

Population Directorate
Population Census Unit

Vienna, April 2002

The 2001 Combined Census in Austria

1 Principles

1.1 Scope of the census

On 15 May 2001, a **population** census (PC), a building and **housing** census (BHC) as well as a census of local units of **employment** (LUE) were carried out at the same census day. The harmonised conduct of these three surveys, which are based on different legal provisions, is called “**combined census**”.

This 2001 Combined Census covers about 2.0 million buildings, 3.8 million dwellings, 3.3 million households containing 8.1 million persons, and 0.4 million non-agricultural local units of employment.

As the previous census, the 2001 Combined Census was performed by using paper questionnaires. Additionally, information from internal and external – existing and accessible – **registers** and administrative sources was extracted as far as it was possible from a technical and organisational point of view.

1.2 Census day

Census day was **May 15th 2001** (in accordance with EU guidelines).

1.3 Responsible institution

As the executive body of the Federal Ministry of the Interior and of the Federal Ministry for Economic Affairs, **Statistics Austria** is responsible for the preparation and the processing of the 2001 Combined Census.

The enumeration was carried out by the local authorities (communes) operating as the executive bodies of the Federal Government.

2 Preparation of the census

2.1 Which topics should be collected and tabulated?

The topics to be collected, the design of the questionnaires, the variables derived, the classifications and definitions, and the programme of dissemination were discussed in certain **advisory bodies** (AB for demographic affairs; AB for social affairs; AB for statistics on production of goods and services) and their working groups. These bodies consist of the delegates of ministries, of the governments of the Länder, of the boards of commercial and trade unions, of the union of towns and villages as well as of additional experts in the areas of research and education.

2.2 Survey of user needs

At the beginning of the consultations for the next census, in autumn 1996 a survey was carried out of 400 users of statistical data. The survey referred to the use of the results of the past census and to the needs concerning the future census with an emphasis on optimising the utilisation of data. There seemed to be no need for a further extension of the catalogue of questions, but we noticed a remarkable demand for statistical data broken down to the smallest regional units. The results of this survey were considered at the consultations mentioned above.

2.3 Technical and methodological tools

The methodological, organisational and technical aspects of the 2001 Census were worked out in internal workshops of Statistics Austria considering international know-how.

2.4 International co-operation

The preparation of the content as well as of methodological aspects was performed in the international context. Delegates of the STATISTICS AUSTRIA took part in international meetings where the **international recommendations** (in particular of the ECE and EU) were developed and the most recent technical and methodological developments were discussed. In bilateral workshops experts exchanged their **experiences**.

3 Place of residence (updating the local population registers)

3.1 Checking the local population registers

To reach a high quality in the population registration system which should be the base for population censuses after 2001, the local population registers had to be checked and updated in a nation-wide operation. This was done together with the census operation. Thus, a procedure parallel to the census was planned aiming to reach the same type of residence in population census and in the registration system.

This procedure was performed by the enumerator comparing the answers concerning the place of residence in the census forms with the registration shown in a list from the population register. Differences were entered into the list (either including new persons or deleting persons or changing the type of residence information for the population register) by the enumerator.

When a correction of the register was necessary the persons concerned were asked to update their registration at the local register office.

3.2 Declaration of residence

People with secondary residences and people whose type of residence was not clear had to fill in an additional form, the so-called declaration-of-residence form. But it was up to the commune to decide on whether such a form had to be filled in or not.

With the help of this form the mayor was able to check if the official registration (for example "secondary residence") and the actual situation of a person in life coincide. In cases of doubt the mayor is entitled to claim the person as being a main resident of the commune (§17 Registration

Law), a procedure which is decided by the provincial governor (Landeshauptmann) or by the Minister of the Interior.

The declaration-of-residence form and the procedures of checking and updating the local population registers are regulated by the Registration Law.

4 Preparing the enumeration stage

4.1 Pilot tests

In April 1998 and 1999 pilot tests were carried out in about 20 communes with an area of about 300 households each, to test the questionnaires, the enumeration procedure in the communes, and several steps of the processing stage.

In May 2000 a "dress rehearsal" of about half the range of a pilot test was carried out to get final test material for the processing programmes.

