# Population censuses and surveys[1]

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[1] The text is presented without formal editing.

# Population censuses and surveys
## (as complementary sources of a vital statistics system)

## Introduction

1.      The demand for the development of the vital statistics system can be influenced by several circumstances, possibilities and the change of these factors, for instance:

- change in the legal regulations concerning the system of vital statistics
- change in technical, IT circumstances
- the new requirements of political, social, local decision makers
- the change of international data production demands
- the expectations of users, researchers and professional stakeholders
- demands due to changes in social and demographic processes.

2.      The changes and demands mentioned above can concern certain parts or the entire vital statistics system. These factors motivate and inspire the Hungarian developments too. Concerning Hungary, the Hungarian vital statistics system collects data comprehensively on births, marriages, registered cohabiting partnerships and their break up, divorces, deaths including foetal deaths and internal migration flows. The Act on Statistics and the decree on its implementation regulate the topic and content of the data collection defining the rights and liabilities of the data collection participants including the tasks of the registrars. Thus the currently operating system guarantees the comprehensive data collection, data processing, the calculation of the related indicators as well as data protection and dissemination.

3.      All of these are emphasized since in the chapter „Population censuses and surveys" chosen for the topic of this paper we primarily deal with the issues: possibilities for collecting new vital statistics data and calculating new indicators based on census data, for what purpose and how these new information can be used. The issue of how sample surveys can complement vital statistics is also profoundly analysed as well as the question of what new fields are studied by researchers due to actual demographic trends.

4.      This means that the use of indirect techniques for imputation of incomplete vital statistics data and the estimation of indicators based on census data and sample surveys are not the topic of this paper. These methods are introduced profoundly and professionally in chapter VI. of Principles and Recommendation for a Vital Statistical System, Revision 2. The recommendations and methods included in this chapter are still relevant and correct to our mind. It is clear that the task of United Nations is to elaborate international standards and recommendations, however it is not possible to ignore the Hungarian and the Central European circumstances and experiences. On one hand the issues, methods and topics introduced in this paper are more or less known but did not appear between the former recommendations, on the other hand there are ideas and notions which are not elaborated in some details, still they might be able to use during the revision.

## I. Vital statistics data and indicators based on census data

**Analysing vital statistics by socio-economic status (SES)**

5.        The censuses performed in every decade offer a special opportunity to collect demographic data and calculate indicators, which are not at the disposal or not available for the years between the censuses. Among these the most important are the information on social-economic status (SES), which are included both in census and in vital statistics questionnaires. Besides the general trends of fertility and mortality the change in social differences is an important social, family and healthcare policy issue. The comprehensive analysis is possible in the years of censuses, since census population can be used as a denominator for the calculation of indicators. In those countries where census and vital statistics data can be linked by a unique identification number such calculations can be performed directly. Where this is not possible – Hungary e.g. – the denominator (population at risk) for the calculation of indicators are provided by the census reference time (giving the mid-year population), and the nominator is the births and deaths data around the census years (as an average of two or four years). The two main SES information refer to the education and the occupation. If age-specific birth and death data are at the disposal total fertility rates, reproduction rates and mortality tables can be calculated by social groups. The classifications on education or occupation must be based on the same standards (ISCED, ISCO) or if this is not the case groupings with similar content both in the numerator and in the denominator must be performed in order to avoid the problem of numerator-denominator bias. Using international standards supports the international comparison of data and results too.

6.        In the late 2000s Eurostat started a working programme to be able to calculate mortality tables by education for the member states to the time of censuses around 2011. During the project first the demand for data, the possible data sources and the issue of the completeness and quality of data were examined and later considering these factors methodological solutions were elaborated for producing mortality tables by SES. The use of the large-sample data of Labour Force Survey (LFS) can also serve as an alternative for the regular calculation of these indicators, with which the composition of the population by education can be estimated for the years between censuses.

7.        The Hungarian census questionnaire attempts to reveal the health situation of the population on a voluntary response basis. Questions refer to e.g. chronic diseases and disabilities and their data of appearance. These questions offer the possibility to calculate the health adjusted life expectancy (HALE) indicator for the entire population, which is usually gained from sample surveys. Since for the years around censuses mortality tables can be calculated by SES, also HALE indicators can be produced by SES.

