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A COMPARATIVE ASSESMENT OF NATIONAL ADDRESS DATABASE AS A SAMPLING FRAME BY LISTING OPERATION OF 2013 TURKEY DEMOGRAPHIC AND HEALTH SURVEY

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SUMMARY

This thesis aims to reveal the differences between the address lists obtained from the National Address Database (NAD) that served as the frame, and the lists that were updated during the listing fieldwork. Moreover, the quality of the frame of TDHS-2013 (NAD) is evaluated during the analysis.

Descriptive analysis is made for 125 selected clusters, within 499 clusters which located in settlements with municipalities, by Systematic Random Selection technique. Block lists obtained from TURKSTAT and updated block lists from the listing operation are compared by diverse aspects (e.g. according to types of dwelling, response codes, type of residence or so on). An additional listing operation (called golden listing) was carried out by author in central district clusters of Ankara province. These clusters were re-listed by the author. Triple comparison are made between the NAD, listing operation and golden listing operation.

According to results of the survey, some visited households were either vacant or they were not a dwelling (such as, commercial unit). Due to the proportion of these buildings (8.4%) are big enough for TDHS-2013, analysis and comments are made upon these households. Moreover, the results of these high percentages investigated by the author. In terms of the comparison results, 32% of total listed (occupied) dwellings do not matched with The NAD addresses. These addresses generally belong to listing staff error or newly constructed buildings, which is not included by the NAD. Although proportion of unit types are same between matched and unmatched addresses, “dwelling vacant/ address not a dwelling” code of unmatched addresses is almost three times more than matched addresses (5.7% and 15.5%). Furthermore, golden listing is revealed that almost 61% of “dwelling vacant/ address not a dwelling” code result from listing staff. Lack of Enumeration Areas in Turkey is a deficiency for sample surveys. Under these conditions, some errors were observed during the listing operation. Therefore, up to date status of address lists should be discussed comprehensively.

ÖZET

Bu tezde çerçeve olarak kullanılan Ulusal Adres Veri Tabanı (UAVT)'ndan edinilen adres listesi ile Türkiye Nüfus ve Sağlık Araştırması 2013 (TNSA-2013)'te listeleme operasyonu sırasında güncellenen listeler arasındaki farklılıklar ortaya çıkarılarak, çerçeve olarak kullanılan UAVT'nın kalitesi ölçülmeye çalışılmıştır.

Araştırma örneklemini oluşturan ve adres bilgisi sağlanan belediyeye bağlı 499 küme içerisinden 125 tanesi Sistematik Rasgele Seçim yöntemi ile seçilmiş ve bu kümeler üzerinden betimleyici analizler yapılmıştır. TÜİK tarafından sağlanan adres listeleri ile listeleme sonucunda elde edilen adres listeleri çeşitli yönlerden karşılaştırılmıştır (konut tipleri, cevap kodları, yerleşim yerleri gibi). Listeleme operasyonuna ek olarak, yazar tarafından gerçekleştirilen ve altın listeleme denilen bir başka operasyon daha yapılmıştır. Altın listeleme, Ankara ilinin merkez ilçelerinde uygulanmış ve blok listeleri yeniden listelenmiştir. Bunun sonucunda da UAVT, listeleme operasyonu ve altın listeleme operasyonu arasında üçlü bir karşılaştırma yapılmıştır.

Araştırmanın sonuçlarına göre ziyaret edilen hanelerin bazıları boş veya konut olarak kullanılmamaktadır (örneğin, ticari birim). Bu hanelerin oranının (%8.4), böylesine büyük örneklemli bir araştırma için yüksek oranda olmasından dolayı, analiz ve yorumlar genellikle bu haneler üzerinden yapılmıştır. Ayrıca, karşılaşılan bu yüksek oranın nedenlerine ilişkin çalışmalar yazar tarafından yapılmıştır.

Türkiye geneli için yapılan karşılaştırma sonuçlarına göre, listelenen dolu hanelerin %32'si TÜİK'ten gelen adres bilgileri ile eşleşmemiştir. Bu eşleşmeyen adresler genellikle listeleme hatasından veya yeni inşaa edilen binalarda oturan ve UAVT'na kayıt yaptırmayan hanehalklarından oluşmaktadır. Eşleşen ve eşleşmeyen hanalerin oranları birim tiplerine göre çok farklılaşmasa da, cevaplama oranlarına bakıldığında, "boş konut veya adres konut değil" kodunun eşleşmeyen hanelerde eşleşenlere göre üç kat daha fazla olduğu görülmüştür (%5.7 ve %15.5). Buna ek olarak, altın listeleme sonuçlarına göre, bu kodun %61 lik bir kısmının listelemeci hatasından kaynaklandığı görülmektedir. Türkiye'de sayım alanlarının olmaması örneklem araştırmaları için bir eksikliktir ve adres listelerinin güncelliğinin tartışılması gerekir.

ABBREVIATIONS

TDHS	: Turkey Demographic and Health Survey
HUIPS	: Hacettepe University Institution of Population Studies
TURKSTAT	: Turkish Statistical Institute
NAD	: National Address Database
ABPRS	: Address Based Population Registry System
GDPCA	: General Directorate of Population and Citizenship Affairs
TBDF	: TURKSTAT Block Definition Form
EA	: Enumeration Area

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1. INTRODUCTION

Compared to many scientific fields, the history of survey research goes closer in the past. The history of survey research can be reviewed in three distinct stages. First, between the era 1930-1960, tools and basic components of the design of data collections were invented by researchers to produce statistics. In order to achieve this aim, several institutions were built by founders of the field. The second period was between 1960 and 1990. Those years witnessed high growth in the use of survey methodology. This growth arose from the growth of quantitative social science and studies on consumer behaviors. In the third period-1990 and forward-, response to surveys have declined, as a result of this, alternative models of data collection have been developed by researchers (such as utilizing internet or administrative data). Through each of the periods, methodology of surveys have been differentiated to adapt alteration in new technology and society (Groves 2011).

To examine a sample in terms of quality, data collection stage and results of the survey are not enough to evaluate the quality of the sample; the process for selection of sample is as important as others.

Followings are the three main features of sample selection:

- The sample frame, which is main subject of this thesis, is the bunch of people or households, which have a chance to be selected. Statistically speaking, a well-developed sampling frame covers the whole target population. This feature of sample selection will be presented and discussed below and next chapters comprehensively.

- Probability sampling is the second key aspect; meaning to give a selection chance to each unit defined in the sampling frame.

- Last but not least, the details regarding sample design, including sample size and specific procedures for selection of units, effect the precision of sample estimates ultimately. In other words, the question is whether the characteristics of the sample is as same as the entire population (target population) or not.

Since sampling frame effects the quality of the survey, it has been the key factor of sampling procedure for years. As mentioned above, sampling frame is a source material or device from which a sample is drawn. It is a list of individuals, households or institutions within a target population. Sometimes more than one set of material is needed for household surveys, due to their multi-stage nature. The early stages of selection in household surveys are generally drawn from area frames, whereas the last stage may be selected either from an area or list frame.

The sampling frame is the vital stage and necessity throughout the sampling design process. Its definition is rather broad, including both area frames (such as enumeration areas) and physical lists and procedures that can explain entire sampling units without the physical effort. For instance, in an area sampling design, maps are used for creating frame(s), but the frame does not have to include the whole target population in multiple stage selection designs. A frame for school children consists of school districts containing schools, their classes and finally children. The design can be carried through in several stages without obtaining a complete list of all the children (Kish 1965). Moreover, the sampling frame has significant implications on the cost and the quality of any survey. It is so hard to come across perfect frame, because there might be some undesirable problems in sampling frame.

The following are four major problems associated with sampling frames: the first one is under-coverage that occurs when some members of the population are inadequately represented in the sample. The second one is ineligible units; meaning there are some elements which are captured by the sampling frame, however, they are not a part of the target population. The third problem is clustering, happening when multiple elements of

the target population are represented by the same element. The last one is duplication, which means the multiple existence of a single unit in a frame; a unit which is taken up twice or more for examination.

The frame is perfect if every element appears on the list separately, only once and nothing else appears on the list. Perfect frames are very rare. So, there may be some problems in sampling frames (Groves et al. 2009).

Today, sample surveys are the most efficient ways for collecting representative quantitative data. A well-known example for international sample surveys is the Demographic and Health Surveys (DHS) Program, which includes sample surveys carried out in many countries in order to collect proper demographic data. Hacettepe University Institute of Population Studies (HUIPS) has been conducting national demographic and health surveys since 1968. The last five surveys have been conducted within the DHS Program (between 1993 and 2013). This long period of time makes TDHS unique among other countries. The total number of clusters in final TDHS (TDHS-2013) was 642. Block level household lists (called block lists), each including approximately 100 households, were provided by the Turkish Statistical Institute (TURKSTAT), by using the National Address Database (NAD). Each cluster has one block list. These obtained addresses in block lists were updated through the listing and mapping activities, before field operation of TDHS-2013.

The NAD has been used for the first stage of sampling frame for the TDHS-2013. The data from NAD, which includes addresses and demographic information of people living in Turkey, was provided by TURKSTAT. The NAD was created in 2007 and after the establishment of the system, conservation and updating operation of the NAD was assigned to the Ministry of Interior. As of today, it is under the management and responsibility of the Ministry of Interior. While the system has some positive attributes like having demographic information on people, even living in small villages, it also has

some downsides. For example, if a person has no Turkish Republic Identification number, s/he is not included in the system. Another drawback is that people might move to another address, but their residence information remains in the initial place because they fail to report this event.

After obtaining the address data from TURKSTAT, the second stage was the listing operation and it was conducted by HUIPS. The listing operation consisted of visiting each of the selected clusters/blocks, updating the address lists obtained from TURKSTAT, and drawing a map corresponding to the address list. The primary objective of the listing operation was to update these address lists (in selected clusters) obtained from TURKSTAT. The selection of households for interviews was made from the updated address lists. Finally, the field operation of TDHS-2013 was conducted by HUIPS.

20 different listing teams were trained by HUIPS in TDHS-2013 for two weeks in order to carry out the listing operation. The listing operation initiated in mid-August 2013 and was completed in the last week of October 2013. Within three months, the whole operation was carried out under the supervision of the research assistants and regional coordinators from the HUIPS. Detailed information regarding NAD, the listing operation and the golden listing operation will be presented in Chapter 3.

Quality of frame is as important as the implementation of survey, because quality of frame effects reliability of the survey. To obtain high reliable surveys, the quality of the frame of TDHS-2013 (NAD) is evaluated by using listing operation of the same survey. The increased proportion of "Dwelling Vacant/Address not a Dwelling" code for last three TDHSs (in 2003: 4.8%, in 2008: 5.9% and in 2013: 8.4%) is an important reason for this evaluation. Moreover, the subject of this thesis has not been studied in Turkey before, and therefore it would constitute an important source for the future studies.

In this thesis, an answer to the question of "Can the quality of a frame be evaluated by the listing operation of a sample survey?" is aimed to be provided. In other words, the main aim of this thesis was testing the quality of the current household frame using the listing operation of the TDHS-2013. An effort was made to reveal the differences between the address lists obtained from the NAD that served as the frame, and the lists that were updated during the listing fieldwork. In order to find out the answer to the research question, 125 clusters were selected from all clusters that were located in settlements with municipalities (499 clusters), using the systematic random selection method. Then, the address information and some characteristics of these selected 125 clusters (studied clusters) were compared to the address lists obtained from TURKSTAT using the NAD. Throughout the analysis stage, two basis cases/errors are assessed. The first one is the NAD based cases. Including missing addresses, deficiencies in numbering system of settlements or so on. The second one is listing operation based errors. Containing, listing staff errors, ringing staff error or error that happens during creating block lists.

A special listing activity (called golden listing) was implemented by the author in the central district of Ankara province in 20 clusters of TDHS-2013. The operation is implemented in order to both checking the quality of the listing operation of TDHS-2013 and making an objective comparison with more reliable source. Since the golden listing operation is performed under the assumption of a flawless/perfect listing operation, the name of the operation is defined as "Golden" (like golden frame, which means complete, up-to-date, accurate frame). Furthermore, as the golden listing operation aims to attain perfect address lists, it should be implemented by experienced people, who have full knowledge of survey methodology and field research.

These 20 clusters were re-listed. After entering the data from the golden listing procedure to computer, a triple comparison (between the listing operation vs. golden listing operation, golden listing operation vs. addresses obtained from TURKSTAT, the

listing operation vs. addresses obtained from TURKSTAT) was made and its results are presented in Chapter 4.

The flow of the thesis is as follows: In Chapter 2, previous literature on sampling and sampling frames are reviewed. In Chapter 3, firstly the sampling design and frame of TDHS-2013 is introduced and secondly, the definition of sampling frame, some feature of sampling frames, types of sampling frames are presented. Then, the NAD and the listing operation are explained comprehensively. In Chapter 4, the address information obtained from TURKSTAT and the address information obtained from the listing operation are compared. These comparisons are made by considering the diverse features of these addresses, such as response codes, type of residence or so on. Moreover, as a case study, an extra listing operation was carried out by the author in capital of Turkey (Ankara province). Results on the comparisons between the golden listing, listing operation and address lists from TURKSTAT are presented in Chapter 4 as well. In the last section, the evaluation of the NAD as a sampling frame is carried out and the quality and reliability of the listing operation in household surveys are discussed comprehensively.

2. LITERATURE REVIEW

Thousands of survey have been carried out every passing year, but the quality of these surveys are more important than carry out a survey. This issue, quality of surveys, have been discussed by researchers for many years. Are there any absolute standards in order to reach high quality survey? Demming (1944) thought that absolute accuracy is a hypothetical issue and it should be evaluated in a tolerance bands instead of absolute numbers. He stressed thirteen factors related to quality of surveys. Following eight of them are relatively more important than others: Sample design, interviewer effects, method of data collection, processing errors, sampling error and bias, errors of interpretation and questionnaire imperfections. One additional point recognized by Groves (1989) that cost is both constraint on researcher and cost efficiency might be though as a component of quality of surveys.

Another research belongs to DeMaio et al. (1998) and they claim that questionnaire design is one of the most important component in achieving high a quality survey. If the answer of respondents are not meaningful, the best sampling design and estimations will not yield accurate data. They thought that although preparation of sampling design and data collection instruments are important, last step of pre-testing the instruments, before the application in field, might be a good way to decide whether the survey meet its objectives properly or not.

Moreover, since sample of a survey drawn from the sampling frame, selection the type of frame or development of sampling frame is a vital stage in sample design which should not be ignored. In other words, a badly-designed frame can cause inconsistent estimates regarding target population.

Once examining the history of sampling frame, between the eras 1930-1960, area-based sampling frames were used in general. With the 1940s, US department of

agriculture utilized the method for households-individuals-. Some other alternative sampling sources existed as well. For example membership/subscriber list, or telephone directories. However, these sources contained partial of population. Between 1960 and 1990, with the development of technology, telephone became a significant medium, first in houses of rich people, then in almost every house in Urban. An alternative sampling frames were provided by telephone companies. Six digit telephone numbers, to which sampling statisticians attached four digit random numbers to create a probability sample. Until 1990s, another sampling source, Electoral Registers(ER) system, was available for UK. Few years later, the system became incomplete, because refusals of some people to register for voting. After 1990 to present, traditional telephone survey frames lost its reputation, due to increased mobile phone numbers. Prediction of geographical location of individuals became harder. Hence, coverage errors was occurred for local area studies. Because of the development of technology and register system, Postcodes Addresses File (PAF) increase its popularity. Such private companies and government agencies compile the data and offer those list to demanding persons or companies. This new sampling design is cost saving, due to not to require listing operation at the last stage of sampling. There are also auxiliary sources exit, like telephone directories, membership records, customer records, employment records and patient files in a hospital are several of them. (Grooves, 2011)

However there are no study about comparison of different types of sampling frames In Turkey, some other studies, corresponding with sampling, exist. Turkey Demographic and Health Surveys (TDHSs) can be considered as an example for the sample studies in Turkey. The Address information from NAD have been used as sampling frame both for TDHS-2008 and TDHS-2013. The address information have updated by special processes called listing operation, which will be explained widely in following chapters. Another example was completed by Aslan (2008) as a dissertation which related for sampling in farm accountancy data network (FADN) and it’s usage in the agricultural situation. He

analyzed the sampling survey infrastructure necessity for FADN implementation in Turkey.

As use of multiple frame have increased its popularity for last years, this topic was studied by Aykuteli (2011) and Dalçık (2010) in Turkey. Both of investigate use and application of multiple frame in Turkey. According to both author, due to meet a golden frame is almost impossible, alternative proposals have been generated to solve problems related to frames. Multiple frame is one of those solutions. It means two or more frames are used and independent samples are drawn in sequence from each of the frame. Multiple frames are used under the assumption of each used-frames covered entire population once these are aggregated. The authors thought that multiple frames provide not only cost efficiency, but also using multiple frames can cover most of the target population. Hence, the latter reason decreases biases because of coverage error.

Although, as stated above, the study for comparison of different address lists (from the NAD, and the listing operation) were not studied in Turkey, the similar topics have been studied in European countries and especially in USA for many years. These studies are presented below.

Iannacchione et al. (2008) carried out a research in order to compare coverage of a household sampling frame between mailing addresses and field enumeration. They used two types of frame: First, residential mailing addresses. The addresses are obtained from the U.S. Postal Service (USPS) through a nonexclusive license agreement with qualified private companies. Delivery Sequence File (DSF) provide the addresses. DSF is a computerized file that include all delivery point addresses serviced by the USPS. Second source is field enumeration (FE). Field enumeration often is assumed to be the “gold standard” for frame construction for in-person household (HH) surveys. Field enumeration activity initiated with a divide into parts to the geographical area cooperate with a survey population into small areas, called segments. Then listing staff dispatch to

the selected segments in order to enumerate all potential dwelling units (2008). After the selection of sampling units and completion of the survey, comparison of two types of frames were completed. Global Positioning System technology was used for matching these housing units (HUs) from each frame, without under the condition of either approach is the "gold standard." As a conclusion, field enumeration included approximately 98 percent of the HUs compared to 82 percent coverage for mailing addresses. Once only the occupied household units were selected however, the coverage rose to approximately 99 percent and 95 percent respectively (Iannacchione et al. 2008).

Simon (2011) released a research, named using administrative data as an alternative sampling frame. Department for Work and Pensions (DWP) keeps the Data and it is utilized for the Family Resources Survey (FRS). To found out an alternative administrative sampling frame, instead of FRS, was aim of this research. This article summaries the major findings that, compassion between current sampling frames (PAF) and suitable administrative data sources. "The findings offer important considerations for how UK household surveys might be sampled in the future by using administrative data sources" (SIMON 2011). Three types of sampling frames were compared. First, PAF that currently used data source for FRS. The PAF is compiled by Royal Mails. It include address lists, this is a list of all addresses getting less than 50 items of post daily in the UK. Second and third sources belong to The Department for Work and Pensions (DWP), considered as suitable alternative sources. Initial alternative source was the Address Hierarchy (AH) File. Following source was the Work and Pensions Longitudinal Study (WPLS) forms. The latter alternative source is Customer Information System (CIS), which display a more complete list of all individuals (2011).

Whereas, small–users PAF records less than 1.5 million unique postcodes, CIS and AH file record just over 1.7 million and 1.8 million respectively. Comparison of AH and CIS files completed according to PAF addresses. For postcodes, the 'match rate' for the PAF to the CIS and AH files seems very high. While 98 percent of PAF's postcodes

matched with the CIS, 97 percent matched with the AH file. For addresses, the match rate of the PAF according to the CIS calculated as 84 percent and to the AH file calculated as 75 percent. One striking result was between addresses and postcodes. The match rate for addresses were less than for postcodes. This stem from missing street numbers. The results of the research indicate that administrative data is potential and proper alternative to FRS. The reason in Simon's words as following:

> "This is because the match of PAF postcodes to the administrative data examined in this research is quite high (possibly even higher when non–private households are excluded from the CIS and AH files). The match rate of addresses, particularly using the CIS, also seems to offer good coverage of the GB population. However, further work is needed to make using administrative data as an alternative sampling frame for the FRS a viable option. (Simon, 2011)"

Another research which was completed by Link et al (2008). They tried to compare two types of sampling source, Address-Based Sampling (ABS) and Random-Digit Dialing (RDD). As part of the 2005 Behavioral Risk Factor Surveillance System (BRFSS), a pilot study was carried out. The comparison was made by using of a RDD telephone survey methodology, which selects people for participation with telephone statistical surveys by generating random telephone numbers, to a method using a mail version of the questionnaire completed by a random sample of households drawn from an address-based frame. Comparison was completed, for two types of survey methods, in terms of their response rates.

The findings indicated that "the mail survey approach can reach higher response rates in low-response-rate states (<40%) than RDD. Additionally, the address frame with mail survey design provides access to cell phone only households and offers cost savings over the telephone approach" (Link et al. 2008).

Johnson et al., (2010) compared two types of sampling frame. - ABS and RDD-. Positive and negative features of these frames tried to be explored according to using ABS techniques for phone data collection. They concluded that there were situations where ABS sample would be preferable to landline RDD dialing (especially when the cell phone only population is essential). However, it should not be forgotten that time and costs would increase by using ABS technique.

One more research was completed by Deborah Kaple and his colleagues in 2010. They tried to compare several types of sampling frames on art organizations. Three metropolitan areas, Philadelphia, Dallas/Fort Worth (Texas) and Twin cities were considered as research area. The first type of source is Service Organization Directories and following organizations provide the list of members for this relevant source: the, Association of Art Museum Directors, American Symphony Orchestra League and the Theatre Communication Group, Dance/USA, examined the listings of museums included in the Official Museum Directory and Opera America. National Standard Database is second data source. Regional art organizations, a few local art agencies, the NEA and state art agencies use this standardized set of terms. Third, database is IRS Business Master File (BMF) data. The BMF is maintained by Internal Revenue Service based on Forms 990 filled by nonprofit charitable entities. State lists and local lists are another two different data sources for this research. Whereas State lists refer project research employed lists provided by several state-level organizations, Local lists state lists provided by local arts service organizations and local foundations. The last data source is Local press. Researchers monitored magazines and newspapers one day for each month of 1994 as a sample. They aim to obtain maximum number of culture and entertainment lists (Kaple et al. 2010).

For each site (metropolitan), different researchers tried to collect information. After gathering all information, comparison was completed in terms of coverage, different artistic disciplines and budget size of organizations. The research exclude the rural area

and the writers thought that some organizations, related to art, could be excluded as well. The results stated with Kaple and his colleague's word as follows:

> "As IRS Form 990 files improve in scope and reliability, supplementing local lists with IRS data will also become cost efficient. If the budget permits, even more complicate listings can be organized by local press listing (almost 9 percent of the organizations we identified were located uniquely through local press source, which included roughly 80 percent of the total population). Different sources may be useful for different purposes: A study of large organizations in established disciplines, for example, can rely on very different sources than one ethnically specific neighborhood arts organizations."(Kaple et al. 2010)

Lynn and Taylor (1995) carried out a research related comparing sampling frames. They tried to find out bias and variance of samples of individuals. Electoral Registers (ER) and Postcode Address File (PAF) was considered as sampling frame. In Great Britain the PAF and the ER are two main sources in order to sampling frames of residential addresses for area sampling. Electoral Registers system defined as for a target population of individuals (electors at the address were selected by probability proportional method). For this study, half of the sample, for the 1991 British Social Attitudes[1] (BSA) survey, was selected from the PAF, and rest of them from ER. Furthermore, the PAF sample was cross-checked with the ER to find out the part of the sample which would not have had a chance of inclusion in an ER sample. Lynn and Taylor (1995) aim to assess frame effects on response rates, effects on survey costs, effects on efficiency and effects on 27 selected attitudinal variables(e.g. demographic structures, ethnic groups, educational qualification or so on).

[1] The British Social Attitudes (BSA) survey series began in 1983 and is designed to measure continuity and change in social attitudes and values.

PAF might be a good alternative sampling source for area sampling.

> "It seems likely that the PAF will be preferred to the ER for many surveys of individuals. The ER has been shown to produce bias estimates, through for only a small number of variables is the bias sufficiently large to be apparent. In general, the larger range of weights which result with a PAF sample do not seem to reduce the precision of estimates noticeably."(Lynn and Taylor, 1995)

Moreover, there is almost no difference between PAF sample and ER sample, in terms of logistical aspect (field cost). All in all, "it should not be concluded that PAF will always be the preferable frame for all general population surveys" (Lynn and Taylor 1995). There might be some other surveys where the ER could be more applicable (Lynn and Taylor 1995).

Regarding epidemiology, another study was conducted by Smith et al. The aim of the study was made comparison of external validity (the demographic and clinical characteristics) and efficiency (response and follow-up rates) of two different sampling sources in primary care -a general population sample and a convenience sample-. Whereas, all patients on practice lists constitute the general population sample, convenience sample consist of listed patients receiving regular analgesic prescriptions. The data obtained from repeat prescription sample (86%) was better than general sample (82%) in terms of response rates. Moreover, according to Smith et al. the repeat prescription sampling method was much more effective than the general population method,-nearly five times-(2005).

Even though, there are not any studies available in Turkey related to comparison of address lists (as frame) from a registration system with another address lists, which is an update operation of those lists, some similar studies have been worked by other countries that stated above. It is important that assessment of these studies should be made very careful in order to comprehend the situations in Turkey.

3. METHODOLOGY

The sampling frame has been an important stage and necessity throughout sample design process for long years. It has a kind of general definition, includes both physical lists and procedures that can explain entire sampling units without the physical effort. Addresses, obtained from the NAD and from the listing operation of TDHS-2013 were used as data source in this thesis. As it was mentioned previous chapters, listing activity is an addresses update operation of the NAD address information, which were provided by TURKSTAT.

Main purpose of this thesis is testing the quality of the current household frame using the listing operation of the TDHS-2013. In order to achieve this aim, effort is made to reveal the differences between the address lists obtained from the NAD that served as the frame, and the lists that were updated during the listing fieldwork. Comparisons are made by various aspects; such as response codes obtained after the survey operation, or type of dwelling codes obtained after the listing operation. Two basis cases/errors are evaluated in this thesis. The first type of cases is the NAD based errors. Comprising missing addresses, deficiencies in numbering system of settlements or so on. The second type of cases is listing operation based errors. Including, listing staff errors, ringing staff error or error that happens during creating block lists.

Firstly the sampling design and frame of TDHS-2013 is introduced in this chapter, then, the definition of sampling frame, some feature of sampling frames, types of sampling frames are presented. Finally, the NAD and listing operation are explained comprehensively.

3.1 DEMOGRAPHIC AND HEALTH SURVEY (DHS)

Demographic and Health Surveys (DHS) provide nationally representative data for the areas of nutrition, health and population. There are two types of DHS surveys conducted. 1) Standard DHS: it has large sample and typically are conducted nearly every 5 years, to allow comparisons in time. 2) Interim DHS Surveys: although this survey focus on the collection of information on key performance monitoring indicators, it may not include data for all impact evaluation measures.

3.1.1 TDHS-2013

TDHSs are one of the important member of DHS, which are the most widespread surveys among developing countries. Many different countries carry out DHS in periodic years. In Turkey, TDHS has been conducted by HUIPS since 1968 and the last survey was 10^{th} of quinquennial demographic surveys.

3.1.1.1 Sampling Design

Weighted, multistage, stratified cluster sampling approach was used in the selection of the TDHS-2013 sample. The sample was designed in this fashion because of the need to provide estimates for a variety of characteristics for various domains (HUIPS, 2014).

These domains introduce as follows:

- Turkey as a whole,
- Urban and rural areas (each as a separate domain),
- Each of the conventional major five regions of the country, namely the West, South, Central, North, and East regions,

- The 12 Nomenclature of Territorial Units for Statistics (NUTS) 1[2] regions, for selected indicators which are based on sufficient number of observations,
- The seven largest metropolitan cities (each with populations above one million: allowing for comparison to TDHS-2008; İstanbul, Ankara, İzmir, Bursa, Adana, Konya, Gaziantep).

Fifteen artificial major strata were designed to aggregate and provide either the five regions or the NUTS 1 regions. Each of the 15 major strata consisted of urban and rural areas, leading to a total of 30 strata. Seven metropolitan areas were also of interest. One of them was Istanbul, which is already a NUTS1 region by itself; thus the final number of 36 strata (Appendix 1) in TDHS-2013. The basis of this stratification approach was used first for the sample design of TDHS-2003, and then repeated for TDHS-2008 and TDHS-2013(HUIPS, 2014).

3.1.1.2 Sampling Frame:

To create sampling frame[3] of TDHS 2013, different criteria have been used to describe "urban" and "rural" settlements in Turkey. The urban frame of the TDHS-2013 consisted of a list of provincial centers, district centers, and other settlements with populations larger than 10,000, regardless of administrative status. The rural frame consisted of all district centers, sub-districts and villages not included in the urban frame. The urban-rural definitions of the TDHS-2013 are identical with those in the TDHS-1998, TDHS-2003 and TDHS-2008(HUIPS, 2014).

[2] Currently Turkey is divided administratively into 81 provinces. Three levels of NUTS regions were constructed in order to adopt the European standards in late 2002. The 81 provinces were designated as regions of NUTS 3 level; these were further aggregated into 26 regions to form the NUTS 2 regions. NUTS 1 regions were formed by aggregating NUTS regions into 12 regions.

[3] For an additional description of these aspects of sample designs for DHS surveys, see the DHS Sampling Manual htttp://dhsprogram.com/pubs/pdf/DHSM4/DHS6_Sampling_Manual_Sept2012_DHSM4.pdf,ICF International. 2012. Demographic and Health Survey Sampling and Household Listing Manual. MEASURE DHS, Calverton, Maryland, U.S.A.: ICF International

Initial information on all settlements in Turkey was obtained from the 2012 Address Based Population Registration System (ABPRS-2012). The results of ABPRS-2012 provided a computerized list of all settlements (provincial and district centers, sub-districts and villages as forming the base for sampling frame of TDHS-2013) and their populations. The Address Based Population Registration System (ABPRS) is a system developed in the last decade, which registers each person who has a citizen ID number (or a special number for resident aliens) at a specific address. The NAD was also developed by municipalities in collaboration with Turkey Statistical Institute (TURKSTAT) to support ABPRS (HUIPS, 2014).

