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France's redesigned census: lessons and prospects

François Clanché[1]

Abstract. From 1801 to 1999, France periodically conducted "traditional" censuses with exhaustive enumeration. In 1997, it decided to undertake a radical reform of its census involving (1) a switch to annual surveys in parts of the country, (2) introduction of a sample survey in large municipalities based on a statistical register of addresses, and (3) annual publication of detailed results using five annual surveys and administrative data. This system is now operational and is supplying results on a regular basis. Have the goals of the reform been met? This paper analyzes the successes and difficulties of the project, and assesses the extent to which it has met its goals for cost, data quality, and information timeliness. We describe the defects and risks that emerged during implementation, and discuss planned developments.

[1] Head of Demography Department, French National Institute of Statistics and Economic Studies (Institut National de la Statistique et des Études Économiques: INSEE), France, francois.clanche@insee.fr.

Translator : Jonathan Mandelbaum

1 The new French census system works

In the late 1990s, INSEE decided to launch a thorough reform of the exhaustive-census model that would replace periodic enumerations with an annual sample-survey system (Godinot, 2004 and 2005). The census results are now compiled annually—at all geographic levels from municipal to national—using data from five successive surveys supplemented by administrative sources (see Annex). Seven years after the start of data collection for this new census, the outcome is largely positive.

1.1 The surveys are being conducted in highly satisfactory conditions

The February 2002 Act establishing the new census called for a sharing of census-taking operations between INSEE and French municipalities: INSEE organizes and supervises the surveys, but the municipalities prepare and execute them, notably by hiring, managing, and paying the enumerators. In the context of decentralization and occasional tensions between the State and local government over the distribution of resources and responsibilities, it was by no means certain that this partnership would function properly.

In the event, the establishment of annual data-collection procedures went smoothly, thanks to major communication and support actions aimed at the municipalities. Even before the first surveys, INSEE launched a communication program to provide an overall explanation of the new system. Every year, INSEE now assists the municipalities conducting the survey in the quarter preceding the collection, then during the collection itself. INSEE staff train the municipal personnel in charge of the operation, as well as enumerators. Over the years, the municipal personnel acquire an experience that contributes to the operation's efficiency. This professionalization is particularly intensive in large cities—which conduct annual surveys—but is also significant in smaller towns.

At INSEE as well, we have drawn lessons from the initial collections. We have gradually refined the protocols and instructions, made marginal changes in printed collection and management forms, and taken other steps to increase data-collection efficiency and speed.

From this standpoint, we have clearly reached our goal of improving survey quality control. Thanks to regular assessments of the process by all participants, we have achieved progress where needed (see Cézard and Lefebvre, 2009).

Once the new census had been endorsed by municipalities, we needed to enlist the support of the population. "Traditional" periodic censuses can rely on communication campaigns that present the operation as a comprehensive operation limited in time. The partial annual census cannot rely on these arguments. Nevertheless, a communication campaign focused on the usefulness of the census and, secondarily, on the innovative and money-saving aspects of the new system has generated a fairly strong endorsement by the population.

From year to year, we do not observe any deterioration in collection quality. The non-response rate remains very low and is not increasing; the share of municipalities unable

to complete the collection on time remains negligible, and the number of collections that INSEE needs to "adjust" via additional surveys remains minimal.

1.2 Legal-population figures are calculated, disseminated, and generally accepted

The second challenge of the new census was the determination of the legal population of France's 36,682 municipalities (*communes*) at end-2008, using the 2004-2008 surveys, the register of localized buildings (Répertoire des Immeubles Localisés: RIL), the register of institutions, and the occupancy-tax (*taxe d'habitation*) data. This task was completed on time.

