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**SEMINAR ON POPULATION AND HOUSING CENSUSES
SESSION I**

The role of censuses in a country with a register-based statistical system:
Norwegian experiences and plans¹

Submitted by Statistics Norway

I. INTRODUCTION

1. The last fully traditional population and housing census in Norway was conducted in 1960. The censuses from 1970 to 2001 were all based on a mixed mode data collection, combining register data and traditional censuses (in 1990 a combination of register data and a sample survey). In 2001 only information on households and dwellings was collected from census forms. According to the plans, the 2010 Census in Norway will be totally register-based.²

2. How have these changes in data collection methods affected the role of censuses in Norway over the last fifty years and what will be the role of censuses in the future? What are the preconditions for developing register-based census solutions, and what are the benefits and problems related to such a solution? These are the topics to be discussed in this paper. Some information on the historical development and the register-based data system to day will give the background for understanding the changing role of censuses.

¹ This paper has been prepared at the invitation of the secretariat.

3. This paper is mainly based on Norwegian experiences, but we have also drawn on experiences from other Nordic countries. Later this year, a report on documentation of best practices for register-based statistics in the Nordic countries will be published.³

II. WHAT IS REGISTER-BASED STATISTICS?

4. A register is as a systematic collection of unit-level data organised in such a way that updating is possible. Updating is the processing of identifiable information with the purpose of establishing, bringing up to date, correcting or extending the register in such a way that it can be maintained as a continuous set of records. Each unit in a register can always be uniquely identified, normally by using a system of identification codes.

5. Administrative registers are registers primarily used in an administrative information system. For statistical purposes, mainly countrywide registers operated by the state or jointly by local authorities are used. Ideally, for statistical use registers should be as comprehensive and accurate as possible, but even incomplete registers can be used for statistical purposes. Statistical registers are created by processing data from administrative registers. Statistical registers could be based on a single administrative register, but they are more frequently based on combined data from several administrative sources.

6. Traditional censuses and other total enumerations are not registers, but may be called cross-sectional data files. The intension of such files is not to update the population of units or the information about the units when changes occur. At every reference point of time or period (census day or census year), all information has to be collected and processed. When cross sectional data files have been established, however, the ways to produce statistics from these files are quite similar to producing register-based statistics.

7. By register-based statistics we mean statistics produced using register data only. In addition data from register are used in combination with data from sample surveys. It is important to note that administrative data records never can fully replace direct data collection by sample surveys, but that these two methods are complementary to each other.

III. A BRIEF HISTORY OF THE USE OF REGISTERS IN NORWEGIAN CENSUSES

8. The first Norwegian population census dates back more than 200 years. Up until the 1960s, all censuses were traditional. In 1964 the Central Population Register (CPR) was established, and an official, personal identification number was introduced. The 1960 Census provided the basis for allocating the personal identification number, while the census of 1970 was used to check and update the CPR. After the CPR was established, it became the major source for all demographic statistics in Norway.

9. The 1970 Census was used to establish the Register of Education. During the sixties and seventies a number of administrative registers were established, all using the personal identification number. This resulted in an increase in the number of register-based subject matter statistics, as well as an increased use of household sample surveys. The role of the census was

changed from being the main source of social and demographic statistics to just one of several sources.

10. In the 1980 Census, administrative registers were used to rationalise data collection. Data capture by postal mail only was introduced. The questionnaires were substantially shortened and only sent to people aged 16 years and older. Register data were also used during coding and editing of the data. Furthermore, in the set-up of basic statistical units (small geographical units designed for dissemination of statistics) the census data played an important role.

11. In the 1990 Census, information on demography, education and income, as well as geographical characteristics, was collected from registers. Labour market data and data on households and housing were collected by questionnaires from a sample of the population. A statistical register for labour market data was established and used as supplementary information when producing tables of labour market characteristics.

12. In the 2001 Census all data on persons (place of residence, demography, education, labour market, income etc.) were based entirely on registers. Data on families, households and housing was based on a full coverage survey with a questionnaire for every household. Prior to the census a dwelling register had been established as an extension of the GAB-register (Register of Ground properties, Addresses and Buildings). Data from the census forms was used to establish links between resident persons and dwellings (in the CPR) and to update information on dwellings in the GAB-register.

