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REDUCING POVERTY THROUGH GROWTH

Millennium Challenge Georgia Fund

RID Impact Evaluation Project

Deliverable R

Final Baseline Report

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TBILISI BUSINESS SERVICE CENTER

act research

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1 EXECUTIVE SUMMARY

The 5-year, 395,3 million MCG Compact seeks to reduce poverty and stimulate economic growth through rehabilitation of regional infrastructure and developing enterprises in the regions of Georgia. The objective of the Regional Infrastructure Development (RID) Project, one of Millennium Challenge Georgia's (MCG's) five projects, is to improve municipal service delivery. The grant amount will be primarily used for the rehabilitation of water supply and sewage systems in several towns of Georgia.

The objective of the RID Impact Evaluation Project (RID IEP) is to assess the impact of five water projects (three which also include sewer systems). The five individual RID projects are expected to improve the operation of important population centers, reduce business transaction costs, contribute to economic growth and poverty reduction and improve the quality of life for more than a quarter million Georgians, particularly benefiting the poor.

This Document is the Final Baseline Report of Regional Infrastructure Development Impact Evaluation Survey. The document includes an overview of all the stages starting from survey methodology development, preparation for surveys, implementation, data cleaning and processing in the frame of RID IEP methodology. The second chapter of the document evaluates the experience obtained from executing the project and summarizes the lessons learned. The chapter also talks about opportunities for improvements and recommendations for future work.

Quantitative survey methodology describes general survey approach and sampling strategies, with a special focus on treatment and control design. Goals and main objectives of household and enterprise surveys are presented in this chapter as well. Survey preparation section talks about the preparatory works undertaken, including cognitive interviews and pilot test results.

In Fieldwork chapter overall management of survey fieldwork is presented. Composition and selection of fieldwork team, training procedure, logistical support of the fieldwork and fieldwork implementation results are described in accordance with survey design.

Data Revision and Coding, Fieldwork Quality Control, Data entry are discussed in Data Entry and Management section. Issues such as questionnaire revision, data correction procedures, coding and code book preparation procedures, quality control procedure, are discussed in this chapter. Data Entry section presents the software used for project purposes and the resources dedicated to data entry procedure. Data entry stages and problems enhanced during the project are discussed as well.

Data Statistical Processing chapter briefly describes issues related to imputation, data weighting and variance calculations. Finally, section on meta data talks about structure and the list of deliverables included in the meta data file.

2 OPPORTUNITIES FOR IMPROVEMENT

Survey preparation, fieldwork, data entry and data cleaning for the RID IEP generally went well; there were no particular problems that significantly affected overall results. Nevertheless, with the benefit of hindsight some things could have been done differently to better avoid the adverse impact that did occur (i.e., to avoid problems) or to simply make the overall process easier to execute (i.e., to reduce either the work to be done or the stress of doing the work). These opportunities for improvement are described in this Chapter.

To put these opportunities in context it is important to recall the overall objective of the RID IEP. The purpose was to evaluate impact in many different areas at good to very high accuracy. This necessarily required a complex analytical design, survey design and questionnaires.

The fact that the questionnaires were complex created a number of opportunities for improvement as discussed below. Clearly, simplifying the questionnaires would have reduced some of the problems that did occur. On the other hand, simplifying the questionnaires would have made achieving RID IEP objectives problematic. We believe that to the end we struck a suitable balance between the RID IEP objectives (pushing towards complexity) and the practical matter of administering surveys (pushing towards simplification).

The general tone of the opportunities for improvement is "with the benefit of hindsight this is what we would do differently." Other Deliverables describe how things were supposed to be done and the rest of this Chapter mentions where events were different than planned. This Chapter focuses solely on opportunities for improvement; no attention is paid to what worked well. That is, while nearly everything worked as planned these successes are not discussed here.

2.1.1 The Analytic Design Was Implemented Without Formally Considering The Practical Implications Of Collecting The Required Data.

The analytical design started with the key research questions and the types of analyses that would be required to answer those questions. The specific data (Data Elements) needed to perform the different types of required analyses were then identified. The list of Data Elements directly determined the detail and length of the questionnaires that were used.

To the end, the questionnaires are near mirror images of the analytical design described in detail in Deliverable E.[1] This careful implementation of the analytical design has created data sets that are fully customized to the needs of the analytical work to be done. However, the breath and depth of the analysis, and the long list of Data Elements, also resulted in complex questionnaires that were difficult to administer.

ACT and TBSC discussed the analytical design at length during its development and compromises were made in the analytical design. However, this review process was informal and there is a risk that certain opportunities to make the questionnaires easier to administer by changing the analytical design were missed.

[1] The order of questions is different than what was shown in Deliverable E. This was done to ease the administration of the survey forms. Nevertheless, the questionnaires contain very few questions not included in the analytical design, and nearly all Data Elements specified in the analytical design are in the questionnaires.

The RID IEP has a clear delineation between analytical design and survey design. This is an excellent feature of the overall RID IEP process. However, during survey design there should have been a formal review of each question area to ensure a proper balance between the need for the question area (or more properly the need for analysis to be done with the Data Elements) and the practical difficulties of asking the questions. For example, sanitation behavior of households is one aspect of water system impact (so it was included in the analytical design) but questions about sanitation behavior are embarrassing for respondents to answer. We never formally asked the question: is the benefit of understanding sanitation behavior worth the cost of embarrassing (and possibly alienating) respondents?

A formal review of the data requirements and subsequent alteration of the analytical design would have likely resulted in questionnaires that would have been shorter and easier to administer. However, we do not know of instances where the complexity of the questionnaires created problems that were not resolved one way or another. As a result, the data from the surveys is now well positioned to support the analysis that was described in the analytical design.

A formal review would have required some time to complete. However, as noted later this could have been accommodated if questionnaire design had begun in earnest well before the final analytical design was approved.

2.1.2 Questionnaires Received Both Cognitive And Pilot Testing; Nevertheless, More Thorough Testing And Subsequent Redesign Would Have Made The Final Questionnaires Easier To Administer

Cognitive and pilot testing was done for both the business and household questionnaires. Each questionnaire was significantly redesigned as a result. Generally the questionnaires were suitable for the intended purpose. However, some problems did occur that could have been avoided if the questionnaires had gone through a second and even third pilot test.

