 1976-1980. New and revolutionary politics were to be implemented. In some sense was considered that the development of the country will invalidate the "Levi-Marrero's curse". It would not be valid if the productivity of the cattle were increased. In Cuba the majority of the population of cattle was a half-breed cow considered as "criolla". The poor farmers raised this race of cows, which produced, as a mean, 10 liters per day. The other very popular race was Cebu (Brahma) which was used as a substitute of tractors and trucks and produced meat for the market. Rich farmers had other races of cattle as Charolaisse, Santa Gertrudis etc. Extensive grazing was used. To increase milk production the government decided to mix Criollas and Brahmas with Holsteins coming from Canada and Europe. A large insemination plan was implemented. One of the challenges faced was how to manage with the feeding and exploitation of the "new to-be race". It was expected that the new race will produce milk as a Holstein and enough meat as a Cebu. See for details in papers as Ruiz and Febles (2006).

The expected changes in the structure and management of cattle forced the development of research centers for evaluating the consequences of the application of the innovations.

Instituto de Ciencia Animal (ICA) was founded in 1965. Its function was to develop investigations on Tropical pastures, animal feeding, Genetics, and Systems Management etc. It was structured a similar fashion as English experimental stations. Doctors T. R. Preston and M. B. Willis were hired at the planning stages of ICA. A Division on Biometry was one of the new features of ICA`s structure. The researchers must introduce statistical modeling for sustaining their claims. Advanced students of statistics started working in that division. ICA was the paradigm for the new research institutions. It was ascribed directly to the director of the institute. Another institution devoted to these studies was "Indio Hatuey" (IH). It was founded in 1962 as an experimental station of pastures and forage. There were not enough statisticians for having a Biometry group and ICA performed some of the job of modeling and analyzing the experiments held in IH.

The system of research institutes was enlarged. Once an important set of problems was indentified, and the government gave to it a high priority, a new research institute was launched. We may mention Instituto de Investigaciones de Sanidad Vegetal, founded in 1980, Centro Nacional de Sanidad Agropecuaria (CENSA), Instituto Nacional de Ciencia Agrícola (INCA), in 1970 etc. They included in their structure a group devoted to Biometry. Some training at ICA allowed that the new statisticians be able to perform the job needed by their institutions.

3.2. Public Health

Public health development is close related to the use of statistics. At my knowledge the first report t of using statistics in medicine in Cuba took place in 1780 when was published "Guía de Forasteros de la Isla de Cuba". In 1793 new Statistics were added to these tables. A remarkable publication, produced in that epoch, was "Tablas Necrológicas del Cólera Morbus en la ciudad de La Habana y sus arrabales, formadas a excitación del Excmo. Sr. Intendente del ejército, Conde de Villanueva", developed by por Don Ramón de la Sagra in 1833. Seven years later the first medical Journal started being published. It was "Repertorio Médico Habanero. Cowley (1845) edited the first book devoted to medical statistics. It was followed by other publications as "Tablas Mortuorias de La Habana". A commission devoted to develop medical Statistics was created in 1878 (Comisión Central de Estadística de la Isla).
During the intervention of USA in Cuba, after the Cuban-American-Spaniard War , a statistical bulletin started to be edited since 1900 (Boletín de Información Demográfica de La Habana y Guanabacoa). With the proclamation of the republic, in May 20, 1902, the official language of the bulletin was Spanish. The Primer Congreso Médico Nacional (First National Medical Congress) took place in 1905 and Dr. Le Roy read a contribution on medical Statistics. He was in charge of medical statistics until his decease in 1934. Dr. Vega Lamar produced a study on life expectancy in 1919 which was read in a congress. López Serrano (2002) developed an exhaustive study of the issues previously presented.
The control of National Public Health Statistics was organized in 1961. There was a need of clerks for dealing with statistics. Capacitating courses of statistics were organized. The health statistics were included in the National Statistical System and controlled by the ministries involved with statistical control.
The development of basic research in medicine motivated the establishment in 1969 of a department of investigations. The increase in number and complexity of medical investigations motivated the creation of Instituto de Desarrollo de la Salud (IDS). It was organized in the sixties and was included in the new structure of the Ministerio de Salud Pública (MINSAP). Its direct antecedent was the Dirección Nacional de Estadísticas (DNE) of the MINSAP. The institute developed important researches for establishing regularities of the Cuban health and the impact of new policies. Among them are some of the most important researches of the XX Century. I remember the development of different national surveys, as those in fecundity, anthropometric studies with children and youngsters; researches on the components and determinants of the estate of public heath as well as the behavior of the planning and organization of services. IDS provided jobs for many young statisticians and promoted joint research and teaching in the country during the seventies. It is worth mentioning that Professor Leslie Kish visited IDS by that time. He gave a course for the statistical community. IDS centered the development of the research in public health, and the statisticians working there participated from the design up to the analysis of the collected data. This group qualified with high standards in its job.
The different changes that took place in Cuba generated the need of perfecting the post-graduate teaching in medicine. IDS were transformed in Facultad de Salud Pública (FSP). It developed teaching for providing medical specializations through diplomas, MSc`s and PhD`s plans. Due to the growing complexity of the statistical work, faced by Cuban health system since 1971, physicians should have courses in biostatics. A specialization in Biostatistics was also launched. These professionals must deal with the data generated by Public Health Statistics.
Due to the new needs of the restructuration many of the researchers of IDS obtained jobs in other institutions of MINSAP. The investigations in course determined the assignment of these statisticians to work directly in the studies in different public health issues as family-community, evaluation of de programs, systems,