13. Future censuses will, according to our plans, be totally register-based. Data on households, families and couples will be collected from the CPR, and data on housing from the GAB-register. The main condition is that the quality of data on households and dwellings becomes satisfactory. A project to improve data quality, including establishing procedures for updating, was started immediately after the 2001 Census and some activities are still ongoing. Statistics Norway is playing an active part in this project.

14. There are two main trends in the development of register-based censuses in Norway. The first one is that censuses have been used quite extensively in establishing registers. The legal base for data collected by statistics Norway is the Statistics Act. However, according to this act, data collected for statistical purposes cannot be used for administrative purposes. In order to transfer data from censuses to administrative registers it has been necessary to use the legal bases for the administrative registers involved, in addition to the Statistics Act.

15. The second trend is the step-by-step development. In the first steps subject matter statistics are tested and published in different areas. Register-based variables are introduced in the census as soon as the quality is considered sufficient. The time elapsing from administrative registers have been established till the data are satisfying for census purposes have varied from one subject matter to another. When statistics has been developed for all areas relevant for censuses, a totally register-based census can be conducted. This process generally takes a number of years, but there are differences between countries. In all Nordic countries a CPR was established in the period 1964 to 1969. However, Denmark was the first country in the world to conduct a totally register-based census in 1981 and Finland followed in 1990. Norway and Sweden are planning for their first register-based censuses in 2010. The main difference between the countries is that

Denmark and Finland had dwelling registers in 1980, while in Norway a dwelling register was established in 2001.

IV. PRECONDITIONS FOR DEVELOPING REGISTER-BASED STATISTICS

A. Legal basis

16. Legislation provides a key foundation for the use of administrative data sources for statistical purposes. The Statistics Act (1989) allows Statistics Norway to use existing administrative data sources rather than re-collect data for producing statistics. The NSO is given the right to access administrative data on unit level and to link them for statistical purposes. Furthermore, the Statistics Act together with the Act on Processing of Personal Data provides detailed definitions of data protection.

B. Public approval

17. It is very important that the general public appreciates and understands the benefits of using register sources for statistical purposes. In Norway most people believe that the statistical use of register data is rational and they also have strong faith to the SN. An open discussion and debate, explaining the rationale and benefits of register use has always been considered a key principle. Cost efficiency, a reduced response burden on the population and the avoidance of overlap in data collection seem to be good arguments for the statistical use of existing administrative data.

C. Unified identification code systems

18. One major factor that facilitates the statistical use of administrative data is the application of unified identification code systems across different sources. In Norway unified personal identity codes (personal identification numbers) are currently present in nearly all registers used in production of statistics. Similarly, almost equally unified identification systems are in use for other basic registers like the business register and the registers on addresses, buildings and dwellings. It may be possible to link different registers even without unified identification codes, but this is clearly more laborious and time consuming.

D. Comprehensive and reliable register systems developed for administrative needs

19. The compilation of administrative data registers has been closely tied up with the development of social security, taxation systems and other administrative needs. These are mostly systems ruled by the state, and therefore it has been necessary to establish registers on a state level. Very often the purposes of the administrative systems are connected, and therefore register information is exchanged between the institutions. Such processes give useful corrections to administrative registers. Since administrative registers are the basis for many individual rights and duties, it is in the interest for the individual to make sure that all data within administrative registers are accurate. Good data quality for administrative uses is of course very important also for statistical use, even if administrative quality not automatically implies statistical quality.

E. Cooperation among administrative authorities

20. Developing a register-based statistical system requires close collaboration among relevant authorities. According to the Statistics Act, Statistics Norway must be informed, and even has the right to negotiate with the administrative authorities whenever a register system is established or restructured. When administrative registers have been established, Statistics Norway has played an active part in initiating and organizing the process. The Norwegian experience is that the NSO should be active in giving support to administrative registers: technical support (reporting quality problems) as well as political support (call for resources needed).