For example, tables M6 and M22 in the household questionnaire look similar at first glance, but there are small differences which can be easily missed by the interviewer. Other questions ask about similar matters but use different units (e.g., both m^3 and liters are used for volumes and both hours and minutes are used for times). These are potential risks for mistakes.

Also for example, all businesses received a copy of a formal letter from TBSC explaining the purpose of the survey. Some problems could have been avoided if the letter had been an original rather than a copy. More extensive pilot testing would have highlighted this problem.

To be fair, the cognitive and pilot testing period was short. Nevertheless, as noted later, this could have been better managed if questionnaire design had begun in earnest well before the final analytical design was approved.

2.1.3 The Water Audit Should Have Been Administered Separately From The Rest Of The Household Questionnaire

The household questionnaire included a wide range of subject areas including the water audit. The water audit required very detailed recollections by respondents; some respondents said they were very tired by the time they started the water audit at the end of the interview meeting.

By design, the water audit was not administered to all respondents. Comparing respondent attitudes and fatigue with and without the water audit it is clear that the water audit should have been administered, to the same households, separately from the rest of the household questionnaire.

In addition, performing the water audit in a separate meeting would permit scheduling of that meeting at a time when municipal water was actually turned on at the household. This approach would have eliminated the need for interviewers to return to households one or more times merely to test the water flow rate at a time when the municipal water was turned on.

2.1.4 Interviewers Would Have Benefitted From Longer Training And Better Instructions.

More than 120 interviewers were used for the RID IEP; (nearly) all had experience with other difficult surveys done by ACT. Interviewers received two days of customized training and there were detailed (30 page) instructions for interviewers. Most interviewers understood the questionnaires and their obligations fully, however there were some interviewers where even this level of instruction was not sufficient.

We found that in isolated cases interviewers were not able to explain well the idea of a question or did not understand the question themselves. This was evident during the revision and coding and quality control stages. Based on the corrections made by the revision and coding team it became evident that more training and guidance was needed for some interviewers.

Another area needing more attention during training is management of respondents when questionnaires are long and difficult to complete. The length and complexity of the questionnaire was probably inevitable given the breadth and depth of the analytical design. Nevertheless, interviewers could have been better trained about how to manage respondent expectations at the start of the interview, how to revitalize the respondent about 60 percent of the way through the interview (i.e., when respondent fatigue starts to become apparent) and how to ease the conversation about uncomfortable subjects (e.g., sanitation habits). The good incentives used for the RID IEP helped greatly in these areas, but some additional training in these subjects would have been helpful.

In retrospect, training should have been done in two sessions (first one of two days then one of one day) with test interviews in between the sessions. This arrangement would have permitted interviewers to gain some experience (i.e., test the questionnaire themselves), reflect on that experience and more completely raise and discuss questions in the second training session.

The extended training should also be supplemented with more comprehensive instructions for interviewers. A stronger “at least one person will not understand” tone should be taken with the instructions. In addition, interviewers should be required to carry the instructions for interviewers with them at all times.

2.1.5 The Database Used For Household And Enterprises Sampling Is Outdated And Should Be Replaced

The database of households and enterprises was obtained from the Department of Statistics of Georgia. The database is simply outdated and, as a result, the RID IEP had high rates of

respondent substitution. For example, in case of enterprises up to 25 percent of enterprises included in the initial sample were not functioning. This increased the cost of callbacks, both in terms of time to complete the surveys and money.

In case of households, the border of clusters in many cases were not determined in advance, causing contamination of a cluster by two interviewers.

In the future a different source of respondents for sampling should be used. If surveys are being administered in a limited area it might be feasible to do a census before beginning work.

2.1.6 Work On The Questionnaires Should Have Begun Much Earlier, Well Before The Approval Of The Final Analytical Design

Limited work was performed on the questionnaires before the approval of Deliverable E. On the first hand this was prudent as the analytical design was subject to change up through the approval of Deliverable E. However, on the second hand probably 80 percent the analytical design was essentially frozen even a month or two before final approval of Deliverable E.

To the end, questionnaire work can be safely begun before final approval of the analytical design when two conditions are met. First, there needs to be a clear delineation between analytical design and survey design to ensure the two do not become confused; that is one should avoid creating the analytical design by creating a questionnaire. This condition was well met by the RID IEP where the analytical design was fully separated in time and institution from the survey design. Second the writers of the questionnaire need to be involved in the analytical design, at least in the review of the design, so that they can easily judge those portions of the analytical design that are stable enough for moving on to questionnaire preparation.

The RID IEP did not exploit this situation creating very short time periods for preparing and testing the questionnaire. However, even with the short time frame the final questionnaire fully incorporated the requirements of the analytical design.

If the first portion of questionnaire design overlaps the final steps of the analytical design then more time can be applied to refining the questionnaires and performing more complete cognitive interviews and pilot testing.

2.1.7 Poor Logistical Planning For Incentives Delayed Some Surveys And Increased Stress On Interviewers

Pilot testing suggested that cleaning and washing detergents would be effective incentives for household interviews. This proved to be the case; respondents were appreciative of their gifts. However, it proved difficult to get incentives to interviewers at the time and place needed. This caused some delays in performing interviews and created the need for interviewers to carry (heavy) incentives more than would have been ideal.

As a result, in the future more attention should be paid to planning the logistics of incentive distribution.

2.1.8 The Use Of Double Data Entry Without Logical Checks Streamlined Data Entry But Complicated Data Cleaning

For data entry purposes the Team used SPSS data entry software which facilitated data entry process and quality. The data entry form was very flexible, with no logical skips and constraints.

Although this speeded up the process of data entry, more data entry errors were made compared to what would have been in case of logical skips and other constraints. This compromise was made due to time constraints and it was decided to focus more attention on data cleaning. Any errors made during data entry were caught by comparing the first and second data entry.

The flexibility of the data entry software created more pressure on the data cleaning process and as a result it took the RID IEP more time than expected to clean the database from errors. Although double entry followed by detailed data cleaning eliminated nearly all data entry errors, it did delay delivery of the cleaned database somewhat.