3.2 SAMPLING FRAMES

A simple meaning of sampling frame is the set of source materials from which the sample is drawn. The definition contains the objective of sampling frames as well, which selecting particular members from target population in order to interview in a survey. Sometimes, in household surveys, more than one set of materials might be required due to multi-stage nature of the survey. The first stage of selection in household surveys are selected from area frames, whereas the following stage may be drawn from either from list frame or an area frame.

While determining a proper frame, paying sufficient attention on relationship between the units of selection (determines target frame) and target population is extremely crucial. One should be recalled that the probability of selection at the last stage is defined by unit of selection. For example, for a medical survey on infants, selection of medical facilities are primarily stage, infants are the next stage of unit of selection. Households are playing a crucial role in household surveys. Because the unit of selections, in other words sample design, are based on these households. According to Turner (2003), followings are futures of the sampling frame.

3.2.1 Features of Sampling Frames

The definition of a perfect frame should accomplished three important criteria: accuracy, completeness and up-to-date. These features are almost unreachable in household surveys. Yet, creation a frame is vital either from utilizing a frame already exist or from scratch that constructed for the survey. On the other side, in order to assess the quality of frame, target population and how well designed sample to reach idealized properties are important. It should not be forgotten that definition of probability sample, which all member of the target population has known and non-zero chance of being selected, is an important parameter for evaluating the quality of frame.

3.2.1.1 Accuracy

Even though, inaccuracy is more common features among different type of surveys, accuracy is an essential property in household surveys. Accurate frame is ensured, when the frame contains all the member of target population only once. Following business establishment example display error regarding accuracy. The list of the establishment defined as more than 50 employees. Error might be occur if any establishment has 49 or less employees or if an establishment counted more than once or if any establishment has 50+ employees but missing from the lists.

Encounter possibility of these inaccuracies in household surveys relatively lower. Following might be an example for household surveys. Computer files for enumeration areas (EA) sometimes have missing elements. This lack elements can violate the condition of correct probability sample. Duplication in listing is also another violation type. Although all elements are known but, they are counted more than once. This disturbs the true probability sample as well.

3.2.1.2 Completeness

The ideal frame defined as full coverage of target population. In other word, it is described as completed, if all of the target population members, the universe, are contained by the ideal frame. Therefore, coverage of frame is a major property for evaluating whether the coverage is appropriate for the survey or not. If it is not applicable, further developments should be executed to make it appropriate.

In household surveys, insufficient coverage would be a problem. For instance, entire populations might be intended to cover by a national survey. In order to this aim, survey organizers can exclude some segments like nomadic populations or institutional populations. When this is the case, entire population is not reachable for household surveys. Survey team should develop an additional frame, which cover omitted segments. Once again, in order to not to make a mistake, survey team should define their target population very carefully and inform the users, who will use same frame, which segments included or which segments excluded from coverage.

3.2.1.3 Current frame

Used frame for a survey should be current for executing previous two features (accuracy and completeness). In household surveys, a perfect frame include accuracies and completeness. The typical instances for out of date frame is census population which was conducted several years ago. Defoliation of dwellings, lack of information for migration, birth and deaths are not displayed by old census data. In such a case, these insufficiencies violate each member of the target population should be known criteria from probability sample. Such as consider a frame obtained from EA, which updated 5 years ago via census. Supposing within 5 years, several streets and slum areas have built, new buildings have been constructed and a considerable amount of people migrate those

location for accommodation. These missings regarding these households, who live in those buildings, disrupt the probability sample condition as well.

Different types of sampling frames has been utilized by survey designers of for years. In the following subsections, these frames, which is used for household surveys of other applications, will be discussed. It is essential to note that the frame should be considered as separate component in each stage of multistage survey designs.

3.2.2 Types of Frames

3.2.2.1 Area frames

Area sampling frames are designed by geographical units of a country in a hierarchical procedure in household surveys. These units are administratively labeled and they might be vary according to country to country. Furthermore, area frame is also a list, since a list of the geographical units of the population in a countries is a necessity in order to select sample for first stage of survey sample. In general, they can comprise following terms: country, provinces, districts, sub-district, and villages. Further classification, like Enumeration areas (EAs), can be developed in order to census purposes. Frequently, EAs are delineated as the smallest geographical unit in a country for the survey and census purposes.

Four important different features of geographical units, which are vital for sample design, are presented as follows.

a. The geographical units cover, generally, the whole land of a country.
b. The boundaries should be well-defined.
c. Population figures should be accessible for them.

d. They should be mapped.

Population census for countries can be a good initial point to develop an area frames for these reasons cited above. Moreover, EAs are reliable geographical units, both for size and accomplished those 4 reasons, for last stage of the multi stage sample design. EAs, in most countries, includes approximately equal number of households, roughly 100 households. Hence, this provides comparable workload for census directors.

EA is the smallest geographical unit (piece of land) into which the country is divided for survey enumerations or census. Therefore, EAs are essential for both the statistical area structure, and to the census management area structure.

In order to create EA, Statistical Institutions of countries have big responsibilities. They have to demarcate and provide an up-to-date geographical frame. Flawlessly covering all country, the frame might enable to execute of the census through the use of Geographic Information System (GIS) technology. A unique numeric code needs to be assigned to each enumeration area or administrative unit and it provides the link between the aggregated census data and the digital EA boundary database stored in a GIS (LAARIBI 2015).

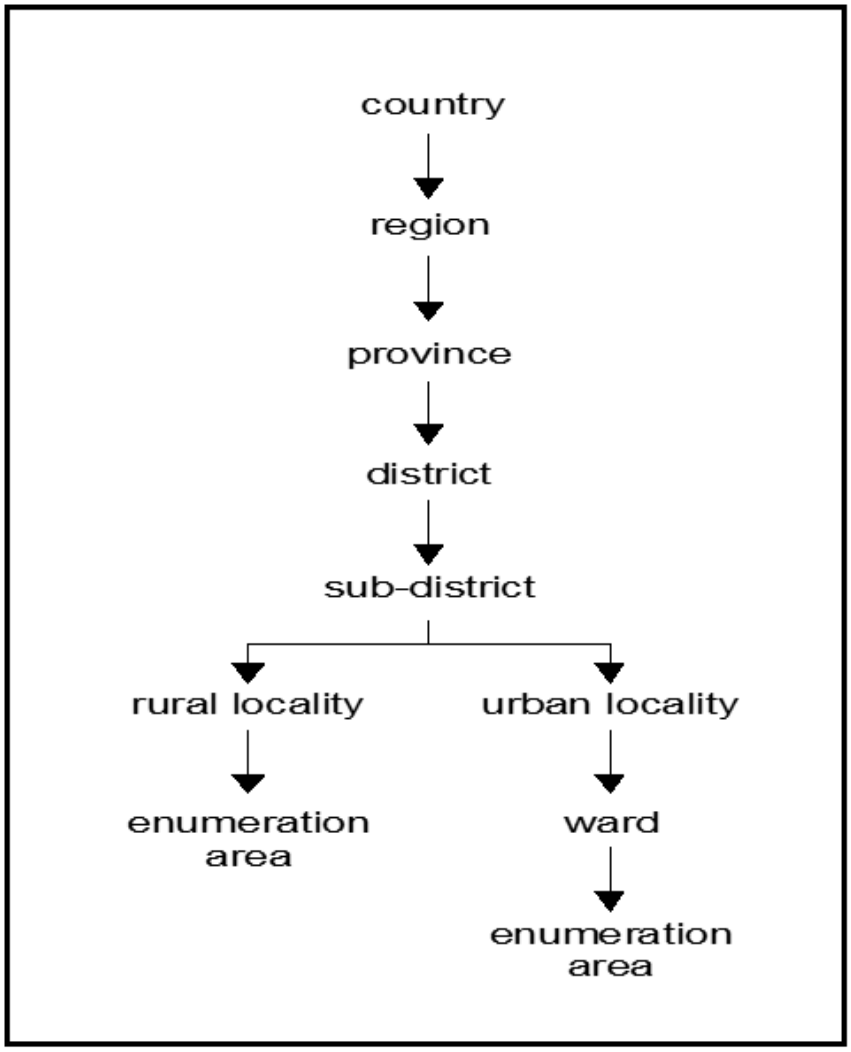
Figure 1: An Example of an Enumeration Area Coding Scheme

Type of coding schemes (Figure 1 is an example of them) can be changed country to country and they serve as a creating block in order to analyze, to disseminate and to

collect the census information for efficient decision making by users in terms of their needs. Moreover, this system provide frames for sampling with other interval divisions.

Hierarchical principals is another crucial requirements for EAs. According to the hierarchical principle, the EAs should fit faultlessly to the boundaries as outlined in the hierarchy to permit combination of data per layer. It might vary country by country and one of those is presented by Figure 2.

Figure 2: Geographical hierarchy



The demarcation of EAs should adhere to certain standards as follows:

- Be mutually exclusive and exhaustive;
- Have easily identifiable boundaries on the ground;
- It should allow to administrative hierarchy;
- Be of approximately equally sized population;
- It should not be big too much in order to accessible to be covered by an enumerator;
- Be large enough to guarantee data privacy;
- It should be available for other types of data collection activities.

The creation of EAs are a painstaking task and contain challenges. According to Mokgokolo, these challenges derived from following reasons:

The first reason is automation. For most of the demarcation of EAs, GIS technology could be the driving force, with most of the operations occur in the office. This effort is made to automate the process as far as possible, particularly in areas where the information are up-to-date. In some cases, EAs could not be efficiently demarcated by automation. For those cases, manually demarcation is switched with automation. In general of the process, office-based operator analyze the area and make a decision on where boundaries of enumeration area should be drawn. The edits on automated EA boundaries are to be done manually on the attribute and spatial data. This is moving boundaries to observable line features on the ground (like rivers, street center-lines, railway lines, etc.).

The second reason is dwelling frame data. The creation of the efficient dwelling frame in order to demarcate EAs meant that a good knowledge base about the location of all dwellings in the country would be established. This would allow every household to be visited. Therefore, proper frame ensure that every person in all parts of the country would be counted. Although, opinion of some countries that their dwelling frames proper

enough, some part of those frames are not covered well. For instance, inadequate information in high-rise buildings (flats). Most high rise buildings do not have such information, making it hard to determine the accurate size and for type an EA.

The third reason is Municipal Demarcation Board (MDB) boundaries. The hierarchical standards of census geography guarantees that, when aggregated, the EAs should fit perfectly to the administrative boundaries, such as district councils, municipalities and where possible, magisterial districts. Once any changes required at the lower level of these boundaries, statistical data releases related those level subsequently.

Size is the forth reason. Size of EA generally refers to either number of dwelling unit or area size. Since EAs are the operational geographic units for the data collection, the determination of EA size is required that an EA should be created by taking account of logistical plan of the organizations. An ideal EA should be a size that field workers can carry out their tasks within the restricted period of census date.

Image is the last reason. The use of images is playing a vital role for the success of not only data collection, but demarcation also. As constructions on the ground occurs fast, the major problem with images is that most of the recent images are acquired only at final stage of the project. This had an impact on size and boundaries, when comparing former images to the most recent (2013).

There are different types of criteria are used for different countries, through creating TEAs. USA can be considered as an example, whose criteria were stated below. For Census 2000 USA, the classified each block in the country into one of the following nine enumeration areas:

TEA 1: Mailout/mailback
TEA 2: Update/leave
TEA 3: List/enumerate
TEA 4: Remote Alaska
TEA 5: Rural update/enumerate
TEA 6: Military
TEA 7: Urban update/leave
TEA 8: Urban update/enumerate
TEA 9: Update/leave originally assigned to mailout/mailback

Census Bureau created two different lines while splitting the blocks. The criteria was whether the block was "inside the blue line" or "outside the blue line." The term "inside the blue line" states blocks with HU mailing addresses which are frequently city-style, where most of the enumeration were conducted by mailing questionnaires. In these areas, the Census Bureau utilized the address list created from the 1990 Address Control File (ACF) and the Delivery Sequence Files (DSFs) from the United States Postal Service (USPS). Blocks in TEAs 1, 6, 7, and 8 are "inside the blue line." (Green 2004)

On the other hand, rest of the addresses are defined as no city-style where the Census Bureau conducted the census by enumerating the census in person or by hand-delivering questionnaires are referred to "outside the blue line." In these areas, the Census Bureau used address listing and map spotting to prepare the initial address list and to determine the block assignment of each Household unit, and the update/leave operation to update the addresses and their block tasks. In the remaining areas, address lists are developed by Census Bureau at the time of enumeration. Blocks in TEAs 2, 3, 5, and 9 are "outside the blue line." Blocks 4 in TEA are excluded from this evaluation.(Green 2004)

3.2.2.2 List frames

A list of sampling frame basically contain all the list of the target population. Hypothetically, the list of frames, called perfect frame, exist for a country right after the census operation. Because, the lists, say obtained from administrative data, include fresh information about target households list could ever be. Due to its geographical arrangement, it is quite simple to stratify fresh census data in order for appropriate geographical distribution of the sample. The frame list of a follow up survey, just after the census, contain much more detail than census. It includes supplemental and more detailed information about dwellings. Therefore, if it is possible, to use a most recent frame list in a survey indisputable crucial issue. In other words, the more gap between follow up survey and the census, the more poor quality of frame would be as a sampling source. Civil registration system and register of utility connections could be given as two of the examples for listing frame.

For household surveys, there are several instances of lists can be considered as suitable sampling frame rely on their quality. Civil registry is first of the useful source for creating a sampling frame, if it is carefully and continuously updated. These type of source kept records of all the citizens' information, like addresses or identity information. The second instance is utility connections, especially electricity. As most of the household have electricity connections and information regarding those households, the source can be used as sampling frame whenever census information is extremely absent. As most of the frame, utility connections also have drawbacks. For example, suppose there are lots of households exist where they do not have any electricity connections. The third example is register of telephone subscriber. Random digit dialing (RDD) technique have used while creating sample design. RDD guaranties the random selection in subscribers in telephone dictionary by giving them proper chance of selection. This source had been very popular between the years 1980 and beginning of 2000s. After the development of cell-phones and low rate of landline ownership, the source lost its popularity. Because,

almost every person in a house have one or maybe more than one cell-phone, this issue disrupt the probability sample condition.

3.2.2.3 Multiple frames

While, most of the survey designed by single sampling frame which covered entire target population, more than one frames are used for multiple sampling frames. Each of the frame are independent and samples are drawn from each of them respectively. Once two different frame are used in design of sample, it called as Dual sampling frame. Following two features are the important motivations for multiple sampling frames.

- To succeed a desired level of accuracy as far as possible with reduced cost.
- To decrease errors arise from coverage error by developing a good coverage.

For some survey operators, cost item of the survey is very important. Hence, they generally tend to use completed sampling frames which is less expensive and easy to access. Such as institutional lists and telephone dictionaries. For some surveys, distinct characteristics of people are important, like a rare diseases. Collecting desirable information from a general health survey could be useless. In such cases, lists, obtained from hospitals or some treatment center, could be more proper and the lists might provide much more information than frame of general health survey.

Development of clusters by using geographical units is constituted the first stage of selection. These areas are usually defined as EAs in city blocks in urban areas -entire village or parts of the village in rural area-. The frame contain whole universe of the study, which is made up from geographical units (the country as a whole, the capital city, provinces or so on). Compilation of the lists of units is last stage of the sampling. First, the survey operators check the list, taking care of completeness, then the list is stratified by certain features – say, geographically-, and last stage is consisted by selection of sample from the lists- frequently Probability proportional to size (PPS).

3.2.2.4 Master sample frames (MSF)

Master sample frames is a type of frame (large enough), which is utilized by either for each stage of multiple surveys, or for periodic surveys or different round of continuing surveys. The nature of the master sample frame, it does not vary that much between surveys to survey. On the contrary, this undifferentiated characteristic of the MSF is made it stable. The MSD has been established in order to drawn subsamples, when necessary, for same surveys over an extended period of time (like DHS), or some specific surveys.

Some features of MSF can be summarized as follows:

• Cost efficient; makes it possible for the National statistics offices (NSO) to spread the costs of construction of a sampling frame over several surveys.

• Simplifies the technical process of drawing individual samples; facilitates quick and easy selection of samples for surveys of different kinds.

• If well-maintained, it will be of value for the next population census. (Turner 2003)

3.3 NATIONAL ADRESSES DATABASE (NAD)

In Turkey, the NAD has been used as sampling frame for the TDHS-2008 and TDHS-2013. With the system NAD, all citizens' address information are known literally and updated continuously. It is a registration system in which the demographic information of people according to their residence is kept updated, their population movements are followed at any moment and the persons are matched with their residential according to the Turkish Republic Identification number in MERNIS registry. The field application is performed by TURKSTAT, in order to develop the "Address Based Population Registration System". One of the aims of this system is to develop existing administrative records based on addresses. In April 29, 2006 dated Population Services Law with numbered 5490 is the legal base for this study. This law charged TURKSTAT and the General Directorate of Population and Citizenship Affairs (GDPCA) of the Ministry of Interior in order to establish, develop and sustain the system. The system includes; Persons residing in households, Persons living in institutional places, Nomads, Homeless persons and foreign citizens residing in Turkey. Turkish citizens living abroad are not included in the system.

Since 2007, The NAD has provided information about population each year (end of December). It is considered up-to-date and supposedly the coverage error decreases in every passing year. For TDHS-2008, the address information (without villages) was gained from The NAD for the first time. For TDHS 2013, address information were provided by the NAD for some villages for the first time as well.

Under the Official Statistical Program, statistics on population size, births, deaths and other vital events, and migration are produced according to this improved population registry. The system keeps going in this way. Furthermore, the census which was planned to be carried out in 2010 did not take place, because TURKSTAT decided ABPRS could take its place.

This system was transferred to the Ministry of Interior after being established by TURKSTAT. The updating carries out in two ways. First, Updating of Address Registry which is defined as when the building usage allowance documents is assigned, the buildings are collapsed or burned, administrative changes, changes in street or district, construction permits are occurred, NAD updated by entering the these issues to system. Second, Updating of MERNIS Registry which is determined as the information of people in MERNIS databases about address and identification will be updated by entering the information of birth, death, marriage, change in residence into the system by Public Organizations from which service about residence is taken, Birth Registration offices and Mukhtars(head of village).

3.3.1 Advantages of the System

Sex, age and education information and even the people living in the smallest settlement can be known at any moment. Accordingly, up to date information for planning regarding health, education, dwelling and social services is available. This data is more valuable, under the assumption of instant reports. This is only possible through people reporting their changes of residence as soon as they move. Such reporting has been increasing by the year in Turkey because of regulations that do not allow basic education or health services in the absence of address registration. Moreover, production of statistics about population size in residential base, age and sex, birth, death, marriage, divorce, migration and education will be possible in shorter periods.

3.3.2 Disadvantages of the System

The system has drawbacks as well. First, although TURKSTAT provides address information for villages, it is not satisfactory. In some cases, there is no observable house-numbering. For some of the villages with observable house-numbering, the numbers are either scattered or missing. Second, there is no proper corresponding map for block lists

provided by TURKSTAT. The logic of selecting streets for blocks is based on geographical proximity. TURKSTAT has a code in order to perform this selection. Although, streets are close to each other generally, in some cases there are big gaps between two relevant streets. Third, lots of changes occur at any moment in life, like the construction/demolition of a new building or a new street. These occasions might not be included by the system instantly.

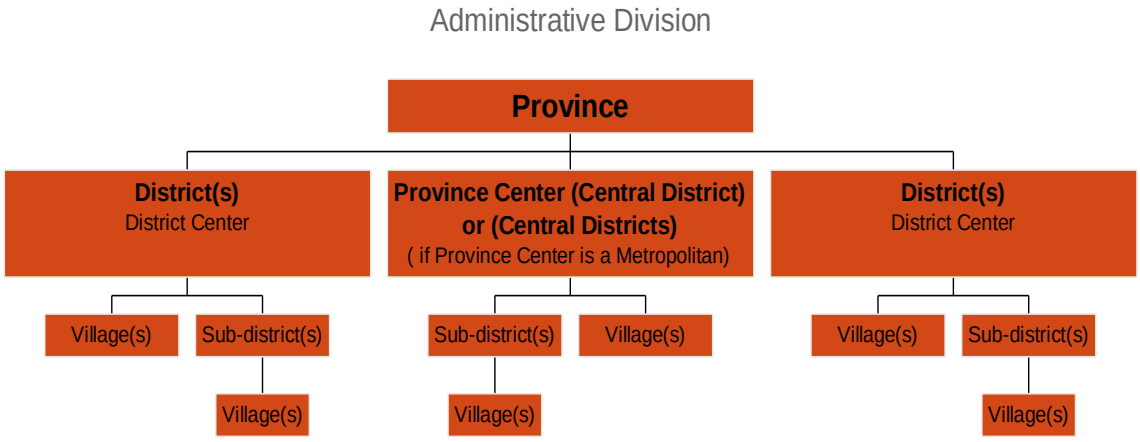
3.4 HOUSEHOLD LISTING OPERATION

The listing operation is independent from interviewing process. It can be considered as initial process before the data collection. It has two aims: first, providing updated data that used through last stage of HUs selections. Second, preparing the documentation which will be used during interviewing. The listing operation is an important procedure for reducing non-sampling errors in the survey, especially when the sampling frame is outdated. (ICF International 2012). The listing operation enables to reach the data which is consisted of occupied residential households in selected clusters.

Each listing team includes two staff and they work together. While one of them is responsible for updating the address lists (lister), the other staff (mapper) is responsible for drawing dwellings, which were listed already, on the sketch maps.

As it is mentioned before, a weighted, multistage, stratified cluster sampling approach was used in the selection stage of the TDHS-2013 sample. It called complex survey design. One of those preceding approach is enough to make the sampling complex.

In Turkey, settlements are defined as province, city center, district, sub-district and villages as follows.



In Turkey, settlements are not divided into small area units with well-defined boundaries (e.g., census enumeration areas) that can be used for conducting surveys. However, for all settlements, household lists are available from the NAD, for the first time in 2007 by municipalities in collaboration with the TURKSTAT, to be the base for Addresses Based Population Registry System (ABPRS). Thus TURKSTAT was able to provide household lists for all selected blocks. In urban areas, the lists consisted of approximately 100 households. In rural areas, different situations arose. Some rural blocks were located in district centers with populations less than 10,000, in this case blocks were similar to urban blocks. Some other situations observed were: 1) blocks consisted of a whole village, 2) blocks consisted of a section of a village covering approximately 100 households, 3) blocks consisted of two villages. TURKSTAT provided a list of the dwellings units with their full addresses (quarter, area, avenue/street, building and door number) for each of the selected blocks (HUIPS, 2014).

The selection of sample consist of broadly three stages: The first stage of the sample selection was started by obtaining the address lists (block) from each strata from TURKSTAT. They developed block lists (as Primary Sampling Units), which contain all residential occupied households in entire Turkey. Each blocks (PSUs) include approximately 100 households and the frame for the block selection was prepared in order for using information on the population sizes of settlements were provided by the ABPRS 2012. Second stage is initiated by updating operation of these address lists through the listing operation. Third, after those updated address lists arrive to HUIPS, as mentioned above, 25 households were selected as a cluster from urban blocks, and 18 households were selected from rural blocks by systematic random selection technique as a cluster. The details of the listing and mapping activities are provided in the next section (HUIPS, 2014).

The listing operation consists of visiting each cluster, recording on listing forms a description of every structure together with the names of the heads of the households

found in the structure, and drawing a location map of the cluster as well as a detailed sketch map of all structures residing in the cluster. These materials will guide the interviewers to find the pre-selected households for interviewing and will allow field work supervisors to perform quality control during data collection (ICF International 2012).

Followings are applied throughout the listing operation:

- To Update the Addresses lists, whose numberıng are observed properly, obtained from TURKSTAT
- If the addresses of some settlements numbering system are not defined well, they create the household lists of corresponding settlements.

Necessity of the listing operation stem from information related to households (e.g., occupied households or a flat can be used as an office instead of a dwelling) are not updated or those are not adequate. For example, one year before a dwelling addresses were specified like occupied, however the household can be observed destroyed or unoccupied during the listing operation. For some villages, there is no street name and the street column called as “Villages Street” in lists, which obtained from TURKSTAT. Moreover, generally in those villages, numbering is another problematic issue, because they are not defined well. For some of these villages, TURKSTAT cannot provide the list of households (for villages which is not municipal). All in all, the main aim of the listing operation is updating the numbering just before the questionnaire implementation and to create a household lists in villages where the addresses are not obtained from TURKSTAT.

Mapping operation was carried out simultaneously with the listing operation and it is important as same as listing activity. The map stuff responsible for drawıng dwellings, which were listed already, on the sketch maps. These sketch not only useful for showing the right direction to survey team, throughout questionnaire implementation, but it is also beneficial for obtaining some information about cluster in first impression.

3.4.1 Definition of Terms

In TDHS-2013, meaning of "Block" and "Cluster" were used interchangeable. Data from the NAD, if the settlements have enough population, their size of cluster 100 households approximately. Smaller population settlements have less than 100 households. The listing operation is a kind of updating all addresses in certain boundaries which was already defined and describe the listers.

Following are the brief definitions of the terms used in documents of listing operation.

A structure (building) is one or more dwelling inside of building and this is a sort of independent construction from other buildings. Dwellings of this structures can be occupied for residential or commercial use. For example, it can be an apartment, if it include one or more households. It can be mosque, which does not contain any household or so on.

A dwelling unit is either a room or a group of rooms that intended as a residence for one household (for example: a single house, an apartment, a group of rooms in a house); a dwelling unit can also have more than one household.

Household is kind of social unit in which a group of people, who live together in a living quarter, share foods and furniture together. They called "head of household" to same person. If those people called themselves a household, they should say "yes" the following three questions.

- Do they live together in same dwelling?
- Do they call same person as head of household?
- Do they share the same food?

In terms of the definition of fore mentioned questions, whereas a household can include a person, the household contain a family. Furthermore, being relatives in household does not important for our definition of household.

In some situations, we might come across a unit in which more than one household contain. For instance, a landlord could rent his 3 rooms to 3 different family. These households live in same unit and eat, sleep and live independently. In this case, three households are defined in the unit. For some public building, like dormitories or hospitals do not include in this surveys design. Those are institutional population and excluded by TURKSTAT.

Head of household is a person and household members acknowledge him/her as head of household jointly. This person responsible for up keeping and maintenance of the household generally.

3.4.1.1 Definition of the forms

All the forms, which was used through listing operation, were provided by HUIPS to the listing staff. While TURKSTAT block definition forms were filled in HUIPS by the Institute staff, other forms were filled by the listing staff in field. Followings are definition of these forms.

TURKSTAT block definition forms (Figure 3) are created by HUIPS after the address lists are obtained from TURKSAT. It include the range of household addresses, which obtained from address lists, already selected by TURKSTAT. For instance, address lists (obtained from TURKSTAT) include following address information. Street name: Arda sokak, outdoor numbers: 8 and 10 (two buildings), each of the building has 60 residential dwellings. First dwelling, whose outdoor number: 8, has 53 occupied

dwellings, 7 unoccupied dwellings. Entire dwellings of the second building are occupied. So, TURKSTAT address lists contain 53 occupied dwellings from the outdoor number 8 and 47 dwellings from the number 10 (for fulfilling 100 household criteria). The outdoor numbers and indoor numbers were developed in block definition forms as follows; initial outdoor number/indoor number: 8/1, last outdoor number/indoor number: 10/47 (Figure 3 displays). One of the duty of the listing team is that to list all the dwellings between these two addresses range. This operation will be explained in following "listing of households" section in detail. Each cluster has one TURKSTAT block definition form (Figure 3). The listing operation was completed in requirements (addresses ranges) of the form.

Figure 3: An Example of TURKSTAT Block Definition Form[4]

TURKEY DEMOGRAPHIC AND HEALTH SURVEY 2013

TURKSTAT BLOCK DEFINATION FORM

PROVINCE	06	**NAME OF PROVINCE**	ANKARA
DISTRICT	2	**NAME OF DISTRICT**	ÇANKAYA
SUB-DISTRICT	0	**NAME OF SUB-DISTRICT**	CENTRAL
VILLAGE	0	**NAME OF VILLAGE**	CENTRAL
5 REGION	3	**12 REGION**	TR5
URBAN/RURAL	1	**TYPE**	3

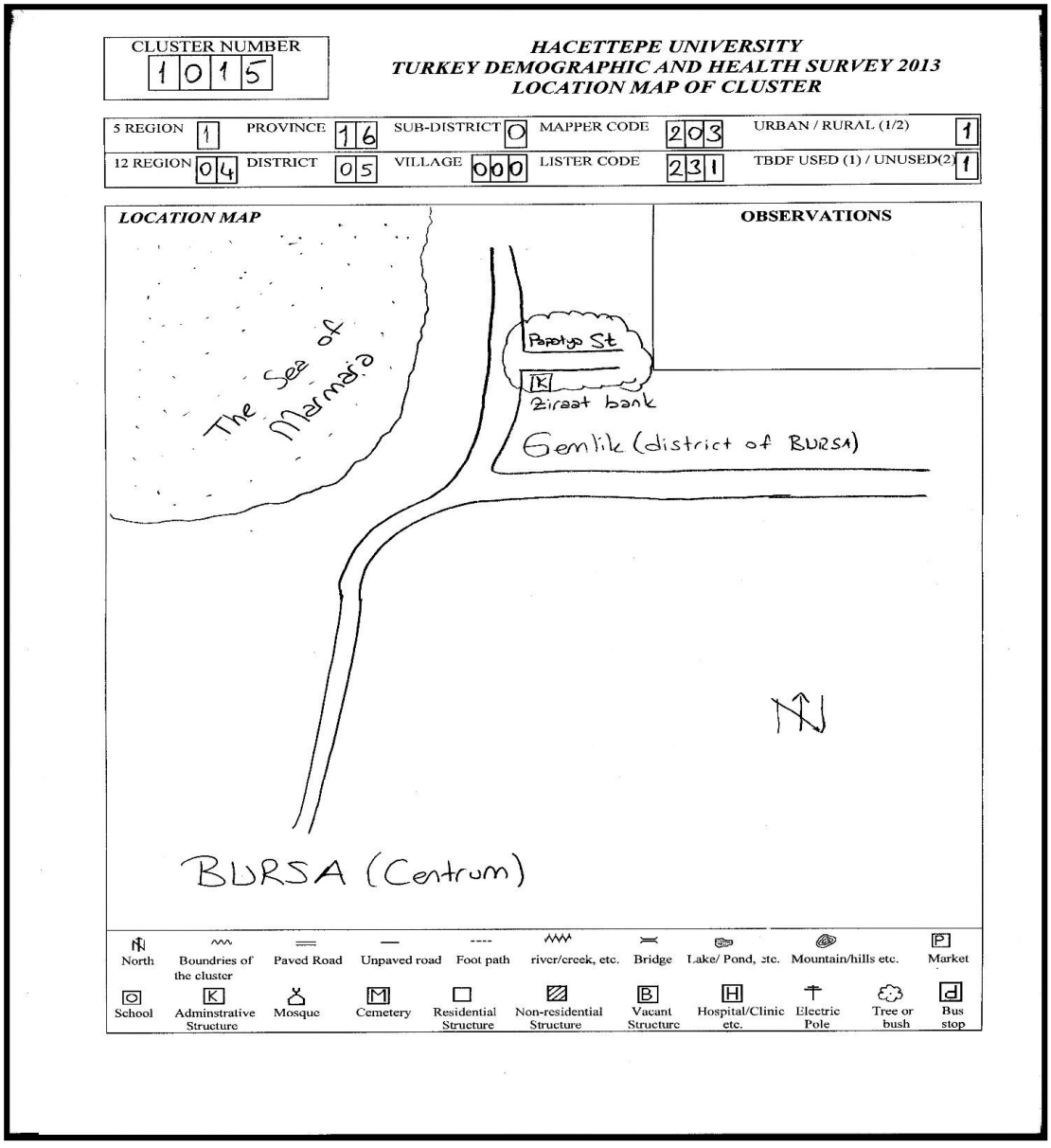
CLUSTER NUMBER	NAME OF QUARTER	NAME OF STREET	THE UNIT IN CORRESPONDING STREET		EVEN / ODD	EXPLANATION
			FIRST OUTDOOR/INDOOR NUMBER	LAST OUTDOOR/ INDOOR NUMBER		
2092	ILKER	ARDA STREET	8/1	10/47	O	No: 8- No:10 Mavi Residence

[4] Original TURKSTAT block definition form is in Appendix 2.

