

**SUCCESSFUL INNOVATIONS IN NATIONAL CENSUSES:  
THE CASE OF COLOMBIA**

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**Abstract**

Typically, countries conduct population and housing censuses every 10 years according to United Nations recommendations. These censuses generally are taken simultaneously on one day requiring an extensive use of resources, and limited to population and housing questions. In 2005, Colombia implemented a continuous census format which not only generated a better allocation of resources but which allowed to survey households on agriculture and business concerns as well.

This paper will explain how this extended census format was conceived and developed in Colombia, and how it has proven to be more effective and efficient than the simultaneous census format. In addition to this conceptual innovation, this paper will address methodological and technological innovations that can help countries planning future national censuses implement best practices.

One of the key methodological innovations in the 2005 Colombian General Census was the selection of qualified staff to serve as paid interviewers in contrast to the previous census where interviewers had been high school students performing an unpaid civic duty. This paper will describe the selection and training process of the interviewers, and will establish the positive impact that it has generated in the local communities.

With regards to technological tools used during the General Census, Colombia was at the forefront of innovation. From CAPI (Computer Assisted Personal Interviewing) to geo-coding and local data warehouses, Colombia demonstrated how powerful the integrated use of technology in national censuses can be. This paper will explore the advantages of using CAPI over PAPI (Paper and Pencil Interviewing), as well as the new possibilities for dynamic data searches.

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In recent years, Colombia, like most countries in Latin America, has had a growing demand of statistical information to define economic and social policies. Research results no longer are solely published on paper but they are made available to users through the Internet. On the other hand, the large investment needed to conduct traditional censuses in an environment of fiscal constraints has led to postponement and delays in the execution of census operations. Therefore, in the years preceding the 2005 General Census, Colombia, was faced with a complex situation in which it needed to produce more and better information with resources that were limited more and more each time. Confronted with this situation, Colombia decided to explore the changes toward less costly alternatives that had been proposed related to the nature of censuses. Specifically, two of the proposals that Colombia considered were the continuous census format and the use of the administrative records.

In a meeting held in 2002, Colombia made a commitment to try an alternative census format for its next General Census. In preparation to comply with this commitment, DANE began to carry out a series of experiments, such as the use of new technologies including GPS-enabled PDAs for information capture, the execution of censuses in extended periods, the use of scanners for information processing, the use of digital cartography, the development of monitoring and centralized control systems, and the use of input, validation and editing programs with the simultaneous information capture of industry, commerce and service entities.

In 2004, DANE's new management team found that regardless of the technological advances that the organization had tested, the methodology that was being used was the same as the one that was traditionally utilized. It was soon established that the costs of the Census could be reduced if a new model of Census was adopted; a Census which extensively used intelligent capture of information and in which the traditional operation was replaced by one where the period of data collection was longer.

Consequently, keeping in mind the inherent deficiencies of traditional censuses in Colombia, as well as the improvement alternatives that the international experience provided, DANE redirected the project toward higher levels of effectiveness, efficiency and opportunity, fulfilling the Colombian commitment of applying new methodologies.

## **SCOPE OF THE CENSUS**

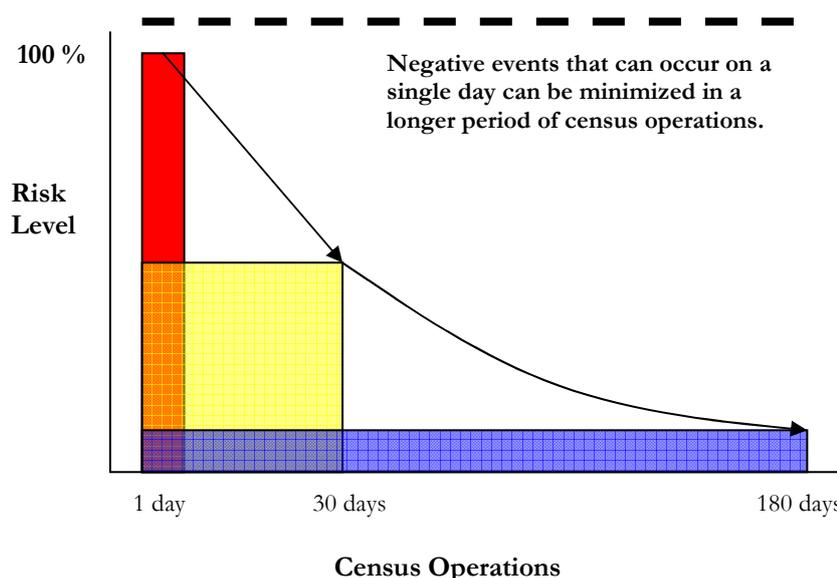
Due to the great financial and operational effort invested in a General Census, DANE decided not only to inquire about population and households in its 2005 General Census but also, and simultaneously, about the industry, commerce and service economic units, in addition to the agricultural production units related to rural households. DANE also took into consideration the condition of the urban environment.