We are not certain how we will do similar tasks in the future, but we would like to mention the pros and cons of making data entry flexible. Advantages of flexible data entry form are high speed of data entry, easy and streamlined data entry process (no need to stop data entry while observing for example an unrealistic response in the questionnaire), while the disadvantage is higher data entry errors. This can be handled using double entry, which was utilized for the RID IEP and we think quite successfully.

One thing that can be said with confidence is that the data entry software worked well, as compared to direct entry into SPSS and this software will be used in the future as well.

2.1.9 Imputation Methods Were Not Considered In The Survey Design Process

Data went through an imputation step after cleaning. The sheer number and types of variables created the need to apply a number of different imputation methods. The nature and use of these methods were not considered until it became necessary to actually start imputation. That is, imputation methods were not included in the survey design process.

For example, in some cases non-response rates are high making it difficult to decide whether to do an imputation or not. In other words there is a tradeoff between reliability of data and completeness of data for analysis.

The lack of a predetermined strategy for imputation, (i.e. what should be the minimum response rate in order to make the imputation) as one element of the survey design required a pause in data processing as imputation methods were designed on the fly. The need to do this in a short period of time did not permit suitable reflection on the methods being applied. To the end sufficient attention was paid to this issue, but at the cost of delays in delivering final cleaned and imputed data.

2.1.10 The Absence Of A Good Language Management Methodology Created Significant Extra Work On The Questionnaires

The RID IEP has been performed in both English and Georgian. This necessitated creation of identical English and Georgian versions of all documents. For most project documents this has entailed a straightforward translation. The situation was more complicated for

questionnaires and the absence of a pre-determined language management methodology created extra work.

The analytical design essentially contains the frame of all questions to be asked on the questionnaires; every Data Element in the analytical design has one question on the questionnaire and vice versa. The analytical design included these frames in both English and Georgian. Consequently, it would have made sense to electronically link the language used in the questionnaires to the language used in the analytical design. An additional link could then have been made between the Georgian version of the questionnaires and the English version. Unfortunately these links were not made electronically; the Georgian questionnaire began as an empty Word file and the English version was an independent translation of the Georgian version.

This situation created significant work as the team brought the English and Georgian versions together in final identical form and significant work to create the as-built analytical design.[2] This work has been completed, but much of it could have been avoided if the language management methodology had been set up before beginning work on the questionnaires.

[2] The problem here was one of highly accurate language, not design. The questionnaires adhere closely to the analytical design. What was needed was to ensure the language in the as-built analytical design matched the language used in the questionnaires.

3 QUANTITATIVE SURVEY METHODOLOGY

This chapter briefly describes the survey methodology used for data collection for RID IEP, including treatment and control strategy, objectives for household and enterprise survey, survey technique and sample size.

3.1 BRIEF DESCRIPTION OF SURVEY METHODOLOGY

The survey methodology is described in details in Deliverable F and covers quantitative survey methodology that was planned to be applied to the Household and Enterprise surveys. This chapter describes what was the actual survey methodology used, which is absolutely identical to the planned one.

3.1.1 Treatment And Control Design

The RID IEP created the Impact Evaluation Design with the purpose of meaningfully measuring the impact of the RID projects. Our work generally fell into two areas: *deciding what to measure* and *how to properly perform* the measurements.

In order to estimate RID impact by comparing the actual observed outcomes among RID project beneficiaries with counterfactual outcomes the treatment and control methodology was developed. Individual households or firms are either beneficiaries of an RID project or not; they cannot be both. Consequently, the hypothetical counterfactual outcomes cannot be directly observed. The central objective of quantitative impact evaluation is to estimate these unobserved counterfactual outcomes.

3.1.2 Selection Of Control Group

It was decided to apply a quasi-experimental design using PSM and DID and the key to using these methods was the proper selection of the population to use as the control group.

Two options were considered: citywide controls and some type of stratification at the city level and then controls selected from among individual households and firms within the stratified city groups. With RID beneficiaries cities were divided into two strata and appropriate control groups were selected (for detailed Control and Treatment Design see Deliverable E).

A comprehensive and quantitative household and enterprise surveys were considered as key elements of the RID IEP Design. The Metrics and Data Elements for both surveys were described in Deliverable E. The following summarizes the Impact Sub-Categories where impact was to be measures (*i.e.*, the objectives of the household survey).

3.1.3 Survey Technique

The household and enterprise surveys applied the face-to-face interview technique. The survey instruments were mainly comprised of closed-end questions, with a few open-end questions. The household interview lasted approximately 1.5 hours; Additional half an hour was devoted to Water Audits, which was applicable to every third household. The enterprise

interview lasted about as long, though this time was split between different respondents for different parts of the survey instrument.

3.1.4 Sampling Strategy

In order to measure the impact of the RID projects with proper counterfactuals, it was necessary to measure effects in control towns with a target population. As none of the towns in Georgia match the target cities, a city-to-city target-control method appeared infeasible and the RID cities into two target groups:

- Resort towns: Kobuleti, Borjomi, Bakuriani
- Industrial cities: Kutaisi, Poti.

Two groups of towns were then selected and matched against the two target groups as shown in the following chart.

1. Survey Target And Control Group Cities

CITY OR TOWN TYPE	TARGET GROUP	CONTROL GROUP
Resort-Type	Bakuriani Borjomi Kobuleti	Tskhaltubo Abastumani Tsagveri Akhaldaba Surami
Industrial-Type	Poti Kutaisi	Batumi Gori Rustavi Zugdidi

Source: RID IEP Analysis.

A two stage cluster sampling strategy was used for the household survey. In each target city, general population was considered as the survey target.

The 2002 population census of Georgia was used as sampling base.

For the RID IEP the maximal possible error was defined to 5 percent (ε =0,05). Consequently the level of reliability is α = 0,95 and $Z_{(1-\alpha)/2}$ = 1.96.

A random sampling strategy was used for the survey. The target cities were the same as for the household survey. In each target city, enterprises were defined as the target population.

The database of enterprises enumerated by the Department of Statistics was used as sampling base for enterprise survey.

In order to guarantee maximum possible error of 5% sample size for the household survey was determined to be 4,478. Allocation of interviews across treatment and control towns are presented in the table below.