Household listing form (Appendix 3): Each row includes one household and the main aim of the form is to determined occupied households which are eligible for the survey.

A location map (Figure 4) are prepared by mappers, who are responsible from drawing the map of the cluster and describing how to reach the targeted cluster.

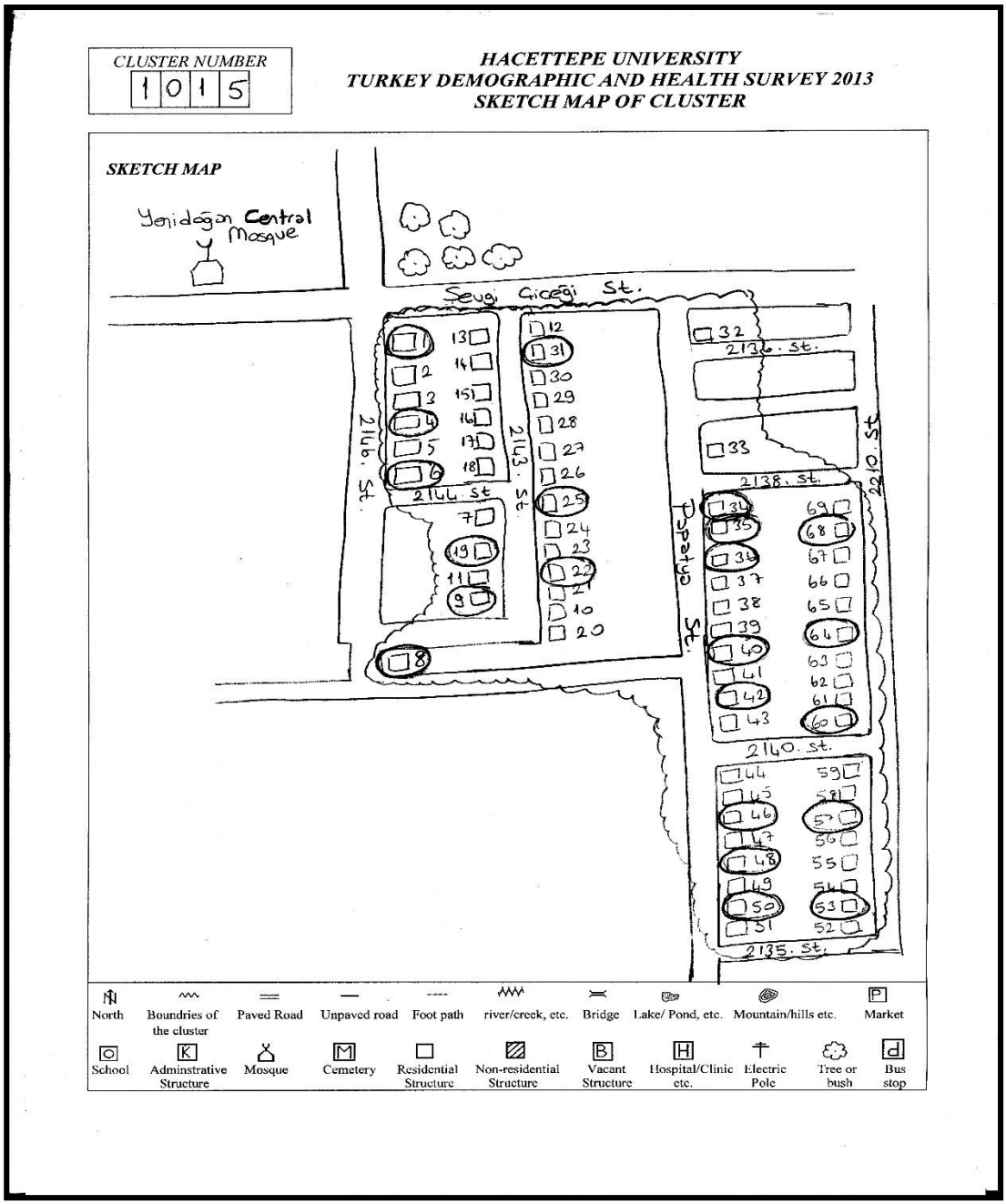
Figure 4: An Example of Location Map[5]



[5] Original of the map is in appendix 4.

A sketch map (Figure 5) is drawn by mappers and it gives the survey team to detailed information about units and constructions in selected clusters.

Figure 5: An Example of Sketch Map[6]



[6] Original of the map is in Appendix 5.

3.4.2 Responsibilities of Listing Staff

Five days training stage of these staff provided by HUIPS. First two days theoretical training were provided by institute staff of HUIPS. Then, plot studies were carried out in following two days. While, one of plot study was implemented in an urban cluster, other was implemented in rural cluster. Both clusters are different from each other, in terms of characteristics of living quarters. In last day of the training, listing teams were created by HUIPS and meetings were conducted before the listing operation.

Throughout the listing operation, they were monitored by a coordinator, who is a HUIPS academic staff, regularly. The responsibilities of the coordinator are to obtain base maps for all the clusters included in the survey; to arrange for the reproduction of all listing materials (listing manuals, mapping and listing forms); the map information forms and the household listing forms must be prepared in sufficient numbers to cover all of the clusters to be visited; assigning teams to clusters; to monitor the reception of the completed listing forms at the central office; to verify the quality of work and to solve the problem that enumerators encountered at field.

Each listing team includes two enumerators and they work together. While one of them is responsible from listing, the other staff is responsible for mapping. The responsibilities of listing teams (mapper and lister) are; to get in touch with local administrators, collaborating with them and expressing the aim of the listing operation to administrators; to define border of the blocks that selected by TURKSTAT and drawing a location map which shows interviewing team how to reach clusters generally; to draw sketch map which has more detail than residential area map(contains dwellings and their borders); to list all buildings those are in the corresponding cluster; if come across a problem, to report these problems to the coordinator and solving the problem according to the coordinator’s advices; to collect information about required administrators who

necessary to contact before field research (e.g. mukhtars), accommodation places and logistic issues for field research.

The enumerators first define the border of cluster. Second, one of them (mapper) draw location map and sketch map. Another one (lister) make lists all the structures in border. After every working day, the internal consistency was checked. (between lists and maps)

The listing materials are presented as follows:

- Listing and mapping Manual
- TURKSTAT block definition form
- Aerial photographs and maps in detail way (if available) for the selected clusters.
- Those detailed maps prepared took advantage of Google maps before the listing operation, yet those maps may not include updated information.
- Forms of location map and sketch map
- Household listing forms
- Other materials (e.g. bag, files, pencils and so on.)

As it is stated above, each team obtain their documents regarding clusters, before reach the cluster. They generally take advantage of local authorities to reach the target clusters. Sometimes they encounter some obstacles like “old” and “new” street names. For example, a new street might be constructed recently in a cluster, which is included by TDHS-2013 sample design. The construction information might not be contained by the registration system (NAD). So, the TURKSTAT block definition form does not include this information as well. In these situations, teams get in touch local authorities to help them out to tackle the problems.

Even though, mapper and lister have different job description, they work in close cooperation. While, mapper prepare the maps about buildings in clusters, listers obtain all the information related structures that is in the sketches.

Throughout listing operation, mapper is responsible for drawing location map (Appendix 4) which describe how to reach corresponding cluster, and sketch map (Appendix 5) that give some information to the interviewing team about buildings and other structures in the cluster in detail way. Both maps were presented above as well.

If the location map gained from muhktars (village headman) or municipalities or other administrators, it wouldn't be drawn, but it would updated upon it.

During drawing the location map, mapper can take advantage of Google Map (Appendix 6, Appendix 10 and Appendix 11). Moreover, mappers can take some notes, which is helpful information for interviewing team, on maps.

Google maps were used throughout drawing the sketch map as well. To contrast to location map, scratch map were pictured in order to identifying the structure in the cluster instead of define its exact location. "X" illustrates starting point to listing. Mappers draw a square for every single structure. Throughout this operation, they used these symbols which specified bottom of figure 5. They number all structures in sequential order beginning with "1". An approximate location is useful for finding the structure in the future. They add all landmarks (such as a park), public structures (such as a school or mosque) and the street and roads to the sketch maps. The symbols were used in order to define type of those structures that fore mentioned.

Whereas mappers are responsible for drawing corresponding maps, listers are responsible for updating the block lists, obtained from TURKSTAT. The listers used household listing form, while record all the households in cluster. First of all, cluster identification information (e.g. cluster number, 5 region, 12 region etc…) were filled. First two column were not entered. Because it was reserved for office use only by the listers, in order to sample selection of cluster late stages. TURKSTAT Block Definition (Appendix 2) forms were used while listing the clusters.

For example, considering a cluster in Ankara province of Turkey

Street name: Erguvan Sokak 1-15 (odd numbers)

Street name**:** Şehitler Caddesi 2-12 (even numbers)

Listers start to list from either Erguvan Sokak or Şehitler Caddesi. Approximately 100 household resides in this living quarter. This information obtained from NAD 2012 and those information might be changed in one year. As it was mentioned before, the main objective of the study is updating the addresses. Let's say, if the lister starts from Erguvan Sokak, he lists all the building and household information to the listing form (i.e. 1, 3, 5, 7 ….. 15). All same things applies for Şehitler Caddesi (2, 4…12). Those listed building should be identified on sketch maps as well.

Two types of changes have been occurred according to the NAD 2012:

1) The number of households could decrease. In that case, listers make lists all the dwelling that they can observe.
2) The number of households might increase. In such cases, listers list all households until 250. If the number exceed 250 households, they list first 250 household. Exceeded number of households were recorded to a special box in household listing form (Appendix 3) .For example, if they come across 390 households in a cluster, they record the number of 250 in listing household numbers box, 140 in unlisted household number box.

In some cases (in villages generally), teams cannot find street names and numbering that written on TURKSTAT block definition form at all. It this type of situation, they marked "2" which means TURKSAT listing form "unused" on the form. If the block lists obtained from TURKSTAT includes all the villages (some small villages), the following instructions are applied.

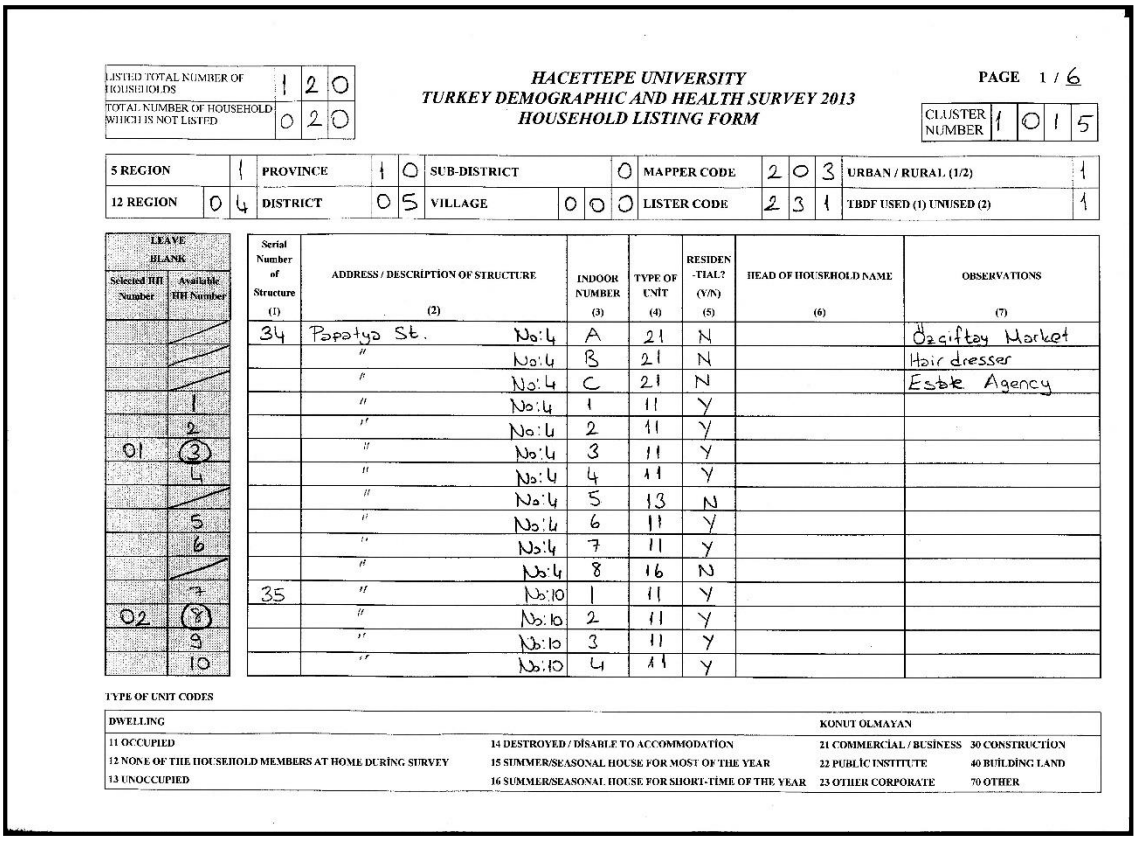
1) Some villages have “Salma lists” which shows all household is the villages. This lists obtained from ABPRS 2007 and it is not updated well. If the team can reach it from mukhtars(head of villages) or another administration of villages, the listing staff updates the list. Then he transfers all the information from “salma” list to the household list form.
2) If they cannot reach any information about household. Listers start listing at the center of the villages through clock wise, like spiral, with one of the administrator of villages.

In TDHS 2013, 4 villages had very small number of household. Therefore, two villages were concatenate and created one block. The listing operation applied as mentioned above.

If the lists obtained from TURKSATAT include only one part (if the village is huge, TURKSTAT define only one part of the villages as block) of the villages, or the street names and numberings could not be found, the villages separated to its segments which does not cross each other. After the segmentation, one of them is selected randomly and it is listed by listing procedures.

Listing forms should be filled as following instructions:

Figure 6[7]: An Example of Household Listing Form



LISTED TOTAL NUMBER OF HOUSEHOLDS: 120
TOTAL NUMBER OF HOUSEHOLD WHICH IS NOT LISTED: 020

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CLUSTER NUMBER: 1015

5 REGION	1	PROVINCE	10	SUB-DISTRICT	0	MAPPER CODE	203	URBAN / RURAL (1/2)	1
12 REGION	04	DISTRICT	05	VILLAGE	000	LISTER CODE	231	TBDF USED (1) UNUSED (2)	1

LEAVE BLANK		Serial Number of Structure (1)	ADDRESS / DESCRIPTION OF STRUCTURE (2)	INDOOR NUMBER (3)	TYPE OF UNIT (4)	RESIDEN-TIAL? (Y/N) (5)	HEAD OF HOUSEHOLD NAME (6)	OBSERVATIONS (7)
Selected HH Number	Available HH Number							
		34	Papatya St. No:4	A	21	N		Özçiftey Market
			" No:4	B	21	N		Hair dresser
			" No:4	C	21	N		Estate Agency
	1		" No:4	1	11	Y		
	2		" No:4	2	11	Y		
01	(3)		" No:4	3	11	Y		
	4		" No:4	4	11	Y		
			" No:4	5	13	N		
	5		" No:4	6	11	Y		
	6		" No:4	7	11	Y		
			" No:4	8	16	N		
	7	35	" No:10	1	11	Y		
02	(8)		" No:10	2	11	Y		
	9		" No:10	3	11	Y		
	10		" No:10	4	11	Y		

TYPE OF UNIT CODES

DWELLING		KONUT OLMAYAN	
11 OCCUPIED	14 DESTROYED / DİSABLE TO ACCOMMODATİON	21 COMMERCİAL / BUSİNESS	30 CONSTRUCTİON
12 NONE OF THE HOUSEHOLD MEMBERS AT HOME DURİNG SURVEY	15 SUMMER/SEASONAL HOUSE FOR MOST OF THE YEAR	22 PUBLİC INSTITUTE	40 BUİLDİNG LAND
13 UNOCCUPIED	16 SUMMER/SEASONAL HOUSE FOR SHORT-TİME OF THE YEAR	23 OTHER CORPORATE	70 OTHER

Column (1) is serial number of structure and it identifies that serial number of buildings started from 1 to total number of structure in the cluster. For each structure, the listing staff records the same structure serial number that the mapper is already marked on the sketch map. All the structures that recorded on the sketch map (except the landmarks) must be recorded on the listing form as well.

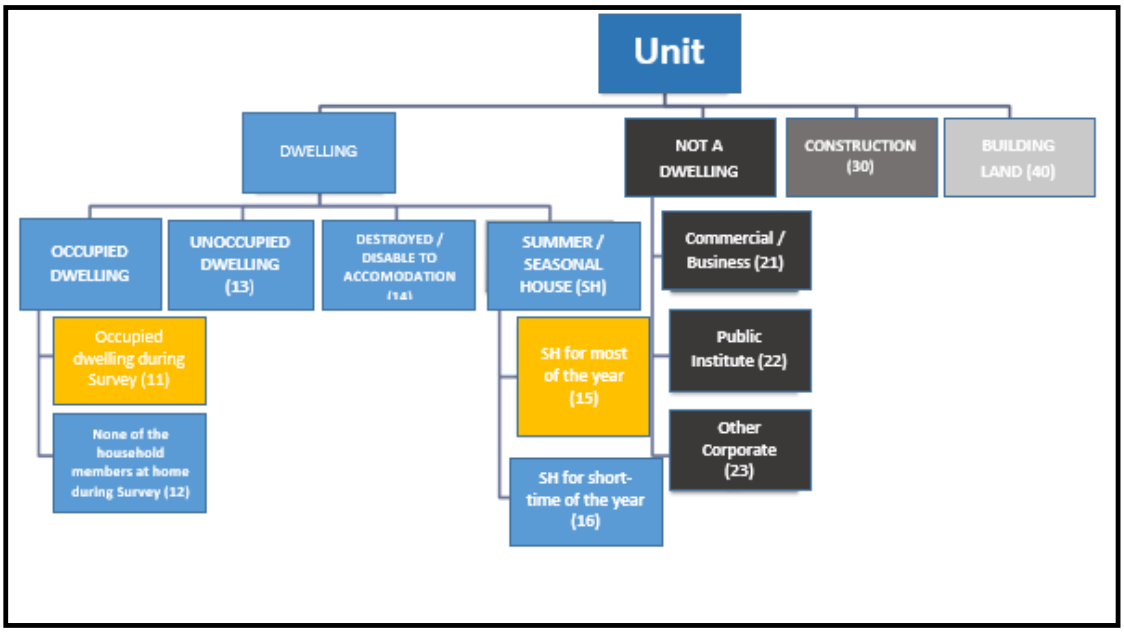
Column (2) is address/description of structure. It indicates addresses or definition of the building. It also include outdoor number of building at the end of addresses line.

[7] Original of the list is in Appendix 3.

Column (3) is serial number of household in structure**.** It illustrates indoor number of structure. For example, in a building might contain 25 dwellings. The number goes from 1 to 25.

Column (4) is type of unit: It indicates purpose of usage to dwellings. The unit codes (Figure 7) were used to show this purposes. Codes 25, 35 and 50 were added through analyze stage of this thesis.

Figure 7: Unit Codes



11: Occupied Dwelling: Household members live those dwellings for most of the year

12: None of the household members at home during Survey: those dwellings are used by household members less than 6 months in a year.

13: Unoccupied Dwelling: the dwelling is empty. In other words no one lives in these dwellings.

14: Destroyed Disable to Accommodation: the difference from unoccupied dwellings is that these type of dwellings do not have any potential of life inside of it.

15: Summer/seasonal house for most of the year: This type of dwellings are used more than 6 month in a year (generally in summer.

16: Summer/seasonal house for short-time of the year: if those dwellings (code 15) are occupied less than 6 month in a year, coded 16.

21: Commercial / business: contains the dwellings which are used as commercial, business.

22: Public institute: Include all Public institutions (e.g., government buildings)

23: Other corporate: all other Private or Public corporates (for example, nursing homes, dormitories etc…)

25: Listing staff error: this error were added by author during analyze stage. It refers the dwelling which was listed in wrong way. For example, TURKSTAT block definition form tells the listers that to create a list of dwellings, whose outdoor numbers are between 28 and 36 in a specific street. If the listers make lists outdoor numbers 38, 40 or so on, it is coded as listing staff error.

30: Construction: If the building is under construction, it is coded as 30.

35: Ringing staff error: These errors were created by author during analyze stage as well. Through selection of household stage (by systematic random selection in each cluster), the ringing staff could select wrong household. For instance, the only condition for selection is that type of dwellings have to be occupied for accommodation purpose for most of the year. If the ringing staff select wrong dwelling, say dwelling that occupied for business purpose, this was coded as ringing staff error.

40: Building land: Sometimes, we might come across a building land which has outdoor numbering. In such cases, listers coded 40 for type of unit (Column 4).

50: Error that happens during creating block lists: For example, TURKSTAT provides the addresses from the outdoor number 5 to 17 in the name of "Aykut Sokak" street. In some cases, the staff, who create the TURKSTAT block definition forms, might forget to write the street name on the list or forget to write outdoor numbers (5 to 12). Therefore, although, all those information were given by TURKSTAT, they are not listed by listing staff during the listing operation. Because the information about the corresponding cluster are not included in block list.

70: Other: All other dwellings were coded as 70.

Column (5) is whether the dwelling is residence or not (Y/N). It pointed out that, whether the dwelling is residential or not. If the column 4 is coded as 11 or 15, column 5 coded "E" (yes), otherwise "H" (no).

Column (6) is name of head of household. This column was left for head of household's name. For some situations like in villages, numbering is not developed that much. In such cases, names can be more beneficial to reach the households.

Column (7) is left for observations**.** All the extra information, which will be useful for interviewing team, wrote on this section. For instance, if the street name changed, they stated the old and new name of street together.

4.2.3 Quality Control

Correctness of the listing teams' work monitored by both listing coordinator and HUIPS staff from head office. If a serious mistake was found, the cluster was listed again. Each team aware of that their work would be controlled again while field interviewing process. They completed their work under the consciousness of this issue.

4.2.4 Prepare the Household Listing Forms for Household Selection

Once the central office (HUIPS) receives the completed listing materials for a cluster, they have to first assign a serial number to all of the households in the cluster in the second column of the household listing form (Appendix 3). Only occupied residential dwellings (including occupied dwellings, coded 11, for residential purpose and occupied summer houses for most of the year coded as "15") will be numbered. This is a continuous serial number from 1 to the total number of occupied residential households were listed in the cluster. Leave the cell blank in the second column if the household is not occupied, or if the structure is not a residential structure. The second column is filled, if the structure is an occupied household. Make sure that the numbering of all occupied households follows sequentially from the previous occupied household on the list, with no gaps or repetitions in the numbering. See the example of a completed listing form in (Figure 6)

After assigning the serial numbers to all households listed in the cluster, copy the listed total number of occupied households to the Excel file, which prepared for household selection. Throughout selection stage of households for interview, several stages were completed. First the interval calculated. Number of listed households entered on excel file and divided by number of households would be interviewed (25 for urban, 18 for rural), the random number is generated by excel between (0-1). Next this number multiplied with interval to reach initiating point, finally, add amount of interval to initiating point each time and reach the final selection of households. For example, say 100 households are listed as occupied and 25 of them will be drawn. The interval is 4 (100/25). Excel generates the initiating point 0, 6. First, the random number multiplied with interval. The Number is 2, 4(round down 2). The initiating point is 2. We add 4 to 2 each time and selected household goes like 2, 6, 10…….98 (25 households). Match those numbers to serial number of household (column two), write in order and circle those numbers (in column 2) as selected household for interview in column 1.

3.5 DESCRIPTIVE ANALYSIS

3.5.1 Data set

Descriptive analysis are started by creating the dataset of this thesis. This section presents creation of dataset and descriptive analysis will be presented in chapter 4. As it is mentioned before, TDHS-2013 has 642 lists of clusters, which was provided by TURKSTAT, contains all 81 provinces of TURKEY. Within total clusters, 143 of these clusters are not located in settlements with municipalities. In other words, they do not belong to municipal areas (generally belong to rural and small districts). All these areas in the cluster are enumerated by listers. Those non-municipal clusters are subtracted from 642 clusters and rest of 499 clusters are located in settlements with municipalities. One in four (125 clusters/blocks) of them are selected by Systematic Sampling method as to represent all clusters statistically, as it will be shown in chapter 4.

After the determination of 125 clusters (22 rural, 113 urban), they are entered to excel (software program) in order to make comparison properly (Figure 8[8]). Because the address information obtained from TURKSTAT is excel format as well. (Figure 9[9]). A special comparison code is developed in Excel, then street names, outdoor and indoor numbers are concatenated and compared with TURKSTAT's data, line by line (Figure 10[10]). Number of occupied households in total households, addresses comparison according to both from the listing operation and TURKSTAT data, type of residence, codes of districts and more than these are available in comparison data set. For selected each cluster, same comparison procedure are applied. Information of all 16950 (in 125 clusters) households from the listing operation and addresses information from

[8] Original of the figure is in Appendix 7.
[9] Original of the figure is in Appendix 8.
[10] Original of the figure is in Appendix 9.

TURKSTAT's data are converted to the SPSS (Statistical Package for the Social Sciences). Variables and their labels are created, then crosstabs and frequencies tables are obtained from the program, which will be presented in Chapter 4 comprehensively.