4.2 Public relations

The following three main "target groups" needed to be treated with special attention:

The contacts to the **local authorities** were intensified by

- information letters delivered by Statistics Austria,
- discussing the topic "combined census" on the occasion of the biennial meetings of the statisticians of communes, towns and cities,
- meetings in the capitals of the districts several weeks before census day to inform the officials who were responsible for the enumeration process in their commune.

A big interest of the **media** was expected. In February 2001 a special seminar for journalists was organised. There were two press conferences (25 April and 11 May 2001) as well as numerous interviews on TV, the radio, and the print media. This time, the representatives of the media were more interested in details of the census than in a justification of the action.

The **local** authorities were encouraged to do public relations by themselves, information material was provided to them. Particular advertising campaigns were not planned by Statistics Austria; the Vienna city government, however, published an

information booklet and sent it out to all Viennese households.

Finally, a website (www.volkszaehlung.at) was set up in mid-February 2001 to inform the respondents on the imminent enumeration. Requests could be addressed to a special e-mail address (volkszaehlung@statistik.gv.at).

The website proved an important information medium. Only in the month of May it was visited more than 30 000 times, and 140 000 pages were viewed.

From the beginning of May until mid-June, the so-called citizens' hotline was open to the public at local rate. About 6 600 callers availed themselves of this institution. The onrush, however, was significantly less violent compared to ten years before, when more than three times as many calls had to be attended to. Main reasons for the lower interest were the circumstance that the telephone number was not printed on to the enumeration forms as well as the hushed debate compared to 1991. Moreover, a number of local authorities, among them Vienna, had installed a hotline.

4.3 Printing of the questionnaires

Two different types of census forms were used, i.e., machine-readable and non-machine-readable questionnaires.

The following machine-readable forms were used:

- building form (A4)
- housing unit form (A4)
- person form (A3 perforated)
- local unit of employment form (A3 perforated)

Non-machine-readable questionnaires:

- census list for a household (A3)
- envelope for an institutional household (A3)
- census list for an institutional household (A3)
- object envelope (A3)

The address and address codes taken from the address register kept by Statistics Austria were **pre-printed** on to the object envelopes and building forms.

Printing offices organised the physical transport of the enumeration material to communes with 5,000 and more inhabitants and to the authorities of the administrative districts which had to carry out the transport to the smaller communes by themselves.

4.4 Instructions for the enumeration staff

The **manual for the enumeration manager** contained instructions to all the steps of the enumeration process as it took place in the communes. The **guidebook for the enumerator** contained facts worth knowing about the census.

5 EDP Application for the communes (GSG²⁰⁰¹)

To support the enumeration the communes were provided with a special EDP programme (**Ge-meindefsoftware Grosszählung 2001**, shortened GSG²⁰⁰¹). The software was installed on the mainframe of a public sector EDP provider. It could be accessed by the communes through the internet or the public sector intranet.

GSG²⁰⁰¹ contained all addresses of a commune. The users had to add addresses, modify or delete them if necessary. All modifications were taken over by the address register at Statistics Austria. Users could group or sort addresses, for example to enumeration areas.

To support the procedure of checking the **local population register** person data sets were loaded into GSG²⁰⁰¹ and attributed to a building (address register of Statistics Austria) and, by means of a housing unit number or by a housing unit separator, to a housing unit. Another tool of GSG²⁰⁰¹ was the printing-out of lists of registered persons which were supplied to the enumerators. Furthermore, there was a tool to control the **completeness** of the returned forms and to list the differences between registration and the results of the enumeration.

GSG²⁰⁰¹ also supported an instrument for the exchange of information between the communes and Statistics Austria.

6 Enumeration in the communes

6.1 Method of enumeration

The communes had to announce the chosen method of enumeration in public.

In small communes up to 6,000 inhabitants the enumeration was usually performed by inviting the respondents to the town hall where census clerks completed the enumeration questionnaires according to the answers of the respondents. Respondents who wished to fill in the forms by themselves could do so.

In big communes (and towns) the enumeration papers had to be distributed and collected. Usually this step was performed by enumerators, but the communes were free to use postal service as well.

The communes received remuneration for their workload from the Federal Government. The amount of the remuneration was ATS 250 mill. (€ 18 mill.) but the real costs born by the communes amounted to twice as much.

6.2 Follow-up duties of the communes

By using GSG²⁰⁰¹ the communes controlled the completeness of the census questionnaires. If individual forms were missing they were entitled to summon the respondents concerned to complete their forms.