**Analysis of fertility on the grounds of census data**

8.        Hungarian censuses traditionally contain the questions on the total number of live births. Not only the number of live born children but their date of birth are asked too. According to the practice the date of birth of the first five children and the last child are recorded. Since at the permanently low Hungarian fertility level only less than 1 per cent of the mothers have more than 6 children in the time of the completed fertility, thus information can be obtained on the date of birth of the vast majority of children. These data offer the possibility for the examination of fertility level and differences by all demographic variables

which are involved in the census questionnaire. Among others number of children of the different cohorts born till the time of the census can be analysed by SES to reveal the differences. The results can be compared with the similar fertility data of former censuses, if the classification by education and occupation are followed by the same policy. If besides the date of birth the sex of the child is also recorded, the connection between the sex preferences and the level of fertility is also can be analysed based on census data.

9.      The lifetime fertility data of censuses yield the possibility to reveal fertility differences by legal (de jure) and actual (de facto) marital status. For the years between censuses the population above 15 years of age is projected by legal marital status (married, never married, widowed, divorced). However this can be considerably different from actual cohabiting forms especially at the never married group, from which a growing rate lives in cohabitation partnerships among young people. On the formation and the dissolution of cohabitation partnerships there are no regular and comprehensive data at the disposal just results of representative surveys. Since an increasing rate of the female population at reproductive age is legally never married, but actually lives in cohabitation partnerships, there is no reliable information on the fertility differences of the partnership statuses. The 2011 census in Hungary collects data both on the date of wedding at married people and on the starting date at cohabitation partnerships. Since there are no questions for partnership histories, fertility differences refer only to partnership statuses at the time of the census.

10.     In the Hungarian vital statistics questionnaires there are no questions for ethnicity or nationality due to data protection reasons. During the census these information are collected on a voluntary basis. So in Hungary to reveal and analyse the differences of fertility by ethnicity only census data can be used.

11.     Since the 2011 census in Hungary collects data on the number of live born children and their data of birth not only from women, but also from men, this offers a special opportunity to analyse male fertility. This is not possible in the case of annual live birth statistics, since at a growing rate of extramarital born children there are no data on the fathers. Age specific male fertility can be estimated based on the census data and theoretically male reproductions rates can also be calculated. It is important if there is remarkable difference between male and female mortality and life expectancy at different ages.

**Projection of the female population by the number of children between two censuses**

12.     According to the present situation of the Hungarian vital statistics system there are information on the total number of live born children regarding both live births and deaths. From the female census population by year of birth, age and number of children it is possible to project female population, since tables with similar content can be prepared from the data of annual live birth and death statistics. The projection is carried out by the birth order of live births, in case of multiple deliveries, each child has to be taken into account separately according to the order of live birth. Thus for example the first born children in a certain year decrease the number of childless women and increase the number of women with one child among female population at the appropriate age (birth cohort). Deaths reduce the number of women at an appropriate age and number of children. Since there are no information on international migration at a similar disaggregation, thus in this case it is assumed that the composition of the mobile female population by age and number of children is similar to the immobile (native) female population in the country. Every year a new young generation reaches the reproductive age, who did not have live births before and an other older

generation leaves the reproductive age, who can not have children any more due to their years of age.

13.     There are data on the female population by year of birth, age and number of children for the 1 January of the years between two censuses by means of population projection. These are only estimated results, which have response, quality and completeness errors especially due to deaths and migration. The main purpose is the analysis of the fertility situation and childbearing behaviour by birth cohort of women at fertile ages. Since at this stage of life the number and rate of deaths is relatively low and there is no considerable international migration in Hungary, thus the errors mentioned above are lower than at the older female population who are beyond the reproductive age.

## Information on migration from censuses

14.     The present version of the Principles and Recommendations did not include international migration into the vital statistics issues under discussion, since data collection is not carried out through the civil registration system. However paralell with the growing importance of international migration there is an increasing demand for the elaboration of a standardised data collection, data process and dissemination system which can register the intensity and direction of migration precisely enough. The fertility and mortality differences between the immigrating and the native population and how these differences contribute to the fertility and mortality of the whole country can also be an important aspect of vital statistics. This question can be fundamental in those countries where the proportion of immigrants reaches or exceeds 8-10 per cent.

15.     The Hungarian census yields the possibility to obtain a more precise picture on long-term foreign residents in Hungary, and Hungarians residing permanently in a foreign country. Due to the free movement of persons between the EU countries and the omission of registration liability the accuracy of migration data should be improved. One of the solutions for the situation is the elaboration of a standardised mirror statistics system for migration.