Throughout 2008, INSEE conducted another communication campaign to inform mayors of the calculation method and announce the future annualization of the figures. In December, each mayor received the figures for his or her municipality a few weeks before the official publication of the list in a decree.[1] INSEE Regional Offices made arrangements to answer mayors' requests for information. More than 1,200 mayors actually asked for explanations in the weeks that followed. After receiving the information, very few municipalities expressed dissatisfaction. The number of formal complaints (in the legal sense) was insignificant and did not concern key aspects of the method.

We repeated the above operation in December 2009 and December 2010. Technically speaking, this entailed no additional difficulty for INSEE, as the method for determining the figures was identical. By contrast, the communication program was complicated by the proximity with the previous year's figures: data freshness—one of the new method's key contributions—creates demanding requirements when annual variations for 36,682 municipalities need to be checked and justified.

Despite the crucial innovation—for mayors—consisting of annualized results and despite the risks of time comparisons, the number of requests for explanations received by INSEE decreased from 500 at end-2009 to 400 at end-2010.

Yet we cannot take the acceptance of the method for granted everywhere. A small number of mid-sized municipalities have challenged the latest figures, sometimes vehemently. Most are municipalities whose 2006 population exceeded that of 1999 and has since been trending down. Even a mild decrease has a symbolic effect on the municipalities concerned, as well as an impact on local finances. INSEE devotes considerable time to checking the data and then explaining the method to these elected officials.

While these isolated complaints call for the greatest vigilance, the decision to prepare annual figures of the official population at all geographic levels has clearly proved to be a winning proposition.

[1] See legal populations at Insee - Populations légales 2008.

1.3 Detailed data are published every year and have found their audience

Six months after publishing the first population figures based on the new census, INSEE released a broad set of statistical data on its website. Like the population figures, they were based on the 2004-2008 surveys and used 2006 as reference year. The data were fully consistent with "Legal" population figures.

This release was designed to satisfy demand from varied segments of the public. We accordingly organized the data in several complementary forms. For the "general public," the data are directly accessible and retrievable on our website, in a rather user-friendly format and presentation. For specialists and professionals, we provided downloadable databases requiring subsequent handling by the user.

In the first segment, we prepared easy-to-print pages of "key figures" on all municipalities—down to the smallest—with a few charts and data comparisons with earlier censuses. Also for the general public, but only for larger geographic units, we prepared detailed tables combining several variables, often comparable with those of the 1999 census. For specialists, we compiled databases containing the figures of the detailed tables and allowing all possible geographic aggregations. A few months later, we added databases at infra-municipal level and databases of individual anonymized data. For the first time, microdata from a census are available free of charge to a wide public and can be freely tabulated by users.

The overall device was designed after numerous consultations with regular users of the census. Its implementation then mobilized members of the production team of Census and broadcasters.

In summer 2010, we "refreshed" all these data and made them consistent with the official population figures dated 2007.[1] Although only some of the data actually reflect updated information (only one-fifth of the information is truly fresh), INSEE has decided to make all the data available again each year.

Early feedback from users is largely positive: the census statistics have found their target audiences, both in local communities and among analysts and researchers. Users appreciate the quantity and variety of the information, as well as the richness of the documentation. But, as always, this publication generated additional demand that was expressed by website visitors, at meetings with public players, in an *ad hoc* group at the National Council for Statistical Information (Conseil National de l'Information Statistique: CNIS), and in a July 2010 online satisfaction survey.

Like the other arrangements, the dissemination system is not frozen. We made marginal changes in summer 2010 and are reorganizing it for summer 2011, particularly to facilitate navigation on the website.

Today, we can confidently state that the census data are widely disseminated and used by a varied and generally satisfied public.

[1] See results at Insee - Results du census de la population - 2007 - Accueil.

1.4 The quality of the data produced is not challenged

Publishing detailed census data every year, strictly on time, would not be a success if the quality of the data were not recognized. The radical change in the census method created a moderate risk of decline in quality relative to "traditional" censuses, particularly because of the introduction of sample surveys and the longer time frame for the collection. We had weighed and estimated the risk in the design phases, notably through simulations.