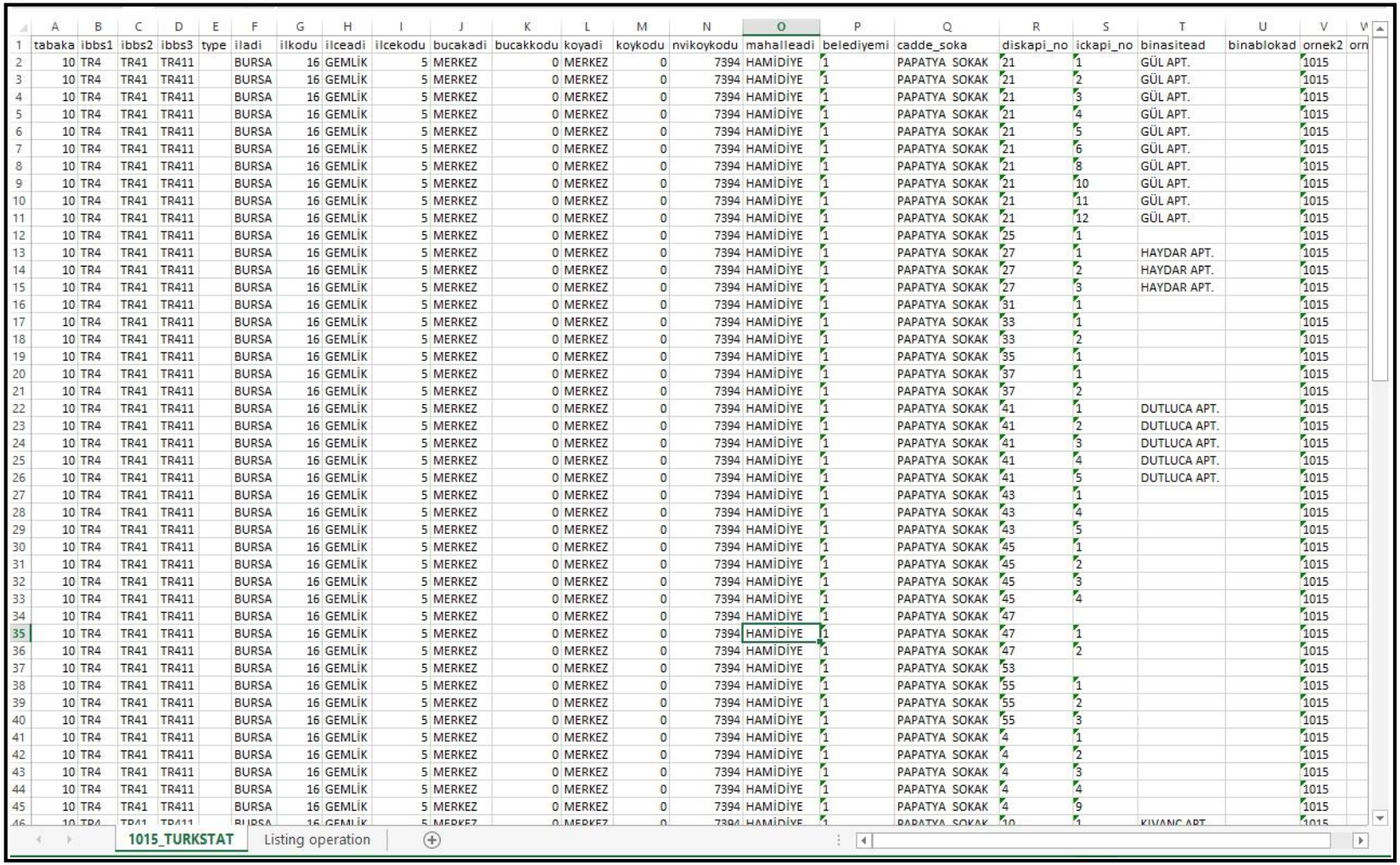
Figure 8: An Image from Data Entry of the Listing Operation[11]

STREET NAME	OUTDOOR NUMBER	INDOOR NUMBER	SELECTION	TYPE OF UNIT CODE	TYPE OF RESIDANCE
PAPATYA STREET	4/A	1		21	URBAN
PAPATYA STREET	4/B	1		21	URBAN
PAPATYA STREET	4/C	1		21	URBAN
PAPATYA STREET	4/D	1		21	URBAN
PAPATYA STREET	4/E	1		21	URBAN
PAPATYA STREET	4	1		11	URBAN
PAPATYA STREET	4	2		21	URBAN
PAPATYA STREET	4	3		21	URBAN
PAPATYA STREET	4	4		11	URBAN
PAPATYA STREET	4	5		21	URBAN
PAPATYA STREET	4	6		11	URBAN
PAPATYA STREET	4	7		11	URBAN
PAPATYA STREET	4	8	1	11	URBAN
PAPATYA STREET	4	9		11	URBAN
PAPATYA STREET	4	10		11	URBAN
PAPATYA STREET	4	11		11	URBAN
PAPATYA STREET	4	12		11	URBAN
PAPATYA STREET	4	13	1	11	URBAN
PAPATYA STREET	4	14		11	URBAN
PAPATYA STREET	10	1		11	URBAN
PAPATYA STREET	10	2		11	URBAN
PAPATYA STREET	10	3		11	URBAN
PAPATYA STREET	10	4	1	11	URBAN
PAPATYA STREET	10	5		11	URBAN
PAPATYA STREET	10	6		11	URBAN
PAPATYA STREET	10	7		11	URBAN
PAPATYA STREET	10	8	1	11	URBAN
PAPATYA STREET	12	1		11	URBAN
PAPATYA STREET	12	2		11	URBAN

1015_Turkstat | Listing operation

[11] Original of the image is in Appendix 7.

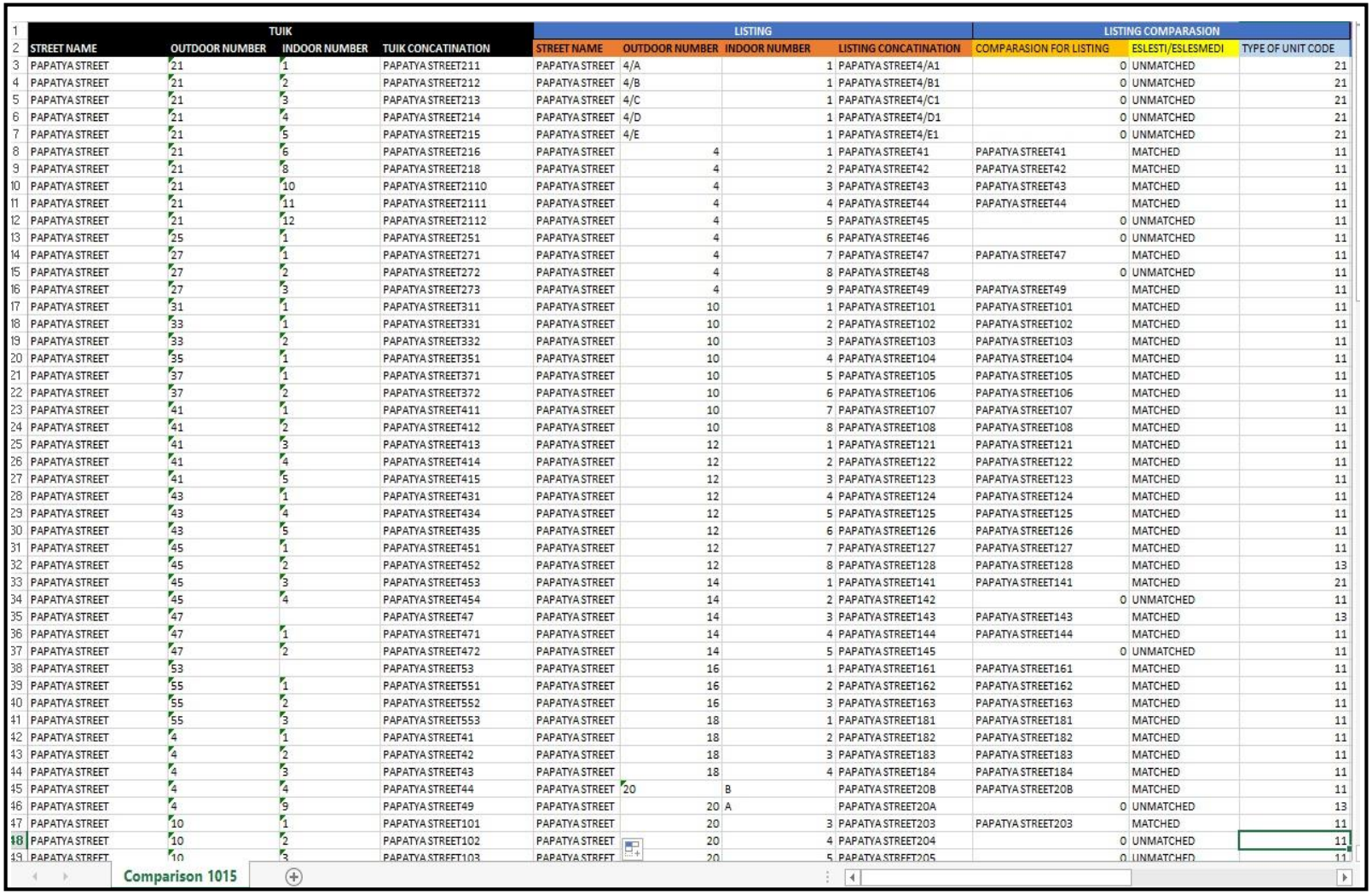
Figure 9: An Example of TURKSTAT Block List



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	tabaka	ibbs1	ibbs2	ibbs3	type	iladi	ilkodu	ilceadi	ilcekodu	bucakadi	bucakkodu	koyadi	koykodu	nvikoykodu	mahalleadi	belediyemi	cadde_soka	diskapi_no	ickapi_no	binasitead	binablokad	ornek2	orn
2	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	1	GÜL APT.		1015	
3	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	2	GÜL APT.		1015	
4	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	3	GÜL APT.		1015	
5	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	4	GÜL APT.		1015	
6	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	5	GÜL APT.		1015	
7	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	6	GÜL APT.		1015	
8	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	8	GÜL APT.		1015	
9	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	10	GÜL APT.		1015	
10	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	11	GÜL APT.		1015	
11	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	12	GÜL APT.		1015	
12	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	25	1			1015	
13	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	27	1	HAYDAR APT.		1015	
14	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	27	2	HAYDAR APT.		1015	
15	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	27	3	HAYDAR APT.		1015	
16	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	31	1			1015	
17	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	33	1			1015	
18	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	33	2			1015	
19	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	35	1			1015	
20	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	37	1			1015	
21	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	37	2			1015	
22	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	1	DUTLUCA APT.		1015	
23	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	2	DUTLUCA APT.		1015	
24	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	3	DUTLUCA APT.		1015	
25	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	4	DUTLUCA APT.		1015	
26	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	5	DUTLUCA APT.		1015	
27	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	43	1			1015	
28	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	43	4			1015	
29	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	43	5			1015	
30	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	45	1			1015	
31	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	45	2			1015	
32	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	45	3			1015	
33	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	45	4			1015	
34	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	47				1015	
35	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	47	1			1015	
36	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	47	2			1015	
37	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	53				1015	
38	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	55	1			1015	
39	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	55	2			1015	
40	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	55	3			1015	
41	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	1			1015	
42	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	2			1015	
43	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	3			1015	
44	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	4			1015	
45	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	9			1015	
46	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	10	1	KIVANC APT.		1015	

1015_TURKSTAT | Listing operation

Figure 10: An Example of Addresses Comparison between Addresses List from NAD and the Listing Operation



	TUIK			LISTING				LISTING COMPARASION		
	STREET NAME	OUTDOOR NUMBER	INDOOR NUMBER	TUIK CONCATINATION	STREET NAME	OUTDOOR NUMBER	INDOOR NUMBER	LISTING CONCATINATION	COMPARASION FOR LISTING	ESLESTI/ESLESMEDI	TYPE OF UNIT CODE
3	PAPATYA STREET	21	1	PAPATYA STREET211	PAPATYA STREET	4/A	1	PAPATYA STREET4/A1	0	UNMATCHED	21
4	PAPATYA STREET	21	2	PAPATYA STREET212	PAPATYA STREET	4/B	1	PAPATYA STREET4/B1	0	UNMATCHED	21
5	PAPATYA STREET	21	3	PAPATYA STREET213	PAPATYA STREET	4/C	1	PAPATYA STREET4/C1	0	UNMATCHED	21
6	PAPATYA STREET	21	4	PAPATYA STREET214	PAPATYA STREET	4/D	1	PAPATYA STREET4/D1	0	UNMATCHED	21
7	PAPATYA STREET	21	5	PAPATYA STREET215	PAPATYA STREET	4/E	1	PAPATYA STREET4/E1	0	UNMATCHED	21
8	PAPATYA STREET	21	6	PAPATYA STREET216	PAPATYA STREET	4	1	PAPATYA STREET41	PAPATYA STREET41	MATCHED	11
9	PAPATYA STREET	21	8	PAPATYA STREET218	PAPATYA STREET	4	2	PAPATYA STREET42	PAPATYA STREET42	MATCHED	11
10	PAPATYA STREET	21	10	PAPATYA STREET2110	PAPATYA STREET	4	3	PAPATYA STREET43	PAPATYA STREET43	MATCHED	11
11	PAPATYA STREET	21	11	PAPATYA STREET2111	PAPATYA STREET	4	4	PAPATYA STREET44	PAPATYA STREET44	MATCHED	11
12	PAPATYA STREET	21	12	PAPATYA STREET2112	PAPATYA STREET	4	5	PAPATYA STREET45	0	UNMATCHED	11
13	PAPATYA STREET	25	1	PAPATYA STREET251	PAPATYA STREET	4	6	PAPATYA STREET46	0	UNMATCHED	11
14	PAPATYA STREET	27	1	PAPATYA STREET271	PAPATYA STREET	4	7	PAPATYA STREET47	PAPATYA STREET47	MATCHED	11
15	PAPATYA STREET	27	2	PAPATYA STREET272	PAPATYA STREET	4	8	PAPATYA STREET48	0	UNMATCHED	11
16	PAPATYA STREET	27	3	PAPATYA STREET273	PAPATYA STREET	4	9	PAPATYA STREET49	PAPATYA STREET49	MATCHED	11
17	PAPATYA STREET	31	1	PAPATYA STREET311	PAPATYA STREET	10	1	PAPATYA STREET101	PAPATYA STREET101	MATCHED	11
18	PAPATYA STREET	33	1	PAPATYA STREET331	PAPATYA STREET	10	2	PAPATYA STREET102	PAPATYA STREET102	MATCHED	11
19	PAPATYA STREET	33	2	PAPATYA STREET332	PAPATYA STREET	10	3	PAPATYA STREET103	PAPATYA STREET103	MATCHED	11
20	PAPATYA STREET	35	1	PAPATYA STREET351	PAPATYA STREET	10	4	PAPATYA STREET104	PAPATYA STREET104	MATCHED	11
21	PAPATYA STREET	37	1	PAPATYA STREET371	PAPATYA STREET	10	5	PAPATYA STREET105	PAPATYA STREET105	MATCHED	11
22	PAPATYA STREET	37	2	PAPATYA STREET372	PAPATYA STREET	10	6	PAPATYA STREET106	PAPATYA STREET106	MATCHED	11
23	PAPATYA STREET	41	1	PAPATYA STREET411	PAPATYA STREET	10	7	PAPATYA STREET107	PAPATYA STREET107	MATCHED	11
24	PAPATYA STREET	41	2	PAPATYA STREET412	PAPATYA STREET	10	8	PAPATYA STREET108	PAPATYA STREET108	MATCHED	11
25	PAPATYA STREET	41	3	PAPATYA STREET413	PAPATYA STREET	12	1	PAPATYA STREET121	PAPATYA STREET121	MATCHED	11
26	PAPATYA STREET	41	4	PAPATYA STREET414	PAPATYA STREET	12	2	PAPATYA STREET122	PAPATYA STREET122	MATCHED	11
27	PAPATYA STREET	41	5	PAPATYA STREET415	PAPATYA STREET	12	3	PAPATYA STREET123	PAPATYA STREET123	MATCHED	11
28	PAPATYA STREET	43	1	PAPATYA STREET431	PAPATYA STREET	12	4	PAPATYA STREET124	PAPATYA STREET124	MATCHED	11
29	PAPATYA STREET	43	4	PAPATYA STREET434	PAPATYA STREET	12	5	PAPATYA STREET125	PAPATYA STREET125	MATCHED	11
30	PAPATYA STREET	43	5	PAPATYA STREET435	PAPATYA STREET	12	6	PAPATYA STREET126	PAPATYA STREET126	MATCHED	11
31	PAPATYA STREET	45	1	PAPATYA STREET451	PAPATYA STREET	12	7	PAPATYA STREET127	PAPATYA STREET127	MATCHED	11
32	PAPATYA STREET	45	2	PAPATYA STREET452	PAPATYA STREET	12	8	PAPATYA STREET128	PAPATYA STREET128	MATCHED	13
33	PAPATYA STREET	45	3	PAPATYA STREET453	PAPATYA STREET	14	1	PAPATYA STREET141	PAPATYA STREET141	MATCHED	21
34	PAPATYA STREET	45	4	PAPATYA STREET454	PAPATYA STREET	14	2	PAPATYA STREET142	0	UNMATCHED	11
35	PAPATYA STREET	47		PAPATYA STREET47	PAPATYA STREET	14	3	PAPATYA STREET143	PAPATYA STREET143	MATCHED	13
36	PAPATYA STREET	47	1	PAPATYA STREET471	PAPATYA STREET	14	4	PAPATYA STREET144	PAPATYA STREET144	MATCHED	11
37	PAPATYA STREET	47	2	PAPATYA STREET472	PAPATYA STREET	14	5	PAPATYA STREET145	0	UNMATCHED	11
38	PAPATYA STREET	53		PAPATYA STREET53	PAPATYA STREET	16	1	PAPATYA STREET161	PAPATYA STREET161	MATCHED	11
39	PAPATYA STREET	55	1	PAPATYA STREET551	PAPATYA STREET	16	2	PAPATYA STREET162	PAPATYA STREET162	MATCHED	11
40	PAPATYA STREET	55	2	PAPATYA STREET552	PAPATYA STREET	16	3	PAPATYA STREET163	PAPATYA STREET163	MATCHED	11
41	PAPATYA STREET	55	3	PAPATYA STREET553	PAPATYA STREET	18	1	PAPATYA STREET181	PAPATYA STREET181	MATCHED	11
42	PAPATYA STREET	4	1	PAPATYA STREET41	PAPATYA STREET	18	2	PAPATYA STREET182	PAPATYA STREET182	MATCHED	11
43	PAPATYA STREET	4	2	PAPATYA STREET42	PAPATYA STREET	18	3	PAPATYA STREET183	PAPATYA STREET183	MATCHED	11
44	PAPATYA STREET	4	3	PAPATYA STREET43	PAPATYA STREET	18	4	PAPATYA STREET184	PAPATYA STREET184	MATCHED	11
45	PAPATYA STREET	4	4	PAPATYA STREET44	PAPATYA STREET	20	B	PAPATYA STREET20B	PAPATYA STREET20B	MATCHED	11
46	PAPATYA STREET	4	9	PAPATYA STREET49	PAPATYA STREET	20	A	PAPATYA STREET20A	0	UNMATCHED	13
47	PAPATYA STREET	10	1	PAPATYA STREET101	PAPATYA STREET	20	3	PAPATYA STREET203	PAPATYA STREET203	MATCHED	11
48	PAPATYA STREET	10	2	PAPATYA STREET102	PAPATYA STREET	20	4	PAPATYA STREET204	0	UNMATCHED	11
49	PAPATYA STREET	10	3	PAPATYA STREET103	PAPATYA STREET	20	5	PAPATYA STREET205	0	UNMATCHED	11

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3.5.1.1 Data Set for Ankara Province

Moreover, one more listing operation (called golden listing) is conducted by author after the listing operation of TDHS-2013. The operation is performed in order to both to check the quality of listing operation of TDHS-2013 and to make an objective comparison with more reliable source. Since the golden listing is carried out under the assumption of a flawless/perfect listing operation, the name of the operation is defined as "Golden" (like golden frame, which means complete, up-to-date, accurate frame). Besides, since attaining the perfect address lists is main purpose of the golden listing operation, it should be implemented by experienced people, who have full knowledge of survey methodology and field research.

The golden listing operation contains clusters/blocks in the capital city of Turkey (ANKARA province). Among 642 clusters, 24 (20 city center, 4 of them county town) of them belong to Ankara province. Only clusters in district center (20) were re-listed, due to logistic reasons. The golden listing operation is accomplished under the assumption of both address lists (from the NAD and Listing operations) are insufficient. Therefore, the golden listing activity is required in order to check the quality and reliability of the listing operation. Even though, it does not come through a certain results for the listing operation in all Turkey, it gives a broad idea.

All the listing materials are obtained from the HUIPS and one or two clusters (depends on largeness of cluster) are listed per a day. This operation is completed in nearly three weeks. After the golden listing is finished, all new addresses are entered to Excel. Then, analyze and comparison of those addresses with main listing operation and TURKSTAT household lists are carried out. Descriptive tables for Ankara case study is presented in upcoming section. Furthermore, all observations and opinions regarding this operation is presented in discussion chapter.

3.5.2 Method for Analysis

The main objective of this analysis that representing different type of tables and figures to indicate alteration between addresses lists from a frame (NAD) and addresses lists from an special updating operation (Listing activity). Our data provide to make comparison with different variables. Following chapter indicates that distribution of clusters by type of residence, distribution of response codes, crosstab of matching status according to selection status, distribution of matching status for TURKSTAT, crosstab of matching status according to response codes, crosstab of type of unit codes in terms of matching status, crosstab of type of unit codes according to selection status, crosstab of response codes in terms of type of unit, distribution of type of units in selected households, crosstab of type of unit according to type of residence, crosstab of code of listing team according to response code, crosstab of code of interviewing team in terms of Response code, crosstab of twelve, five and three regions in terms of response code.

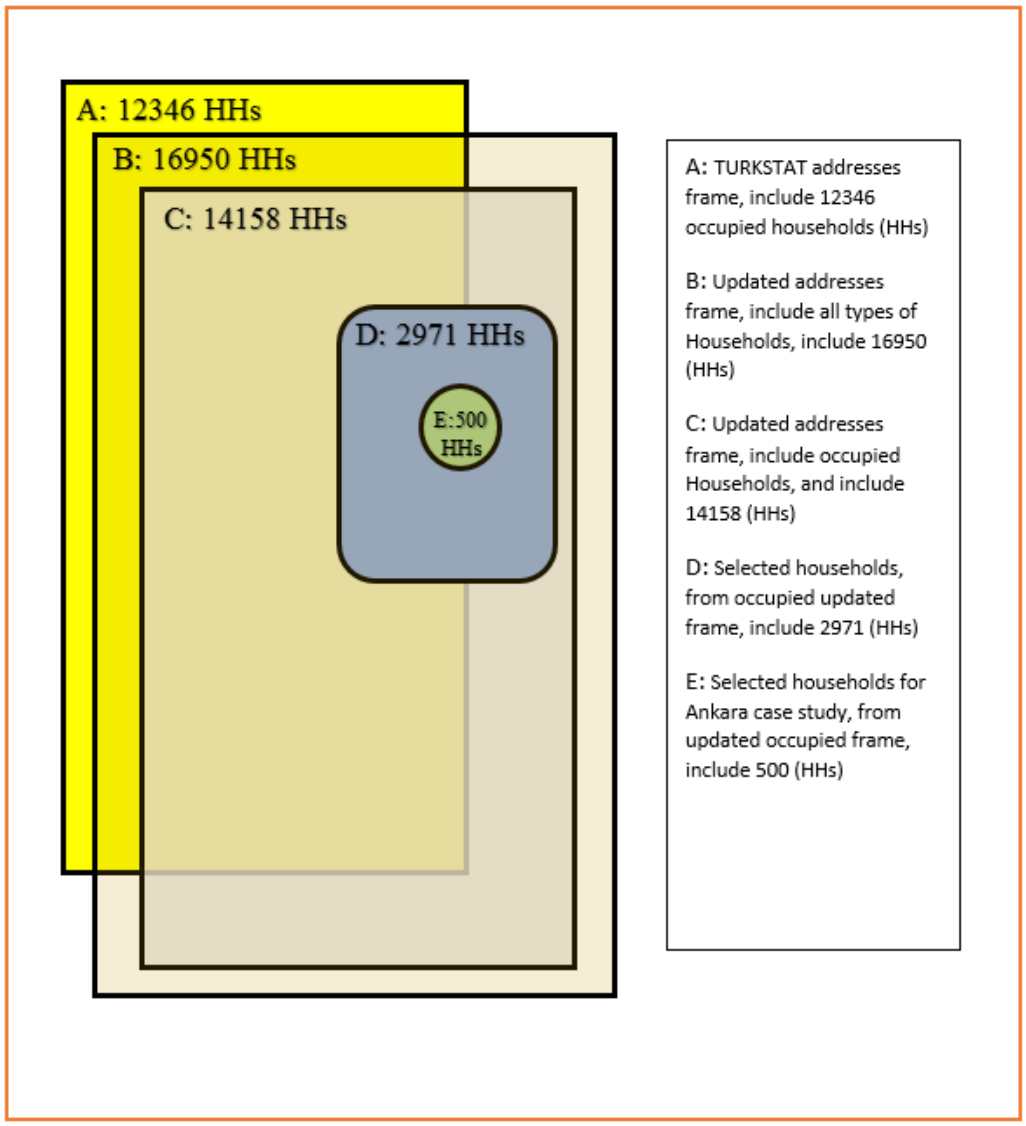
Listed households could display difference between urban and rural, or different region of Turkey, or listing team, or interviewing team or so on. Therefore, while accomplishing analysis and creating table, all those concerns were considered.

4. RESULTS

4.1 RESULTS OF THE ANALYSIS

Two types of address lists are used in order for comparison in this thesis. Address information from both TURKSTAT (as sampling frame of TDHS-2013) and the listing operation are compared diversely (such as, type of residence, matching status, selection status or so on). Comparisons depends on selected 125 clusters (called studied blocks/clusters) by systematic selection within 625 clusters. Through the listing operation, 16950 households are listed in studied blocks/clusters. These households include occupied households, unoccupied households, constructions, building lands, dwellings occupied for business purpose or so on. Most part of the analysis are performed upon 16,950 households, but for some tables (Table 4, Table 6 and Table 13) total amount of these households are differentiated. For example, the number of total households are 12,346 in table 4, this is because the table contain occupied addresses according to TURKSTAT address information. In other words, 12,346 (studied clusters) amounted address information of occupied household are provided by TURKSTAT and the table displays comparison of these address information with addresses from the listing operation. Since TURKSTAT provides only address information regarding occupied households (used for just residential purposes) and the listing operation contains all types of household, filtering the data by only occupied households (i.e. TURKSTAT address lists) is the more appropriate way to compare two types of address lists. In other words, this filtration help us out that not to compare apples and oranges. Therefore, the number of listed households are reduced 16,950 to 14,158 (occupied households according to listing operation) in Table 6 and Table 13. Moreover, Figure 11 displays a brief explanation of these selected studied blocks/clusters that mentioned above.

Figure 11: A Brief Explanation of Selected and Studied Blocks/Clusters



The results chapter starts with distribution of different number of clusters according to type of residence and finalized with percent distribution of survey team codes according to response codes in interviewed households in studied blocks/clusters.

Table 1: Percent Distribution of Total 642 Blocks/Clusters According to Type of Residence in THDS-2013

Residence	Percentage	Number
Urban	65.4	420
Rural	34.6	222
Total	100.0	642

As it is mentioned above, 642 clusters constitute sample of TDHS-2013. Each clusters/block lists contains approximately 100 households and they are provided by TURKSTAT. Those lists were updating through listing and mapping activities. Table 1 illustrates distribution of 642 clusters according to types of residence. While approximately 65% of total clusters located in urban area, rest of them belongs to rural areas.

Table 2: Percent Distribution of clusters with address information According to Type of Residence in THDS-2013

Residence	Percentage	Number
Urban	84.0	419
Rural	16.0	80
Total	100.0	499

Table 2 describes selected clusters which located in settlements with municipalities in total 642 clusters. Once, 143 clusters, which are not located in settlements with municipalities, are subtracted from 642 clusters, 499 clusters (clusters with address information) are obtained which located in settlements with municipalities. Because all those non municipal clusters belongs to rural area, the subtraction almost halved the rural percentage (it decreases 35% to 16%). Since TURKSTAT did not provide address

information for non-municipal clusters, all clusters (in villages) were listed by listing teams throughout the listing operation. Other side, according to the table, 84% of clusters, which located in settlements with municipalities, located in urban areas, and 16% located in rural area.

Table 3: Percent Distribution of Studied Blocks/Clusters According to Type of Residence in THDS-2013

Residence	Percentage	Number
Urban	82.4	103
Rural	17.6	22
Total	100.0	125

Table 3 indicates percent distribution of studied clusters (125 in 499). Once table 2 and table 3 are compared with each other, figures show that systematic random sampling method are provided high represented sample with almost same percentages. In terms of both tables, almost one in five households live in rural areas.

Table 4: Percent Distribution of Matched and Unmatched TURKSTAT Addresses with Listing Addresses in Studied Blocks/Clusters

Matching Status Based On TURKSTAT Addresses list	Percentage	Number
Matched	83.7	10330
Unmatched	16.3	2016
Total	100.0	12346

Table 4 indicates the number of households, provided by TURKSTAT, before the survey. Within selected 125 clusters, TURKSTAT defined 12,346 households as occupied

in order to interview and shared these address information with HUIPS. First, these address information were updated through the listing operation then both addresses were compared with each other. If the address information (street name, outdoor number and indoor number) from TURKSTAT match with addresses information from listing operation, it was identified as matched. According to the table, 84% of 12,346 households are matched with updated addresses (listing addresses). On the other hand, 16% of them did not recognized as dwelling throughout the listing operation (neither occupied nor not occupied).

Table 5: Percent Distribution of Matched Addresses According to Selection Status in Studied Blocks/Clusters in THDS-2013

	Selection Status For Interview		
Matching Status	**Selected**	**Unselected**	**Total**
Matched	69.5	59.7	61.4
Unmatched	30.5	40.3	38.6
Total	100.0	100.0	100.0
Number	2971	13979	16950

Table 5 Displays cross tabulation of studied clusters in terms of matching and selection status. While approximately 61% of listing addresses (households) are matched with TURKSTAT addresses, 39% of them are not matched. According to Table 5, unmatched rate is relatively high in terms of TURKSTAT address lists (Table 4). This is because, the listing operation include all types of dwellings (occupied and unoccupied), although TURKSTAT provide only occupied dwellings. Furthermore, once the data are examined in terms of selection criteria; 18% (2,971 households) of aggregate households

were selected and these households were visited for interview in survey process. In those selected households, whereas 70% (2,066 households) of them are matched with TURKSTAT addresses, 30% (905 households) of them are not match.

Table 6: Percent Distribution of Matched Occupied Household Addresses According to Selection Status in Studied Clusters/Blocks in THDS-2013

	Selection Status For Interview		
Matching Status	**Selected**	**Not Selected**	**Total**
Matched	69.6	68.1	68.4
Unmatched	30.4	31.9	31.6
Total	100.0	100.0	100.0
Number	2962	11196	14158

The previous table is created in terms of all household units (i.e. include unoccupied dwellings, commercials, public or so on). When those households are filtered by "code of unit type" (occupied dwellings), table 6 is obtained. As TURKSTAT provides only addresses for occupied dwellings, figures in Table 6 makes our comparison more accurate. This table include only households, those are marked as occupied households throughout the listing operation. According to Table, 14,158 in 16,950 households are defined as available for interview and roughly 69% (9,683 households) of them are matched with TURKSTAT addresses. Other side, 21% (2,962 households) of occupied households are selected and 79% (11,196 households) of them are not selected for interview. The percent distribution within selected households, around 70% of them are matched with TURKSTAT addresses.

When comparison is made between Table 6 and Table 5, total number of selected households are differentiated (according to Table 5; 2,971 households, according to Table 6; 2,962 households). There are 9 missing households and these missing stem from ringing staff error, selection of unoccupied households and seasonal households. For example, ringing staff make a mistake and select the dwelling which was defined as commercial unit during the listing operation. This mistake is coded as ringing staff error through analyze stage and these error were extracted.

One significant point is presented on unmatched addresses row. Table 6 indicates that 14,158 households are listed as occupied during the listing operation and around 32% (4,475 households) of them do not match with TURSTAT addresses. This issue arise from a couple reasons. First, listers might found a new constructed building between identified outdoor numbers in TURKSTAT addresses block definition form (TABDF) and they listed these addressees which were recently constructed. Second, it might results from listing staff errors, which are out of TABDF. For instance, according to TABDF, there is a building (outdoor number: 8) that comprising 20 dwellings and located in Serap street. The outdoor number: 8 and indoor number: 2 is the last dwelling, which the lister has to lists. In some cases, listers did not pay attention to this restriction and he listed entire building. These listed additional 12 households and suchlike households were included in those unmatched 4,475 households, which is stated above.

