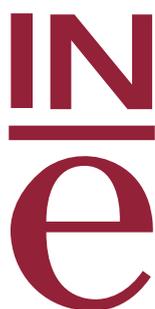


INSTITUTO NACIONAL DE ESTADISTICA



Survey on Equipment and Use of Information and Communication Technologies in Households (ICT-H 2010)

Methodological report

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1 Presentation of the survey

The general objective of the Survey on the Equipment and Use of Communication and Information Technologies in Households (ICT-H) is to obtain data on the development of what is known as the *Information Society*.

The survey has the following specific objectives:

1. To ascertain the information and communication technologies equipment in Spanish households (ICT products: television, landline and mobile phone, computer equipment.).
2. To ascertain the use that the Spanish population makes of Internet and e-commerce.
3. To serve as a base to establish comparisons between Spain and other countries and meet the requirements of international institutions.
4. To obtain information that is comparable between Autonomous Communities.

1.1 General description of the survey

In 2004 the survey started to be conducted continuously, as a 'Rotating Panel', in other words, the same dwellings (panel) are investigated over various years, with a quarter of the sample being renewed (i.e. rotating) every year.

The sample was obtained from the continuous municipal register of inhabitants. It comprised 2,578 census sections distributed by Autonomous Community. Eight main dwellings were selected within each section, and 6 reserve dwellings were also selected in case incidents were to arise regarding the main dwellings.

In the first wave of 2005 the corresponding quarter of the sample of dwellings was renewed. As regards the rest of the sections, the main and reserve dwellings that filled in the 2004 questionnaire are maintained (they are all considered main dwellings in 2005), as are the reserves that were not used before to replace main dwellings (they are still considered reserves in 2005).

The sample for the ICT-H 2005 survey was selected from 28,224 dwellings, 23,682 of which were main dwellings and the rest reserve dwellings that are used if something happens to the main dwelling. From this year, all first interview sections will have eight reserves, rather than the six for previous surveys, in order to reduce the loss of "effective" sample which occurs over time.

The same procedure was used in in all subsequent waves (second wave of 2005, first wave of 2006, second wave of 2006, 2007, 2008, 2009 and 2010). In this latest survey, the main sample was 24,877 households (16,571 CATI and 8,306 CAPI), there also having been used 2,980 reserves, meaning that the number, whereby the number of dwellings visited was 27,857. The total number of sample sections in 2010 was 3,060, since there are sections with dwellings in CATI, and at the same time in CAPI.

ICT - 2010 No. of dwellings visited and no. sections, CATI and CAPI, by province

Province	CATI Dwellings	CATI Sections	CAPI Dwellings	CAPI Sections
1 Álava	109	14	76	10
2 Albacete	132	18	132	18
3 Alicante/ Alacant	353	49	256	44
4 Almería	341	48	238	42
5 Avila	58	8	45	7
6 Badajoz	380	51	249	39
7 Balears, Illes	484	69	359	64
8 Barcelona	1079	149	787	120
9 Burgos	140	18	104	12
10 Cáceres	240	33	172	27
11 Cádiz	368	64	434	77
12 Castellón/Castello	129	17	86	16
13 Ciudad Real	210	28	107	18
14 Córdoba	353	48	194	39
15 Coruña (A)	336	47	242	44
16 Cuenca	72	10	67	12
17 Girona	130	18	91	14
18 Granada	329	48	298	43
19 Guadalajara	77	10	57	12
20 Guipúzcoa	267	35	168	22
21 Huelva	258	39	226	38
22 Huesca	116	16	106	14
23 Jaén	330	48	207	49
24 León	183	26	148	24
25 Lleida	78	10	57	6
26 Rioja, La	398	54	272	45
27 Lugo	120	16	56	10
28 Madrid	1141	153	837	141
29 Málaga	466	69	359	76
30 Murcia	549	75	372	62
31 Navarra	1349	180	643	130
32 Ourense	115	16	57	12
33 Asturias	1307	173	754	120
34 Palencia	63	9	43	9
35 Palmas, Las	317	45	295	46
36 Pontevedra	269	38	160	34
37 Salamanca	132	18	106	15
38 Tenerife	312	45	202	41
39 Cantabria	445	60	285	46
40 Segovia	53	7	33	6
41 Sevilla	512	75	356	75
42 Soria	37	5	38	6
43 Tarragona	154	21	76	15
44 Teruel	80	12	60	13
45 Toledo	233	33	140	31
46 Valencia	603	81	391	70
47 Valladolid	204	27	83	18
48 Vizcaya	450	59	260	38
49 Zamora	77	11	60	10
50 Zaragoza	497	68	323	56
51 Ceuta	72	11	69	12
52 Melilla	64	10	50	10
Total	16,571	2,292	11,286	1,958
	Total dwellings	27,857	Total sections	3,060