2. Household Survey Sample Size

GROUP	TYPE	CITY OR TOWN	NUMBER OF HH	MAXIMUM POSSIBLE ERROR	SIGNIFICANCE OF DESIGN EFFECT	SAMPLE SIZE
Target	Resort	Bakuriani	621	5%	1.5	355
		Borjomi	4 124	5%	2,0	702
		Kobuleti	5 027	5%	2,0	713
	Industrial	Poti	12 915	5%	2,0	746
		Kutaisi	54 611	5%	2,0	762
	Total		**77 298**	**n.a.**	**n.a.**	**3 278**
Control	Resort	Tskhaltubo	7 715	5%	1.2	440
		Abastumani				
		Tsagveri				
		Akhaldaba				
		Surami				
		Oversample	n.a.	n.a.	n.a.	150
	Industrial	Batumi	95 943	5%	1.2	460
		Gori				
		Rustavi				
		Zugdidi				
		Oversample	n.a.	n.a.	n.a.	150
	Total		**103 658**	**n.a.**	**n.a.**	**1 200**
Total			**180 956**	**n.a.**	**n.a.**	**4 478**

Source: RID IEP Analysis.

To the end 4469 interviews were conducted with households.

Sample size for enterprise survey and allocation of interviews across target and control towns are given in the table below.

3. Business Survey Sample Size

CITY OR TOWN	NUMBER OF ENTERPRISES
Bakuriani	25
Borjomi	77
Poti	126
Kobuleti	91
Kutaisi	183
Total In Target Towns	**502**
Control towns (Industrial and Resort)	400
Total	**902**

To the end 898 interviews were conducted with enterprises.

4 SURVEY PREPARATION

This chapter describes a route from analytical design to final survey questionnaires which were actually used for interviews. Survey instrument translation issues, cognitive interviews and pilot test result are also covered in this chapter.

4.1 FROM ANALYTICAL DESIGN TO SURVEY QUESTIONNAIRE

Analytical design presented in details in Deliverable E served as a basis for creating survey questionnaires. Analytical design includes six impact areas and six analytical models. Data requirement for each model/tool is different from each other. The RID IEP Team created a list of data elements required for each model and based on this very long list created survey instruments for households and businesses. These data elements were later incorporated into the questionnaire but during the questionnaire review some problems regarding data requirements were identified.

4.1.1 Objectives for Households Survey

- Socio-demographic structure of households
- Coping and non-coping water and sewer costs for households
- Estimates of the willingness of households to switch to the new water and sewer systems
- Time spent coping with less than 24/7 water supply (*e.g.*, running private water wells)
- Incidents of water-borne disease
- Perceptions about the safety of the water and sewer systems and overall satisfaction with each
- Perceptions about the physical features of water not related to safety (*e.g.*, taste, color)
- Availability of public sanitation information
- Individual sanitation practices in households
- Time and inconvenience of not having 24/7 water
- Self-reported water consumption and conservation practices
- Gender impacts of less than 24/7 water
- Income and expenditure patterns among households (for CGE analysis).

4.1.2 Enterprise Survey Objectives

- Firm profile
- Monetary costs of firm not having reliable water 24/7
- Estimates of willingness to switch to the new water and sewer systems among businesses

- Overall water consumption among firms
- Income and expenditure patterns among businesses (for CGE analysis).

4.1.3 Translations

Originally, RID Impact Evaluation Design was created in English, including micro models, data requirements for which represent more than half of the questionnaire. The questionnaires were translated together by professional translators and the RID IEP Team members since many terms used in the questionnaire were very specific.

4.1.4 Cognitive Interviews

Given the difficulty of the questions presented in the survey instrument cognitive interviews was a very important stage before starting data collection. Cognitive interviews which were conducted after the preparation of questionnaires identified several problems. Some questions were not clear or were interpreted in several ways. To avoid these confusions, one of the main purposes of pilot study conducted later was to evaluate the changes which were made to the questionnaire after cognitive interviews. Cognitive interviews are described in details in Deliverable L.

4.1.5 Pilot Test Results

Pilot testing had several important purposes. Changes made after cognitive interviews were tested during pilot, but other important issues, such as precision of instructions, relevant skips, questionnaire format optimization, entry of pilot test results into the database were also tested. One of the tasks of the pilot which helped the Team in deciding incentives was testing of incentive scheme. Details of pilot test results are given in Deliverable L.

5 FIELDWORK

This chapter briefly describes the preparatory activities for fieldwork, including fieldwork team, training of field staff and finally the results of the fieldwork. Details of training and survey manuals, interview and staff training plan are presented in Deliverable I. Work plan and timeline for all survey work is given in Deliverable G.

5.1 FIELDWORK TEAM

ACT used a field organization similar to that used in past complex surveys. The overall organization and the responsibilities of individual positions involved in RID Survey are described in this Sub-Section.

Overall Organization. The fieldwork team was composed of following positions:

- Fieldwork Manager (one individual)
- Field Coordinators (two individuals)
- Regional Coordinators (six individuals)
- Interviewers (120).

The detailed duties and responsibilities of each position were described in Deliverable F (Detailed Survey Methodology). Position of Field Coordinator was not on the stage of the survey design development but due to the complexity of the fieldworks and time constraints ACT decided to assign two additional persons for field management purposes.

The main duty of Field Coordinator was to assist field manager in successful execution of the fieldwork plan, to coordinate Regional Coordinators and report to Field Manager on field work progress on everyday basis.

As mentioned above, 120 interviewers were involved in fieldwork implementation process.

4. Interviewers distribution by regions

Region	Number of interviewers
Adjara	28
Imereti	26
Kvemo Kartli	7
Samtskhe Jvakheti	28
Samegrelo	23
Shida Kartli	8
Total	120

Detailed list of interviewers who had participated in RID Survey is attached to the document.

5.2 TRAINING OF FIELD PERSONNEL

Fieldwork staff training was conducted according to existing ACT procedures and templates as well as additional training session conducted by TBSC representatives on Project Goals and Objectives. All training participants were given following documentation and materials:

- RID IEP description
- Interviewer's manual
- Route card
- Incomplete interview form
- Technical report form

Prior to the interviewers training 4 regional coordinators were invited to ACT Tbilisi office to attend general training on project goals and survey methodology. Training lasted two days and following subjects will be covered:

- RID IEP project and general evaluation design
- Conceptual background on the various analytical methods to be used (*e.g.*, detailed background on the micro-models to facilitate data collection)
- Instructions for questionnaire
- Control mechanisms
- Logical control and primary revision
- Logistical plan
- Organizational issues
- Discussion

Training of the interviewers was divided into two parts. First part of the training was held by TBSC representatives on Project goals and objectives. The main purpose of the training was to introduce the interviewers the mechanisms of coping strategies and sources of alternative water and sewage systems in order to make aware them with main concepts of the survey instrument.