services, management for example. In my opinion some medical institutes have not the structures for supporting the creative work a statistician.

Escuela Nacional de Salud Pública (ENSP) was created in 2000 and it has new responsibilities in the area of ID (Investigation-Development). ENSP was the result of melting FSP with Centro Nacional de Perfeccionamiento Médico (CENAPEM). ENSP has among its duties the approval of strategic planning of MINSAP in ID. See Rojo Pérez & Valenti Pérez (2012) for more details.

In the eighties the country decided to develop Biotechnology. A cluster of institutes was created and they were constructed at the East of La Habana and were denominated Polo Científico of the East. This Polo must promote the development of biotechnologies and other advanced technologies for solving medical and alimentation problems. It started working in 1991. Afterwards some other clusters were organized: in 1992 in Villa Clara , located at the center of the island, and in Santiago de Cuba , in the East. They have developed works in important international problems as the studies of challenging diseases, as Dengue and AIDS. Different last generation medicaments have been also developed. The original planning of some of these institutes did not consider the need of having a department devoted to the development of statistical studies, as ICA did. Computers with adequate softwares seemed to be enough. Once the institutes surmounted the initial tasks it became evident the need of having professional statisticians in their staffs. Actually the number of groups in statistics has grown in quality and efficiency and they are looking for increasing their staffs. These groups are particularly important in Centro de Ingenieria Genética y Biotecnología (CIGB), Centro Nacional de Neurociencias (CNN), Centro De Inmunología Molecular (CIM) and National Coordinating Center of Clinical Trials (CENCEC).

3.3. Official Statistics

Censuses in Cuba have a long history. During the colonial period the first census took place in 1774.They mainly collected population and commerce data. The last colonial census was developed in 1887. In 1899 and 1907, under the provisional USA´s administrations, were developed the first complete censuses and the last one was developed by Oficina del Censo de Cuba. 1899`s census was among the first censuses where magnetic cards were used. In 1919 the Cuban office developed another census. Afterwards census studies were developed in 1931, 1943 and 1953. The next censuses were developed in 1970, 1981 2002 and 2012. The Ministries of Economía (ME) and Hacienda were in charge of economical statistics. Distinguished professionals, well-known by their statistical studies, Regino Boti León and Rufo López Fresquet , were in charge of these ministries during some periods after 1959. ME was included in Junta Central de Planificación (JUCEPLAN) in 1960 and it was transformed in Ministerio de Economía y Planificación (MEP) in 1994. The responsibilities of Hacienda were assumed by Banco Nacional in 1965.

JUCEPLAN included, within its structure, a direction of statistics (DE). Dr. E. Dorticós was its first director. The direction was in charge of developing statistical studies and to control the statistics provided by the different institutions of the government.