The dwellings in sections undertaking the first interview and dwellings without a telephone were interviewed via personal interview with tablet (CAPI).

All other dwellings were interviewed by telephone, recording the survey on an electronic questionnaire from CATI centres.

The field work was conducted all over Spain. The collection period, from the CAPI centres, was from 19 January to 11 April 2010, while from the CATI centres, it was from 2 February to 25 May 2010.

The population object of investigation (objective population) are persons who live in main family dwellings. Although persons of all ages form part of the objective population, not all persons are investigated exhaustively, as they are only eligible for an exhaustive investigation of persons 16 and over at the time of the interview, of whom one is selected.

For the questionnaire, the table "Household members" is filled in first of all to decide which persons are household members and which are surveyable (household members aged 16 and over). In order to provide this data, an informant is required who is a member of the household and is aged 18 or over).

The selection of the person to survey is made electronically by means of a random procedure.

Blocks II and III deal with the equipment of the household as to ICT products: television, computer, telephone, etc, and whether or not the household has Internet access.

Block IV is filled in if there are children aged 10-15 in the household. There is a series of questions for all of them related to the use of computers, the Internet and mobile phones.

Blocks II to IV may be filled in by the initial informant or the selected person.

Blocks V to X deal with the use of computers, the Internet, e-commerce and the electronic ID card, and the XI asks about some socio-economic data on the selected person. Only the selected persons may respond.

1.2 Organisation of field work

Data was collated in two ways:

- Personal interview with laptop computer or tablet (CAPI): The interviewer does not use paper questionnaires, rather s/he has a laptop computer onto which the questionnaire has been uploaded, so that interviews may be carried out with this laptop computer.

By using this method, households from sections with a new sample and households already included in the 2009 sample for whom there is no contact telephone, are interviewed.

- Telephone interview in a CATI centre: households from the 2009 sample are interviewed by phone from a CATI centre as long as they have a

telephone number. The interviewer does not use paper questionnaires but rather records responses from the informant on the electronic questionnaire directly.

The CATI centres are located in the Delegations of Madrid, Barcelona, Cádiz, Coruña, Sevilla, Valencia and Vizcaya and each one of them calls the following provinces:

Province where the CATI centre is located	Provinces from where information is collected
Madrid	Albacete, Avila, Badajoz, Burgos, Cáceres, Cantabria, Ciudad Real, Cuenca, Guadalajara, Rioja, Madrid, Palencia, Salamanca, Segovia, Soria, Toledo, Valladolid y Zamora
Barcelona	Baleares, Barcelona, Girona, Lleida y Tarragona
Coruña	Coruña, León, Lugo, Orense, Asturias y Pontevedra
Cádiz	Cádiz, Córdoba, Granada, Jaén, Las Palmas y Tenerife
Sevilla	Almería, Huelva, Málaga, Sevilla, Ceuta y Melilla
Vizcaya	Alava, Guipúzcoa, Navarra y Vizcaya
Valencia	Alicante, Castellón, Huesca, Murcia, Teruel, Valencia y Zaragoza

In CATI centres, personnel worked in two shifts from Monday to Friday. The first shift covered the interval from 9 am to 3 pm and the second from 3 pm to 9 pm.

Each sample section is allocated a week of initial work, plus 3 weeks more in order to make up any absent or inaccessible dwellings. The survey letters of introduction are sent the week prior to the first week of section work.

As regards personnel contracted for the survey, it is worth noting that there were 14 Interviewer Inspectors and 45 Interviewers for 16,571 CAPI main households; 41 Interviewer Inspectors in the field, and 150 Interviewers for 8.306 CAPI main households.