The more detailed and important point was revealed when reviewing following Table.

Table 7: Percent Distribution of Response Codes According to Matching Status in Interviewed Households in Studied Blocks/Clusters in THDS-2013

	Matching Status		
Response Codes	**Matched**	**Unmatched**	**Total**
Completed (01)	86.2	74.7	82.7
None Of The Household Members Or No Eligible Member Present At Home During Visits (02)	0.6	1.4	0.9
None Of The Household Members Present At Home During The Survey Period (03)	3.3	3.6	3.4
Postponed (04)	0.0	0.0	0.0
Refused (05)	3.8	4.3	4.0
Dwelling Vacant/Address Not A Dwelling (06)	5.7	15.5	8.7
Dwelling Destroyed (07)	0.0	0.1	0.0
Dwelling Not Found (08)	0.1	0.2	0.2
Questionnaire Partly Completed (09)	0.0	0.1	0.1
Other (96)	0.1	0.0	0.1
Total	100.0	100.0	100.0
Number	2066	905	2971

Table 7 shows response codes of selected households according to match/unmatched status. Percent distribution of selected those unmatched addresses (mentioned in previous paragraph) is presented in second column. The comparison between matched and unmatched addresses shows a striking point that percentage of “dwelling vacant/address not a dwelling” codes of unmatched addresses is almost three times more than matched addresses. This high ratio effects percentage of other codes and completion rate of the survey.

On the other hand, number of completed households constitutes 83% of aggregate response codes and around 9% (258 households) of total interviewed household are constituted by “dwelling vacant/address not a dwelling” code. Once these vacant addresses are monitored in detail way, the percentage of the code is 6% (118 households) within matched addresses. 16% (140 households) within unmatched addresses. Furthermore, following table exhibits percent distribution of response codes for clusters with address information. There is almost no difference for percentages between these municipal clusters and studied clusters as displayed in following Table.

Table 8: Percent Distribution of Response Codes for Interviewed Households According to Clusters with Address Information and Studied Blocks/Clusters in Municipalities in THDS-2013

	Clusters with Address information (499 Clusters)	**Studied Clusters (125 clusters)**
Response Codes	**Percentage**	**Percentage**
Completed (01)	81.0	82.7
None Of The Household Members Or No Eligible Member Present At Home During Visits (02)	1.1	0.9
None Of The Household Members Present At Home During The Survey Period (03)	4.1	3.4
Postponed (04)	0.0	0.0
Refused (05)	5.2	4.0
Dwelling Vacant/Address Not A Dwelling (06)	8.2	8.7
Dwelling Destroyed (07)	0.0	0.0
Dwelling Not Found (08)	0.2	0.2
Questionnaire Partly Completed (09)	0.1	0.1
Other (96)	0.1	0.1
Total	100.0	100.0
Number	11905	2971

Table 9: Percent Distribution of Three Region According to Response Codes in Interviewed Households in Studied Blocks/Clusters in THDS-2013

	Response Codes											
Type of Residence	**Completed (01)**	**None Of The Household Members Or No Eligible Member Present At Home During Visits (02)**	**None Of The Household Members Present At Home During The Survey Period (03)**	**Postponed (04)**	**Refused (05)**	**Dwelling Vacant/Address Not A Dwelling (06)**	**Dwelling Destroyed (07)**	**Dwelling Not Found (08)**	**Questionnaire Partly Completed (09)**	**Other (96)**	**Total**	**Number**
Urban	82.7	1.2	4.1	0.1	3.3	8.3	0.1	0.2	0.1	0.1	100	1650
Rural	82.3	1.0	3.0	0.0	1.5	11.9	0.0	0.3	0.0	0.0	100	396
Metropolitan	82.8	0.2	2.5	0.0	6.2	8.0	0.0	0.1	0.1	0.1	100	925
Total	82.7	0.9	3.4	0.0	4.0	8.7	0.0	0.2	0.1	0.1	100	2971

Table 9 indicates the distribution of response codes according to Urban/Rural/Metropolitan status (3 regions). The table points out that, “dwelling vacant/address not a dwelling” code reached highest proportion (around 12) in rural areas. Same proportion in urban and metropolitan areas resemble each other (around 8). Whereas, completion rates almost same for three regions, the highest refusal rate belongs to metropolitan area as expected.

Table 10: Percent Distribution of Five Region, According to Response Codes in Interviewed Households in Studied Blocks/Clusters in THDS-2013

	Response Codes											
Region	**Completed (01)**	**None Of The Household Members Or No Eligible Member Present At Home During Visits (02)**	**None Of The Household Members Present At Home During The Survey Period (03)**	**Postponed (04)**	**Refused (05)**	**Dwelling Vacant/Address Not A Dwelling (06)**	**Dwelling Destroyed (07)**	**Dwelling Not Found (08)**	**Questionnaire Partly Completed (09)**	**Other (96)**	**Total**	**Number**
West	79.9	0.3	3.4	0.0	6.0	10.3	0.0	0.1	0.1	0.0	100	954
South	86.0	1.2	2.2	0.2	2.4	7.7	0.2	0.0	0.0	0.0	100	415
Central	84.0	1.8	2.7	0.0	3.3	7.8	0.0	0.0	0.2	0.2	100	658
North	81.2	0.7	5.4	0.0	2.9	9.4	0.0	0.2	0.0	0.2	100	447
East	84.7	0.6	3.8	0.0	3.2	7.0	0.0	0.6	0.0	0.0	100	497
Total	82.7	0.9	3.4	0.0	4.0	8.7	0.0	0.2	0.1	0.1	100	2971

Table 10 shows the percent distribution of response codes in terms of five regions. According to the table, west region is the most disadvantaged area (in terms of codes 01 and 06) among five regions. Even though completion rate is not different significantly from other four regions, refusal rate and “dwelling vacant/address not a dwelling” code have highest percentage in West region. This might stem from composition of the region. It contains maybe the most important industrial areas (e.g. İstanbul, Izmit or so on). Since People work on factories, reaching to these people for interview is not easy. Even if survey team reach these people after work hours, the respondents might not would like to

complete the survey. In addition, many people migrate this area because of job opportunities. Hence, construction of new buildings are initiated almost every month for meeting accommodation needs of these people. This can be also result of high "dwelling vacant/address not a dwelling" code.

Moreover, following table provide us to examine response codes according to 12 geographical region[12] (NUTS1).

[12] From 2002 onwards, within the framework of the EU harmonization process, a new statistical region definition has been adopted which Compromised Nomenclature of Units for Territorial Statistics (NUTS) I (12 regions), NUTS II (26 regions) and NUTS III (81 provinces).

Table 11: Percent Distribution of Twelve Region (NUTS 1), According to Response Codes in Interviewed Households Studied Blocks/Clusters in THDS-2013

	Response Codes											
Region(NUTS1)	**Completed (01)**	**None Of The Household Members Or No Eligible Member Present At Home During Visits (02)**	**None Of The Household Members Present At Home During The Survey Period (03)**	**Postponed (04)**	**Refused (05)**	**Dwelling Vacant/Address Not A Dwelling (06)**	**Dwelling Destroyed (07)**	**Dwelling Not Found (08)**	**Questionnaire Partly Completed (09)**	**Other (96)**	**Total**	**Number**
Istanbul	80.9	0.0	2.2	0.0	8.6	8.3	0.0	0.0	0.0	0.0	100	325
West Marmara	79.2	0.8	3.4	0.0	3.0	12.7	0.0	0.4	0.4	0.0	100	236
Aegean	77.4	1.1	5.4	0.0	6.1	10.0	0.0	0.0	0.0	0.0	100	261
East Marmara	83.1	0.4	1.8	0.0	4.0	10.7	0.0	0.0	0.0	0.0	100	225
West Anatolia	85.0	0.3	2.1	0.0	4.5	7.3	0.0	0.0	0.3	0.3	100	286
Mediterranean	86.0	1.2	2.2	0.2	2.4	7.7	0.2	0.0	0.0	0.0	100	415
Central Anatolia	82.9	3.8	3.8	0.0	1.9	7.6	0.0	0.0	0.0	0.0	100	211
West Black Sea	83.5	0.4	6.4	0.0	3.0	6.4	0.0	0.0	0.0	0.4	100	236
East Black Sea	80.3	0.7	4.3	0.0	2.9	11.5	0.0	0.4	0.0	0.0	100	279
North East Anatolia	84.6	0.7	1.4	0.0	2.8	9.8	0.0	0.7	0.0	0.0	100	143
Central East Anatolia	78.9	0.6	9.3	0.0	5.0	5.6	0.0	0.6	0.0	0.0	100	161
South East Anatolia	89.6	0.5	1.0	0.0	2.1	6.2	0.0	0.5	0.0	0.0	100	193
Total	82.7	0.9	3.4	0.0	4.0	8.7	0.0	0.2	0.1	0.1	100	2971

While, the highest proportion of “dwelling vacant or addressees not a dwelling” code belongs to West Marmara region (with nearly 13%), the lowest proportion belongs to Central East Anatolia (with approximately 6%). On the other hand, once examining the completion rate among NUTS1 regions, the rate fluctuates around 80%. Whilst, the average percent of completed questionnaires 83% in Turkey, South East Anatolia (SEA) has the maximum number of completed questionnaires (173 completed questionnaires, 90% of total in SEA).

Table 12: Percent Distribution of Code of Unit Type According to Matching Status in Studied Blocks/Clusters in THDS-2013

	Matching Status			
Code Of Unit Type	**Matched**	**Unmatched**	**Total**	**Unmatched in occupied dwellings**
Occupied Dwelling (11)	92.7	62.3	81.0	91.2
None Of The Household Members At Home During Visits (12)	0.8	1.9	1.2	-
Unoccupied Dwelling (13)	3.9	10.3	6.4	-
Destroyed / Disable To Accommodation (14)	0.2	1.2	0.6	-
Summer/Seasonal House For Most Of The Year (15)	0.3	0.4	0.3	0.5
Summer/Seasonal House For Short-Time Of The Year (16)	0.7	2.4	1.4	-
Commercial / Business (21)	0.4	8.6	3.6	-
Public (22)	0.1	0.6	0.3	-
Other Corporate (23)	0.0	0.1	0.0	-
Listing Staff Error (25)	0.0	5.9	2.3	8.1
Construction (30)	0.1	1.7	0.7	-
Ringing Staff Error (35)	0.0	0.0	0.0	-
Building Land (40)	0.0	0.6	0.2	-
Error That Happens Through Creating Block Lists (50)	0.5	0.2	0.4	0.2
Other (70)	0.3	3.8	1.6	-
Total	100.0	100.0	100.0	100.0
Number	10407	6543	16950	4475

Table 12 indicates distribution of codes of unit type in terms of matching status. According to the table 81% (13,727 households) of total households were marked as occupied during the listing operation. While, around 6% of them are identified as unoccupied dwelling, approx. 2% of them are detected as listing staff error. Once to be examined unmatched column, 6,543 addresses were extra listed (recently constructed buildings generally) during the listing operation and those addresses do not match with TURKSTAT addresses. The percentage of unmatched occupied dwellings are almost two-third of matched occupied dwelling code. Unoccupied dwelling code for unmatched addresses is almost three times more than matched code. Another important indicator for this table is percentage of listing staff error in unmatched column (6%). Most of these listing staff errors (nearly 97%) were coded as occupied dwellings during the listing operation. In other words, listing staff coded those addresses as occupied dwelling, but these addresses were out of TURKSTAT block definition form, so all these addresses are coded as listing staff error during analyze stage by author. Those buildings, which are listed as listing staff errors, are mostly newly constructed buildings. One significant point should be recalled that those table contain all types (occupied and un-occupied) of addresses (commercial / business, constructions or so on). Therefore, the differentiations are observed between matched and unmatched addresses that much.

On the other hand, 4,475 of total 6,543 unmatched addresses are occupied and percent distribution of those occupied unmatched households, according unit types, are presented in last column. Since these addresses include only residential households, observation values regarding other unit types (i.e. unoccupied dwellings) are not contained by the column. It is important to say that percent distribution of occupied unmatched dwellings are almost as same as matched dwellings.

Table 13: Percent Distribution of Code of Unit Type for Occupied Households According to Selection Status Studied Blocks/Clusters in THDS-2013

	Selection Status For Interview		
Code Of Unit Type	**Selected**	**Not Selected**	**Total**
Occupied Dwelling (11)	97.2	96.9	97.0
Summer/Seasonal House For Most Of The Year (15)	0.5	0.4	0.4
Listing Staff Error (25)	2.2	2.6	2.5
Error That Happens During Creating Block Lists (50)	0.0	0.1	0.1
Total	100	100	100.0
Number	2962	11196	14158

Once Table 12 is filtered by eligible dwellings (occupied households only the purpose of accommodation), Table 13 is obtained. This filtration was made to examine the distribution of type of units in more proper way, as it is mentioned beginning of this chapter. Within 14,158 occupied households, 2,962 of them are selected for interview and 11,196 of them are not selected. Table shows that there is almost no difference between four different unit types in terms of selection status. This ensure that the selection technique (systematic selection) is an unbiased statistical method. In terms of the distribution of percentages, around 97% of them are coded as occupied dwelling, slight over 2% of them are coded as listing staff error for both selected and unselected households.

Table 14: Percent Distribution Response Codes According to Code of Unit Type in Interviewed Households in Studied Blocks/Clusters in THDS-2013

	Code Of Unit Type							
Response Codes	**Occupied Dwelling (11)**	**Unoccupied Dwelling (13)**	**Summer/Seasonal House For Most Of The Year (15)**	**Summer/Seasonal House For Short-Time Of The Year (16)**	**Listing Staff Error (25)**	**Ringing Staff Error (35)**	**Error That Happens During Creating Block Lists (50)**	**Total**
Completed (01)	83.1	50.0	37.5	0.0	78.8	50.0	100.0	82.7
None Of The Household Members Or No Eligible Member Present At Home During Visits (02)	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.9
None Of The Household Members Present At Home During The Survey Period (03)	3.3	16.7	6.3	0.0	6.1	50	0.0	3.4
Postponed (04)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refused (05)	3.8	0.0	0.0	0.0	12.1	0.0	0.0	4.0
Dwelling Vacant/Address Not A Dwelling (06)	8.5	33.3	56.3	100	3.0	0.0	0.0	8.7
Dwelling Destroyed (07)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dwelling Not Found (08)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Questionnaire Partly Completed (09)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Other (96)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	2879	6	16	1	66	2	1	2971

Table 14 points out the cross tabulation between code of unit types and response codes. Within 2,971 selected households, 2,879 of them are coded as occupied dwelling, 16 of them are coded as summer/seasonal house for most of the year and 66 of them are coded as listing staff error. Percent distribution of all these unit types, according to response codes, are displayed in the Table. For instance, within occupied dwellings, 83% of questionnaires were completed, around 9% of them were observed as "dwelling vacant/address not a dwelling" by Survey team, and nearly 4% of questionnaires were not completed because of refusals. When examination is completed by listing staff error, 80% of questionnaires were completed, 12% of those people refused to complete questionnaire and survey team did not reach the 3% of those dwellings (listing staff errors) because, either dwelling vacant or address not a dwelling. One important point should be noted that these listing staff error are not create that much bias in terms of completion rate, because completion rate of listing staff error and completion rate of selected studied clusters are almost same (79% vs 83%).

Table 15: Percent Distribution of Codes of Unit Type According to "Dwelling Vacant/Address Not A Dwelling" Codes in Interviewed Households in Studied Blocks/Clusters in THDS-2013

Codes Of Unit Type	Percentage
Occupied Dwelling (11)	94.6
Unoccupied Dwelling (13)	0.8
Summer/Seasonal House For Most Of The Year (15)	3.5
Summer/Seasonal House For Short-Time Of The Year (16)	0.4
Listing Staff Error (25)	0.8
Total	100.0
Number	258

Table 15 displays percent distribution of 258 dwellings which coded as “Dwelling Vacant / Address Not a Dwelling” according to code of unit types. Whereas, 95% of these codes are observed as occupied dwelling by listing staff, 4% of them are marked as “summer or seasonal house for most of the year” during the listing operation.

Table 16: Percent Distribution of Codes of Unit Type According to Residence in Interviewed Households in Studied Blocks/Clusters in THDS-2013

	Residence		
Code Of Unit Type	**Urban**	**Rural**	**Total**
Occupied Dwelling (11)	96.6	98.7	96.9
Unoccupied Dwelling (13)	0.2	0.0	0.2
Summer/Seasonal House For Most Of The Year (15)	0.4	1.3	0.5
Summer/Seasonal House For Short-Time Of The Year (16)	0.0	0.0	0.0
Listing Staff Error (25)	2.6	0.0	2.2
Ringing Staff Error (35)	0.1	0.0	0.1
Error That Happens During Creating Block Lists (50)	0.0	0.0	0.0
Total	100	100	100
Number	2575	396	2971

The distribution of codes of unit types in terms of residence is shown in Table 16. However, the Table indicates that distribution of occupied dwellings looks same between Urban/Rural differentiations, this similarities does not go for listing staff errors. In total, 66 households (2.6% of Urban) was identified as listing staff error (in selected 2,971 households) and all these errors belong to urban areas. In other words, there is no listing staff error belongs to rural area. This might be result from rural areas do not have new

constructed buildings in as much as urban areas. Moreover, there are no addresses lists were provided by TURKSTAT for non-municipal areas. These areas were enumerated by the listing teams during the listing operation. The following two tables present the distribution of response codes according to listing team codes and Survey team codes.

Table 17: Percent Distribution of Listing Team Codes According to Response Codes in Interviewed Households in Studied Blocks/Clusters in THDS-2013

	Response Codes											
Listing Team Codes	**Completed (01)**	**None Of The Household Members Or No Eligible Member Present At Home During Visits (02)**	**None Of The Household Members Present At Home During The Survey Period (03)**	**Postponed (04)**	**Refused (05)**	**Dwelling Vacant/Address Not A Dwelling (06)**	**Dwelling Destroyed (07)**	**Dwelling Not Found (08)**	**Questionnaire Partly Completed (09)**	**Other (96)**	**Total**	**Number**
1	74.8	0.9	10.8	0.0	6.3	6.3	0.0	0.9	0.0	0.0	100	111
2	76.0	0.0	4.0	0.0	4.0	**12.0**	0.0	4.0	0.0	0.0	100	50
3	82.0	2.0	0.0	0.0	4.0	**12.0**	0.0	0.0	0.0	0.0	100	50
4	80.3	0.7	3.3	0.0	4.6	**11.2**	0.0	0.0	0.0	0.0	100	304
5	90.1	1.2	1.9	0.0	1.2	5.0	0.6	0.0	0.0	0.0	100	161
6	87.4	0.0	2.8	0.0	2.8	6.3	0.0	0.7	0.0	0.0	100	143
7	87.0	0.5	3.1	0.5	2.6	6.2	0.0	0.0	0.0	0.0	100	193
8	78.3	1.2	5.0	0.0	2.5	**13.0**	0.0	0.0	0.0	0.0	100	161
9	85.7	0.0	5.4	0.0	3.6	5.4	0.0	0.0	0.0	0.0	100	168
10	82.0	1.0	6.0	0.0	3.0	8.0	0.0	0.0	0.0	0.0	100	100
11	79.6	1.1	7.5	0.0	1.1	9.7	0.0	0.0	0.0	1.1	100	93
12	87.3	1.3	1.3	0.0	2.7	7.3	0.0	0.0	0.0	0.0	100	150
13	81.7	1.1	5.4	0.0	5.4	6.5	0.0	0.0	0.0	0.0	100	93
14	84.6	5.1	2.2	0.0	2.2	5.9	0.0	0.0	0.0	0.0	100	136
15	86.3	0.0	3.1	0.0	3.7	6.2	0.0	0.0	0.0	0.6	100	161
16	85.6	1.8	0.9	0.0	1.8	9.9	0.0	0.0	0.0	0.0	100	111
17	76.2	0.5	2.1	0.0	4.1	**16.6**	0.0	0.5	0.0	0.0	100	193
18	81.1	0.7	4.9	0.0	3.5	9.1	0.0	0.0	0.7	0.0	100	143
19	80.9	0.0	2.2	0.0	8.6	8.3	0.0	0.0	0.0	0.0	100	325
20	83.2	0.8	0.8	0.0	5.6	8.8	0.0	0.0	0.8	0.0	100	125
21	74.1	0.7	5.6	0.0	7.0	**12.6**	0.0	0.0	0.0	0.0	100	143
Total	82.7	0.9	3.4	0.0	4.0	8.7	0.0	0.2	0.1	0.1	100	2971

Throughout the listing operation, 20 different listing team worked for HUIPS. They visit all province of Turkey (Table 18). Because of the structure of provinces (size of population), some teams visited one province, other teams visit more than one. For example, Istanbul, Izmir and Ankara are three of metropolitan of Turkey. Hence, these provinces have much more clusters rather than other small provinces. Therefore, in order to achieve an equilibrium for work load, these provinces were visited by one team. Such as, while team 19 listed Istanbul, team 17 listed Balıkesir, Yalova, Bursa provinces.

Team codes, which have "dwelling vacant/address not a dwelling" code over 10%, are written by bold type in order to lay emphasis on these teams. Within studied clusters (2971 households), lets focus on 193 households, which was listed by team 17. The important point is that team 17 (Balikesir, Bursa, Yalova provinces) has highest percent of "dwelling vacant/address not a dwelling" code with approx. 17%. Team 8 and team 21 follow team 17, with almost same percentage (13%). Completed codes looks similar among most teams, except the teams, which have high "dwelling vacant/address not a dwelling", as expected. One interesting point from the table is that team 1 (Istanbul) has the highest "none of the household members present at home during the survey period" code (11%). Istanbul is an important industrial city of Turkey and people are even change continent to reach their working place and they spend pretty much time to arrival. Hence, survey team did not find them in their houses. This might be the reason of this code.

Moreover, education and age information of the listing staff, according to team codes are presented in Appendix 12.

Table 18: Visited Provinces Through the Listing Operation, According to Listing Team Codes in THDS-2013

Team codes	Provinces
Team 1	ELAZIG, TUNCELI, BINGOL, MUS, BITLIS, DIYARBAKIR
Team 2	AGRI, IGDIR, KARS, ARDAHAN, ARTVIN
Team 3	VAN, HAKKARI, SIRNAK, SIIRT, BATMAN, MARDIN
Team 4	ERZURUM, BAYBURT, GÜMÜSHANE, ERZINCAN, IZMIR
Team 5	SANLIURFA, KAHRAMANMARAS, ADIYAMAN, MALATYA,
Team 6	GAZIANTEP, KILIS, HATAY
Team 7	MERSIN, ADANA, OSMANIYE
Team 8	TRABZON, RIZE, GIRESUN
Team 9	SINOP, ORDU, SAMSUN
Team 10	SIVAS, TOKAT, AMASYA, YOZGAT, KIRIKKALE
Team 11	BARTIN, ZONGULDAK, KARABÜK, KASTAMONU, ÇANKIRI, ÇORUM
Team 12	BOLU, DÜZCE, SAKARYA KOCAELI, BILECIK, KÜTAHYA, ESKISEHIR
Team 13	AFYONKARAHISAR, USAK, MANISA, AYDIN, MUGLA
Team 14	KIRSEHIR, KAYSERI, NEVSEHIR, NIGDE, AKSARAY
Team 15	KONYA, KARAMAN
Team 16	ISPARTA, BURDUR, ANTALYA, DENIZLI
Team 17	BALIKESIR, BURSA, YALOVA
Team 18	TEKIRDAG, KIRKLARELI, EDIRNE, ÇANAKKALE
Team 19	ISTANBUL
Team 20	ANKARA

Table 19: Percent Distribution of Survey Team Codes According to Response Codes in Interviewed Households in Studied Blocks/Clusters in THDS-2013

	Response Codes											
Survey Team Codes	**Completed (01)**	**None Of The Household Members Or No Eligible Member Present At Home During Visits (02)**	**None Of The Household Members Present At Home During The Survey Period (03)**	**Postponed (04)**	**Refused (05)**	**Dwelling Vacant/Address Not A Dwelling (06)**	**Dwelling Destroyed (07)**	**Dwelling Not Found (08)**	**Questionnaire Partly Completed (09)**	**Other (96)**	**Total**	**Number**
101	85.1	0.0	2.5	0.0	6.5	5.8	0.0	0.0	0.0	0.0	100.0	275
102	78.8	0.0	2.6	0.0	7.3	**11.4**	0.0	0.0	0.0	0.0	100.0	193
103	80.6	0.5	2.8	0.0	3.8	**11.8**	0.0	0.5	0.0	0.0	100.0	211
104	79.3	0.4	5.7	0.0	5.4	9.2	0.0	0.0	0.0	0.0	100.0	261
105	80.4	2.1	5.6	0.0	4.2	7.7	0.0	0.0	0.0	0.0	100.0	143
106	83.4	1.7	2.9	0.0	2.9	8.6	0.0	0.0	0.6	0.0	100.0	175
107	80.6	0.0	2.9	0.0	4.0	**12.0**	0.0	0.6	0.0	0.0	100.0	175
108	83.4	1.2	5.7	0.0	2.0	6.9	0.4	0.4	0.0	0.0	100.0	247
109	87.1	0.0	3.2	0.0	3.2	5.4	0.0	0.5	0.0	0.5	100.0	186
110	84.4	1.4	1.9	0.0	1.4	**10.9**	0.0	0.0	0.0	0.0	100.0	211
111	83.9	0.7	2.1	0.3	4.5	8.0	0.0	0.0	0.3	0.0	100.0	286
112	86.0	3.8	3.8	0.0	2.2	4.3	0.0	0.0	0.0	0.0	100.0	186
113	83.9	1.1	1.1	0.0	5.4	8.6	0.0	0.0	0.0	0.0	100.0	93
114	76.0	2.0	10.0	0.0	2.0	8.0	0.0	0.0	0.0	2.0	100.0	50
115	88.8	0.7	1.4	0.0	2.8	6.3	0.0	0.0	0.0	0.0	100.0	143
116	75.0	0.0	4.4	0.0	3.7	**16.2**	0.0	0.7	0.0	0.0	100.0	136
Total	82.7	0.9	3.4	0.0	4.0	8.7	0.0	0.2	0.1	0.1	100.0	2971

After the listing operation, 16 different interviewing team visited the selected and listed households in order to interview. Like listing teams, each survey team visits different number of provinces, because the size of population of those provinces. Visited provinces might vary between listing teams and survey teams (table 20). For instance, while Bursa, Yalova, Balıkesir provinces were visited by the listing team 17 during the listing operation, Yalova and Bursa were visited by a survey team and Balıkesir plus additional one provinces (Canakkale) were visited by survey team 103. Team codes, which have "dwelling vacant/address not a dwelling" code over 10%, are written bold type as well. Within studied clusters (2,971 households), Survey team 116 visited 136 households. They visit the north side of Turkey and the highest "dwelling vacant/address not a dwelling" code (16%) belong to them among other teams. Team 107, 103 and 102 follow previous team with percentage of 12%, 12% and 11% respectively. Moreover, completion rates are fluctuated around 80% for most of the survey team.

Table 20: Visited Provinces Through Survey Operation, According to Survey Team Codes in THDS-2013

Team Codes	**Provinces**
Team 101	ISTANBUL-AVRUPA, KASTAMONU, ORDU
Team 102	ISTANBUL-ANADOLU, MALATYA, ERZINCAN, OSMANIYE
Team 103	CANAKKALE, BALIKESİR, CORUM, AMASYA, TOKAT, SIVAS
Team 104	IZMIR, SINOP, SAMSUN
Team 105	AYDIN, DENİZLİ, MUGLA, AFYON, RIZE, GİRESUN
Team 106	USAK,KUTAHYA,MANISA,BILECIK,ESKİSEHİR, EDIRNE, KIRKLARELI, TEKIRDAG
Team 107	BURSA, YALOVA, GAZIANTEP, KILIS
Team 108	BOLU,SAKARYA,KOCAELI,ÇANKIRI,KAHRAMANMARAS, ELAZIG, ADIYAMAN
Team 109	KONYA,KARAMAN,AGRI, KARS, ARDAHAN, IGDIR
Team 110	BURDUR,ISPARTA,ANTALYA,KAYSERI, YOZGAT
Team 111	HATAY,MERSIN,URFA, HATAY,ANKARA
Team 112	ADANA,KIRSEHIR, NEVSEHIR, NIGDE, AKSARAY, KIRIKKALE
Team 113	SIRNAK,HAKKARI,BATMAN,SIIRT,DIYARBAKIR,MARDIN,TUNCELI,BINGOL, BITLIS, MUS, VAN
Team 114	DUZCE,BARTIN, ZONGULDAK, KARABUK
Team 115	ERZURUM, GUMUSHANE, BAYBURT
Team 116	ARTVIN, TRABZON

4.2 RESULTS FOR THE GOLDEN LISTING OPERATION

In previous chapters, the comparison of lists from the NAD, which is frame of TDHS-2013, with lists from the listing operation, which is updating operation of the NAD address lists, are made by considering the survey result. In this section, an additional special listing operation was carried out by author in the central district of Ankara province.

After five months from completion of the survey, a special listing operation called golden listing operation were carried out. Twenty clusters were included in the central district of Ankara province placed in TDHS-2013. The listing operation of these 20 clusters were repeated by author through the golden listing activity. The listing materials were obtained from HUIPS and the golden listing operation were performed in one month. After completing the operation, these updated addresses were entered to computer, finally triple comparisons (between the listing operation and golden listing activity - golden listing activity and addresses from TURKSTAT- listing operation and addresses from TURKSTAT) were made and these are presented as follows:

4.2.1 The Listing Operation versus Golden Listing Operation

Entered 2,516 dwelling addresses, from the listing operation, are compared with address lists from the golden listing operation (listed 2,531 dwellings during the golden listing). If the address information (street name, outdoor number and indoor number) of listing activity match with addresses of the golden listing operation, it is identified as matched. Both percent distribution of matching status and their code of unit types are presented in following two tables. First, these comparisons are made by the listing operation and then, same comparisons are implemented according to the golden listing operation.