During the "ramp-up" period, i.e., between 2004 and 2008, we conducted studies to verify the plausibility of the provisional data in demographic terms and the credibility of statistical results, in consultation with INSEE specialists in the relevant fields such as employment, education, and housing. Once we were sure of the quality of the national data, we performed validation tests on local data in cooperation with our Regional Office network. Lastly, the main dissemination products underwent multiple rereadings in the months before their online release. These progressive validation phases led to the publication of national and regional results as early as 2005. And they enabled us to verify the quality of the final results as thoroughly as possible.

Since the initial publication, our validation tests are more abbreviated: they concern (1) the legal populations of municipalities, with systematic analyses of major annual trends, and (2) selected statistical results for regions and départements.

The response from national and local users of these data over the past two years has convinced us that the quality of the results of the new census is at least as high as that of the figures from older censuses.

The quality of the new census holds, first of all, with the innovations brought by the new formula compared to a traditional census. The availability of an annual directory of buildings in towns with more than 10,000 people ensures that no address has been omitted in data collection operations. The distribution over five years of data collection in municipalities with fewer than 100,000 inhabitants decreases the burden on the statistical institute, and allows a streamlined monitoring of these communes, in favor of a higher quality.

More importantly, the annualisation of the operations of census allows a true control of the process, enabling the funding of improvements over successive years. These check operations and the continuity of the method from one year to another make it possible to reduce to the strict minimum the data-collection risks specific to the traditional censuses. Since the introduction of the rolling census in France, no statistical adjustment was necessary to understand the evolution of populations, contrary to past experience.

However, it would be inaccurate to state that the census results are flawless.

Some defects are trivial and can be explained by failure to collect data (isolated cases) or to edit data (for which we can take remedial action). These defects were already present in earlier censuses, but there was no hope of correcting them in later rounds.

Other defects are more "structural" and require deeper methodological scrutiny.

The first is the apparent underestimation of young children aged 0-4, which becomes visible when we compare the census numbers with vital statistics. This is a known

problem in censuses, both in France and elsewhere, but the new method does not solve it.

The census also seems to underestimate the number of people recently arrived in France, by comparison with administrative data on international migrations.

2 Adjustments and improvements are needed

2.1 The annual series raise questions about the quality of the source

The new census produces data every year at all geographic levels. As soon as we introduced the system, we clearly announced that these successive data would not constitute annual series in the usual statistical sense: only results compiled from independent data sets (i.e., at least five years apart) are strictly comparable. Pending publication of the results dated 2011 (i.e., obtained from 2009-2013 surveys), the local data from the census can be compared only with the figures of the last "general" census of 1999.

This scientific "warning" is not always heeded or well understood by users. It generates complaints from some elected officials (in localities where annual figures are trending down) and serves as an argument for persons (now admittedly few in number) who still oppose the change of method.

For INSEE, the analysis of annual trends, at least in large cities, is a means to control the quality of results: any significant change (taking into account the confidence interval of the sampling process) must be explainable either by a duly verified event (concerning the number of dwellings in the municipality or neighborhood) or by a regularly observed trend. Otherwise, the system may very well have malfunctioned. Thus far, we have confined these verifications to the population figures. We need to perform them more systematically in order to prepare the dissemination of data fully comparable at intervals of at least five years.

In the new census system, each annual survey is supposed to be representative at national and regional level. The sample for each annual survey was built to form, at these higher geographic levels, an independent survey comparable from year to year. INSEE has not yet conducted a systematic analysis of the quality of the resulting series; there are a few exceptions, at national level only, for demography and employment. Absent this expert review, the annual census surveys are not playing their initially intended role in official statistics.

2.2 Collection costs are rising every year

As regards census costs, the goal of the redesign was not to reduce the cost of the operation but to smooth it over time. The sampling rate in large municipalities was actually calculated so that the survey volume would be equal to one-seventh of that of an exhaustive survey, in reference to the "usual" seven-year frequency of the last general censuses. INSEE consequently spends some €33 million on the census every year, roughly one-seventh of what an exhaustive survey would probably have cost.