1.3 Incidents concerning dwellings and groups and their treatment

The **dwelling keys** considered are:

- Unlocatable dwelling (IL)

In CAPI this incidence occurs when the dwelling is not located by an error in the entry address. The dwelling may not be located on the address that appears on the list of dwellings selected either because the address is incorrect, is duplicated with another dwelling included in the sample or because the dwelling does not currently exist.

This incidence does not exist in CATI.

- Dwelling used for other purposes (OF)

The household selected is dedicated entirely to purposes which are different from family residence. For example: convent, old people's home, garage, office, etc.

- Inaccessible dwelling (IN)

In CAPI this is the dwelling which cannot be accessed to carry out the interview due to geographical climatological (floods, snowfall, etc.) changes (when there are no routes to arrive there) or any other type of changes.

In CATI this incidence is automatically assigned when the telephone recorded for a dwelling does not correspond to the address in which the interview may be conducted and it is not possible to locate a correct telephone.

- Empty dwelling (V)

The dwelling selected is not a main dwelling, it may be a temporary dwelling (inhabited or uninhabited at the time of the interview) or inhabited for any reason, such as death or change of residence of persons who live there.

- Surveyable dwelling (E)

The **group keys** considered are:

- Total refusal (NT)

This is considered when it has not been possible to conduct the interview and the cause is the subsequent outright refusal of the initial informant after having started to collaborate.

- Refusal from the selected person (NS)

This case is considered as long as the initial informant answers the general household questions but **the selected person refuses to give information** either via an outright refusal as occurs subsequently after initially having started to collaborate.

- Total absence (AT)

This incidence occurs when, after successive visits (in CAPI) or successive calls (in CATI), it is not possible to contact anybody in the dwelling or when it

is possible to contact somebody who does not live in the dwelling and who gives information that its occupants are absent.

- Absence of the selected person (AS)

This is used after successive visits to the dwelling have not resulted in interview because the person selected is absent and cannot be contacted.

- Incapacity to respond (IC)

This incidence occurs when it is not possible to carry out the interview due to incapacity to respond whether due to age, disability, illness, lack of knowledge of the language or any other circumstances either from household members as a whole preventing initial contact as well as the selected persons.

In the case of the selected person's incapacity to respond it is admissible for the interviewer to use a third person as an intermediary to obtain the information.

- Surveyed group (E)

When none of the previous incidences occurs and the questionnaire filled in fulfils the requirements to be considered *complete*.

A questionnaire is **complete** if all corresponding questions according to the movement of the electronic questionnaire have been answered.

Moreover, for dwellings collected by means of telephone interview in CATI centres the results of all of them are collected and each one of the calls made.

The possible call results are:

- Not contacted (NC): when nobody answers the telephone or answer phone.

Without a telephone (ST): the telephone does not exist or is a fax or the interviewer verifies that the address to which this telephone corresponds is not the address to be interviewed.

-Engaged (C): the engaged tone.

Contact postponed (AP): the dwelling is contacted but before starting the interview the informant asks to be called at another time to conduct it or there is no valid informant in the dwelling at this time and the call is postponed.

- Partial interview because a new appointment is established (EPC): these are calls in which the questionnaires have been started to be filled in but the informant requests that the interview continue at another time.

- Partial interview interrupted for other reasons (EPO): these are calls in which the interview is interrupted due to the line being cut, problems with the system, etc.

- Interview completed (EF): these are calls in which the survey is completed, either because the questionnaire has been filled out completely, or because there is an incidence in the dwelling which makes it impossible to carry out the questionnaire. Households where the questionnaire is not carried out are

regarded as empty (V), used for other purposes (OF), or without a telephone (IN) and also those that are surveyable, but whose human group refuses to take part (NT, NS), is absent (AT, AS) or is unable to respond (IC).

2. Sample design

2.1 Type of sampling

The sample design has been made in the whole country by means of a stratified tri-stage sample.

The first-stage units are the census sections. The second-stage units are main family dwellings. During the third stage, a person is selected in each dwelling who is aged over 15. Furthermore, all minors aged between 10 and 15 are also investigated in each dwelling.

For the selection of the sample, we have used a framework of areas comprising the list of existing census sections with reference to 1 January 2001 and incorporating the variations that have occurred over time.

Second stage units use the list of main family dwellings in each of the sections selected for the sample obtained from the most up-to-date continuous Municipal Register of inhabitants available.