The second part of the training was held by ACT representatives and consisted of following topics:

- Survey instruments
- Sample design

- Instructions regarding completion of fieldwork forms
- Other additional materials or instructions.

After the completion of the second part of the training participants were divided into two groups – "interviewers" and "respondents" and simulated interviews were conducted.

Upon the completion of the simulated interviews typical mistakes and problems were discussed among trainers and the participants.

5.3 MOBILIZATION FOR FIELDWORK

Printed survey questionnaires were enumerated at ACT Tbilisi office. Prior to the field work start questionnaires were allocated by cities / towns and according to the enumeration. Separate package of field documentation was prepared for each regional coordinator and send to the survey area.

Survey incentives / gifts were distributed by supplier company in each town according to the schedule prepared by ACT field management.

5.4 FIELDWORK RESULTS

The fieldwork implementation was scheduled from December 5th 2010 to December 18th 2010. Due to the problems accrued during filed work implementation, fieldworks were completed on December 25th 2010. The problems were connected to the substitution of sampling units and distribution of incentives in regions.

Number of planned surveys both household and enterprise were successfully completed except Tsagveri enterprises, where instead of 6 planned interviews only 40 visits were conducted as there was only 4 functional enterprises in Tsagveri at the moment of the survey.

As prescribed in deliverable F (Detailed Survey Methodology) three visits were conducted in each sampling unit if the interview was not conducted during the first visit.

In the table below refusal rates for Household survey are presented according to the settlements.

5. None response rate for households

	Interview was conducted	Nobody was at home / dwelling was closed	Respondent refused the interview	Interview was stopped	Other
Bakuriani	352	46	3		4
Borjomi	700	135	17		13
Kobuleti	715	104	11		4
Poti	750	195	44		5
Kutaisi	760	158	24	7	6
Tskhaltubo	192	111	3	1	3
Abastumani	80	6	1		
Tsagveri	55	3			
Akhaldaba	85	12			
Surami	180	57			5
Batumi	180	101	24		15
Gori	115	18	3		2
Rustavi	180	123	16		5
Zugdidi	125	25	5		12
Total	4469	1094	151	8	74

6. Refusal breakdown for households

Refuses	N	%
Interview was conducted	4469	77.1%
Nobody was at home / dwelling was closed	1094	18.9%
Respondent refused the interview	151	2.6%
Interview was stopped	8	0.1%
Other	74	1.3%
Total	5796	100.0%

In the table below refusal rates for Enterprise survey are presented according to the settlements.

7. None response rate for enterprises

	Interview was conducted	Interview was conducted during pilot study	Respondent refused the interview	Enterprise is not functional	Enterprise was not found	Other
Abastumani	15		1	3		
Bakuriani	25		1	10	6	1
Surami	19			2	18	
Tsagveri	4			3		
Batumi	118			18	16	
Borjomi	77		10	43	33	3
Poti	128		14	116	3	2
Gori	61		13	19	63	1
Kobuleti	92			22	6	
Kutaisi	184	1	13	97	12	8
Rustavi	73	1	8	6	11	
Tskhaltubo	43		1	20	3	1
Zugdidi	59		6	26	6	
Total	898	2	67	385	177	16

8. Refusal breakdown for enterprises

Refuses	N	%
Interview was conducted	898	58.1%
Interview was conducted during pilot study	2	0.1%
Respondent refused the interview	67	4.3%
Enterprise is not functional	385	24.9%
Enterprise was not found	177	11.5%
Other	16	1.0%
Total	1545	100.0%

5.5 FIELDWORK QUALITY CONTROL

As prescribed in deliverable F (Detailed Survey Methodology) three types of quality control procedure were used in RID Survey.

- Telephone control.
- Visit to the respondent.
- Attend the interview.

In total 18 quality control specialists participated in the survey:

9. Quality control schedule

	Number of quality control specialists	Number of controlled questionnaires
Telephone control	4	894
Visit to the respondent	8	447
Attend the interview	6	67
Total	18	1408

Special quality control form was designed by the Project Manager and in total 31.5 percent of conducted Household interviews were controlled.

Quality control was conducted in four stages according to the fieldwork schedule. Detailed schedule of quality control visits / calls was submitted to Project Manager by the end of quality control procedure.

Out of 1408 controlled questionnaires 177 problematic cases were sent back to field department for further processing. In all cases callbacks (visit or phone call) were conducted to the address in order to fix the incorrect or missing data.

6 DATA ENTRY AND MANAGEMENT

This chapter describes issues related to data entry, revision and coding and cleaning. More details on these issues were presented in Deliverables S and V.

6.1 DATA REVISION AND CODING

For the first time questionnaires were revised by regional supervisors:

(1) revision of title page

(2) Revision of skips.

To the and of each working day completed questionnaires were delivered to ACT offices for final revision prior to the data entry procedure.

Revision specialists' team consisted of 14 revision specialists. All of them were selected based on their experience on field supervision and prior to the revision procedure the were involved in RID IEP Survey pre-test and pilot studies.

Every working day revision field work manager gave revision specialist completed questionnaires from the field and they scrutinized the questionnaires.

In case of any inaccuracy revision specialist in coordination with team leader made decision on correction procedure. Call backs (phone or visit) were made to the respondent in any data was missing or the information was inconsistent.

As the questionnaire mainly consisted of closed questions still there were several questions with open ends. Under the management of revision specialists team leader universal code-book was developed and all revision specialists used unique codes wile reviewing the questionnaires.

Detailed description of the revision procedure and the types of errors identified in the questionnaire will be described in separate document included in baseline report.