This expenditure, now included in INSEE's annual budgets, is no longer exposed to the same risk as the former censuses: it should be recalled that France's last general census was postponed from 1997 to 1999 for budget reasons. Of the annual €33 million, INSEE transfers €22 million to municipalities, which collect the data. The rest is spent on the printing of census forms, the capture of questionnaires by optical scanning, the communication campaign, INSEE staff travel, and the compensation of certain inteviewers.

The financial system is therefore functioning as planned. However, it now faces pressure due to the overall restriction in public spending as well as to population growth.

The INSEE budget, like those of all government agencies, is subject to constant downward pressure, even in nominal euros. For example, in 2011-2013, it must be cut by 10%. As the census alone accounts for over a third of INSEE expenditures, it must be included in the common effort to curb spending.

At the same time, the French population is rising by nearly 0.7% per year. Collection costs—the largest single item of the INSEE budget—are largely proportional to population size. The rules governing the INSEE allocation to municipalities actually stipulate that this funding is strictly proportional to population.

The issue of the medium-term sustainability of census funding is therefore on the table.

Beyond the financial aspects, there are also human-resource issues involved. At INSEE, 450 staffers are assigned full-time to census work: 40 to the design and central management, 260 to the organization and monitoring of operations in Regional Offices, and 150 to sampling-frame maintenance. During the collection period, another 500 staffers are responsible for training, accompanying, and supervising municipal personnel conducting census operations. Our survey experience shows only a very small decrease in this human-resource requirement. However, like all government agencies, the Institute is experiencing a steady, significant decline of its workforce. Again, the issue of sustainability is on the table.

At a lesser level, many municipalities are complaining of their difficulties in hiring sufficient enumerators. This situation is reported by one-half of localities that need to hire more than ten enumerators.

2.3 The data processing workload is not diminishing year after year

The repetitiveness of the construction of census results gave us reason to hope that, once the system was up and running and the first series of detailed results had been published, the workload involved in preparing and validating the data would diminish. Our experience shows that this is hardly the case at the moment, and the situation is unlikely to improve in the years ahead—especially if we want to settle the quality issues that are emerging. The actual methodological work of establishment of the standard calculation method is completed since 2008, and corresponding computer programs as well. But the effective reduction in the properly methodological needs was compensated by an increase in the load of processing data, because of need for permanent adaptations.

A ten-member team is responsible for the specifically "statistical" aspects of the census that range from sampling to determination of legal populations, processing of variables, weightings, validations, and production of microdata files. This workforce is as large as it was in the "project design" period. Why are we not achieving "productivity gains" here? Basically for three reasons:

a) Although we have now stabilized the method, some parameters of the statistical environment are evolving

b) Over a five-year period, some of the statistical ingredients of the census are proving unstable

c) The methodological teams are responsible for correcting the accidental defects in the basic census data.

a) Although we have now stabilized the method, some parameters of the statistical environment are evolving

The census method is based on the five-year stability of the "municipality" entity whose legal population we seek to determine. But every year a small number of municipalities merge or, on the contrary, are created through separations, or adjust their borders through territorial exchanges. The treatment of these modifications varies according to the position of the event date relative to the census collection cycle. Each "event" of this kind therefore requires several years of *ad hoc* calculations.

While municipalities are born and disappear, they also change size, notably by crossing the 10,000-inhabitant threshold upward (approximately twenty a year) or downward (two or three a year). Here as well, therefore, we need to define specific calculation procedures for the municipalities' entire "transition" period between the old and new calculation methods that concern them.

It was also necessary to integrate the change of the classification of activities in 2008 (new French Classification of Activities in coherence within the European Communities NACE rev. 2).