Sections are grouped in strata in each Autonomous Community, in accordance with the size of the municipality they belong to.

The following strata have been considered:

Stratum 0: Municipalities with more than 500,000 inhabitants

Stratum 1: Municipalities that are the province capitals with less than 500,000 inhabitants

Stratum 2: Municipalities between 100,000 and 500,000 inhabitants, that are not province capitals

Stratum 3: Municipalities between 50,000 and 100,000 inhabitants, that are not province capitals

Stratum 4: Municipalities between 20,000 and 50,000 inhabitants, that are not province capitals

Stratum 5: Municipalities between 10,000 and 20,000 inhabitants

Stratum 6: Municipalities with less than 10,000 inhabitants

For the purpose of reaching the objectives of each Autonomous Community, an agreement has been signed with some of them, and sub-strata have been defined. In the case of Navarra, substrata are based on the rural or urban type of municipality and on the geographical location within the country (Urban Pamplona, Rural Pamplona, Urban North, Rural North, Urban Middle, Rural Middle, Urban South and Rural South). As regards Asturias, for the same reason, other substrata have been defined based on the regions to which the municipality belongs (Navia, Narcea, Avilés, Oviedo, Gijón, Caudal, Nalón and Oriente).

For each Autonomous Community an independent sample is designed from that represented due to one of the survey objectives being to facilitate data with this level of breakdown.

2.2 Size of the sample.- Allocation.

In order to fulfil the goals of the survey, i.e. to provide estimates with a specific degree of reliability on a national level and by Autonomous Community, the investigation uses 3,060 census sections, with 8 dwellings selected in each census section.

In order to obtain a minimum sample size that allows reliable estimates on an Autonomous Community level, the sample is distributed among them by using a commitment allocation, either uniform or proportional to the size of the Community such that the number of sections by stratum in each Autonomous Community is a multiple of four.

The sample initially designed by INE has increased in some Autonomous Communities in accordance with the agreements signed with them. In previous years, the samples for Asturias (2005), Andalucía (2006) and Navarra (2006).

The distribution of the number of sections selected by Autonomous Community is:

Autonomous Community	Number of census sections
Andalucía	588
Aragón	128
Asturias, Principado de	232
Balears, Illes	92
Canarias	120
Cantabria	80
Castilla y León	172
Castilla - La Mancha	132
Cataluña	264
Comunidad Valenciana	196
Extremadura	112
Galicia	156
Madrid, Comunidad de	204
Murcia, Región de	100
Navarra, Comunidad Foral de	240
País Vasco	144
Rioja, La	72
Ceuta y Melilla (Autonomous City)	28
TOTAL	3,060

Between strata, allocation is proportional to the size of these, always maintaining that the number of sections per stratum in each Autonomous Community is a multiple of four.

2.3. Sample selection

In order to conduct the ICT-H-10, the selection of first stage units in each stratum has been carried out with probability proportional to the size of each section. In the second stage, dwellings have been selected by means of a systematic sample with random start and equal probabilities of selection for each dwelling in the section. This procedure provides self weighted samples of dwellings in each stratum.

During a third stage, and within each dwelling, a person is chosen with equal probability among those 16 and over.

2.4. Renewal of the sample

Rotating panels are groups of sample sections, which are used to gradually incorporate modifications into the sample, particularly those deriving from the updating of likelihood of the units in the first stage (sections) or rotation of dwellings. The fact that the number of sample sections per stratum in each Autonomous Community is a multiple of four makes it possible to distribute the sections such that the representation of subsamples that they define is equivalent.

2.4.1. Renewal of the sample of sections. Update of probabilities.

Taking information from the electoral files and from the Continuous Register, section probabilities are updated.

Changes taking place as a result of the update are incorporated on an ongoing basis into the sample by rotation shift.

In the year 2010 changes were made in rotation shift 1.

The procedure used for updating is the one proposed by L. Kish and A. Scott (JASA 1971).

2.4.2 Renewal of the sample of dwellings.

In order to avoid weariness on the part of families interviewed, as well as giving a likelihood of selection to other, new ones arriving from the census section, the sample of dwellings is partly renewed by rotation shifts.

Therefore, the survey is a rotating panel such that every year the dwellings corresponding to the sections belonging to a specific shift are renewed.