Table 21: Percent Distribution Matching Status, According to the Listing Operation and Golden Listing Activity in 20 Blocks/Clusters (Listing Operation vs Golden Listing Operation)

Matching Status	According To Listing Activity	According To Golden Listing Operation
	Percentage	Percentage
Matched	94.3	94.8
Unmatched	5.7	5.2
Total	100	100
Number	2531	2516

Table 21 indicates that 2,531(in 20 clusters) dwellings (include all type of dwellings, occupied, unoccupied) were listed by listing staff throughout listing operation. Once those dwellings compared with the golden listing, almost 95% of them are matched with the golden listing. On the other side, the author listed 2,516 households throughout the golden listing activity. Both number of listed households and percent distribution of those are almost as same as listing operation by listing staff. Distribution of those addresses according to code of unit types, are presented at following tables.

Table 22: Percent Distribution of Code of Unit Types According to Matching Status of the Listing Operation in 20 Blocks/Clusters (The listing operation vs Golden Listing Operation)

	Code of Unit Types								
Matching Status	**Occupied Dwelling(11)**	**None Of The Household Members At Home During Visits(12)**	**Unoccupied Dwelling(13)**	**Summer/Seasonal House For Short-Time Of The Year(16)**	**Commercial / Business(21)**	**Listing Staff Error(25)**	**Construction(30)**	**Total**	**Number**
Matched	94.8	0.0	3.4	0.3	1.3	0.0	0.1	100.0	2386
Unmatched	64.8	0.0	4.8	0.0	9.0	17.2	4.1	100.0	145
Total	93.1	0.0	3.5	0.2	1.8	1.0	0.3	100.0	2531

Table 22 displays cross tabulation of those listed dwellings (from the listing operation), are stated at Table 21, according to types of residence. Whereas, more than nine out of ten matched dwellings are marked as occupied dwelling, nearly 3% of them are listed as unoccupied dwellings. This means, 3% of matched addresses are coded as unoccupied. On the other hand, percentages of unmatched addresses are distributed different than matched addresses. Although, 65% of unmatched addresses are defined as occupied dwelling, 17[13] % of them are identified as listing staff error by author throughout analyzing the listing data. In general, 93% of all listed dwellings are coded as occupied by listing staff.

[13] Most of the listing staff errors (around 97%) coded as occupied dwellings through listing operation. In other words, listing staff coded those addresses as occupied dwelling, but these addresses were out of TURKSTAT block definition form. Therefore, all these addresses coded as listing staff error during analyze stage by author.

Table 23: Percent Distribution of Code of Unit Types According to Matching Status of Golden Listing Operation in 20 Blocks/Clusters, (Golden Listing Operation vs The listing operation)

	Code of Unit Type									
Matching Status	**Occupied Dwelling(11)**	**None Of The Household Members At Home During Visits(12)**	**Unoccupied Dwelling(13)**	**Summer/Seasonal House For Most Of The Year(15)**	**Summer/Seasonal House For Short-Time Of The Year(16)**	**Commercial / Business(21)**	**Construction(30)**	**Other(70)**	**Total**	**Number**
Matched	90.1	0.1	6.6	0.2	0.9	1.9	0.1	0.1	100.0	2386
Unmatched	96.2	0.0	1.5	0.0	0.0	2.3	0.0	0.0	100.0	130
Total	90.4	0.1	6.4	0.2	0.8	1.9	0.1	0.1	100.0	2516

According to the Table 23, most of the listed households by author (2,386 in 2,516) are matched with listed households by listing staff. Though, almost nine out of ten households are determined as occupied households, approximately 7% of those are listed as unoccupied. It should be highlighted that the latter percentage is almost doubled (3.4% to 6.6%), when the comparison is completed by the listing operation versus the golden listing operation (Table 22). Beside, 130 households, which are not included by lists from the listing operation, were listed through the golden listing operation and 96% of them were identified as occupied. In other words, 125 occupied addresses, which were not listed by listing staff, were identified and listed during the golden listing activity.

Table 24: Percent Distribution Response Codes According to Code of Unit Types of Golden Listing Operation in Interviewed Households in 20 Blocks/Clusters (in Terms of Golden Listing Activity)

	Code Of Unit Types						
Response Codes	**Occupied Dwelling(11)**	**Unoccupied Dwelling(13)**	**Summer/Seasonal House For Most Of The Year(15)**	**Summer/Seasonal House For Short-Time Of The Year(16)**	**Commercial / Business(21)**	**Total**	**Number**
Completed (01)	96.0	2.7	0.2	0.7	0.2	100.0	405
None Of The Household Members Or No Eligible Member Present At Home During Visits (02)	100.0	0.0	0.0	0.0	0.0	100.0	5
None Of The Household Members Present At Home During The Survey Period (03)	91.7	0.0	0.0	0.0	8.3	100.0	12
Refused (05)	96.6	3.4	0.0	0.0	0.0	100.0	29
Dwelling Vacant/Address Not A Dwelling (06)	38.7 (12)	41.9 (13)	0.0 (0)	12.9 (4)	6.5 (2)	100.0 (31)	31
Questionnaire Partly Completed (09)	100.0	0.0	0.0	0.0	0.0	100.0	1
Total	92.3	5.2	0.2	1.4	0.8	100.0	483

Table 24 is the most critical one among entire tables in this section. The table shows differentiations between listing activity and the golden listing operation. The survey teams interviewed with 483 households (in central districts of Ankara province) which listed during the golden listing activity. Among interviewed households, 92% percent of those are occupied dwelling and nearly 5% of them are unoccupied dwelling. Once the investigation completed by response codes, a special attention should be paid on code 06. This row points out that 31 amount of addresses listed as occupied dwelling, but these addresses were identified as code 06 by survey teams. However, almost 39% (12 dwellings) of those were listed as occupied by author as well through the golden listing

activity, other 61% (19 dwellings) of them were listed as other codes (etc., unoccupied dwelling, dwelling occupied for commercial or business purpose or so on). In other words, more than half of the code 06 can be decreased by being more careful while listing. On the other hands, percent distribution of another unreachable households due to "none of the household members present at home during the survey period (03)" are slightly different than other codes. Almost 92% of those codes were listed during the golden listing as occupied dwelling and nearly 8% were listed as dwelling that occupied for commercial or business purposes.

Table 25: Percent Distribution Response Codes According to Code of Unit Types of the Listing Operation in Interviewed Households in 20 Blocks/Clusters (in Terms of the listing operation)

	Code of Unit Type			
Response Codes	**Occupied Dwelling(11)**	**Listing Staff Error(25)**	**Total**	**Number**
Completed (01)	99.0	1.0	100.0	416
None Of The Household Members Or No Eligible Member Present At Home During Visits (02)	100.0	0.0	100.0	5
None Of The Household Members Present At Home During The Survey Period (03)	100.0	0.0	100.0	12
Refused (05)	100.0	0.0	100.0	29
Dwelling Vacant/Address Not A Dwelling (06)	97.3	2.7	100.0	37
Questionnaire Partly Completed (09)	100.0	0.0	100.0	1
Total	99.0	1.0	100.0	500

Within 20 clusters in the central district of Ankara province, survey team were tried to interview with 500 households. Table 25 indicates the distribution of response codes according to type of dwellings. The only condition selecting a household for interviewing is that those households should be occupied for accommodation purpose. Therefore, only occupied dwellings is seen on type of residence column of the table. Listing staff error are created by author while comparing different addresses lists. The survey team did not find 37 houses, because those dwellings either vacant or addresses not a dwelling (the code is 06). Throughout comparing two address lists (lists from the listing operation and golden listing), one considerable point is that, while almost 3% of those codes were resulted from listing staff errors, other 97% percent of those were marked as occupied by listing staff. Beside that the interviews were completed with 416 households and 99% of them are occupied dwelling and 1% of them consisted by listing staff error.

4.2.2 The Golden Listing Operation versus Addresses obtained from TURKSTAT

Addresses comparison is completed by the golden listing with addresses, obtained from TURKSTAT, in this section. Following three tables shows differentiation between these two types of address lists.

Table 26: Percent Distribution Matching Status, According to Golden Listing and Addresses from TURKSTAT in 20 Blocks/Clusters (Golden Listing Operation vs Addresses Obtained from TURKSTAT)

Matching status	**According To Golden Listing Operation**	**According To TURKSTAT Address lists**
	Percentage	**Percentage**
Matched	76.3	95.2
Unmatched	23.7	4.8
Total	100	100
Number	2516	2016

According to Table 26, almost three out of every four golden listing addresses are matched with addresses from TURKSTAT. Since these addresses include all types of dwelling, 24% of those (unmatched) addresses contain mostly either unoccupied or they are not occupied for accommodation propose. In other saying, however, listing staff listed all types of dwellings (such as dwellings used for commercial purpose) throughout the listing operation, TURKSTAT provided only occupied households.

Otherwise, 2,016 address information were obtained from TURKSTAT as occupied. Although 95% of them were confirmed by author through the golden listing activity, 5% of them were not listed because, these dwellings were not detected as dwelling weather occupied or not. As entire address information are occupied from TURKSTAT addresses lists, both matched and unmatched addresses cannot be investigated by unit types.

Table 27: Percent Distribution of Code of Unit Types According to Matching Status in 20 Blocks/Clusters (Golden Listing Operation vs Addresses Obtained From TURKSTAT)

Matching Status	Occupied Dwelling(11)	None Of The Household Members At Home During Visits(12)	Unoccupied Dwelling(13)	Summer/Seasonal House For Most Of The Year(15)	Summer/Seasonal House For Short-Time Of The Year(16)	Commercial / Business(21)	Construction(30)	Other(70)	Total	Number
Matched	97.3	0.1	1.9	0.0	0.3	0.4	0.0	0.1	100.0	1920
Unmatched	68.1	0.3	20.8	0.8	2.5	6.9	0.3	0.2	100.0	596
Total	90.4	0.1	6.4	0.2	0.8	1.9	0.1	0.1	100.0	2516

The percent distribution of matching status between golden listing and TURKSTAT are presented the table above. 2,516 household were listed during the golden listing activity in the central district of ANKARA province (20 clusters), and 1,920 of them are matched with TURKSTAT addresses. Pretty much of those matched dwellings were seen as occupied, 2% of those were identified as unoccupied. This means, according to TURKSTAT addresses lists 2% (nearly 37 households) of these households are occupied dwellings, but according to the golden listing operation these households are unoccupied. Otherwise, 596 amount of unmatched addresses are not included by TURKSTAT's addresses list. Because, these buildings are destroyed or newly constructed buildings mostly.

4.2.3 Addresses Obtained From TURKSTAT versus Listing Operation

Addresses comparison are made by the listing operation with addresses, obtained from TURKSTAT, in this section. Following three tables shows differentiation between these two types of address lists (from the NAD and from the listing operation).

Table 28: Percent Distribution Matching Status, According to The Listing Operation and TURKSTAT Address Lists in 20 Blocks/Clusters, (Addresses Obtained from TURKSTAT vs Golden Listing Operation)

Matching status	**According to The listing operation**	**According to TURKSTAT Address lists**
	Percentage	**Percentage**
Matched	73.5	92.3
Unmatched	26.5	7.7
Total	100	100
Number	2531	2016

TURKSTAT addresses are compared with addresses from the listing operation in table above. Percent distribution of Table 28 is almost as same as Table 26. However, most of the TURKSTAT addresses are matched with the addresses from listing operation (92%), the proportion of unmatched addresses were raised according to the golden listing operation. In other saying, almost half of the unmatched addresses (7.7%- 4.8%) were found by author during the golden listing. On the other hand, almost three out of every four listing operation addresses are matched with addresses from TURKSTAT (like Table 26). Since these addresses include all types of dwelling, 26% of those (unmatched) addresses include mostly either unoccupied or they are not occupied for accommodation propose. In order words, however, listing staff listed all types of dwellings (such as dwellings used for commercial purpose) throughout listing operation, TURKSTAT provided only occupied households.

Table 29: Percent Distribution of Code of Unit Types According to Matching Status in 20 Blocks/Clusters, (Golden Listing Operation vs Addresses Obtained from TURKSTAT)

Matching Status	Occupied Dwelling(11)	None Of The Household Members At Home During Visits(12)	Unoccupied Dwelling(13)	Summer/Seasonal House For Short-Time Of The Year(16)	Commercial / Business(21)	Listing Staff Error(25)	Construction(30)	Total	Number
Matched	98.0	0.1	1.5	0.1	0.4	0.0	0.1	100.0	1860
Unmatched	79.7	0.0	9.2	0.7	5.5	3.7	1.0	100.0	671
Total	93.1	0.0	3.5	0.2	1.8	1.0	0.3	100.0	2531

The percent distribution of these matched and unmatched households between the listing operation and TURKSTAT are presented in the table above. 2,531 households were listed during the listing operation in the central district of ANKARA province, and 1,860 of them were matched with TURKSTAT addresses. Major amount of those matched dwellings are identified as occupied, 2% of those addresses are analyzed as unoccupied. This means, although according to TURKSTAT addresses lists 2% (nearly 28 households) of these households are occupied dwellings, according to the listing operation, these households are identified as unoccupied. Once checking the same percentages from Table 27, golden listing points out that 37 households are marked as unoccupied. Otherwise, 671 amount of unmatched addresses are not contained by TURKSTAT's addresses list. Because, these buildings are destroyed or newly constructed buildings generally.

5. DISCUSSION AND CONCLUSION

Reaching a perfect frame has been a difficult job, even impossible, but some studies have been conducted to attain the perfect frame, which is very close to it. Three important components of the perfect frame are up-to-date, accurate and complete frame. In order to achieve these features of the frame, listing operation, which is an update operation of a current frame, is conducted. The increased proportions of "Dwelling Vacant/Address Not a Dwelling" code (coded 06) for last three TDHSs in 2003, in 2008 and in 2013 are 4.8%, 5.9% and 8.4% respectively. The high proportion of code 06, especially in 2013, affects the completion rate of the survey ultimately. Hence, the main aim of this thesis is to test the quality of current household frame by using the listing operation of the TDHS-2013. In order to achieve this, effort is made to reveal the differences between the address lists obtained from the NAD that served as the frame, and the lists that were updated during the listing fieldwork. Comparisons are made by various aspects; such as response codes obtained after the survey operation, or type of dwelling codes obtained after the listing operation. During the analysis stage of this thesis, two basis cases/errors are assessed. The first one is the NAD based cases comprising deficiencies result from registration, deficiencies in numbering system of settlements or so on. The second one is listing operation based errors including, listing staff errors, ringing staff error or error that happens during constructing block lists.

For the TDHS-2013, the address lists of selected 642 clusters are provided by TURKSTAT. Then, these address lists are updated through the listing operation in TDHS-2013. While 499 of the 642 clusters are selected from settlements with municipalities, the others consisted of villages that are not located in municipal areas. For this thesis, systematic random selection is used for selecting 125 out of these 499 clusters. The results indicates that the systematic selection technique does not create bias statistically by displaying almost no difference between selected sample and entire data.

In the beginning of the survey, according to the NAD, 12,346 occupied households were identified within the 125 selected clusters located in municipal areas. However, 2,016 of those were not identified by listers during the listing operation. Moreover, 4,475 different occupied dwellings (unmatched addressees), which are not included in TURKSTAT address lists, were listed by listing staff. Some of those additional listed households result from listing staff error[14] (all in urban areas), others stem from newly constructed buildings, which are not covered by the NAD. Examining the 4,475 unmatched addresses by unit type, it is seen that the percent distribution of unmatched addresses, are almost the same as matched addresses. However, by response codes; although the completion rate of unmatched occupied addresses are lower than the completion rate of the matched addresses (74.7% and 86.2%), "dwelling vacant/address not a dwelling" code of unmatched addresses are almost three times more than matched addresses (5.7% and 15.5%). It can be concluded that, decreased completion rate mostly results from increased "dwelling vacant/address not a dwelling" code. This is a type of error that is made by listing staff. It can be decreased by a more careful listing operation, meaning more investigation while listing relevant addresses.

For metropolitan areas, the high proportion of "dwelling vacant/address not a dwelling" code and the lower proportions of completion are among the results of this thesis. Although lower completion rates are expected in metropolitan areas, high proportions of vacant dwellings are not. This can stem from the following reasons: Metropolitan areas are growing more and more every day, because of better job opportunities, etc. Many people have migrated to metropolitan areas in time, to improve their life conditions. In order to meet the needs of the increasing population, many new buildings have been constructed. These structures are mostly high rise buildings. Listing staff tend to not examine such buildings to find out whether they are occupied or not. Some of the staff just completed the listing operation of such buildings utilizing the

[14] Listing staff coded those addresses mostly as occupied dwelling, but these addresses were out of TURKSTAT block definition form. Therefore, all these addresses coded as listing staff error during analyze stage by author.

information on the outdoor bells. If some name is written on the bell, the dwelling was coded as occupied, otherwise it was coded as unoccupied. Especially for metropolitan areas, mostly buildings are high rise buildings, and they are protected by high security. Therefore, the listing staff, at times, took the easy way out and listed the households from the bells.

The results show that the high percentage of "dwelling vacant/address not a dwelling" code (code 06) is worthy to note for the West Marmara Region. Among the 12 NUTS1 regions, West Marmara has the highest share of code 06, which might be an example of the listing errors mentioned above. Moreover, the listing team 17 has the highest proportion of code 06. This team visited Bursa, Balıkesir and Yalova provinces in the West Marmara region. Because the percentages of code 06 are relatively high for these provinces according to the field operation, a special field operation is conducted to eliminate survey team effects on the results (called the sweeping operation). This operation is conducted after the completion of the field survey operation. After all questionnaires are entered to the computer during data entry, uncompleted questionnaires (addresses) are visited one more time by the staff of HUIPS. If the addresses are vacant (code 06), or if the household members are not found during survey time (code 02) or so on, they are visited once again. Because of these reasons, the high percentage of code 06 for the West Marmara region might be explained by listing error resulting from listing staff, rather than the main fieldwork.

As the golden listing operation, 20 urban clusters were re-listed by the author in the central districts of Ankara province from scratch. The operation is performed in order to both checking the quality of listing operation of TDHS-2013 and making an objective comparison with more reliable source. Since the golden listing is carried out under the assumption of a flawless/perfect listing operation, the name of the operation is defined as "Golden" (like golden frame, which means complete, up-to-date, accurate frame). Moreover, as attaining the flawless address lists is main purpose of the golden listing

operation, it should be implemented by experienced people, who have full knowledge of survey methodology and field research.

Striking results were revealed after the golden listing operation. Results of the golden listing operation shows that 31 out of 500 households[15] are identified as code 06 by the survey team. However, almost 39% of those 31 households were listed as occupied by the author (like listing staff did) through the golden listing activity, the remaining 61% was listed as other codes (unoccupied dwelling, dwelling occupied for commercial purpose or so on). In other words, more than half of the households coded as 06 can be decreased by being more querier while listing. Moreover, 130 households, which were not included in the lists from the listing operation, were listed during the golden listing operation and 96% of them were identified as occupied. In other words, 125 different occupied addresses, which were not listed by the listing staff, were identified and listed during the golden listing activity. Most of these addresses are matched with the NAD addresses; and it would have increased the percentage of occupied dwellings and the size of sampling frame as well.

Overall, the high percentage of "dwelling vacant/address not a dwelling" code (around 8% for Turkey) might have resulted from errors in then NAD or from the listing operation. Following are some observations from the listing operation regarding errors that were due to listing staff: 1) there are some addresses that are not in the TURKSTAT Block Definition Form (TBDF), but still listed by the staff. Some listing staff did not pay attention to this upper limit and listed entire building. For example, TBDF tells the listers to create a list of dwellings between the address range of 8/1 (outdoor number/indoor number) and 8/30, on a specific street. Let us assume this building has 50 dwellings, going up to 8/50. Some listing staff did not pay attention to this upper limit and listed entire building. 2) Most of the houses for rent or sale were listed as occupied dwellings through the listing operation, assuming these houses would be occupied at survey date. Thus some

[15] Selected households in order to interview in 20 clusters.

proportion of the "dwelling vacant/address not a dwelling" code on the household questionnaire is constituted by such rental or on sale houses. 3) Especially for some residence building complex, proper investigation about dwellings was not made and these dwellings were listed as occupied. 4) For some twin buildings with two entrances, one of the entrances was missed. For example, if a twin building has two entrances with the outdoor numbers 10 and 12, the listing staff might list only the dwellings that can be accessed through the entrance with the outdoor number 10, and skip the other entrance; missing half the dwellings in the twin building. 5) The two columns on the listing form that are related to - type of unit code and whether the unit is an occupied dwelling or not- (marked by E and H, representing yes and no respectively) were inconsistent for some cases. For example, a commercial unit was given the code of 21, which should imply a unit that is not an occupied dwelling; yet was still marked with the letter E in the next column.

Some errors (called ringing staff error) occurred during the selection of households for interview: 1) the inconsistency mentioned before between the type of unit codes and whether the unit is an occupied dwelling or not was not checked thoroughly by the ringing staff. Therefore some errors made by the listing staff were not noticed. 2) While numbering the occupied households, the ringing staff gave numbers to the units that were marked with an H (Hayır[16]); where they should have only selected those marked with an E (Evet[17]). For instance, the only condition for numbering is the type of dwellings being occupied for accommodation purposes for most of the year. Some dwellings were selected wrongly through the ringing stage, such as unoccupied dwellings being selected. 3) Some pages of households listing forms might not be noticed. For instance, let us assume 100 occupied households are listed by the listing staff with 20 of them being on the last page.

[16] Hayır meaning No.
[17] Evet meaning Yes.

If the ringing staff misses this page, 20 households do not have any chance of being selected. This is a rare error compared to other mistakes (just one cluster).

Some other errors are occurred during creating block definition forms: 1) the most common one is skipping a street as whole. For example, according to the address lists (Appendix 8) obtained from TURKSTAT, "Arda Street" between numbers 20/3 and 30/6 as even numbers, and "Arda Street" between the numbers 11/1 and 17/3 as odd numbers should be listed. In some cases, the latter address information (odd numbers) were missed and were not written on the TURKSTAT Block Definition Form. Therefore, these addresses could not be listed by the listing staff, although the corresponding address information was already provided by TURKSTAT.

Some errors are resulted from the lists provided by TURKSTAT and NAD: 1) lack of street names is one of the deficiencies of the TURKSTAT address lists. Even though it is not common, address lists of some clusters do not have street names, and "Streetless" are written on the street name cell. As a result of this, these addresses could not be listed during the listing operation. 2) Many changes may occur at any moment regarding addresses, such as the construction/demolition of a building or a street. Such occurrences might not be included in the system instantly. 3) Misreporting, particularly for migration, is still a problem that has been decreasing over time. This deficiency is important for reliability of the system. 4) Although there are address lists for non-municipal villages, most of cannot be used during the listing fieldwork; because often there is only one street with the name "Village Street", and the numbers given to the buildings cannot be observed physically. Therefore the lists for non-municipal villages could not be used. 5) Despite the existence of block lists for municipal villages, there were no observable outdoor numbers in some of these villages. For villages with observable outdoor numbers, the numbers were either scattered or missing. 6) An observation regarding additional – probably illegal - storeys to buildings was that they were likely to be missed by TURKSTAT in their frames.

The results point out that the percentages of ringing staff error, errors during creating block lists, and errors which resulted from the NAD are relatively much lower than the percentage of listing staff errors. The percentages of listing staff error, errors during creating block lists and ringing staff error are 2.3%, 0.4% and almost 0.1% respectively in the studied clusters.

Although there are some drawbacks of the Listing operation and NAD, they also have their unique strengths. Following are the positive features of the listing operation: 1) time of the listing operation: This is a crucial characteristic of the listing operation. As the provided addresses frame (NAD) does not include current information regarding target population, these addresses are updated by the listing operation just before the survey. The operation provides an updated frame, which is desired. 2) Training time: Although field staff are trained for one or two days in most of the surveys, the listing staff in TDHS-2013 were trained for 5 days in order to comprehend entire information related the listing operation. 3) Field visits by HUIPS staff: Throughout the listing operation, each team was visited as least once by either academic staff or project assistant of HUIPS, in order to monitor the work of listing staff. 4) Experienced coordinators: Listing operation has been conducted for many TDHSs and other demographic surveys at HUIPS. This provided the Institute with great experience in this field.

The following are the positive features of the NAD: 1) up to date information: Sex, age and education information and even the people living in the smallest settlement can be known at any moment. Accordingly, up to date information for planning regarding health, education, dwelling and social services is available. This data is more valuable, under the assumption of instant reports. This is only possible through people reporting their changes of residence as soon as they move. Such reporting has been increasing by the year in Turkey because of regulations that do not allow basic education or health services in the absence of address registration. 2) Experienced system: Since 2007, Address Based Population Registry System (ABPRS) has provided information about

population each year (end of December). Shortcomings of the system stated above has been amended for 8 years and the quality of the data has been getting better.

Up to now, the positive and negative features of the address lists obtained through both the NAD and the listing operation have been discussed. A further step would be to identify methods of overcoming the negative aspects of both these types of address lists.

Some recommendation for the future listing operations are as follows: 1) description of listing codes should have been explained clearer during the training stage. For instance, listing staff listed a home-office as a commercial unit, although the dwelling was occupied and it should have been coded as such. 2) An additional cross-check stage might have be included before the selection of households. This extra stage can reduce the inconsistency between type of units and whether the unit is an occupied dwelling or not (Evet[18]/Hayır[19]). 3) A revise version of golden listing operation, called reliability check, can be implemented. Reliability check refers that one in every ten clusters, which were listed by listing staff, are listed by institute staff especially in first week of field implementation. 4) All types of addresses (commercial units, institutional population or so on) can be requested from TURKSTAT in the future, instead of occupied household addresses only. Therefore, some information about these dwellings can be used in the explanation column of TURKSTAT block definition lists. For example, if a selected building has a market, its name can be used for describing the building to the listing teams. 5) Obtaining information (about occupation status) from selected households might be more appropriate for creating a proper survey frame. Up to now, listing staff have collected information about an entire selected building either from an occupant of this building, or from a person who has knowledge about the building (like a person from a hair styling salon in the building). This recommendation might extent the listing period of time and more visits might be required by the Institute staff to listing teams, in order to check their work. 6) Not to list rental or

[18] Meaning “Yes”
[19] Meaning “No”

on sale dwellings could be another solution for decreasing “dwelling vacant/address not a dwelling” code on the household questionnaire. If they are to be listed, listing staff should ensure that they will be occupied until survey date. 7) If instructors of the listing operation come across a mistake (like listing staff errors) during plot study, the date of plot study can be expanded for more practice.

Moreover, a couple of recommendations for data from TURKSTAT are presented as follows: 1) as mentioned before, shortcomings of the registration data (ABPRS) have been amended since 2007. For instance, the number of addresses with missing information or unregistered people have decreased. Utilization of services may be the most important part of this improvement in the registration system. For example, if a person would like to get health service where s/he resides, s/he has to be registered in the ABPRS. In order to increase the registration rate to the system, public service announcements (PSA) might be prepared by the government to attract people’s attention to the importance of this issue. 2) In some clusters, the household addresses provided by TURKSTAT are far away from each other. This is a painstaking issue for the survey teams in terms of logistics. For example, the field supervisor has to be attentive of both an interview visiting a household two streets away from the main area, and the rest of the field team. This problem stems from the lack of enumeration areas (EA) in Turkey. Creation of EAs would provide not only well shaped survey areas (buildings close to each other), but it would also allow the production of statistics for subpopulations of the country defined by the EAs, which is a vital issue. In other words, it is not for census purposes only. It would not be wrong to say that EAs are one of the important development indicators for a survey area. 3) As a good implemented listing operation provides up-to-date and accurate frame, the listing operation is an important component of a survey. The operation is conducted for limited number of surveys. Therefore, in order to obtain a current frame, which is a quality component of a survey, the number of listing operation should be increased for the following years.

Having listed a number of recommendations, this paragraph includes some conclusions reached on the NAD. Deficiencies observed during the listing operation are important regarding the registration system, and they effect the sample frame (NAD) ultimately. The most common defects are unregistered people and newly constructed buildings. For instance, a new building is registered to the system after more than one year; or people migrates from one place to another, but not reporting this movement for two years. Many similar instances exist in Turkey and this problem should be evaluated in detail. Moreover, list frames are used in Turkey. Sequential address information, which cover the whole country, is listed hypothetically and samples are drown from these lists. For example, although the intended sample is a group of close buildings, the selected sample could include a bunch of buildings that are far away from each other. Sometimes this gap may be up to two kilometers to the main group of the block.

An area frame could solve the deficiencies stated above, such as enumeration areas (EAs). An EA is the smallest geographical unit into which the country is divided for census purposes. Therefore, EAs are essential for both the statistical area structure, and for the census management area structure. The EAs should fit faultlessly to the boundaries as outlined in the hierarchy to permit combination of data per layer.

Regarding the listing operation, some conclusions are as follows: Although up to date frames are very important for surveys, the updating operation of an existing frame is not always easy. The difficulties that arise effect the quality of the sampling frame and the results of the surveys directly. Most of the listing staff errors resulted from the following reasons: Firstly, there was lack of attention. The listers skipped some buildings during the listing operation, and these skipped buildings became missing units for the frame. Secondly, the staff generally took the easy way out while they are listing the blocks. Some of them completed the listing forms according to outdoor bells, instead of getting information from a person with knowledge about the listed building. Thirdly, some buildings (especially separate houses) did not have outdoor numbers and some were

scattered. As there is no definite area for the listing operation, some listing staff listed addresses which were out of the TURKSTAT definition form. This problem also stemmed from the lack of EAs in Turkey. In other words, the results of the listing operation could be more reliable by an existing EA. If these results and suggestions are considered throughout the listing operation, the reliability of the operation will be increase for sure.

The time gap between the listing operation and golden listing operation can be considered as a limitation of this thesis. Even though, the listing activity took place in July-September 2013, the listing operation (golden listing) for Ankara was carried out in May-June 2014. There is a few time gap between two operations. In order to eliminate the drawback of this time gap, more efforts have been carried out during the operation of golden listing. For example, the information, at the time of listing operation, tried to be obtained from either the authorities or dwellers. Another limitation of this thesis limited number of cluster located in central district of Ankara province for the golden listing operation. These clusters are selected because of the logistic reasons. Since visiting other clusters which are located in other provinces, costly, only the clusters in Ankara province (also HUIPS is located in same city) are listed. The golden listing operation is a case study and it does not represent the big picture in Turkey.