After the control step was finished, GSG²⁰⁰¹ transmitted the preliminary results of the commune to Statistics Austria.

The enumeration papers of a building had to be ordered according to a certain sequence. The questionnaires had to be packed and forwarded to the authorities of the administrative districts, which collected them and passed them on to Statistics Austria.

7 Processing Stage

7.1 Preparation of Forms

Until the end of June, the smaller communes had to hand over the census material to the respective district authorities, which had to pass it on to Statistics Austria by July 6th. Already 10 days earlier, three Lower Austrian districts delivered their census papers. Thus, processing could start in time with the so-called preparation of forms on July 2nd.

In this working process, 120 mostly temporary members of staff prepared the census material for data capture.

The incoming enumeration papers were manually checked for completeness. Machine-readable sheets were separated from other forms and

checked for correct sequence; person forms were separated into two A4 sheets, "master sheets" and supporting sheets (e.g., substitute forms for objects without any building, forms indicating an institutional household) were inserted and the complete material was passed on to the data capture.

7.2 Sequence of Forms

The different forms for persons, dwellings, buildings and local units of employment were processed together in the following sequence: first the building form, which was followed by the form for the first dwelling of the building, which was followed by the respective person forms which again was followed by the form for the local unit, etc. The procedure of keeping up the physical link was considered to be less risky than a system of identification numbers. The regional codes which were derived from the (pre-printed) address codes on the building form were transferred automatically to the following records (dwellings, persons) during data capture.

7.3 Data Capture

The questionnaires were captured by three high-performance **scanners**, the entries of text and numbers were recognised by a **recognition** software.

7.4 Coding

The biggest part of the **coding** step was executed **automatically** by a method of splitting text entries into "bigrams" which were compared with an existing thesaurus. The value of probability to take over the corresponding code could be settled individually for each entry in the thesaurus. Text entries that could not be coded automatically were coded by 15 to 20 specialists on personal computers. Hereby the original images and the thesaurus were presented on the screen. The specialist had to search for the corresponding text in the thesaurus and confirm the choice by mouse-click. Texts which were not found in the thesaurus had to be forwarded to the supervisor who could add texts to the thesaurus if necessary.

By means of the method described above, the following text entries were coded: field of education completed, occupation, other country of birth, other citizenship, other colloquial language, other religious denomination. Except the area of occupation, coding was finished by mid-February

2002. The coding of the economic branch and of the commuting destination is done by means of another method, which will be explained in the following section.

Due to the improved resolution of the high-performance scanners and the improved recognition software the share of automatically coded cases rose to 80 or even 90 percent. On the other hand, some markers and texts of the reverse side were scanned, too, and caused absurd double markings. Therefore, additional members of staff controlled by means of personal computers double markings on whether they were intentional or not. Thanks to this measure, markings caused by pollution were deleted, too.

7.5 Classifications

For coding the **place** of residence, the place of work etc. the official Statistics Austria codes for communes are used. The coding procedure is supported by the respective ZIP code.

The statements concerning the topic "education completed" were coded according to a national classification of education which can be mapped into **ISCED 97**.

The codes of the topics "**branch of economic activity**" (**ÖNACE**) and "**commuting destination**" (the latter if possible down to the address of the workplace) will be derived from a special register of local units of employment using information on the phone number, the name and the address of the employer given by the respondents on the individual form. This register is based on the register of non-agricultural enterprises (UBR) which is completed by non-profit institutions, by the register of agricultural and forestry holdings (LFR) and by information from the census of local units of employment. Therefore, the latter census has to be processed first.

The use of the register of local units of employment enables us to obtain additional information as for example the number of employees or the legal status of a company. If respondents are stating unidentifiable local units of employment (e.g., out-commuter abroad) their entries of the branch of economic activity will directly be coded according to **ÖNACE** (at least at the 3-digit-level).

Occupational entries are provided with individual codes in order to enable both the coding by **ISCO-88(COM)** (at the 4-digit-level) and the production of other classifications.

7.6 Multi-stage processing

The need for multi-stage processing results from the fact that some processing steps depend on other preceding steps. Compared to the two-phase concept applied in former censuses, this time all answers were captured at once, but the coding process made separate steps still necessary.

In the first stage, results will be gained from the building and housing census as well as from the census of local units of employment. The first stage will also allow to gain results on demographic topics, on livelihood and education completed.