Lastly, the census questionnaire is not set in stone: in 2011, we modified it for the first time since 2004, in a marginal way, to adapt it to the 2011 EU census regulations. The

publication of detailed results based on data collected with different questionnaires is obviously a difficult, costly, and sometimes ultimately impossible statistical challenge.

A further change in the questionnaire is planned for 2014, after a round of discussions starting in spring 2011. This will generate a new methodological workload.

b) *Over a five-year period, some of the statistical ingredients of the census are proving unstable*

The method set up both to estimate populations and to describe them presupposes explicitly or implicitly that the phenomena observed will follow a certain "trend" over the five-year period. In small municipalities, we extrapolate or interpolate by making proportionality hypotheses. In large municipalities, we apply five-year moving averages for the variables to a known number of dwellings in the median year. But, with respect to these trends, some phenomena are "accidents" inadequately addressed by the basic method. The first example is the temporary closing, for renovation, of a institution (retirement home, student residence) for the two months of the collection period—an event that potentially "deprives" the municipality of the institution's population for several years. The second example is the demolition of a large building preceded by a period in which the dwellings are gradually vacated. If this situation is not properly handled, two risks arise: first, the building may be surveyed at a time when it is almost empty; second, the building may disappear from the address register. Another situation worth mentioning is the change in legal status of a retirement home (institution) that makes it subject to the occupancy tax (*taxe d'habitation*) in a small municipality: the normal extrapolation may cause an increase in the number of "private" dwellings to show up in the figures, whereas the institution has already been included in the total.

c) *The methodological teams are responsible for correcting the accidental defects in the basic census data*

Lastly, an inevitable number of quality accidents occurs in the census—as with all very large-scale statistical operations repeated every year and from which results are expected for more than 36,000 territorial units. Accidents include errors (involuntary omissions and double counts) in the sampling and editing frames (namely, the localized building register and institution register), collection errors (such as forgotten units, and surveys carried out by mistake in large municipalities), deficiencies in the occupancy-tax database (of which INSEE not control the compilation process), and so on. All these errors, when spotted in time and statistically significant, are subject to corrective calculation. Some errors are reported by the municipalities themselves upon receipt of the intermediate data concerning them. However, INSEE takes steps to ensure that municipalities are treated fairly.

A total of some one hundred and fifty municipalities a year are subjected to an *ad hoc* calculation, and at least fifty are reviewed in an in-depth analysis that does not result in an adjustment. These various adjustments and corrections make up approximately one-third of the "data processing" workload for the census.

3 Developments planned for the years ahead

In addition to methodological work on data-quality monitoring, discussed earlier, most of the developments planned for the years ahead seek to cut costs without lessening process quality control—and, if possible, to concurrently improve the process. As the bulk of the census cost is generated by information collection, we shall concentrate our efforts on the latter.

3.1 Introduction of online collection and modernization of address-register management

The 2004 census redesign was undertaken without changing the collection protocol: the census forms are dropped off by the enumerator, filled out by households, retrieved by the enumerator, then scanned for data acquisition.

The first notable change in this protocol will be to introduce online response for households starting with the 2013 survey. This fully voluntary option should enable us to: reduce travel by enumerators; improve the quality of the information collected (better control of filters, multiple-choice answers, and overall consistency); reach and convince certain population segments more easily; improve the public image of the census; and reduce data-capture costs. However, the implementation of the option is neither cost-free nor risk-free, for it must blend smoothly into existing protocols and information systems. It involves informing the enumerator—as promptly as possible—that a household has responded online, so as to save him/her a visit. With the enumerator now working under the municipality's supervision, we need to rethink the entire information flow between INSEE and municipalities, and adjust it to the wide diversity of situations.

This modernization will offer INSEE an opportunity to launch an overall modernization of the collection-monitoring system with the aim of saving resources and controlling quality. In particular, the system will include a monitoring tool to enable municipalities to determine whether a household has responded online. By the same occasion, INSEE will be able to check collection progress for each enumerator. We shall thus be able to focus our efforts on the sectors that are behind schedule. Experience has taught us that collections that do not start at a fairly brisk pace are typically the ones that ultimately pose data-quality problems.