6.2 DATA ENTRY

6.2.1 Data Entry Software

In order to achieve data entry effectiveness it has been decided to use SPSS Data Entry Builder. The mentioned software has quite a number of advantages that in the end is reflected on quality of data entry and process management:

1. Entry form is maximally assimilated to the questionnaire that considerable simplifies navigation during the entry process

2. With creation of entry form SPSS database has been automatically created that considerably saved spend on unification of entered data. Time was saved for transferring to data clearance stage

3. Database structure is directly connected to forms that ensures constant connection between base and entry form

4. Program enables us to define those essential connection that were necessary for high quality data entry

SPSS Data Entry Builder has been applied for entering of researches of enterprises and households. Entry forms passed three stages before taking final shape:

5. Designing of initial form – Designing of initial form was started from the moment of developing pilot questionnaire. First, database structure was designed (variables have been defined for each questionnaire, variable types were determined, consequence and format of variables was defined). On the basis of created structure visual form has been designed in SPSS Data Entry Builder.

6. Testing of from on pilot questionnaire – Testing of entry software based on pilot questionnaire has been accomplished on the second stage. Imperfections were identified and corrective actions were defined. Main imperfections revealed during the testing were:

    - Variable format has been specified
    - Rules of Navigation in the tables has been specified
    - Entry font has been specified for open questionnaires
    - Variables that did not coincide with the base structure have been revealed

7. Designing of final entry form – On the basis of final questionnaire and considering imperfections revealed during the testing final form has been defined. Before start of main entry one day has been assigned for testing of final form. Every operator took part in testing. Testing was accomplished without imperfections.

After passing the mentioned procedure entry form has been considered as final variant, which was used for direct entry.

6.2.2 Data Entry Resources

Twenty-one personnel have been participating in the data entry process – seventeen of which were operators, while others were involved for process coordination and monitoring:

1. Database Manager (1) – Main duty was monitoring of entry process. Controlling the number of entries on a daily basis, coordinating works and relations with the field department. Controlling terms and planning works.

2. Database specialist (1) – Main duties were monitoring of document keeping necessary for entry process, solving technical issues, uniting databases and responding to operators' remarks. Ensuring efficient operating of software and computers. Duties of database specialist covered receiving questionnaires from field department.

3. Coordinators of Operators (2) – Main function of operators were direct contact with operators. They were ensuring transfer-delivery of questionnaires to operators on a

daily basis. Gathering and archiving of databases entered on a daily basis. Revision of entered database and reviewing of remarks made by operators. Their main function included correction of remarks, specification of identification parameters of questionnaires and filing of questionnaires in a specially assigned place for this.

4. Operators (17) – Seventeen operators were working on data entry. Four of them are permanent employees of the company ACT, while others were contracted. Responsibility of the operators included entry of questionnaires, strictly following of instructions and keeping of documentation connected with data entry.

Every person participating in entry process was working on a personal computers in headquarter of ACT.

6.2.3 Training On Data Entry Software

At the initial stage, Database Manager and database specialist jointly developed procedural part of entry. All the documents that should have been recorded in the entry process have been defined. Corresponding formats for the documents have been designed and instructions for the operators have been written. Coordinators of the operators were trained and their authorities and duties have been defined. Coordinators of the operators were regular staff members of ACT. They were working on clearing/processing of databases. Seventeen operators have been selected from ACT entry specialist bases before the start of piloting. (Four of them are ACT regular staff operators). They took trainings on procedural part of entry. They were trained how to keep documentation associated with entry. Data entry of pilot results has been accomplished by four regular staff operators. Pilot questionnaires have been handed to the rest operators for testing. They were exercising on data entry for two days. Data entry quality was checked by Coordinators of the operators and database specialist.

As the main questionnaire has been developed, operators passed one-day testing on final questionnaire. Entered data was checked and only afterward operators were considered as ready for data entering.

6.2.4 Data Entry Procedure

For data entry and archiving of corresponding documentation, following procedures have been performed:

- Receiving of questionnaires from field department – questionnaires after passing revision and encoding were gathered for the database specialist. The number of transferred questionnaires was recorded on every receipt and was recorded in corresponding document.

- Distribution of questionnaires for operators – questionnaires received from field department was distributed within operators. Coordinators of operators were bodies responsible for this procedure. Questionnaires were distributed among operators according to the load of work.

- Recoding of remarks revealed during entry – operators were recording discovered imperfections on a daily basis. Remarks were recording in a special document. Coordinators were nearby the operators during the entry process in order to answer questioned that might have been aroused.

- Gathering of entered questionnaire and database – On a daily basis, Coordinators of operators were gathering database and questionnaires entered on previous day. Questionnaires were sorted by operators on a specially assigned place. Coordinators of the operators were comparing identification parameters of the questionnaires with the base and were correcting any mistakes found. One of their duties included detailed reviewing of remarks of the operators and making corresponding corrections in the base. Coordinator was reporting to database manager on the process of entry. For this aim, special document was kept (data entry monitoring sheet).

- Regulation of database and questionnaires – archiving of data base gathered each day was done in accordance with preliminarily defined rules (archive structure, format of file title etc). Unification of bases gathered previous day was accomplished by database specialist. Database specialist duties included comparing the number of questionnaires received from field department with the number of entries.

- Unification of initially entered bases – After completion of initial entry database specialist united bases entered on each day and archived them in accordance with standards.

Questionnaires were sorted by their number for secondary entry. Questionnaires were handed to operators in the way to avoid entry of the same questionnaire by two operators. The rest procedure is similar to initial entry.

6.2.5 Data Entry Errors

After completion of double entry database specialist compared databases. Corresponding differences can be considered as entry mistakes. Two approaches can be applied for calculation of stake of mistakes:

- Households

    - When mistake stake is derived from every cell – In this case the stake of mistake is 0.38%.

    - When mistake stake is derived only from number of valid cells – In this case the stake of mistake is 2.56%.

- Enterprises

    - When mistake stake is derived from every cell – In this case the stake of mistake is 0,50%.

    - When mistake stake is derived only from number of valid cells – In this case the stake of mistake is 5,94%.