16.     The role of mirror statistics is important indeed not only at international migration, but in the whole vital statistics system. To provide fully comprehensive data collections on births and deaths, the births and deaths in foreign countries of people permanently resident in a certain country must be registered too.

## Handling of the difference between census and projected population

17.     The projected population numbers between two censuses are mainly based on estimations particularly due to the incompleteness and inaccuracy of information on international migration and can more or less deviate from census populations. Census results constitute official data on the number and composition of population. These are the basis of the subsequent population projections, provide the population basis for sample surveys and determine the values of those indicators in which population number serves as a denominator. There is no standard practice whether it is worth to revise population numbers and indicators retrospectively and when to do this, if the census and projected population deviates. The main issue is the amount of deviation and how does it modify the previously calculated and disseminated indicators. There are no international standards for the limit of acceptable deviation and the methods for revision. The issue is actual because the 2010 census round which was already executed or planned in several countries presently. The current practices,

the theoretical and methodological aspects of the revision, the advantages and drawbacks should be examined and methodological recommendations should be elaborated for the sake of practical execution. An advantage of the revision is that there is no break at the time series of indicators in the years of censuses, still a regardable problem is that there are two population data and indicators at the disposal for the same year, which can be confusing for users. Furthermore the revision needs considerable human, technical and financial resources depending on the disaggregation level of the revised data.

## II. Sample surveys as complementary information for vital statistics

18.     The social-demographic situation of a country, a region or a continent, the data-need of decision makers and researchers highly determine those issues and questions, which we would like to analyse with sample surveys and to use as complementary information for the regular vital statistics data. A couple of them are introduced here in order to draw the users' and editors' of „Principles and Recommendation for a Vital Statistical System, Revision 2" attentions during the revision work.

### Healthy life expectancy (HLE)

19.     The increase of life expectancy in the case of developing countries is possible through the improvement of infant and childhood mortality, while in developed countries the main aim could be the decrease of mortality level at older ages. Still, the expansion of life expectancy must not be the goal in itself, the main question is that the gained extra years are lived on what health level and quality. A combined indicator was developed in order to measure mortality conditions and the health status of the population simultaneously with the time spent in good health conditions. From these indicators the "health adjusted life expectancy" (HALE) is the most common. This is an estimate of the number of healthy years (free from disability or disease) that a person born in a particular year can expect to live based on current trends in deaths and disease patterns. The average number of years spent in unhealthy states is subtracted from the overall life expectancy, taking into account the relative severity of such states.

20.     The information used for the calculation of HLE or HALE indicators are gained partly from mortality tables and partly from the questions concerning health status of different representative surveys. For example Eurostat obtains health information for the calculation of HLY (Healthy Life Year) from the Statistics on Income and Living Conditions (EU-SILC) survey. Besides the apparent advantages these analysis have a considerable drawback. Namely they are so called subjective (soft) indicators, since the questions on the respondents' health status are answered by self-assessment. Thus during the comparison by time, geographical region and national practices it is a major aspect that the content and form of questions must remain unchanged and different countries use the same questions. The problem of interpretation is also essential, the same questions can have different meanings among population with different culture and health status. For the sake of comparability the calculation methodology of the indicators must be the same too. If these conditions are not realized, than the results must handle circumspectly.

**Unmet need for contraception**

21.      The issue was originally elaborated for developing countries to examine to what extent the lack of knowledge or unavailability concerning contraceptive methods cause undesired pregnancies and thus hinder the fulfilment of family plans. As a result of undesired pregnancies in developing countries usually more children are born than it was planned by the parents or where it is allowed it increases the number of induced abortions. In developed countries especially undesired pregnancies due to the lack of knowledge and use of modern contraceptive methods and their outcome are examined. In these cases not only the number of planned children but their timing is asked. As a result of the analyses different family planning and educational programmes can be started to introduce modern contraceptive methods and their use.

22.      Besides their inevitable usefulness, these surveys raise several problems. Since these questions concern the private sphere, they are „sensitive" questions, so the chance of „deliberate forgetting", non-response or reticence is considerably high. In addition to this, the resource need of these surveys is high indeed, since for the expected results a large sample is necessary and the training of interviewers requires a long time. It has to take into consideration that in those countries where modern contraceptive methods are available, but due to their high price young people or certain poorer social groups cannot afford the regular use of them, the results of these surveys not necessarily reveal the problem of „unmet need for contraception".