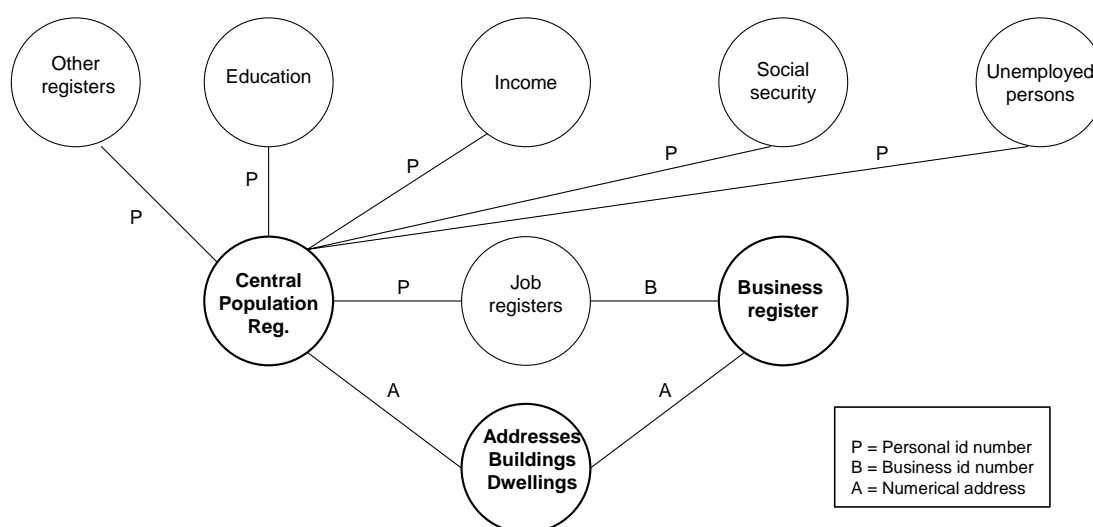
V. THE CENSUS AS A PART OF THE REGISTER-BASED STATISTICAL SYSTEM

21. In Norway a number of statistical registers have been created by processing data from an even larger number of administrative registers. A major objective has been to integrate these statistical registers into one system. Such a strategy has implication for all stages in statistical production: data collection, data processing, quality control and dissemination.

22. One statistical register may be used as a source in different subject matter statistics. For instance, demographic variables are produced in the statistical population register and are used in all kinds of social statistics. Population and housing censuses are an integrated part of this system of register-based information. The same statistical registers are used as sources for censuses and for subject matter statistics.

23. Data for future censuses will be collected from a register-based statistical system that is built around three base registers: The Central Population Register, the Business Register and the Register on Addresses, Buildings and Dwellings (GAB-register).

Data sources for future Population and Housing Censuses in Norway



24. All statistical units relevant for a census are linked to one another by means of the identification numbers. Persons, families and households in the population register are linked to dwellings and buildings by the residential address. Through job registers employed persons are linked to their place of work in the business register.

25. In addition to the information contained in the population register, a number of other registers are used in the census: registers on employment (job registers) and unemployment, education, income (taxation registers), social security, and some others (for instance on car ownership). In total some 30 major administrative registers are used and in addition a number of minor registers.

26. Even though the census is based on data from registers, most census variables are not directly available from administrative sources. It is necessary for Statistics Norway to combine data from different administrative registers, and data are further processed to obtain the variables required for censuses. For instance, to construct the variable employed persons, data from 11 different registers are used. This is partly because no single register covers all kinds of employment, partly because it is necessary to combine several sources to obtain sufficient data quality and coverage.

VI. CHANGING ROLE OF THE CENSUS - THE CITIZENS' POINT OF VIEW

27. The policy of Statistics Norway is to use data collected by other authorities as much as possible and not to ask the public to give information for statistical purposes unless absolutely necessary. Changing from traditional to register-based censuses will of course reduce the response burden on persons and households substantially. Furthermore, data security is improved because of reduction in the number of persons handling the data (for instance no enumerators).

28. Will the citizens miss the traditional census as some kind of "national event"? When censuses have been conducted people have after all been quite motivated and eager to participate. In the 2001 Census the response rate was 97 per cent. In the 1990 Census, when the questionnaire was sent to a sample of the population only, a number of persons complained about not having received a census form. However, when there will no longer be a visible census operation every tenth year, there is not much evidence that the citizens of Norway will really miss their census forms.

VII. CHANGING ROLE OF THE CENSUS - THE PRODUCERS POINT OF VIEW

29. A traditional census is a huge operation. A lot of resources are needed for designing and testing questionnaires, collecting and processing data and for public information. When using register-based data, census costs are considerably reduced. This is not to say that register-based statistics are "free of charge". To transform administrative data into statistical data involves quite a lot of work. However, since different subject matter statistics as well as census statistics are based on the same data, the additional costs of producing a register-based census are not very high.