We can also analyze mistakes by stakes between initial and secondary entry bases. Or during which entry more mistakes were done. Data is analyzed by blocks:

10. Breakdown of mistakes for HH questionnaire data entry

Block	Mistake stake (calculated from total number of cells)	Was initially entered correctly	Was entered correctly for the second time	Other value was correct
B	0.2%	42.3%	57.4%	0.3%
D	0.5%	46.1%	53.6%	0.3%
F	0.9%	40.3%	59.4%	0.3%
H	0.7%	43.1%	56.2%	0.7%
I	0.6%	38.1%	61.6%	0.3%
K	0.2%	40.0%	59.2%	0.8%
L	1.5%	53.9%	45.8%	0.3%
M	1.1%	44.5%	55.3%	0.2%
P	0.2%	38.5%	61.3%	0.2%
Q	1.0%	49.9%	49.9%	0.2%
R	0.5%	61.7%	37.9%	0.4%
S	0.6%	41.5%	58.1%	0.4%
U	0.3%	61.3%	38.7%	0.0%
W	0.2%	38.3%	61.5%	0.2%
Other	1.2%	53.0%	46.7%	0.4%
Total	**0,38%**	**44.1%**	**55.5%**	**0.4%**

11. Breakdown of mistakes for Enterprise questionnaire data entry

Block	Mistake stake (calculated from total number of cells)	Was initially entered correctly	Was entered correctly for the second time	Other value was correct
B	1.2%	51.5%	47.6%	0.9%
E	0.4%	54.0%	45.3%	0.7%
H	1.9%	32.7%	67.3%	0.0%
K	0.4%	41.1%	57.8%	1.1%
L	0.3%	37.7%	61.8%	0.5%
O	2.7%	42.1%	57.6%	0.3%
P	0.1%	30.6%	69.4%	0.0%
other	2.7%	39.4%	60.3%	0.3%
Total	**0.5%**	**46.7%**	**52.6%**	**0.6%**

As it can been seen from given tables secondly entered data are more precise than that of initial one.

Deliverable S explains in details issues related to data collection and data entry.

6.3 DATA CLEANING

6.3.1 Preparatory Activities For Data Cleaning

Following documentation are needed for cleaning procedures:

1. Database;
2. Codes sheet;
3. Questionnaires;

Data cleaning procedures are performed by Data Base Specialist (3) and Data Base Specialist Assistants (3 every day);

Data base and its structure – collected data is formed as SPSS data base (with SAV extension). The data is presented in SPSS system as a table. Each column in the database implies question (variable) and the rows unique interview.

Each variable has a variable label and a value label.

Codes sheet – the codes sheet bears all the new codes of all types which have been identified in the process of coding and revising.

Questionnaire organization – for cleaning procedures it is necessary to organize the questionnaires according to questionnaire numbers. Each questionnaire with any nonsense / incorrect value in the database must be detected and checked in accordance with the original questionnaire.

Staff involved in cleaning procedures – Database specialists is involved in the cleaning procedures together with assistants who help the specialist in extracting questionnaires. Revision and coding specialist are involved as assistants in certain projects.

6.3.2 Error Types

Errors identified in the database cleaning are divided into 6 types:

1. Operator’s mistake
2. Error made during revision/coding
3. Interviewer’s mistake
4. Mistake identified by control
5. Stylistic error
6. Error which was impossible to amend

Errors made by the data entry operators – one of the major tools to avoid making errors while recording the data is to double-record. After double-recording, the possibility of making

additional errors is driven to the minimum. Such errors are detected and corrected by the database specialist.

Errors made by the revision and coding specialist – such type of errors are those overlooked during coding as well as errors caused as a result of breaking the rules while coding and revising.

Errors made by the interviewer – such errors include the facts when the interviewer does not follow the skip rules identified in the questionnaire, marks inappropriate answers for certain questions and breaks the rules imposed by general instructions. Some errors may also be caused by respondent's answer.

Mistake identified by the control – Mistakes were revealed by the control team and relative amendments were made to the base.

Stylistic error – this type of error doesn't affect the accuracy of data. These are minor mistakes which can be made by the interviewer, for instance, if the respondent cannot answer the question and the interviewer has to code 999, but s/he accidently marked 99 or questions where the response was 0 instead of leaving it blank.

Errors which was impossible to amend – these are mistakes which could not be amended during the data cleaning process. All other types of mistakes were corrected and only this type of mistakes remained uncorrected.

6.3.3 Error Detection Procedures

SPSS is equipped with effective tools for error detection. Database specialist uses ready-made SPSS procedures as well as macros developed by database department. Macros are developed in SPSS syntax language and are used for the major part of data filtering. In frames of specific projects, a certain task may occur which is beyond ordinary macros standards. In this case data base specialist works to develop appropriate syntax for error detection.

Following ready-made procedures are applied during cleaning:

1. Data
    a. Sort Cases
    b. Transpose
    c. Restructure
    d. Aggregate
    e. Split file
    f. Select Cases
2. Transform
    a. Compute Variable

b. Count Values within Cases

c. Recode into Same Variables

d. Recode into Different Variables

3. Analyze

a. Descriptive Statistics

- Frequencies
- Descriptives
- Explore
- Crosstabs

b. Reports

- Case Summaries

c. Tables

- General Tables
- Table of Frequencies

d. Compare Means

- Means

6.3.4 Macros Developed By ACT:

Fltr – this is the major macros used in cleaning. Expression of any type can serve as an argument. Macros will ensure the visual dissociation of appropriate questionnaires in case the authenticity of the argument.

Equals – This macros will identify similar meanings in the set of variables and highlight them visually;

Delsys – This macros will identify omitted meanings in the set of variables and gather them on the left side.

Include – This macros will connect two sets of variables and detect the cases where meanings of one set of variables are repeated in the second one.

New – These macros will ensure the transition of gathered variables into position variables

6.3.5 Data Cleaning Procedure

Data cleaning covered the following stages:

Comparison of data which were entered twice - data cleaning started by comparing data which were entered twice. All differences were identified. Database specialists and their assistances went through each questionnaire and found correct answers to all differences.

Logic-arithmetic cleaning of the database - database specialists reviewed each question in detail whil cleaning the base. They verified all possible values and connections with other questions. They used SPSS ready-made procedures and the language of syntax.

Identifying mistakes – each inaccuracy revealed in the cleaning process were fixed in the database. For this, new variables were created where codes were entered by the type of mistake.