The results of the census of local units of employment are required for the coding of the branch of economic activity. In order to classify occupation economic variables like the number of employees are necessary. Thus data about occupation, industry and commuters will be obtained later.

Because of the fact that the combined analysis of data of the population census and of the building and housing census requires results in the areas of households and families these combined data can also be produced only later.

7.7 Use of registers and administrative data

The census of **local units of employment** has a close connection to the register of non-agricultural enterprises (UBR). The questionnaires for units registered in the UBR had pre-printed addresses. During the processing stage the answers concerning the economic field, the number of employees and the address are checked with the UBR. In case of differences the decision of which information is the correct one is taken according to credibility.

The UBR itself is permanently updated by checks with other sources (e.g. "Firmenbuch") and by returns of different economic surveys.

To a great extent data on areas of **buildings** can be gained from registers of the National Survey Office (BEV). Other – invariable – characteristics about buildings (e.g. the period of construction) can be taken over from the previous census. Instead of these variables, detailed questions about considerable changes within the period of 10 years were asked.

Regarding the **population census** it is possible, from a technical point of view, to match administrative registers in order to obtain individual char-

acteristics such as nationality, place of birth, secondary and former places of residence as well as the date of moving in. In case of missing statements on the personal form these data are extracted from the person data sets imported from the registration office to GSG²⁰⁰¹.

7.8 Safeguarding quality (editing and imputation)

Records usually contain missing and contradictory information. By the following additional procedures records are checked and, if necessary, supplemented and improved with respect to their form.

In the first follow-up step, the so-called “**pre-editing**”, records are checked for coverage and correct sequence by comparison with the entries into the GSG²⁰⁰¹ application as made by the communes. Partly, the errors are corrected manually, partly automatically.

As next step comes the **compilation of households and family nuclei**. About 10% of the households – of complex structure or containing false information – will have to be compiled manually.

In the following fully automatic step, the so-called **micro-editing**, variables are first checked for formal correctness (sex and date of birth are contrasted to GSG features); then the variables within one record are checked for consistency and finally the records within one household (or the statements of the building record with the accompanying dwelling/s) are checked for reciprocal contradictory information. Most missing or incorrect values are imputed by using the hot-deck method. Statistics on the changes effected in these values accompany this step and allow permanent supervision. The multi-stage processing demands micro-editing after each processing stage.

Before releasing the data for publication a final step, the **macro-editing**, is necessary. The fact that an individual record is correct does not allow the conclusion that the whole quantity is correct as well. At this stage the data are compared with the results of the last census as well as with other sources. Extremely low/high values are checked for plausibility. Implausible quantities have to be either verified or corrected.

7.9 “Cases to be clarified”

2,356 communes have used the GSG application, three towns (Vienna, Linz and Klagenfurt) have used their own EDP solutions.

GSG²⁰⁰¹ did not only support the enumeration process but also documented the result of the parallel action, as mentioned above. On the basis of all of these entries an EDP programme (“algorithm”) established the residential quality of every individual person enumerated. This was after the end of the legally permitted report period, that is, at the beginning of September. Regulations are determined by the census law (article 6 paragraph 2a). Under certain circumstances “it is the role of Statistics Austria to clarify the residential quality in co-operation with the reporting authority and the concerned person.. “. These are the so-called “**cases to be clarified**”.

The advantage of the GSG application may be seen from the fact that all GSG communes together contained 6,000 cases to be clarified, only, while the files of the towns using different systems produced 40,000 cases to be clarified as well as numerous other mistakes.

Moreover, there were 50,000 data sets pointing out more than one main residence which, presumably, refer to 22,000 to 25,000 persons counted **double** (or several times). Furthermore, in a number of doubtful cases research work confirmed the suspicion that persons were reported who did not exist (any more). The corresponding counter measures are under preparation.

Additionally, 70,000 **claims** were addressed to the provincial governors or – when communes of different provinces were concerned – to the Minister of the Interior.

The clarification of all these doubtful cases, double and non-existent counts as well as the consideration of the mentioned claims will severely affect all plans concerning the moment of publication of the data collected. Thus, the specifically Austrian problem of residences influences the latest census, as well.