The lack of specialists in statistics motivated the establishment of a school for training clerks, for doing the statistical jobs needed by the economy. Dr. Juan Noyola, was a promising economical investigator who had obtained his PhD in Universidad Nacional Autónoma de México. He came to Cuba as an economic expert sent by Raúl Prebisch in 1959. He stayed in Cuba and worked in teaching and management in Banco Nacional and JUCEPLAN. He played an important role in this training and died in an accident. The school, organized by him for teaching middle level statisticians, was baptized with his name. A large list of students graduated in that school went to UH for obtaining a diploma as mathematic-statisticians.

In 1976 was created Comité Estatal de Estadísticas (CEE) as an independent institution. The Instituto de Investigaciónes Económicas (IIE) was one of its dependences. Antonio Bebelagua, one of the first statisticians graduated in our school, was in charge of it. That institute was mainly related with the development of statistical research, not only in economy and also mastered the development of social investigations using samples. It had modern computation facilities and large data bases, master sampling frames etc. They were used in the development of national statistical inquiries. The roster of the institute was mainly composed by economists and statisticians. The importance of CEE increased notably with the need of evaluating effectively the behavior of the economic plans. That need promoted that a specialization in statistics, within the studies in, economics, be established. The graduated students worked mostly in the state administration for dealing with official statistics.

CEE was re-absorbed by MEP in 1994 and was created Oficina Nacional de Estadísticas (ONE) which was not longer part of the Administración Central del Estado.

The relations between JUCEPLAN and the development of applied mathematics were very fruitful. Statisticians graduated in UH obtained good jobs in JUCEPLAN and DE, promoted joint research, particularly in the development of censuses, as well as collaborations in teaching, the development of diplomas MSc´s and PhD´s thesis etc.

The development of computing was centered by JUCEPLAN and the development of a career of Computer Science was promoted within a national strategy launched in the sixties. Instituto de Matemática Aplicada y Computación (IMAC) belonged to JUCEPLAN. It had an old computer Elliot-805 and edited a Journal that published scientific paper s in Operations research. IMAC disappeared in the beginnings of the seventies and some persons and equipment were assigned to UH and particularly to the School of Mathematics. Part of its personnel, headed by C. Campagná, started working as professors and a research group on Operations Research (OR) was created. By that time some courses on optimization were taught in the Summer Schools and a specialization was organized. The Journal (Investigación Operacional) was inserted into the UH´s editorial mechanism and has been published up to now. It is remarkable that OR was developed also by engineers. The School of Industrial Engineering invited some top researchers of the epoch to give courses and training.

To my knowledge many institutions of the government had in their structure a department which dealt with the statistical control. The importance of these departments grew together with the importance of statistics in decision making. The need of a strategic-thinking needed of statistical inferences and our graduated obtained jobs for advising the decision makers within specialized departments. They, together with specialists in OR, were highly appreciated by decision makers. These facts were consequences of the development of five years economic plans, as other socialist countries did. Further changes in the management of Cuban economy determined that the work of statistics in decision making be less important, and as a result changes in the study plans were produced.

The Academy of Sciences of Cuba (Academia de Cadencies de Cuba) was founded on May 19, 1861. Distinguished scientifics formed part of its staff. An example is C. J. Finlay. The ACC can be considered as the successor of the former Royal Academy of Medicine, Physical and Natural Sciences of Havana. With the structural changes in the country after 1959, it played a role similar to the Academies of Sciences of European socialist countries. Its structure included research institutions. One of its institutes was devoted to the development of mathematics. It grouped statisticians that should develop statistical advisory. The institute has changed of name several times, but always a group of statisticians worked there given specialized courses and developing statistical research. It has close relations with the statisticians of the universities. Nowadays the institutes are in the structure of the Ministry of Science, Technology and the Environment. Cuba's Academy of Sciences is now an official institution with a national scope and its role is mainly consultative in the area of science. The institute, where statisticians form a research group together with mathematicians, informatics and physics, is named Instituto de Cibernética, Matemática y Física , (ICIMAF) and its foundation is dated in 1964, see www.ecured.cu/index.../Instituto_de_Cibernética,_Matemática_y_Física.