Error made by the operator is corrected locally and this decision is made by the database specialist. Error made by the coding and revising specialist addresses appropriate team and the errors are corrected locally. For issues related to errors made by the interviewer, omitted meanings and other drawbacks the revising team contacts the respondent for information.

Files and documents developed in the cleaning process were archived for further usage. All syntax and macros used by the base specialists are kept in the SPSS syntax file and any interested person can review the conducted work.

Data cleaning procedures are explained in more details in Deliverable V.

7 DATA STATISTICAL PROCESSING

This chapter includes brief overview of issues related to imputation, data weighting and variance calculations. Data weighting and variance calculations were done according to the predetermined procedures. More details on these issues are presented in Deliverables V and U.

7.1 IMPUTATION OF DATA

Need for imputation was caused by two reasons:

1. Discrepancies could not be corrected during the data cleaning process

2. There were no full responses on a question

As a result, imputation scheme is divided into two parts.

At the first stage, discrepancies identified during the data cleaning process, which could not be corrected will be replaced by the "999" code.

For the second stage, variables will be grouped into three categories. (1) Variables assessed on a nominal scale - Nominal (2) Variables assessed on an ordinal scale - Ordinal (3) Variables assessed either on interval or ratio scale - Scale. Imputation method will be tailored to each type of variable:

3. **Nominal** – for this type of variables "do not know" answers will not be imputed, since this type of answer itself provides information.

4. **Ordinal** – imputation will be used for this type of variables. In particular, every non response will be replaced with the average value. Average value for the variable will be calculated either on a cluster or strata level.

5. **Scale** – imputation will be used for quantitative variables. Every non response will be replaced by the average value of the variable calculated at a strata level.

This approach will enable us to characterize summative indicators for each target group. During the data analysis stage share of imputed variables will be presented, which will enable the RID IEP Team to decide whether the parameter is reliable or not.

7.2 DATA WEIGHTING

7.2.1 Weighting of data for household survey

Two weights were calculated for the database of the household survey:

1. W_t – Weights for the general section of the questionnaire. They are used for all questions of interviewed 4469 households apart from the questions related to the estimation of the volume of water consumption.

2. W_w – Weights for the questionnaire sections related to the estimation of volume of water consumption within the household. These weights are used only for 1312 households who completed the questionnaire regarding the volume of water consumption.

Weights were calculated at the city level.

Weights of the households interviewed i-type of cities were calculated by the following formula:

$$W\_t_i = \frac{H_i}{n_i}$$

$$W\_w_i = \frac{H_i}{m_i}$$

Where,

H_i is the number of households in i-type of city.
n_i is the number of interviewed households i –type of city.
m_i – is the number of questionnaires completed for the water consumption volume in i –type of city.

7.2.2 Weighting data for the survey of enterprises

Weighting of enterprise data were made at the strata level. One stratum united the enterprises of one and the same city, which are almost the same type in terms of water consumption.

Weighting was carried out in two stages. At the first stage, in consideration of refusals, the number of operating enterprises was corrected and at the second stage, weight of each enterprise was calculated.

Refusals were divided into two types:

3. The interview failed because the enterprise is not functioning any more.

4. Due to some other reason

At the first stage, initial weight of each enterprise was calculated in each i-type of stratum:

$$W_{0i} = \frac{N_i}{n_i + w_{1i} + w_{2i}}$$

Where,
N_i is the number of enterprises in i-type of stratum,
r_i is the number of completed interviews in i-type of stratum,
u_{1i} is the number of first stage refusals in i-type of stratum,
u_{2i} is the number of second stage refusals in i-type of stratum,
Final weight of the enterprise interviewed in i-type of stratum was calculated by the following formula:

$$W_i = \frac{N_i - W_{2i} u_{1i}}{r_i}$$

7.3 VARIANCE CALCULATION

For variance calculation purposes we used SPSS standard procedure.

On the first stage complex sampling design file was created. Based on this file following calculations were processed:

- Mean
- Standard error
- Confidence interval
- Coefficient of Variation
- Design Effect

8 PREPARATION OF METADATA

RID IEP Survey Meta Data files were organized according to the Deliverable scheme. Both English and Georgian packages contain list of folders by deliverables.

Each Deliverable folder contains approved final versions of the deliverable and supporting documents. “ReadMe” word documents were prepared as guidance for the user and are included in separate folders.

Deliverables included in the meta data are as follows:

- Deliverable A – Initial Report Describing Initial Findings And Ideas For Evaluation Design And Data Collection After Reviewing RID Documentation
- Deliverable B – Detailed Work Plan And Timeline
- Deliverable C – Brief Report On Consultations With MCG And MCG Technical Program Staff About Evaluation Design
- Deliverable D – Draft Final Detailed Evaluation Design And Data Collection Report, Including Key Research Questions, Evaluation Methodology And Design, Description Of Surveys, Key Indicators, Target Areas, Target Groups (Treatment And Control), Beneficiaries.
- Deliverable E – Final Detailed Evaluation Design And Data Collection Report Incorporating MCG and MCC Comments
- Deliverable F – Detailed Survey Design (Including Sampling Methodology) For Each Survey Necessary
- Deliverable G – Work Plan And Timeline For All Survey Work
- Deliverable H – All Survey Questionnaires
- Deliverable I – Training And Survey Manuals; Interview And Staff Training Plan
- Deliverable K – Write-up Of Incentive System For Response Rate
- Deliverable L – Brief Report On Pilot Testing Of Questionnaires, Results And Any Subsequent Changes
- Deliverable M – Elaborated Programs For Data Base Formation For Each Component Of The Survey (SPSS Program For Each Survey With Variables And Labels)
- Deliverable O – Database/dataset Of Partial Survey Results Halfway Through Survey
- Deliverable N – Tables On Non-response And Partial Response Rates
- Deliverable P – Initial Database/data set Of All Survey Results After Survey Completion
- Deliverable S – Written Overview Of Issues Related To Data Collection And Data Entry

- Deliverable V – Report On Data Cleaning Procedures, Imputation Methods And Sampling Weight And Variance Estimation Methods

- Deliverable U – Results Of Response Rate And Variance Calculations, Frequency Analysis, Sample Weights And Any Other Variables

- Deliverable W – Final, Cleaned, Complete Data Sets Of All Surveys