At the same time, INSEE will upgrade the management of its "register of localized buildings" (Répertoire des Immeubles Localisés: RIL). The RIL, which is maintained only in large municipalities, serves both as a sampling frame for annual surveys and a reference for calculating legal populations. It is extremely costly to maintain, as it occupies 140 staffers in our central and regional offices. The reason is that, because of its very design, it requires heavy local expertise, at INSEE itself and in municipalities, yet even this does not ensure perfect nationwide consistency or stable quality. We shall therefore rethink the updating process and the underlying information-technology infrastructure so as to improve the supervision of operations and of their statistical impact, as well as to reduce management costs.

3.2 Creating a statistical register of dwellings

The second important stage in census modernization will be the implementation of a new infrastructure in the French statistical system: a statistical register of dwellings. This is a "structuring" operation that should satisfy several needs at INSEE: the establishment of a more effective sampling frame for household surveys; creation of a repository of addresses for geolocation operations involving administrative sources; but also improvement of census quality, introduction of direct mailing of census forms, and upgrading of the statistical model for the census.

The register itself should be largely compiled from tax data and be enhanced by systematic mapping through the cadastral survey reference, henceforth linked to a geographic information system (Système d'Information Géographique: SIG). We have conducted initial tests on this source. First, we have checked that the address quality allowed interviewers to unambiguously locate a building. Second, we have verified the quality of statistical information on the number of dwellings and population figures. The results of all these investigations were sufficiently encouraging for INSEE to decide to launch the register-construction project. Work will begin in autumn 2011.

Initially, i.e., around 2014-2015, the register will serve as a tool for improving census quality. In large municipalities, the RIL must be consistent with the dwelling register. Discrepancies will need to be reviewed and resolved. As each source has its own updating procedure, it will serve as "quality benchmark" for the other. In small municipalities, the dwelling register will serve as the initial address base to prepare the collection, avoiding needless captures and involuntary omissions. Conversely, the census surveys will enable us to correct the quality deficiencies of the dwelling register.

These changes will not constitute a "revolution" of the census model: the use of administrative data to check RIL and collection quality, called for in the official guidelines for the redesigned census, has already been put into practice (see Clanché, 2010). Rather, the aim is to systematize the use of administrative data and introduce it at earlier stages of the census processes.

3.3 Gradual introduction of direct mailing

The second stage of the use of the statistical register of dwellings in the census could be the gradual introduction of postal delivery of forms, as already exists in many countries. The system was not possible in France until now, absent a list of dwelling addresses available ahead of the collection. Even in large municipalities, it is the enumerators who, when preparing their rounds, compile the exact list of dwellings to be surveyed.

By using the addresses supplied by tax offices, the dwelling register allows a "targeted" mailing of forms to a very large majority of persons to be enumerated. This change will greatly diminish the survey burden. Naturally, however, the enumerator will still have a substantial amount of work: checking the exhaustiveness of the base (number of dwellings for large municipalities, of addresses for small ones), management of incorrectly addressed envelopes returned to sender, and, of course, retrieving the forms.

As of now, postal delivery is merely a plan that INSEE is considering, without a specific implementation date. Even more than the introduction of online collection, it

will modify the roles of participants in the census process, as well as the division of labor between INSEE and municipalities. The project will therefore require a major testing and consultation phase, which has not yet even been scheduled.

3.4 Medium-term evolution of the statistical model

Lastly, the statistical register of dwellings could allow the basic statistical model of the census to move toward a smaller number of surveys. The modernizations described above make it possible to reduce collection costs for a given annual-survey size, i.e., without compromising the exhaustiveness of the five-year collection in small municipalities while preserving an 8% annual sampling rate in large ones.