9. Publication of results

9.1 Preliminary results

At the beginning of July 2001, first preliminary population figures were published on the census website. On the occasion of two press conferences in November, preliminary results on the structure of the population were presented, which were published down to the level of communes in

the form of a rapid report. The raw data were stored within the database ISIS and can be retrieved via Internet.

9.2 Final results

As all cases to be clarified have to be attended to first final results will probably be published in late summer of 2002. According to the processing stage described above, the demographic and simple household and family variables will be dealt with first. At the same time, the results of the building and housing census will be published. In late autumn, the presentation of results from the areas education and livelihood is intended, followed by the data on occupation, industry and commuting in mid-2003.

The results of the census will be made accessible to the public by different media.

9.2.1 Database

As a first step, special input files for tabulation called "**database files**" (they fulfil the demands of our generalised tabulation programmes) are produced from the checked records.

Based on these files the census results are stored in the **database ISIS**, (approx. 200 tables on population, 120 tables on buildings and dwellings and 20 tables on local units of employments) from which they can be recalled on-line internally, but also by external users from the Internet.

9.2.2 Booklets

Printed booklets (together with a CD-ROM) will present the results of the census (altogether approx. 60 brochures with about 15,000 pages).

9.2.3 Internet

In the Internet, the tables contained in the booklets may be looked at free of charge. An abstract may be downloaded for printing. Retrievals from the database ISIS via Internet are, however, liable for costs.

9.2.4 Tailor-made tabulations

The production of tailor-made tabulations supported by our table composing software is recommended if

- the required combination of variables is not included in the database or if

- tables for individually defined areas are necessary or if
- GIS analyses (e.g. data based on coordinates) are required.

10. Appendix

10.1 Legal base

The **population census** is based on a law defining its legal frame ("Population Census Act", version of 1994, latest update in order to regulate GSG²⁰⁰¹ in 2001). This law orders a population census every ten years ("on the turn of each decade"). A separate decree of the Federal Government fixes the census day. By another separate decree the Minister of the Interior fixes the questionnaires.

The **building and housing census** is based on the Federal Statistics Act. The Minister for Economic Affairs fixes by decree the census day and the enumeration papers.

The **census of local units of employment** is ordered by the Federal Government on the basis of a separate law (latest update in 2001).

10.2 Time schedule

April, 29th 1998: first pilot test

April, 21st 1999: second pilot test

May, 10th 2000: final dress rehearsal

May, 15th 2001: Census Day

From the end of June 2001: receipt of the enumeration papers and starting of the processing stage;

July 2001: preliminary population figures according to communes in the Internet

November 2001: publication of provisional results (number of persons, age, sex and citizenship, number and size of households) in the so-called "Schnellbericht"/rapid report;

Late summer of 2002: promulgation of the official population figures; publication of the first results available of the building and housing census and of the census of local units of employment as well as demographic results of the population census and basic data on household and family statistics

Late autumn of 2002: publication of education and livelihood results

From the middle of 2003 onward: publication of results on occupation, industry and commuters as well as of the combined analysis of population census and building and housing census.

10.3 Personnel and costs

Taking into consideration that the described processing steps of the 2001 Census have been transferred to a greater extent from manual to automatic procedures compared to the 1991 Census (electronic coding, use of registers, etc.) significantly less **personnel** is required this time.

The **costs** for printing the forms and for processing is ATS 270 mill. (€ 20 mill.), and the remuneration for the communes amounts to ATS 250 mill. (€ 18 mill.). The total costs of the 2001 Census will amount to ATS 520 mill. (€ 38 mill.), not taken into account the additional expenses of the communes.

10.4 Confidentiality

The Census Act provides that the collected data may only be used for statistical purposes. The census returns must not be used for administrative or fiscal purposes.

The fact that the data are stored and processed without the names of the persons prevents unau-

thorised access. To underline this protection, the census forms were organised as in 1991, i.e., the names of the persons and their answers were on separate sheets.

10.5 Quality control

Later on, a quality control will be performed as traditional part of each census processing. This procedure contains the counter-check of the data gained from the three censuses as well as analytical controls and data comparisons with a number of other sources.

The comparison with the information of the population registers during enumeration stage guarantees the coverage of persons as well as the use of GSG²⁰⁰¹ guarantees the **coverage** of the buildings. A quality control by case-to-case comparison with other sources (e.g., **post enumeration check**) is not planned due to costs and methodological reasons.

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