4. THE UNIVERSITY REFORM AND THE RESEARCH IN STATISTICS.

A UNESCO-PNUD with UH started by 1973. It promoted research as one of its tasks. This project supported first world advisory for different schools of the Faculty of Sciences of UH. The expert Prof. Vitomir Erdeljan was an experienced researcher. He dealt with the organization of research groups and promoted the development of scientific research and in training in particular subjects at graduate level. The groups (lines of research) were organized using the research experience of the people of the Department of Statistics. Previously to the project the group acted as experts within different applied researches. The development of plans of ID by the industry and the agriculture needed of statistical advice. Complex research used was developed by the statisticians on JUCEPLAN. Other less important asked for advice from our department. I was graduated recently and got involved with the development of survey sampling.

My first experience was with the Centro de Investigaciones de la Caña (CIC). It was a centre of UH. They were involved with the evaluation of harvest machines. Cuba developed some models Henderson, Libertadora. They were compared with the work of the Australian Massey Ferguson . I designed surveys for evaluating their efficiency. When KPT´s were introduced, a machine which was an adaptation of a soviet potato harvester, the designs continued being used.

The mining industry was not important before 1959 but in the eastern province of Oriente two nickel mines existed. Nicaro mine worked but the process of obtaining nickel was a unknown. The documentation of the

American enterprise did not give enough information for managing the control variables. Moa mine was unfinished but Cuban engineers managed to make if stat working. Again some information on the processes was lacking. The Centro de Investigación de la Industria Minera Metalúrgica asked for our advise. A group got involved with modeling of the nickel separation using multiple regression. The advice of the French prof. R. Tomassone, and the codes, with which we had trained us, allowed fitting the models and to look for response surfaces. If they were no perfect they, at least, provided of tools for tuning the parameters of the processes. Another problem was on quality control. In Moa there was a protocol but it was useless as it was not a tool for evaluating the outputs of the separation of nickel from cobalt. The buyers reclaimed that the percentage of the exportation did not fulfilled the standards. A theoretical study gave sustain to a sample procedure that gave confidence intervals for the percent of nickel plus cobalt in the product sold. It worked correctly and the price of the material was fixed in terms of these intervals. Some lesser jobs were performed as the establishment of rules for the prospection of new exploitable zones.

The development of a new race of cattle went in different directions. The needs for statistic work surmounted the labor possibilities of the Division of Biometry of ICA. We established collaboration and some of the jobs were developed by our professors and students. By this time were organized the research groups by Prof Erdeljan. Our experience in application suggested the themes: Regression Analysis (RA), Design of Experiments (DE) , Survey Sampling (SS) and Stochastic Processes (SP).

It was particularly important the cooperation with the stations Niña Bonita. The person in charge of them was an agronomic engineer, J. Pérez Infante, who obtained an MSc in USA. The task of these stations was to determine the best type of pastures to be used and how to manage the cattle, obtained by artificial insemination, using intensive pasturage. The techniques to be used were mainly those of Design of Experiments and Sampling. I developed a set of sampling designs and they provided sufficient material for developing my MSc and PhD works under the guidance of Prof Erdeljan.

Different application took place in parallel. The UH behaved as a center of investigation and the government assigned to it the development of different studies, as those developed by CIC. Institutions of UH developed the first Cuban mini-computer (CID-201) and the sequel of other models and a super-language for their operation. Our department was involved in that policy and gave advice to different university projects. Our department established some kind of Advisory Bureau. Professors and students participated in the consulting. Occasionally the consulting involved the design and analysis. Many of this consulting gave advice to persons developing their PhD´s. Our students got experience and specialization through the participation in consulting and by writing their thesis .

In 1974 was conformed and interdisciplinary group for developing a study of the Operations of a Sugar Mill Factory. Professors specialized in computing, operations research and statistics constituted it. Prof. C. Domingo and V. Erdeljan, both UNESCO´s experts, were advisors. The research ended with a simulation model which was run in Cuban computers. That research gives a high profile to our researchers.