30. The introduction of register-based censuses also has a strong impact of the way of working in the NSO. There is no longer a need to recruit and train a large number of people for the census operations every tenth year. The processing of register data is carried out continuously and is an integrated part of the statistics production. The skills of the staff involved have been changing. Collaboration with register-keepers (authorities), editing and processing register-based data is quite different from conducting traditional census operations. In general a growing part of the staff is involved in producing and analysing statistics, resulting in a rising qualification level of the staff.

31. In a register-based data system standardising of data as well as metadata is very important. Populations, definitions of variables and classifications must be harmonised. In Statistics Norway a project on population management has been established to harmonise data from the base registers (Central Population Register, business register and register on addresses, buildings and dwellings). Further, an integrated system for metadata is being developed, comprising databases on definitions and standards.

32. In order to establish an effective system for producing register-based statistics, there may be a need for organisational as well as cultural changes within the NSO. The organisation should support extensive cooperation between those units responsible for different parts of the register system. In Statistics Norway cooperation over organisational boundaries has been handled by establishing several comprehensive projects dealing with data collection and processing and by developing tools (for instance handbooks) common to the whole organisation.

VIII. CHANGING ROLE OF THE CENSUS - THE USERS' POINT OF VIEW

33. One very important question is of course: What are the changes as seen from the users' point of view? And what are the users' opinions on these changes?

34. Censuses must provide national users with the statistics they need. In addition, Norwegian censuses must be able to provide the international statistical community with comparable census statistics for Norway.

A. National users

35. Since censuses in Norway have been partly register-based since 1970, we do have quite a lot of information on the users' opinion. In planning and evaluation of censuses, advisory groups and users' meetings have been organised to collect information on users' needs.

B. Advantages

36. One advantage of a register-based approach is that census statistics and annual statistics are using the same data sources, and therefore are directly comparable. Or to put it another way: Census type of statistics can be produced currently, for most variables annually. This has been considered as a major advantage by many users.

37. Register-based data offer information on the entire population at regular intervals (annually or in some cases even monthly or quarterly). This means that register-based data is very suitable for producing statistics on small groups annually and not only every tenth year as with traditional censuses. The main users of census statistics in Norway are local and central planners, and their requests are often for small area statistics and statistics for other sub-groups.

38. Furthermore, there is a potential for developing new types of statistics. In flow statistics, data on the same individual is chained together for consecutive time periods (longitudinal data). This makes it possible to follow statistical units, for instance persons, over time. One example is statistics describing the transition from education to working life.

39. Longitudinal data is also very useful for research purposes. Several registers, for example the population register, comprise dates of changes and events. In this way it is possible to estimate the precise dates of transitions or the duration of statuses and activities. In Norway, as in the other Nordic countries, register-based micro data is available for researchers on certain conditions.

C. Disadvantages

40. In a register-based census only variables that are included in registers or could be derived from register variables, are available. In Norway all core topics will probably be included, but some non-core topics will not be covered by the registers available, for instance ethnic group, language, religion, journey to work, and type of energy used for heating. Variables on journey to work (for instance mode of transportation) were included in the censuses up till 1990, but not in the 2001 Census. Even if statistics on a national level is available from sample surveys, the users are complaining about the lack of local data in this field.

41. Additionally, some restrictions are imposed on the definitions of units and variables. In a register-based census a private household is defined as all persons living in the same dwelling (dwelling household). Housekeeping units (persons living in the same dwelling with joint board) cannot be included. The population is normally counted according to legal place of residence (according to the population register) and not de facto place of residence.⁴ For some users, housekeeping units based on de facto place of residence would be more appropriate for their analyses.

42. When census data are collected from registers, the census is no longer a collection tool for ad hoc needs. In many countries the population census is an important tool for data collection that is used to meet emerging information needs. This flexibility is lost when data are no longer collected by means of questionnaires.

43. It may be concluded that register-based censuses can comply with most users' needs, but that a few non-core topics, traditionally regarded as part of Norwegian censuses, are not available. In such cases data collected by sample surveys is a valuable supplement.

D. International users

44. Regardless of methods used for data collection, all countries have an obligation to produce census statistics according to international recommendations. Register-base censuses comply with all essential features of population and housing censuses: individual enumeration, simultaneity, universality, small area data and defined periodicity.