The statistical register of dwellings does not only include exact dwelling addresses. It also provides information on the dwellings (size, construction date, occupancy status) and their occupants (number, gender, age, income levels). Admittedly, this information does not always match the census definitions exactly, and the occupants may have changed between the source compilation date and the census survey. Nevertheless, it does constitute additional information that may strongly enhance the survey's sampling and processing efficiency.

If the statistical qualities of the register are confirmed, it could allow an overall reduction in survey volume without undermining the final accuracy of the data published. We might thus be able to increase the sampling rate in large municipalities, introduce sampling in mid-sized municipalities, and increase the intervals between exhaustive surveys in the smallest municipalities. In large municipalities, the possibility of identifying floors in apartment buildings before the survey might also enable us to cease the systematic sampling of entire buildings. This would limit the cluster effects that degrade sampling efficiency.

This change, unlike the previous ones, will not affect the collection protocol, but it will disrupt the methodological balance between "traditional" collection and statistical processing defined by the 2002 Act. It will require adjustments in regulations, and a fresh effort to convince census users. This will only be possible if, in the meantime, the lingering manifestations of reluctance to accept the present method have been overcome.

Conclusion

The new census system introduced in France in 2004 has met its goals. Good-quality results are disseminated annually at all geographic levels. Nevertheless, the census will evolve in the years ahead, chiefly in order to reduce costs without jeopardizing the quality of results. The first phases of this modernization are under development and will be implemented by 2015. Others are still in the preliminary design stage and will probably be launched between 2017 and 2020.

Annex: The French census since 2004

Since 2004, annual surveys have replaced the traditional exhaustive enumeration conducted every seven or nine years. The survey method varies according to the size of the municipality (*commune*).

Municipalities with a population of under 10,000 are enumerated every five years on a rolling basis. They have been divided into five groups, under rules that ensure an equivalent number of inhabitants in each group. Every year, the census survey covers the entire population and all the dwellings of the municipalities in the designated group. Over a five-year cycle, the entire population of municipalities with a population of under 10,000 will have been enumerated.

In municipalities with a population of 10,000+, a sample of inhabitants is enumerated each year. The annual survey covers a sample of addresses representing around 8% of the population. Over a five-year cycle, the entire territory of each municipality is covered and some 40% of the population of these municipalities will have been enumerated.

The collection frequency is therefore five-yearly for municipalities with a population of under 10,000 and annual for municipalities with a population of 10,000+. The census survey is exhaustive for the first group, and sample-based for the second. Concretely, around 9 million people are enumerated every year, or 14% of the population living in France.

The data disseminated annually are based on the five most recent census surveys. They therefore concern 45 million people or 70% of the population. The data collected over the five years are assigned to the same reference year (the median year) using interpolation and extrapolation methods and moving averages.

Bibliography

1. Cézard, M. and Lefebvre, O. (2008), *Census quality*, INSEE (available at www.insee.fr, "INSEE and official statistics - Quality at the Insee - 4- quality commitment " section)
2. Clanché, F. (2010), *The French use of housing tax in the new census method*, Joint UNECE/Eurostat Expert Group Meeting on Register-Based Censuses, Working paper 8 (available at www.unece.org/stats/documents/2010.05.census.htm)
3. Clanché, F. (2010), *The dissemination of French census results since 2009*, Joint UNECE/Eurostat Group of Experts on Population and Housing Censuses, Working paper 18 (available at http://www.unece.org/stats/documents/2010.07.census.htm)
4. Godinot, A (2004), "Redesigning the population census," Courrier des statistiques, English series no. 10, 2004, pp. 5-12, (available at http://www.insee.fr/en/publications-et-services/collection.asp?id=8&numpage=2&nombre=20)
5. Godinot, A. (2005), "Pour comprendre le recensement de la population," *Insee Méthodes*, Hors Série (out-of-series issue), May 2005 (available at www.insee.fr, "Publications et services" section).