Besides integrating different types of information, not only through the larger scope of the Census in itself, but by the use of adequate questions, both in number and type, distributed between a basic form of universal coverage and an additional form for content development applied to an extensive sample of surveyed households, it is now possible to integrate and interrelate topics of different nature (demographic vs. social, economic vs. urban), expanding on miscellaneous issues or on complex themes that can result of such interrelations.

## EXTENDED CENSUS FORMAT

Without a doubt, amongst all the innovations of the 2005 Colombian General Census, the most essential one was expanding the period of data collection from a day to maximum one year.

Adverse effects of the risks, learning curves and concentrated expenditure of traditional censuses were mitigated with good management of the census data collection period. Through the use of time management, the execution of census operations was planned in several phases between May 22, 2005 and May 22, 2006. In this way, as shown in the graph below, with an extended time period, negative effects related to risk control, quality of learning of interviewers, coverage rate and budget distribution, associated with the one day time period of traditional census, were mitigated or eliminated.



Source: DANE

Regarding the first issue – risk control –, the possibility of occurrences attempting against the correct realization of the census operation are innumerable in such a vast undertaking magnitude, extension and complexity as the census one. Included in these probable occurrences are: those related to geological origin, changes in weather, social conflict, armed conflict, common delinquency, logistical shortage, field personnel shortage,

problems in the questionnaire development, negative attitude among citizens, communication systems' failures, and poor teamwork.

In the traditional operational method of collecting data in one day, the adverse effect of any fateful event needs to be dealt with on that day, since no additional time is available at a later date to undertake the necessary corrections or solutions. On the other hand, with an extended time frame for census operations, the effect of such an event will be lesser, since it will only affect the operations on that day, and the consequences of this event can be resolved at a later date.

As for the second issue – quality of learning of interviewers –, the success of a census greatly depends on the skills attained by interviewers to carry out the interviews. These skills are mainly summarized as abilities to visualize the spatial location of the survey site, handling of interviewees, time management during the interview, understanding of the concepts involved, operation of the data input tools, control of coverage and quality, delivery of collected data, and data collection team relationships.

In the traditional one day operating method, with the exception of some possible training sessions which are generally ineffective given the educational focus, the motivation, the aids and the massive teaching method, the interviewers do not have or they have very little opportunity to learn the diverse and numerous responsibilities entailed in the process. Thus, failures, knowledge gaps and vices which interviewers have at the beginning of the census day, can not or minimally be alleviated due to the short time limit of that day. On the other hand, when an interviewer has several days, he/she builds his/her own learning curve in such a way that each new day the product of his/her work is better than that of the previous day, converging to the maximum quality level if he/she has sufficient time.

Next, it is necessary to clarify that the total coverage of census units in a single day is practically impossible. This is revealed in the coverage gaps generated by traditional censuses; these gaps being especially critical in Colombia. This problem generated the need to carry out post-census coverage surveys which failed to show their validity to resolve the issue. As a result, with time, those responsible for national statistical offices accepted their economic unsuitability, and a growing group of demographers accepted their technical unsuitability.

The problem with coverage is solved mainly, during census operations, by making pre-visits to enumerate census units, as well as re-visits to finish incomplete or deficient surveys. With this procedure and statistical adjustment methods, the main problem of national censuses is resolved.

Finally, DANE kept in mind that the total amount of resources demanded by a national census operation is considerable. When censuses are done within the timeframe of the traditional method (one day), expenses converge around the census date. Adverse conditions in quality and opportunity of delivery, as well as negative factors such as inflation, ineffectiveness, and inefficiency, can be caused by the volume of supplies required, the urgency of their availability, and the variety and quantity of participating agents in the acquisition process.

## **COMPETENT HUMAN RESOURCES**

The qualitative improvement in Human Resources for the 2005 Colombian General Census was supported by establishing an adequate model of personnel management that

integrated selection, training and hiring of field personnel. Through this process, all Colombians had the opportunity to participate in the project's operational phase from their own location. By training individuals in the use of modern techniques in data collection and information analysis through the pedagogical model of competences and the support of teaching aids such as the Internet and the interactive CDs, DANE added value to its process. Through a transparent selection process which was based on meritocracy, DANE selected the most competent human resources with the necessary skills for a project of this importance.

## **TECHNOLOGY USE**

Technological innovations constituted a fundamental element for the development of a project of this magnitude. To make processes more efficient and to obtain a better quality of census data, the use of information and communication technology was essential.

At each location, DANE used CAPI (Computer Assisted Personal Interviewing). Mobile device technology and PDAs, were utilized for data collection and geo-coding of census information (with the application of validation and integrity rules). To guarantee data security and integrity, DANE employed information reception centers, local data warehouses and a national data warehouse that was accessed through the Internet.

To train field personnel required for the census operation, DANE used multimedia technology that was of great usefulness for the learning methods which were selected. To process and purge statistical data, DANE relied on software packages widely used and extensively developed such as IMPS, CSPRO and REDATAM, and statistical analysis packages such as SAS and SPSS. To publish census results, DANE set up an information system through interactive applications on the Internet, where the user can conduct inquiries, analyze and generate information with the census data, crossing variables according to his/her needs.