45. For the 2010 Census, register data in Norway are expected to have a sufficient quality and coverage to include all core topics, even if it may not be possible to specify all details for all variables (for instance there exists very little information on persons living in non-conventional dwellings).

46. The fact that not all countries are no longer conducting traditional censuses must be taken into account when preparing international recommendations for future censuses. Definitions of units and variables should be discussed under the consideration that data are not always collected from census forms. Countries using register-based data and other alternative methods should play an active part in this work.

IX. HOW VISIBLE SHOULD FUTURE CENSUSES IN NORWAY BE?

47. When a NSO spends a lot of money on a traditional census, the office will clearly like to demonstrate to the public that the investments are giving a good return. It is then quite obvious that the output will be disseminated as census products. However, in the future most census type of statistics in Norway will be produced annually as a part of different subject matter statistics: demography, families and households, education, labour market, income and housing. In this situation, to what degree is there a need to label this statistics as "census products" every tenth year? How visible should future censuses in Norway be? These are questions that are being discussed in Statistics Norway as part of the planning for future censuses.

48. In our planning we will draw on experiences from other Nordic countries that already are conducting register-based censuses: Denmark and Finland. From an international point of view it is quite clear that these countries are producing census statistics. From a national point of view the conclusion is less obvious. In the Danish statistical system there is no products known as census statistics. In Finland register-based census statistics has been disseminated every fifth year including some extra variables and tabulations compared to the annual statistics. By now, however, all variables are produced annually and no "census statistics" is published for 2005.

49. In Statistics Norway a project on census statistics is established and will according to the plans be running till the next 2010 Census. The objectives are to prepare for the next census round as well as for annual "census statistics". What will be characteristic of census statistics compared to subject matter statistics? Clearly, census statistics shall present more detailed statistics for small areas. Furthermore, censuses will be a tool for integration of statistics from different sources.

50. It is most likely that the 2010 Census will be visible, at least to some extent. There may be a need for some additional data collection, for instance on education completed abroad. Some extended quality studies may be carried out. And statistics with a "census label" will probably be

disseminated. In the long run, however, the assumption is that improvements achieved will be integrated in the annual statistics and that censuses consequently will become less visible at a national level. At an international level Norwegian censuses are aiming at being quite visible, both in a preparatory phase and by disseminating census information suitable for international comparisons.

X. SUMMARY

51. In the introduction of this paper, questions were asked about preconditions for register-based censuses, advantages and disadvantages related to such a solutions and the role of censuses in a register-based system. In this section we will give a summary of the answers to these questions.

A. Preconditions for producing register-based censuses

52. Since register-based censuses are an integrated part of the register-based statistical system, the preconditions are the same as for developing register-based statistics in general:

- (a) Legal base
- (b) Public approval
- (c) Unified identification code systems
- (d) Comprehensive and reliable register systems developed for administrative needs
- (e) Cooperation among administrative authorities

53. Register-based censuses - advantages

- (a) Reduces cost
- (b) Reduced response burden
- (c) Census data available annually
- (d) Longitudinal data available for statistics and research purposes

54. Register-based censuses - disadvantages

- (a) Only variables included in or derived from registers can be included
- (b) Some restrictions on definitions of units and variables
- (c) The census is no longer a collection tool for ad hoc needs

55. Role of censuses

- (a) Over the last years Norwegian censuses have played an important role in establishing administrative registers. The use of register data in censuses has increased gradually over the same period.

56. The 2010 Census will be the first one to be totally register-based. The role of the ongoing census project in Statistics Norway is to prepare for the next census as well as for annual census statistics. The Census will be used as a tool for integration, and may also be used for some additional data collection for selected variables.

57. There is not yet a final decision on the role of future censuses in Norway. The assumption is however, that the census concept will be used mainly on an international level. What is today known as census statistics on a national level will probably become more and more integrated in the annual subject matter statistics.

² By "2010 Census" we mean the next census round. The census will probably be conducted in 2010 or 2011.

³ The report is being prepared by a working group with members from the NSOs in Denmark, Finland, Norway and Sweden and will be published by UNECE.

⁴ A project has recently started in Statistics Norway with the objective to produce data on de facto residence for some groups, mainly students and persons resident in homes for elderly.

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