The dwellings from the sections in rotation shift 1 were renewed during 2010.

2.5. Estimators

The following types of estimators have been considered to estimate the survey characteristics:

- Estimator for data on households
- estimator for data on persons aged 16 and over.
- estimator for data on persons aged 10 to 15.

Ratio estimators will be used in all cases, calibrated according to information from external sources.

A). Estimator for data on households

So as to obtain characteristics regarding households, the survey uses an estimator obtained by means of the following steps:

A1) Expansion estimator based on the design factor with correction for non-response on a stratum level.

In each stratum h , the estimator for the total of a characteristic X is obtained by means of the following expression:

$$\hat{X}_h = \sum_{i=1}^{n_h} \sum_{j=1}^{v_{ih(e)}} c_i \frac{V_h}{v_{h(e)}} x_{hij}$$

where:

V_h : Dwellings from stratum h .

$v_{h(e)}$: Size of effective sample of dwellings in stratum h .

n_h : Number of sample sections in stratum h .

x_{hij} : value of the of study in dwelling j , section i .

c_i : Update coefficient. Value that depends on section i . This represents the growth of the same from the selection of the simple of first units to the moment of conducting the survey.
(See note).

Note on the calculation of coefficient c_i

The probability of selection of a household is the following:

$$P(V_{ish}) = K_h \cdot \frac{V_s}{V_h} \cdot \frac{m}{V_s} = K_h \cdot \frac{m}{V_h} \quad (\text{are self-weighted samples on a stratum level})$$

level)

where:

K_h = no. of sample sections in stratum h.

m = no. of dwellings in the sample in each section=8

V_h = dwellings in stratum h.

V_s = dwellings in section s.

Given that the sections are updated periodically, the probability of selection of the sample dwellings corresponding to the sections of the rotation shift that is being renewed, change in the following way:

If we call the number of dwellings in the updated section V'_s , we arrive at:

$$P(V_{ish}) = K_h \cdot \frac{V_s}{V_h} \cdot \frac{m}{V_{s'}} = K_h \cdot \frac{V_s}{V_h} \cdot \frac{m \cdot \frac{V'_s}{V_s}}{V'_s} = K_h \cdot \frac{m}{V_h}$$

As may be observed, in order for the new dwellings to have the same probability as the rest of the sample dwellings, it is necessary to introduce a coefficient, which we call the growth coefficient, and which is defined as:

$$C_i = \frac{V'_s}{V_s}$$

A2) Separate ratio estimator, to adjust to the population projection in each stratum h.

$$\hat{X}_h^R = \frac{\sum_{i=1}^{n_h} \sum_{j=1}^{V_{ih(e)}} C_i X_{hij}}{\sum_{i=1}^{n_h} \sum_{j=1}^{V_{ih(e)}} C_i p_{hij}} P_h$$

where:

p_{hij} : Total sample persons (aged 16 and over) from dwelling j, section i.

P_h : Population projection in stratum h.

A3) The final estimator is obtained by applying reweighting techniques to the previous estimator, using CALMAR software.

As an auxiliary variable, we have used the total dwellings classified by size (5 sizes) for each Autonomous Community. This information is from the Economically Active Population Survey.

B). Estimator for data on persons aged 16 and over

The final estimator is obtained from the individual questionnaire, whose responses come from a person selected among household members aged 16 and over. The estimator is similar to that used in the case of the household but bearing in mind the existence of a factor that incorporates the probability of selection corresponding to the person inside the dwelling.

B1) Estimator based on the design factor with correction for non-response.

$$\hat{X}_h = \sum_{i=1}^{n_h} \sum_{j=1}^{v_{h(e)}} \frac{V_h c_i p_{hij}}{v_{h(e)}} x_{hij}$$

B2) Separate ratio estimator, to adjust to the population projection in each stratum.

$$\hat{X}_h^R = \frac{\sum_{i=1}^{n_h} \sum_{j=1}^{v_{h(e)}} c_i p_{hij} x_{hij}}{\sum_{i=1}^{n_h} \sum_{j=1}^{v_{h(e)}} c_i p_{hij}} P_h$$

B3) Implementation of re-weighting techniques by age groups and sex on an Autonomous Community level (CALMAR) with populations referring to 15 February 2010, provided by the Demographic Analyses and Forecasting units.