23.      In Hungary modern contraceptive methods are available, still the longitudinal survey among married women shows that at two third of undesired pregnancies ending in induced abortions couples did not use contraception. It is also notable that 60 percent of induced abortions are a result of „timing mistake", i.e. conception occurred not at the expected time. Annual induced abortion statistics show similar features. In these cases undesired pregnancy and induced abortion are the result of inadvertence, improper or irregular contraceptive practices. In those countries where induced abortions are legal and there is comprehensive data collection on abortions the most practical method to estimate the rate of undesired pregnancies and the prevalence of the problem is the indicator of induced abortions per hundred live births.

**Voluntary and involuntary childlessness**

24.      In several countries of the world and in almost all countries of Europe fertility is below the replacement level. According to 2010 data Hungary with its total fertility rate (TFR) of 1,26 entered again into the category of countries with „lowest low" fertility. In countries with low fertility the proportion of childless women at fertile ages grows dynamically. A demographic explanation for this is the ascendant trend of the age of childbearing and marriage. In the past decades the most common childbearing age of women altered from their 20s to 30s, however the ratio of women having a child above 40 in the „latest late" age is also growing. In certain European countries the proportion of childless women at the age of completed fertility is between 20 and 30 percent. According to Hungarian data 27 percent of women born in 1980 would be childless, if they have their first children from the age of 30 like women over 30 actually did in 2009. For comparison 8 percent of women born in 1960 were childless at the age of 49.

25.     Basically there are two reasons for the growing rate of childlessness. Some people do not want to have a child voluntarily, on purpose, while others have health, biological problems or postponed the childbearing for too long and are unable to have a child. Fecundity by women over 35 declines firmly. However these childbearing intentions can change during different stages of life. Those people who planned to have children later can deliberately become childless and reversely, those who wanted to live their life without children might change their mind. On the rates, reasons and the temporal changes of its dynamics of voluntary and involuntary childlessness only representative surveys can provide information. For the follow-up of the change in opinions the relatively expensive longitudinal survey is the most appropriate.

26.     The social effects and demographic consequences of the two types of childlessness can be partly different. As an effect of the extension of voluntary childlessness it can become a socially accepted norm, which can have serious demographic outcome on the composition of population by age and can support the realization of „Low Fertility Trap" hypothesis [2](Lutz, Skirbekk at al. 2006). The demographic consequences of involuntary childlessness are similar, but in this case the risk factors of late childbearing can be stressed. It is also important to emphasize that despite modern artificial insemination methods childbearing cannot postponed beyond a certain age. The possibilities are also different for political decision makers. While in the case of voluntary childlessness family politics are more or less incapable, the proportion of involuntary childlessness can be decreased, partly by encouraging childbearing at younger ages or by supporting artificial insemination.

**Childbearing intention and realization**

27.     In countries where modern contraceptive methods are widely available couples have the opportunity to have as many children and at that time as they want. This is called conscious family planning. Obtaining information on the number of planned children is especially important in countries with low fertility from the aspect of demography and family policy. They can provide an overview on the differences between intended family size and the actual fertility behaviour. If the actual fertility behaviour lags permanently and considerably behind childbearing intentions, than this means that families wanted to have more children than they actually realized. "The gap between intended and realized fertility is often conceptualized as representing an unmet need for children. However, it would be wrong to represent the entire gap between the expected and achieved fertility as arising from an unmet need for children. People do change their expectation, and constrains do matter; but other things matter too. Some people decide to have fewer children than they originally wanted and some decide to have more."[3] The goal of sample surveys is to reveal the possibly reasons of changing in family planning, while it is the task of family-policy to solve those issues which hinder the realization of intended family size.

28.     The need for a careful and evidence-based research on family intention and fertility behaviour motivated the launching of REPRO project (Reproductive decision-making in a macro-micro perspective). The project placed emphasis on studying fertility decision at an individual level, but it also aimed at integrating different levels of analysis, which are important for understanding fertility behaviour. The summary document which reviews the

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[2] Once fertility falls below a certain level and stays there for a while it can imply a self-reinforcing demographic regime change that is difficult or impossible to reverse.
[3] European Demographic Research Papers 2011 No. 1. Reproductive Decision-Making in a Macro-Micro Perspective (REPRO) Synthesis and Policy Implication, prepared by Tomás Sobotka

major finding and achievements and summarises policy-relevant findings of the REPRO was recently published.