The groups projected their research in terms of obtaining scientific degrees by the mid-seventies. The cooperation with the department of Statistics and Probability of University –Humboldt was mainly with in RA and related methods. The groups of RA and DE melted in a new group on Linear Models (LA). This fact promoted changes in the structure of the teaching. SS used the cooperation with Prof. Erdeljan who advisored 3 Phd´s and organized different MSc´s projects. Afterwards the cooperation included Prof. Mácheck of Charles University , Prague. He advised at least 2 PhD's. SP used the cooperation with the Soviet Union for the development of research.

By the ending of the seventies, with the creation of MES, Faculty of Sciences was partitioned and the departments of Statistics and Operations Research were joined. The investigations developed in modeling the Operations of a Sugar Mill Factory suggested the existence of common activities of statisticians and operations researchers. Humboldt University was the main counterpart of the new born department of Matemática Aplicada.

In 1975 a research program was planned with the collaboration of the universities of Humboldt (O. Bunke) and Charles (J. Machek). I was the head of it and I guess that its name was something like "Applications of Mathematical Models to Economy". Operations Research was included as one of the research themes. The denomination of it within the National Research Plan qualified it as a Ramal Program (a program of national interest for MES) in terms of its importance. These results allowed that international collaboration could be managed, within assignments of exchange among the universities involved by the government, by us. There was a lot of bureaucracy involved but was possible to plan joint research with interested professors, to manage assignments and to project particular investigations. The three groups (Probability & Stochastic Processes, Sampling and Multivariate Analysis) were integrated under a general line on applications of

theoretical models. Each one defined a research theme with particular objectives. The policy was to plan, every 5 years, a new program. They coincided with the general economic plan, classic of socialist countries. During the period 1975-85 the results allowed to obtain 12 awards, discussing 5 PhDs of the participants and 4 PhD were advised to statisticians of other institutions. Was created a laboratory for performing the consulting in Statistics and Operations Research (Laboratorio de Estadìstica y Optimizaciòn). The changes in the policy of the government ended with the use of centralized plans. By1985, such planning ceased to have priorities. Applied research was priorized and the development of theoretical research and the development of investigations for obtaining scientific degrees diminished in importance.

Actually the group of statisticians in the faculty has been diminished from 22 to 6. There is less courses to be taught as the specialization in statistics not longer exists. The quantity of research has been shrunk too, due, to my advise, to the existence of graduated statisticians working in institutions needing of statistical work. Common work is less frequently present in the advisory asked by clients. We receive mainly theoretically complicated problems in the provided consulting services. Hence, we are acting more as gurus in Statistics. Our actual research is described by interests in Probabilities & Stochastic Processes, Mathematical Statistics Modeling and in .Applications to Health and Environment.

The group is, or has been, involved in a series of projects among which are remarkable Unidad Innovación Docente. Universidad de Granada(in course) and Inferences with missing data, with Universidad de Granada, Spain (2008-9), Modelos Matemáticos para el Estudio de Medio Ambiente, Salud y Desarrollo Humano. (2010-2012; 2011-2014 jointly with universities of Cuba, México, Spain and Colombia), Modelación Matemática en Epidemiología -Gmme, (jointly with Universidad Autónoma De Guerrero), Project B/020075/08 de la Secretaria de Estado para la Cooperación Internacional de España (Universidad de . Lleida, Spain, 2009). In this set of researches are involved 21 Phds being 6 from our group and more than 30 graduate students. The advisory of PhD's to Latin American specialists is being a new and promising line of development of joint research, and a motivation for more basic investigation.

5. CLOSING THE OVERVIEW

In the seventies my friends said that I was skeptical, as I was always questioning the perfection of plans and expected behaviors. I was nicknamed "the black philosopher" in the eighties, as I darkened what were considered as clear improvements. I used to look the weakness and in the nineties they considered that I was in my fifties and my advice was considered for designing some "worse behavior scenarios". Now, in my seventies, the role is being a guru. In this paper I have tried to give an overview, and not which is my view, of statistics and its development in Cuba. I guess none of my old questioning on what was going to happen, or on what should have been preserved, has pervaded what I have written. I hope that some critical evaluation of this "history of Cuban statistics". Being a skeptical black philosopher who acts as a guru, I guess that, if it would be written, it will be more a story than a history.

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