Furthermore, although information about matched addresses are available for TURKSTAT address lists, the information are not available for unmatched addresses. In other words, almost 16% of TURKSTAT addresses were not listed by listing staff. Hence, these addresses were not matched with updated addresses from the listing operation. As households were selected from updated lists, unmatched addresses did not have selection chance. So, these addresses were not visited for interview and information about those were not collected.

The subject of this thesis is a first attempt to do make a comparative assessment of the address lists obtained from the National Address Database (NAD) that served as the frame,

and the lists that were updated during the listing fieldwork. Evaluation of the quality of frame (NAD) by using the listing operation in Turkey has not been studied before, even there are considerable amount of similar studies exist in developed countries, especially in the USA.

The recommendations for the further studies are the followings: The first recommendation is the need to define the EA. Existence of EAs can definitely solve some of the problems faced during the survey process. Creation of the EAs will be useful not only for collection of data, but also for getting information related to exact areas that are targeted for specific studies. Provided the benefits of EAs, it can be useful to take this issue into the statistical agenda of Turkey as well. The second recommendation is to conduct a further study which evaluates the types of dwelling by using type of unit codes (i.e. occupied dwelling, unoccupied dwelling or so on) of TDHS-2013. By the study, current status of dwellings can be assessed in Turkey. The last recommendation is to carry out a comparison study where response codes of TDHS is compared with response code of another study that conducted without listing operation. It would facilitate to exhibit the effect of listing operation on response codes. However, when comparing two surveys, date, quality and sample size of both surveys should be considered carefully.

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APPENDIX

Appendix 1: List of strata by region, NUTS 1 region, residence, type and province, Turkey 2013

Stratum	Region	NUTS 1 Region	Type	Province
1	West	İstanbul	Urban/Metropol	İstanbul
2	West	İstanbul	Rural	İstanbul
3	West	West Marmara	Urban	Edirne, Kırklareli, Tekirdağ, Balıkesir, Çanakkale
4	West	West Marmara	Rural	Edirne, Kırklareli, Tekirdağ, Balıkesir, Çanakkale
5	West	Aegean	Urban/Metropol	İzmir
6	West	Aegean	Urban	İzmir, Aydın, Denizli, Muğla, Manisa
7	West	Aegean	Rural	İzmir, Aydın, Denizli, Muğla, Manisa
8	Central	Aegean	Urban	Afyon, Kütahya, Uşak
9	Central	Aegean	Rural	Afyon, Kütahya, Uşak
10	West	East Marmara	Urban/Metropol	Bursa
11	West	East Marmara	Urban	Bursa, Kocaeli, Sakarya, Yalova
12	West	East Marmara	Rural	Bursa, Kocaeli, Sakarya, Yalova
13	Central	East Marmara	Urban	Bilecik, Eskişehir, Bolu, Düzce
14	Central	East Marmara	Rural	Bilecik, Eskişehir, Bolu, Düzce
15	Central	West Anatolia	Urban/Metropol	Ankara
16	Central	West Anatolia	Urban/Metropol	Konya
17	Central	West Anatolia	Urban	Ankara, Konya, Karaman
18	Central	West Anatolia	Rural	Ankara, Konya, Karaman
19	South	Mediterranean	Urban/Metropol	Adana
20	South	Mediterranean	Urban	Antalya, Burdur, Isparta, Adana, İçel, Hatay, K. Maraş, Osmaniye
21	South	Mediterranean	Rural	Antalya, Burdur, Isparta, Adana, İçel, Hatay, K. Maraş, Osmaniye
22	Central	Central Anatolia	Urban	Kırşehir, Nevşehir, Niğde, Aksaray, Kırıkkale, Kayseri, Sivas, Yozgat
23	Central	Central Anatolia	Rural	Kırşehir, Nevşehir, Niğde, Aksaray, Kırıkkale, Kayseri, Sivas, Yozgat

24	North	West Black Sea	Urban	Zonguldak, Bartın, Karabük, Kastamonu, Sinop, Samsun
25	North	West Black Sea	Rural	Zonguldak, Bartın, Karabük, Kastamonu, Sinop, Samsun
26	Central	West Black Sea	Urban	Çankırı, Amasya, Çorum, Tokat
27	Central	West Black Sea	Rural	Çankırı, Amasya, Çorum, Tokat
28	North	East Black Sea	Urban	Artvin, Giresun, Gümüşhane, Ordu, Rize, Trabzon
29	North	East Black Sea	Rural	Artvin, Giresun, Gümüşhane, Ordu, Rize, Trabzon
30	East	Northeast Anatolia	Urban	Erzincan, Erzurum, Bayburt, Ağrı, Kars, Ardahan, Iğdır
31	East	Northeast Anatolia	Rural	Erzincan, Erzurum, Bayburt, Ağrı, Kars, Ardahan, Iğdır
32	East	Central East Anatolia	Urban	Bingöl, Elazığ, Malatya, Tunceli, Bitlis, Hakkari, Muş, Van
33	East	Central East Anatolia	Rural	Bingöl, Elazığ, Malatya, Tunceli, Bitlis, Hakkari, Muş, Van
34	East	Southeast Anatolia	Urban/Metropol	Gaziantep
35	East	Southeast Anatolia	Urban	Adıyaman, Gaziantep, Kilis, Diyarbakır, Şanlıurfa, Mardin, Siirt, Batman, Şırnak
36	East	Southeast Anatolia	Rural	Adıyaman, Gaziantep, Kilis, Diyarbakır, Şanlıurfa, Mardin, Siirt, Batman, Şırnak

Appendix 2: An Example of TURKSTAT Block Definition Form

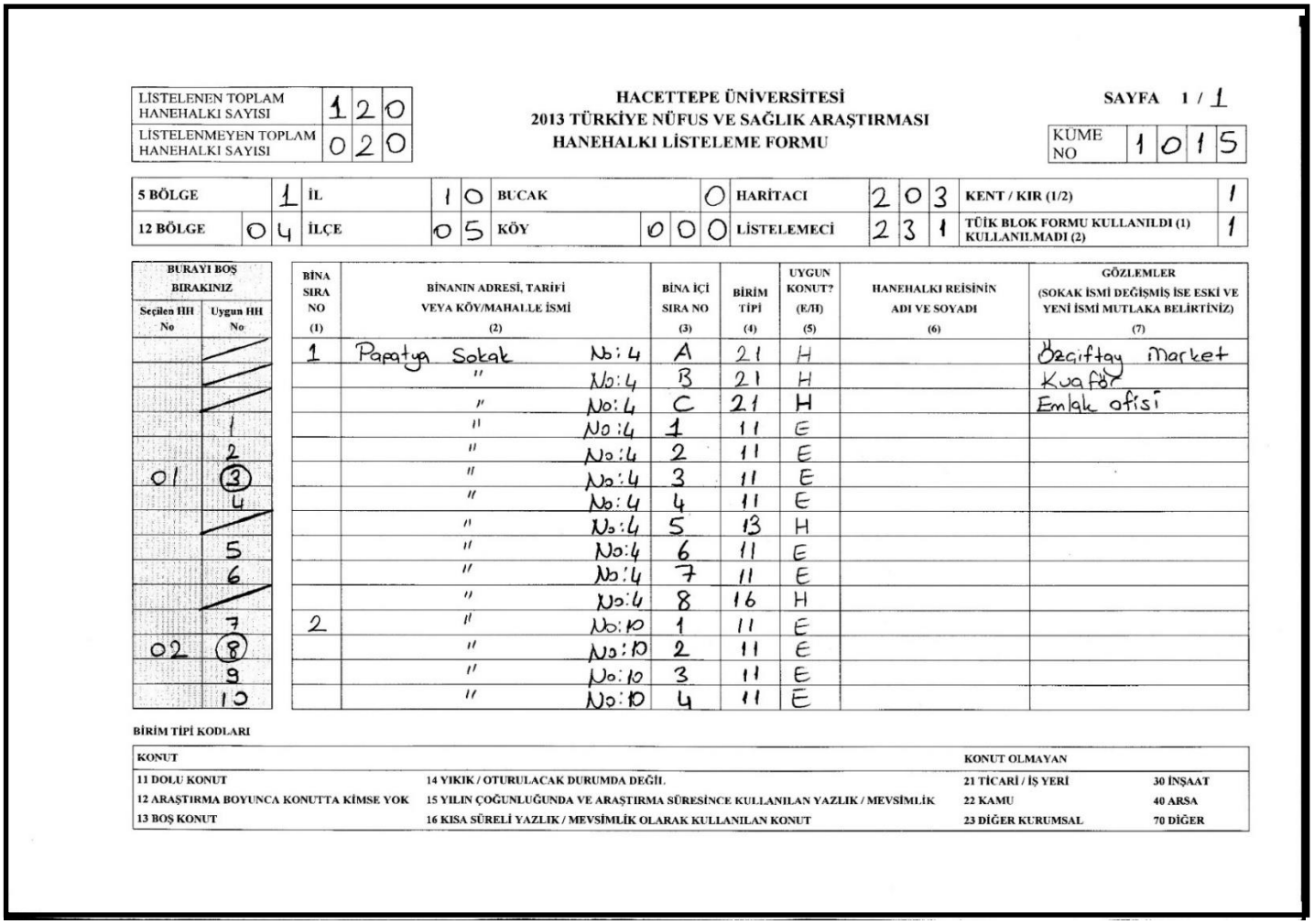
2013 TÜRKİYE NÜFUS VE SAĞLIK ARAŞTIRMASI

TÜİK BLOK TANIMLAMA FORMU

İL	16	**İL ADI**	BURSA
İLÇE	5	**İLÇE ADI**	GEMLİK
BUCAK	0	**BUCAK ADI**	MERKEZ
KÖY	0	**KÖY ADI**	MERKEZ
5 BÖLGE	1	**12 BÖLGE**	TR4
KIR/KENT	1	**TİP**	3

KÜME NO	MAHALLE ADI	CADDE / SOKAK ADI	CADDE / SOKAKTAKİ BİNANIN		TEK / ÇİFT	AÇIKLAMA
			BAŞLANGIÇ KAPI NO	BİTİŞ KAPI NO		
1015	HAMİDİYE	PAPATYA SOKAK	21/1	55/3	T	No:21 GÜL APT.
		PAPATYA SOKAK	4/1	48/1	Ç	
		PAPATYA ÇIKMAZI SOKAK	5/1	7/6	T	NO: 5 ERTUNÇ APT. NO: 7 BOYTAŞ APT.

Appendix 3: An Example of Household Listing Form



LİSTELENEN TOPLAM HANEHALKI SAYISI	12
LİSTELENMEYEN TOPLAM HANEHALKI SAYISI	02

HACETTEPE ÜNİVERSİTESİ
2013 TÜRKİYE NÜFUS VE SAĞLIK ARAŞTIRMASI
HANEHALKI LİSTELEME FORMU

SAYFA 1 / 1

KÜME NO: 1015

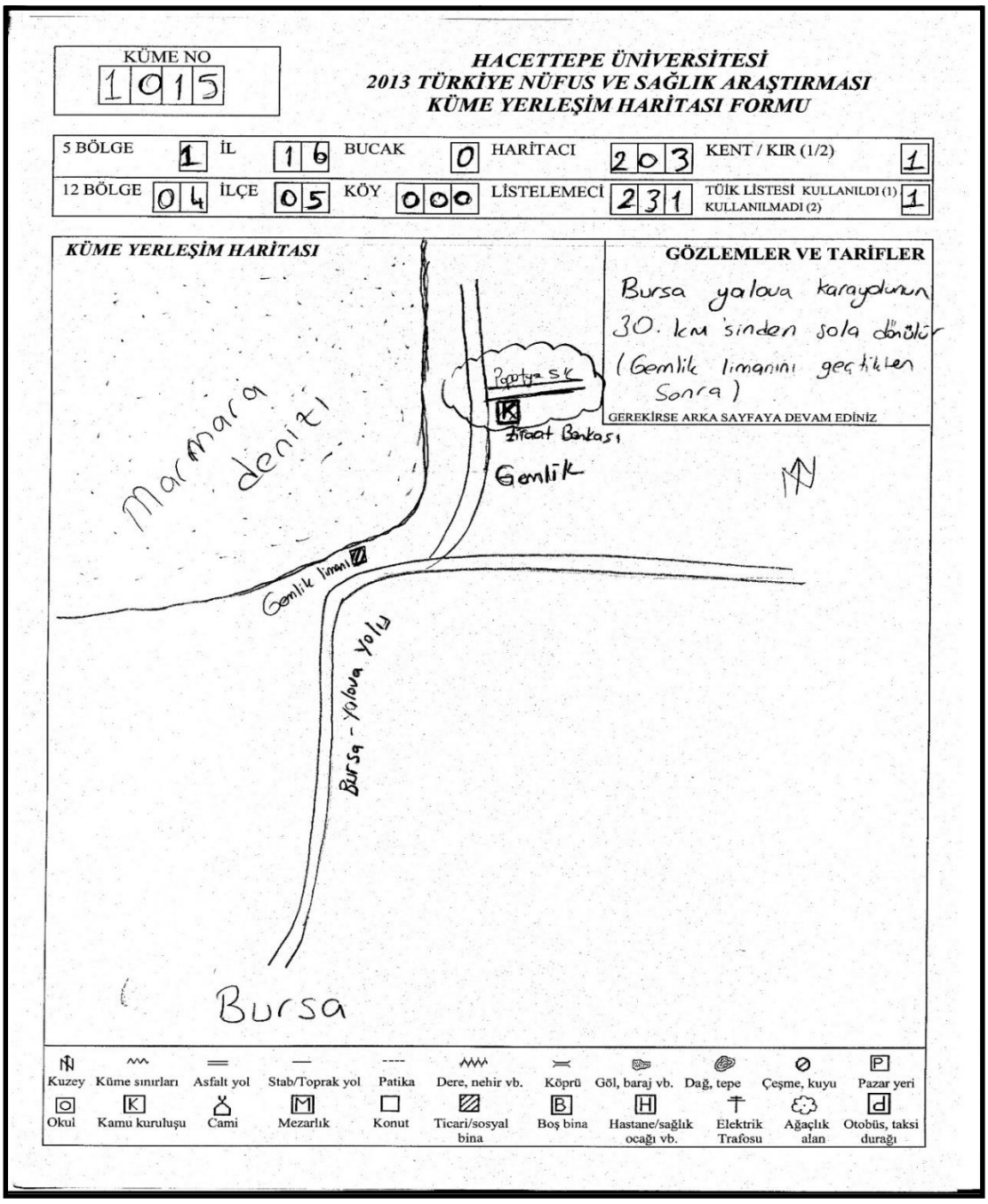
5 BÖLGE	1	İL	10	BUCAK		0	HARİTACI	203	KENT / KIR (1/2)	1
12 BÖLGE	04	İLÇE	05	KÖY	000		LİSTELEMECİ	231	TÜİK BLOK FORMU KULLANILDI (1) KULLANILMADI (2)	1

BURAYI BOŞ BIRAKINIZ		BİNA SIRA NO (1)	BİNANIN ADRESİ, TARİFİ VEYA KÖY/MAHALLE İSMİ (2)	BİNA İÇİ SIRA NO (3)	BİRİM TİPİ (4)	UYGUN KONUT? (E/H) (5)	HANEHALKI REİSİNİN ADI VE SOYADI (6)	GÖZLEMLER (SOKAK İSMİ DEĞİŞMİŞ İSE ESKİ VE YENİ İSMİ MUTLAKA BELİRTİNİZ) (7)
Seçilen HH No	Uygun HH No							
	/	1	Papatya Sokak No:4	A	21	H		Özçiftay Market
	/		" No:4	B	21	H		Kuaför
	/		" No:4	C	21	H		Emlak ofisi
	1		" No:4	1	11	E		
	2		" No:4	2	11	E		
01	(3)		" No:4	3	11	E		
	4		" No:4	4	11	E		
	/		" No:4	5	13	H		
	5		" No:4	6	11	E		
	6		" No:4	7	11	E		
	/		" No:4	8	16	H		
	7	2	" No:10	1	11	E		
02	(8)		" No:10	2	11	E		
	9		" No:10	3	11	E		
	10		" No:10	4	11	E		

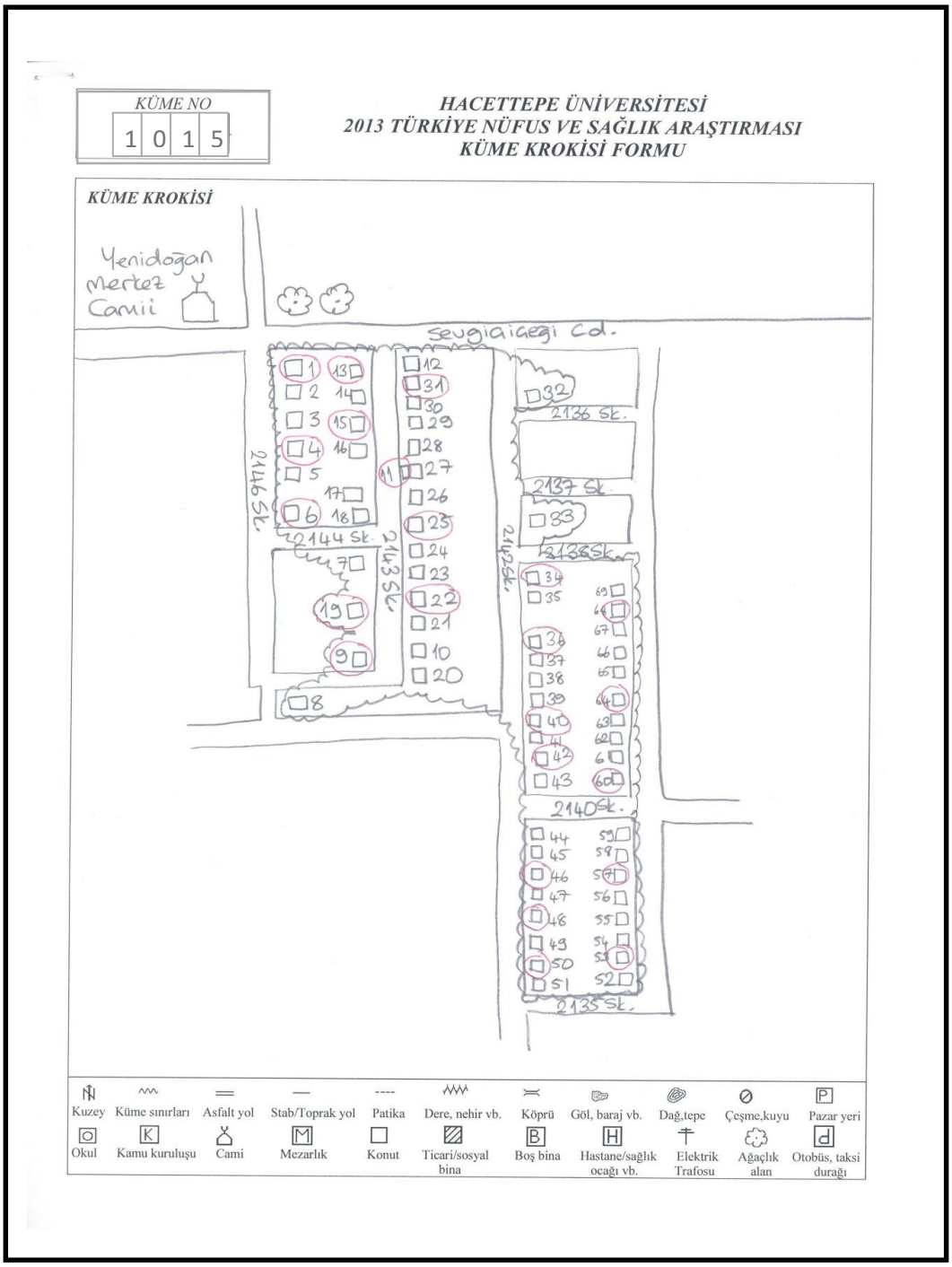
BİRİM TİPİ KODLARI

KONUT		KONUT OLMAYAN	
11 DOLU KONUT	14 YIKIK / OTURULACAK DURUMDA DEĞİL	21 TİCARİ / İŞ YERİ	30 İNŞAAT
12 ARAŞTIRMA BOYUNCA KONUTTA KİMSE YOK	15 YILIN ÇOĞUNLUĞUNDA VE ARAŞTIRMA SÜRESİNCE KULLANILAN YAZLIK / MEVSİMLİK	22 KAMU	40 ARSA
13 BOŞ KONUT	16 KISA SÜRELİ YAZLIK / MEVSİMLİK OLARAK KULLANILAN KONUT	23 DİĞER KURUMSAL	70 DİĞER

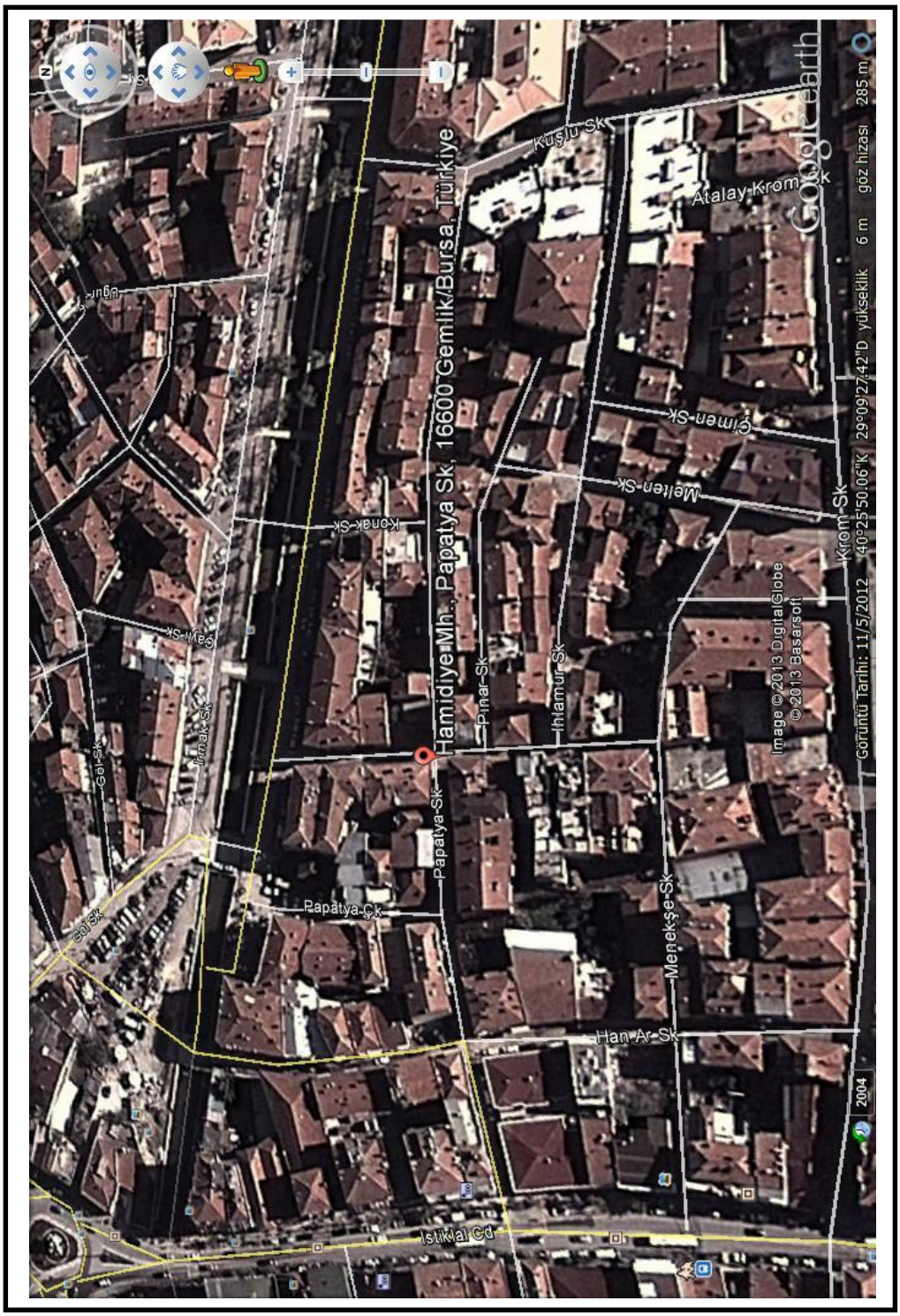
Appendix 4: An Example from Location Map



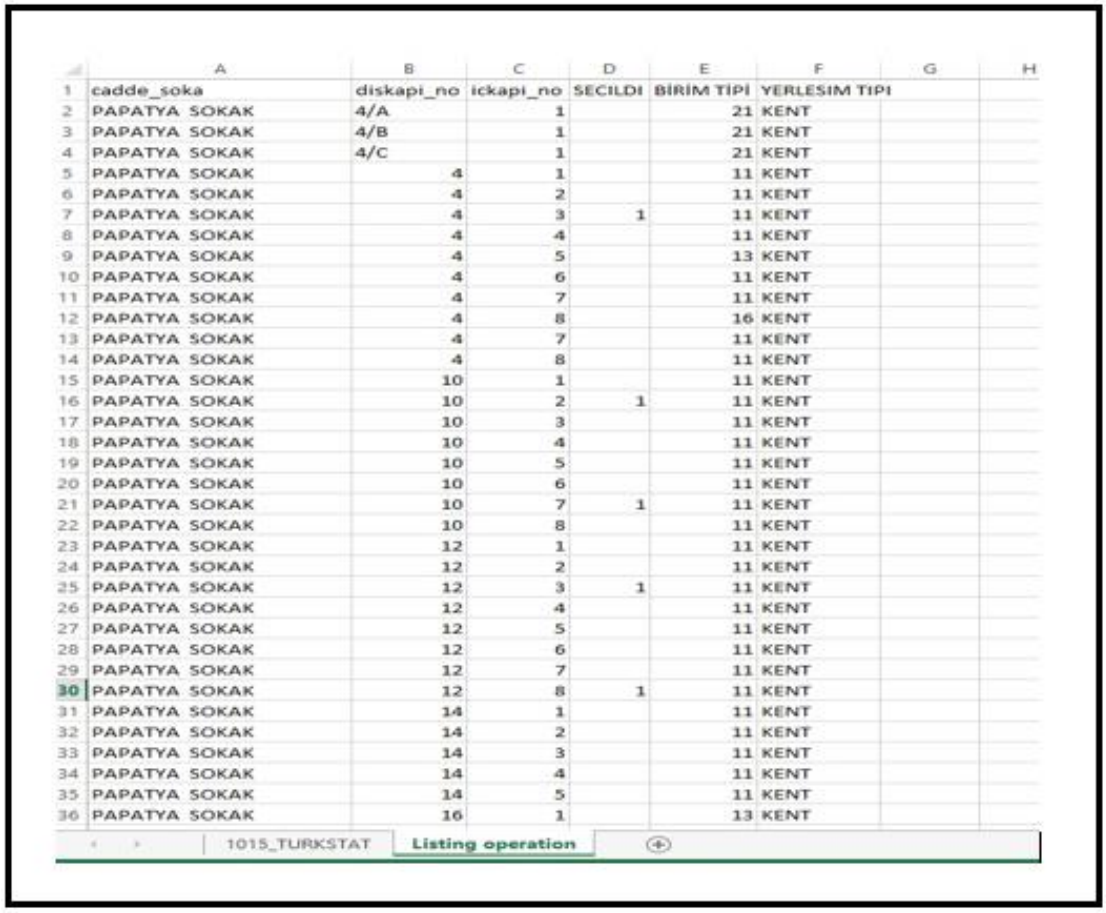
Appendix 5: An Example from Sketch Map



Appendix 6: An Example from Google Map



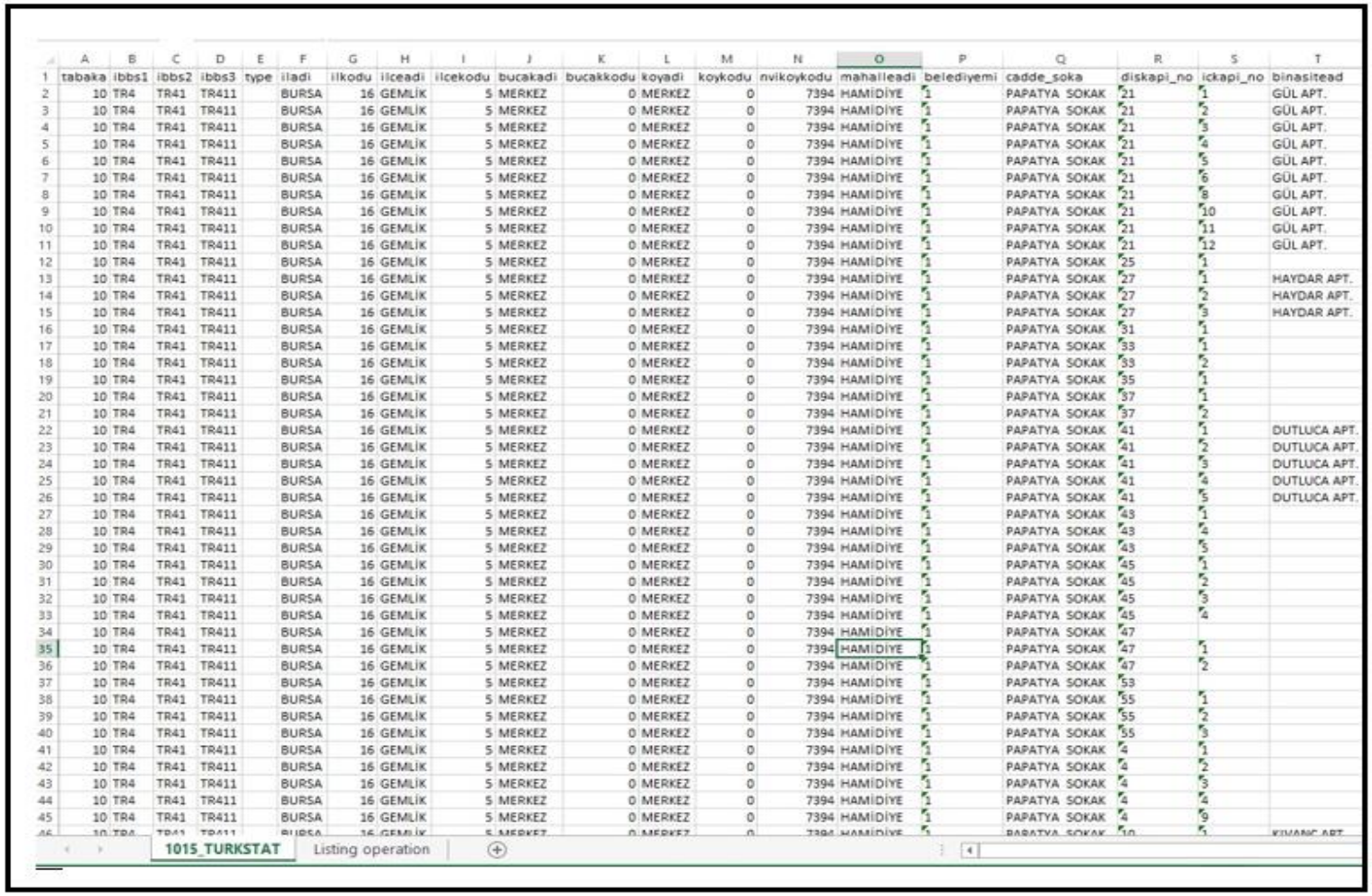
Appendix 7: An Image from Data Entry of the Listing Operation