C). Estimator for data on persons aged 10 to 15 years

The sampling information relating to all household members between the ages of 10 and 15 is supplied by the person aged 16 or over selected in each household.

The estimator used to obtain the information related to persons aged 10 to 15 is analogous to that described in section A, with the exception of the auxiliary variables, used in calibration (section A.3), which are the population projections of for 10 to 15 years, by sex, in each Autonomous Community, provided by the Demographic Analyses and Forecasting units.

2.6. Sampling errors

The indirect Jackknife method is used for the calculation of sample errors of the main characteristics investigated. (*).¹

This method is based on the formation of subsamples in which each one of them is obtained by eliminating a primary unit from the total sample. The estimate of the variance of the estimator has the following expression.

$$\widehat{\text{Var}}(\hat{X}) = \sum_h \frac{(n_h - 1)}{n_h} \sum_{j \in h} (\hat{X}_{(hj)} - \hat{X})^2$$

where:

$\hat{X}_{(hj)}$ is the estimate of X when primary unit j from stratum h is removed from the sample.

\hat{X} is the estimate of X obtained with the whole sample.

n_h is the number of primary units in stratum h .

The sample error allows us to build a numerical interval in which a certain confidence exists, measured in terms of probability, that it contains the true value of the estimated characteristic. The most frequently used confidence interval is that comprised between the estimation, minus 1.96 times the sample error, and the estimation, plus 1.96 times the sample error. This interval has a confidence of 95%, measured in terms of probability, of finding within it the true value of that which is being estimated.

The INE website (<http://www.ine.es/en/>) publishes the sample errors of some of the main variables relating to dwellings, persons (16 to 74 years of age) y children (10 to 15 years of age). They are grouped in three tables located after the results of the Survey, which include information on both a national level and by Autonomous Community. Formally, these errors are expressed as the estimations of *the typical deviations* of the estimators of the characteristics in question, expressed as a percentage, and called *standard errors*.

¹ (*) CALJACK software, developed by P. Lavallé of Statistics Canada, has been used

3. Results of the field work

FINAL SUMMARY OF INCIDENTS

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	Total households	Total completed	Incidents in households						Incidents in households					Reservations polled	Total polled
			E	NT	NS	AT	AS	IC	Surveyable	IN	V	OF	IL		
Total CATI	16,571	16,571 100.0%	12,256 80.4%	957 6.3%	196 1.3%	1,512 9.6%	212 1.4%	120 0.8%	15,253 92.0%	1,095 6.6%	218 1.3%	5 0.0%			
Total CAPI	8,306	8,306 100.0%	5,355 77.9%	665 9.7%	43 0.6%	708 10.3%	51 0.7%	48 0.7%	6,870 82.7%	28 0.3%	1,231 14.8%	76 0.9%	101 1.2%	1,773 85.8%	
TOTAL	24,877	24,877 100.0%	17,611 79.6%	1,622 7.3%	239 1.1%	2,220 10.0%	263 1.2%	168 0.8%	22,123 88.9%	1,123 4.5%	1,449 5.8%	81 0.3%	101 0.4%	1,773 77.9%	

The percentage of the total completed on the total for initial households

Surveyable=E+NT+NS+AT+AS+IC

In incidents E, NT, NS, AT, AS and IC, the percentages are calculated on the surveyable total. For the remainder, the percentages are calculated on the total for completed main households

4. Dissemination of the results

The statistical tables of the results of the survey and the methodological report and other supplementary material will be published on the INE web site (www.ine.es) and, if applicable, in the corresponding electronic publication.

With the aim of achieving greater comparability with the data published by Eurostat, the statistical tables of the ICT-H 2010 results presented refer to dwellings inhabited by at least one person aged from 16 to 74 years and to people in this same age group. In years prior to 2006, the results referred to the total number of dwellings and people aged 15 years old and above.

In successive performing of the survey, n tables relating to dwellings, the main magnitudes refer to ICT equipment in the dwelling (television, computer, telephone, radio, video, etc.), as well as access and way of connecting to the Internet. As regards person, tables, among others, will be created for the use of computers, the Internet and e-mail.

These statistical variables inherent to the survey are cross-referenced with the socio-demographic variables obtained in the same, such as the size of the household and of the municipality where it is located, sex, level of training of the persons, employment situation, etc.