	A	B	C	D	E	F	G	H
1	cadde_soka	diskapi_no	ickapi_no	SECILDI	BİRİM TİPİ	YERLEŞİM TIPI		
2	PAPATYA SOKAK	4/A	1		21	KENT		
3	PAPATYA SOKAK	4/B	1		21	KENT		
4	PAPATYA SOKAK	4/C	1		21	KENT		
5	PAPATYA SOKAK	4	1		11	KENT		
6	PAPATYA SOKAK	4	2		11	KENT		
7	PAPATYA SOKAK	4	3	1	11	KENT		
8	PAPATYA SOKAK	4	4		11	KENT		
9	PAPATYA SOKAK	4	5		13	KENT		
10	PAPATYA SOKAK	4	6		11	KENT		
11	PAPATYA SOKAK	4	7		11	KENT		
12	PAPATYA SOKAK	4	8		16	KENT		
13	PAPATYA SOKAK	4	7		11	KENT		
14	PAPATYA SOKAK	4	8		11	KENT		
15	PAPATYA SOKAK	10	1		11	KENT		
16	PAPATYA SOKAK	10	2	1	11	KENT		
17	PAPATYA SOKAK	10	3		11	KENT		
18	PAPATYA SOKAK	10	4		11	KENT		
19	PAPATYA SOKAK	10	5		11	KENT		
20	PAPATYA SOKAK	10	6		11	KENT		
21	PAPATYA SOKAK	10	7	1	11	KENT		
22	PAPATYA SOKAK	10	8		11	KENT		
23	PAPATYA SOKAK	12	1		11	KENT		
24	PAPATYA SOKAK	12	2		11	KENT		
25	PAPATYA SOKAK	12	3	1	11	KENT		
26	PAPATYA SOKAK	12	4		11	KENT		
27	PAPATYA SOKAK	12	5		11	KENT		
28	PAPATYA SOKAK	12	6		11	KENT		
29	PAPATYA SOKAK	12	7		11	KENT		
30	PAPATYA SOKAK	12	8	1	11	KENT		
31	PAPATYA SOKAK	14	1		11	KENT		
32	PAPATYA SOKAK	14	2		11	KENT		
33	PAPATYA SOKAK	14	3		11	KENT		
34	PAPATYA SOKAK	14	4		11	KENT		
35	PAPATYA SOKAK	14	5		11	KENT		
36	PAPATYA SOKAK	16	1		13	KENT		

1015_TURKSTAT | Listing operation

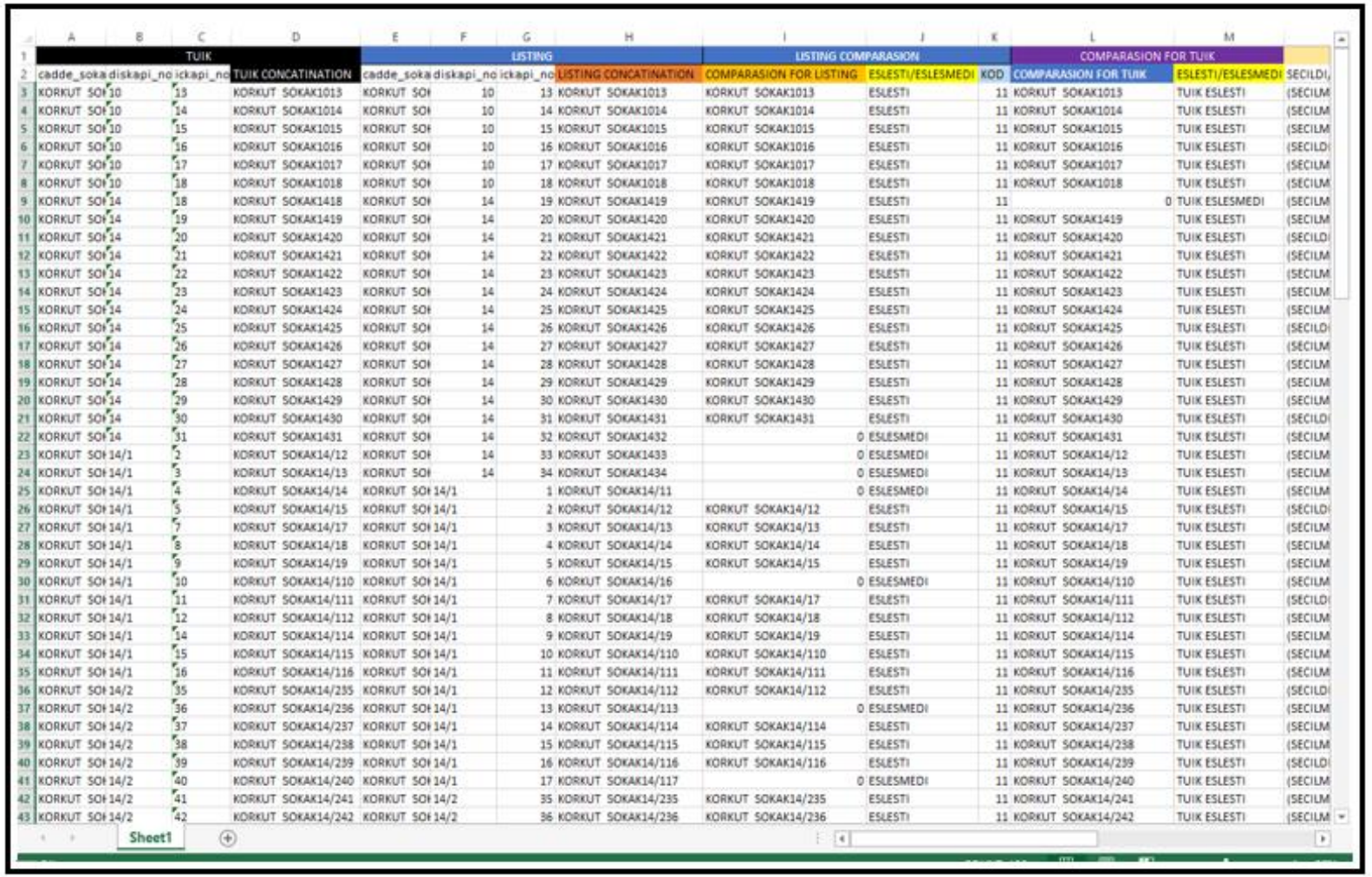
Appendix 8: An Example of TURKSTAT Block List



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	tabaka	ibbs1	ibbs2	ibbs3	type	iladi	ilkodu	ilceadi	ilcekodu	bucakadi	bucakkodu	koyadi	koykodu	nvikoykodu	mahalleadi	belediyemi	cadde_soka	diskapi_no	ickapi_no	binasitead
2	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	1	GÜL APT.
3	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	2	GÜL APT.
4	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	3	GÜL APT.
5	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	4	GÜL APT.
6	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	5	GÜL APT.
7	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	6	GÜL APT.
8	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	8	GÜL APT.
9	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	10	GÜL APT.
10	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	11	GÜL APT.
11	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	21	12	GÜL APT.
12	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	25	1	
13	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	27	1	HAYDAR APT.
14	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	27	2	HAYDAR APT.
15	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	27	3	HAYDAR APT.
16	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	31	1	
17	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	33	1	
18	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	33	2	
19	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	35	1	
20	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	37	1	
21	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	37	2	
22	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	1	DUTLUCA APT.
23	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	2	DUTLUCA APT.
24	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	3	DUTLUCA APT.
25	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	4	DUTLUCA APT.
26	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	41	5	DUTLUCA APT.
27	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	43	1	
28	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	43	4	
29	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	43	5	
30	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	45	1	
31	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	45	2	
32	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	45	3	
33	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	45	4	
34	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	47		
35	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	47	1	
36	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	47	2	
37	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	53		
38	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	55	1	
39	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	55	2	
40	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	55	3	
41	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	1	
42	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	2	
43	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	3	
44	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	4	
45	10	TR4	TR41	TR411		BURSA	16	GEMLİK	5	MERKEZ	0	MERKEZ	0	7394	HAMİDİYE	1	PAPATYA SOKAK	4	9	

1015_TURKSTAT | Listing operation

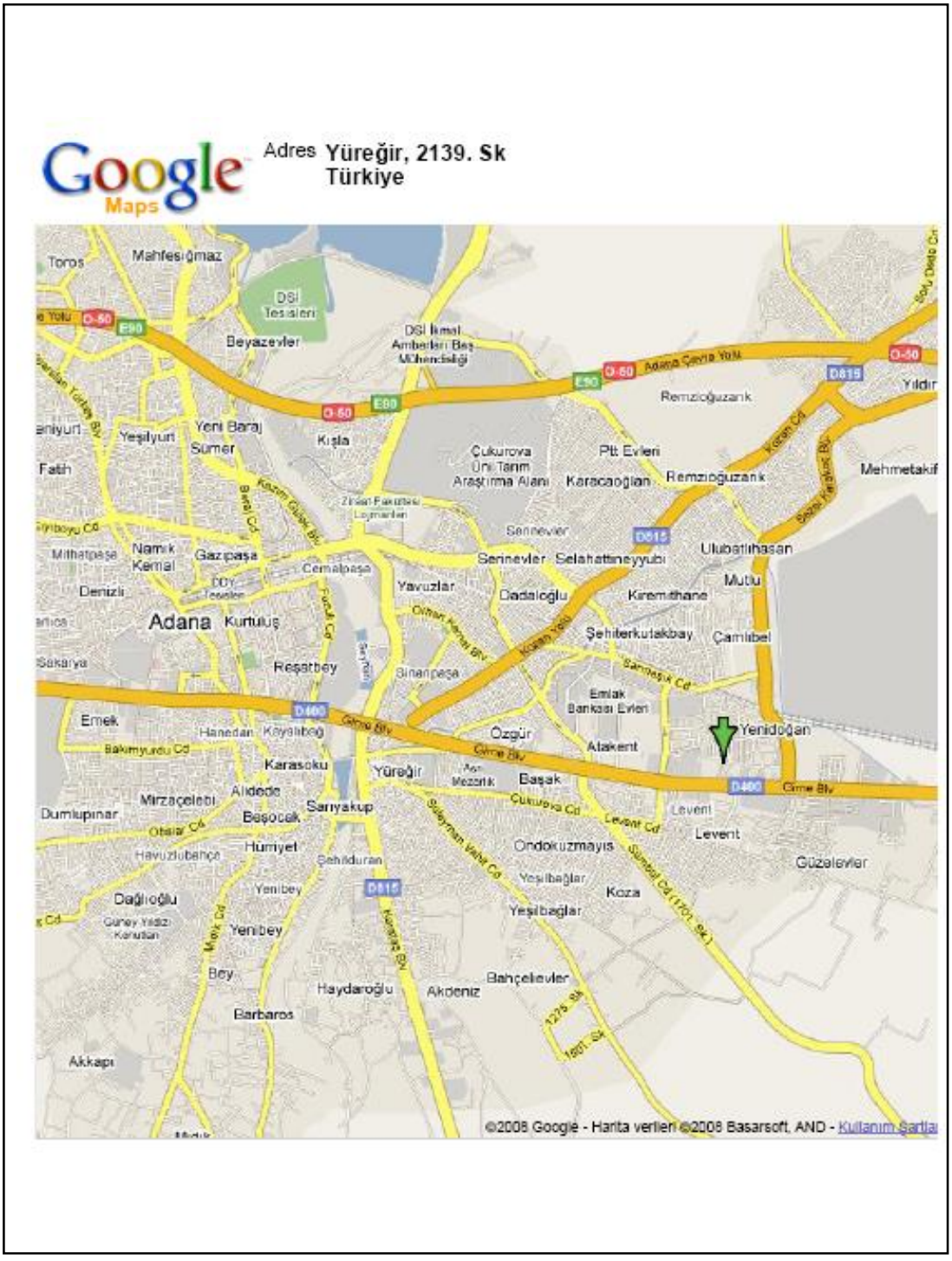
Appendix 9: An Example of Addresses Comparison between Addresses List from NAD and the Listing Operation



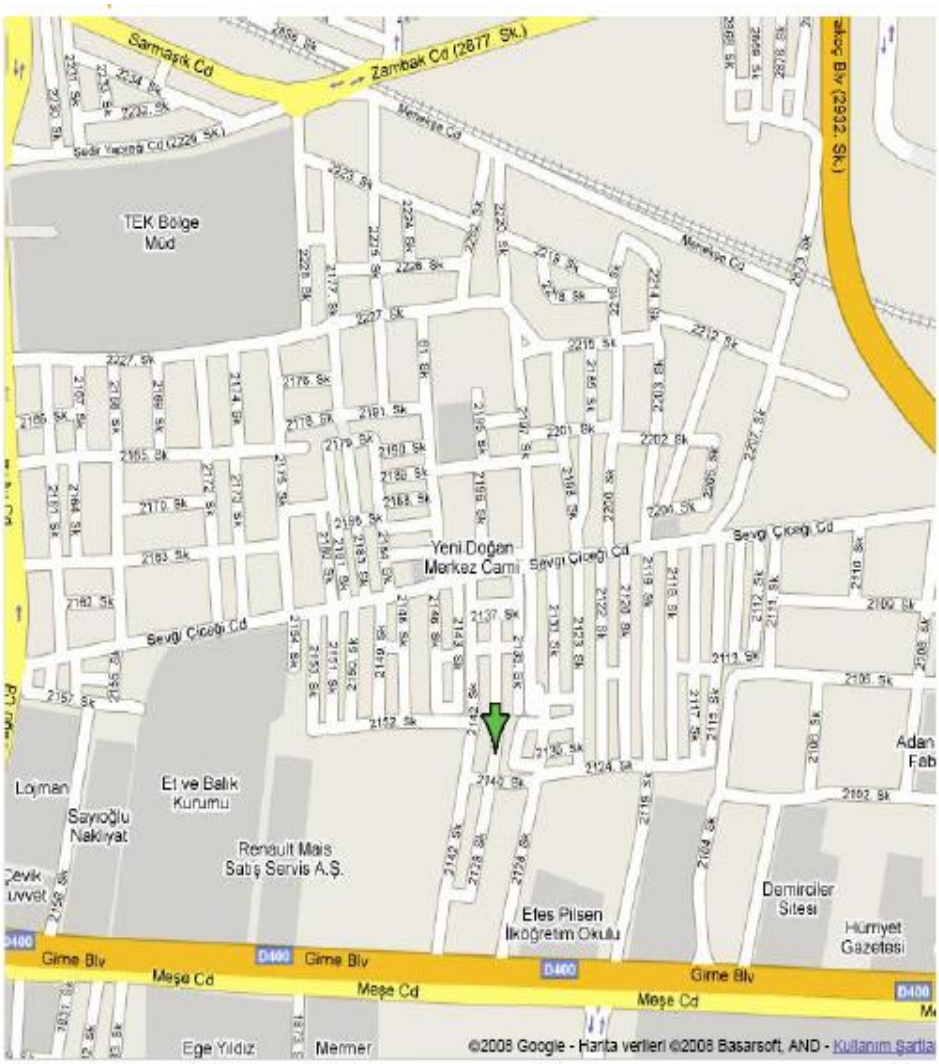
	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	TUIK				LISTING				LISTING COMPARASION			COMPARASION FOR TUIK		
2	cadde_soka	diskapi_no	ickapi_no	TUIK CONCATINATION	cadde_soka	diskapi_no	ickapi_no	LISTING CONCATINATION	COMPARASION FOR LISTING	ESLESTI/ESLESMEDI	KOD	COMPARASION FOR TUIK	ESLESTI/ESLESMEDI	SECILDI,
3	KORKUT SOK	10	13	KORKUT SOKAK1013	KORKUT SOK	10	13	KORKUT SOKAK1013	KORKUT SOKAK1013	ESLESTI	11	KORKUT SOKAK1013	TUIK ESLESTI	(SECILM
4	KORKUT SOK	10	14	KORKUT SOKAK1014	KORKUT SOK	10	14	KORKUT SOKAK1014	KORKUT SOKAK1014	ESLESTI	11	KORKUT SOKAK1014	TUIK ESLESTI	(SECILM
5	KORKUT SOK	10	15	KORKUT SOKAK1015	KORKUT SOK	10	15	KORKUT SOKAK1015	KORKUT SOKAK1015	ESLESTI	11	KORKUT SOKAK1015	TUIK ESLESTI	(SECILM
6	KORKUT SOK	10	16	KORKUT SOKAK1016	KORKUT SOK	10	16	KORKUT SOKAK1016	KORKUT SOKAK1016	ESLESTI	11	KORKUT SOKAK1016	TUIK ESLESTI	(SECILD
7	KORKUT SOK	10	17	KORKUT SOKAK1017	KORKUT SOK	10	17	KORKUT SOKAK1017	KORKUT SOKAK1017	ESLESTI	11	KORKUT SOKAK1017	TUIK ESLESTI	(SECILM
8	KORKUT SOK	10	18	KORKUT SOKAK1018	KORKUT SOK	10	18	KORKUT SOKAK1018	KORKUT SOKAK1018	ESLESTI	11	KORKUT SOKAK1018	TUIK ESLESTI	(SECILM
9	KORKUT SOK	14	18	KORKUT SOKAK1418	KORKUT SOK	14	19	KORKUT SOKAK1419	KORKUT SOKAK1419	ESLESTI	11		0 TUIK ESLESMEDI	(SECILM
10	KORKUT SOK	14	19	KORKUT SOKAK1419	KORKUT SOK	14	20	KORKUT SOKAK1420	KORKUT SOKAK1420	ESLESTI	11	KORKUT SOKAK1419	TUIK ESLESTI	(SECILM
11	KORKUT SOK	14	20	KORKUT SOKAK1420	KORKUT SOK	14	21	KORKUT SOKAK1421	KORKUT SOKAK1421	ESLESTI	11	KORKUT SOKAK1420	TUIK ESLESTI	(SECILD
12	KORKUT SOK	14	21	KORKUT SOKAK1421	KORKUT SOK	14	22	KORKUT SOKAK1422	KORKUT SOKAK1422	ESLESTI	11	KORKUT SOKAK1421	TUIK ESLESTI	(SECILM
13	KORKUT SOK	14	22	KORKUT SOKAK1422	KORKUT SOK	14	23	KORKUT SOKAK1423	KORKUT SOKAK1423	ESLESTI	11	KORKUT SOKAK1422	TUIK ESLESTI	(SECILM
14	KORKUT SOK	14	23	KORKUT SOKAK1423	KORKUT SOK	14	24	KORKUT SOKAK1424	KORKUT SOKAK1424	ESLESTI	11	KORKUT SOKAK1423	TUIK ESLESTI	(SECILM
15	KORKUT SOK	14	24	KORKUT SOKAK1424	KORKUT SOK	14	25	KORKUT SOKAK1425	KORKUT SOKAK1425	ESLESTI	11	KORKUT SOKAK1424	TUIK ESLESTI	(SECILM
16	KORKUT SOK	14	25	KORKUT SOKAK1425	KORKUT SOK	14	26	KORKUT SOKAK1426	KORKUT SOKAK1426	ESLESTI	11	KORKUT SOKAK1425	TUIK ESLESTI	(SECILD
17	KORKUT SOK	14	26	KORKUT SOKAK1426	KORKUT SOK	14	27	KORKUT SOKAK1427	KORKUT SOKAK1427	ESLESTI	11	KORKUT SOKAK1426	TUIK ESLESTI	(SECILM
18	KORKUT SOK	14	27	KORKUT SOKAK1427	KORKUT SOK	14	28	KORKUT SOKAK1428	KORKUT SOKAK1428	ESLESTI	11	KORKUT SOKAK1427	TUIK ESLESTI	(SECILM
19	KORKUT SOK	14	28	KORKUT SOKAK1428	KORKUT SOK	14	29	KORKUT SOKAK1429	KORKUT SOKAK1429	ESLESTI	11	KORKUT SOKAK1428	TUIK ESLESTI	(SECILM
20	KORKUT SOK	14	29	KORKUT SOKAK1429	KORKUT SOK	14	30	KORKUT SOKAK1430	KORKUT SOKAK1430	ESLESTI	11	KORKUT SOKAK1429	TUIK ESLESTI	(SECILM
21	KORKUT SOK	14	30	KORKUT SOKAK1430	KORKUT SOK	14	31	KORKUT SOKAK1431	KORKUT SOKAK1431	ESLESTI	11	KORKUT SOKAK1430	TUIK ESLESTI	(SECILD
22	KORKUT SOK	14	31	KORKUT SOKAK1431	KORKUT SOK	14	32	KORKUT SOKAK1432		0 ESLESMEDI	11	KORKUT SOKAK1431	TUIK ESLESTI	(SECILM
23	KORKUT SOK	14/1	2	KORKUT SOKAK14/12	KORKUT SOK	14	33	KORKUT SOKAK1433		0 ESLESMEDI	11	KORKUT SOKAK14/12	TUIK ESLESTI	(SECILM
24	KORKUT SOK	14/1	3	KORKUT SOKAK14/13	KORKUT SOK	14	34	KORKUT SOKAK1434		0 ESLESMEDI	11	KORKUT SOKAK14/13	TUIK ESLESTI	(SECILM
25	KORKUT SOK	14/1	4	KORKUT SOKAK14/14	KORKUT SOK	14/1	1	KORKUT SOKAK14/11		0 ESLESMEDI	11	KORKUT SOKAK14/14	TUIK ESLESTI	(SECILM
26	KORKUT SOK	14/1	5	KORKUT SOKAK14/15	KORKUT SOK	14/1	2	KORKUT SOKAK14/12	KORKUT SOKAK14/12	ESLESTI	11	KORKUT SOKAK14/15	TUIK ESLESTI	(SECILD
27	KORKUT SOK	14/1	7	KORKUT SOKAK14/17	KORKUT SOK	14/1	3	KORKUT SOKAK14/13	KORKUT SOKAK14/13	ESLESTI	11	KORKUT SOKAK14/17	TUIK ESLESTI	(SECILM
28	KORKUT SOK	14/1	8	KORKUT SOKAK14/18	KORKUT SOK	14/1	4	KORKUT SOKAK14/14	KORKUT SOKAK14/14	ESLESTI	11	KORKUT SOKAK14/18	TUIK ESLESTI	(SECILM
29	KORKUT SOK	14/1	9	KORKUT SOKAK14/19	KORKUT SOK	14/1	5	KORKUT SOKAK14/15	KORKUT SOKAK14/15	ESLESTI	11	KORKUT SOKAK14/19	TUIK ESLESTI	(SECILM
30	KORKUT SOK	14/1	10	KORKUT SOKAK14/110	KORKUT SOK	14/1	6	KORKUT SOKAK14/16		0 ESLESMEDI	11	KORKUT SOKAK14/110	TUIK ESLESTI	(SECILM
31	KORKUT SOK	14/1	11	KORKUT SOKAK14/111	KORKUT SOK	14/1	7	KORKUT SOKAK14/17	KORKUT SOKAK14/17	ESLESTI	11	KORKUT SOKAK14/111	TUIK ESLESTI	(SECILD
32	KORKUT SOK	14/1	12	KORKUT SOKAK14/112	KORKUT SOK	14/1	8	KORKUT SOKAK14/18	KORKUT SOKAK14/18	ESLESTI	11	KORKUT SOKAK14/112	TUIK ESLESTI	(SECILM
33	KORKUT SOK	14/1	14	KORKUT SOKAK14/114	KORKUT SOK	14/1	9	KORKUT SOKAK14/19	KORKUT SOKAK14/19	ESLESTI	11	KORKUT SOKAK14/114	TUIK ESLESTI	(SECILM
34	KORKUT SOK	14/1	15	KORKUT SOKAK14/115	KORKUT SOK	14/1	10	KORKUT SOKAK14/110	KORKUT SOKAK14/110	ESLESTI	11	KORKUT SOKAK14/115	TUIK ESLESTI	(SECILM
35	KORKUT SOK	14/1	16	KORKUT SOKAK14/116	KORKUT SOK	14/1	11	KORKUT SOKAK14/111	KORKUT SOKAK14/111	ESLESTI	11	KORKUT SOKAK14/116	TUIK ESLESTI	(SECILM
36	KORKUT SOK	14/2	35	KORKUT SOKAK14/235	KORKUT SOK	14/1	12	KORKUT SOKAK14/112	KORKUT SOKAK14/112	ESLESTI	11	KORKUT SOKAK14/235	TUIK ESLESTI	(SECILD
37	KORKUT SOK	14/2	36	KORKUT SOKAK14/236	KORKUT SOK	14/1	13	KORKUT SOKAK14/113		0 ESLESMEDI	11	KORKUT SOKAK14/236	TUIK ESLESTI	(SECILM
38	KORKUT SOK	14/2	37	KORKUT SOKAK14/237	KORKUT SOK	14/1	14	KORKUT SOKAK14/114	KORKUT SOKAK14/114	ESLESTI	11	KORKUT SOKAK14/237	TUIK ESLESTI	(SECILM
39	KORKUT SOK	14/2	38	KORKUT SOKAK14/238	KORKUT SOK	14/1	15	KORKUT SOKAK14/115	KORKUT SOKAK14/115	ESLESTI	11	KORKUT SOKAK14/238	TUIK ESLESTI	(SECILM
40	KORKUT SOK	14/2	39	KORKUT SOKAK14/239	KORKUT SOK	14/1	16	KORKUT SOKAK14/116	KORKUT SOKAK14/116	ESLESTI	11	KORKUT SOKAK14/239	TUIK ESLESTI	(SECILD
41	KORKUT SOK	14/2	40	KORKUT SOKAK14/240	KORKUT SOK	14/1	17	KORKUT SOKAK14/117		0 ESLESMEDI	11	KORKUT SOKAK14/240	TUIK ESLESTI	(SECILM
42	KORKUT SOK	14/2	41	KORKUT SOKAK14/241	KORKUT SOK	14/2	35	KORKUT SOKAK14/235	KORKUT SOKAK14/235	ESLESTI	11	KORKUT SOKAK14/241	TUIK ESLESTI	(SECILM
43	KORKUT SOK	14/2	42	KORKUT SOKAK14/242	KORKUT SOK	14/2	36	KORKUT SOKAK14/236	KORKUT SOKAK14/236	ESLESTI	11	KORKUT SOKAK14/242	TUIK ESLESTI	(SECILM

Sheet1

Appendix 10: An image from Google Maps



Appendix 11: An image from Google maps



Appendix 12: Education and Age Information of the Listing Staff, According to Team Codes

Team Codes	Job Status	Age	University	Department
1	Lister	23	Hacettepe University	Social Work
	Mapper	23	Hacettepe University	Social Work
2	Lister	25	Ankara University	Department of Journalism
	Mapper	25	METU	History
3	Lister	27	Eskisehir Osmangazi University	Statistics
	Mapper	26	METU	Geological Engineer
4	Lister	21	Hacettepe University	Industrial Engineer
	Mapper	20	Bozok University	Computer Programming
5	Lister	22	Hacettepe University	Computer Programming
	Mapper	29	Hacettepe University	Computer Programming
6	Lister	27	Ankara University	Sociology
	Mapper	28	Hacettepe University	History
7	Lister	28	Hacettepe University	Physics Engineer
	Mapper	25	Ankara University	Social Anthropology
8	Lister	23	Gazi University	Statistics
	Mapper	24	Ondokuz Mayis University	Statistics
9	Lister	24	Giresun University	Statistics
	Mapper	22	Giresun University	Statistics
10	Lister	25	Gazi University	Statistics
	Mapper	23	Hacettepe University	Sociology
11	Lister	25	Gazi University	Statistics
	Mapper	23	Gazi University	Statistics
12	Lister	26	Kocaeli University	Civil Engineer
	Mapper	28	Balikesir University	Physics
13	Lister	26	Gazi University	Statistics
	Mapper	21	Gazi University	Statistics
14	Lister	25	Ankara University	The Department of Radio,Television and Film
	Mapper	20	Hacettepe University	The Department Of Mapping and Cadastre
15	Lister	22	Gazi University	Mechanical Engineering
	Mapper	23	Gazi University	Statistics
16	Lister	27	Ankara University	Theater Science
	Mapper	27	Ankara University	Theater Science
17	Lister	20	Hacettepe University	The Department of Mapping and Cadastre
	Mapper	21	Hacettepe University	The Department of Mapping and Cadastre
18	Lister	24	METU	Aerospace Engineering
	Mapper	24	Ankara University	Sociology
19	Lister	29	Eskisehir Osmangazi University	Chemical Engineering
	Mapper	25	Hacettepe University	Actuary
20	Lister	21	Hacettepe University	Industrial Engineer
	Mapper	20	Bozok University	Computer Programming
21	Lister	25	Gazi University	Statistics
	Mapper	29	Hacettepe University	Computer Programming