



TWINNING CONTRACT

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Support to the Israeli Central Bureau of Statistics in Improving the Quality of Official Statistics

MISSION REPORT

on

Component D

**Methodological and geo-spatial tools for
improving the quality and efficiency of field surveys**

Activity D.1

**Position analysis of methodology to allocate interviewers'
workload in multi-field surveys**

Implemented by

- *Mr. Peter Linde, Head of Division, DST Survey, Statistics Denmark; PLI@dst.dk*
- *Mr. Finn Lund, Survey Coordinator, Statistics Denmark; FIL@dst.dk*
- *Mr. Poul Juhl Vestergaard, Head of IT Development Team, Statistics Denmark; PJV@dst.dk*

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Authors' names, addresses, e-mails

Mr. Peter Linde
MS Component Leader
Head of Division
DST Survey
Statistics Denmark,
Sejrøgade 11
DK-2100 Copenhagen Ø
Denmark
PLI@dst.dk

Mr. Finn Lund
Survey Coordinator
DST Survey
Statistics Denmark,
Sejrøgade 11
DK-2100 Copenhagen Ø
Denmark
FIL@dst.dk

Mr. Poul Juhl Vestergaard
Chief Advisor – Head of IT Development Team
Survey Coordinator
DST Survey
Statistics Denmark,
Sejrøgade 11
DK-2100 Copenhagen Ø
Denmark
PJV@dst.dk

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List of Abbreviations

BC	Beneficiary country
CAPI	Computer-assisted personal interviewing
CATI	Computer-Assisted Telephone Interviewing
DST	Statistics Denmark
EU	European Union
GIS	Geographic information system
ICBS	Israeli Central Bureau of Statistics
IT	Information Technologies
MS	Member State (of the EU)
NSI	National Statistical Institute
ToR	Terms of Reference

Executive Summary

One of the purposes of the activity was to carry out an initial position analysis through presentations of the survey organization at the ICBS and at DST – Survey. The presentations and the discussions between the ICBS and the DST Survey staff showed significant differences in the size of the two organizations. The difference in size is not entirely proportionally reflected in the number of surveys conducted but to some extent due to national differences in geography as well as laws of employment. The total number of interviews is nearly double in ICBS than in Denmark.

5 main differences were identified:

- 1) At Statistics Denmark (DST) drawing of sample units are done centrally but workload allocation to individual interviewers is decentralized in three local Centers. At the Israeli Central Bureau of Statistics (ICBS) both drawing of sample units as well as workload allocation is performed centrally. At DST, allocation of workload is based on addresses whereas at ICBS, workload allocation is based on geo-codes (x,y coordinates).
- 2) At (DST) interviewers work simultaneously on multiple surveys in three geographical areas and with one full time supervisor for each of the three areas. At ICBS interviewers usually perform interviews only on a single survey. Each survey is managed by up to 12 supervisors located at three Data collection Centers, each with its own geographical domain. In total there are 35 full time supervisors overseeing the field surveys conducted by ICBS (excluding censuses).
- 3) DST uses a performance based wage structure for interviewers - Interviews are recruited for each survey and paid by each assigned Interview and not by hours worked (different rates for non-response and responses). In addition, interviewers are also paid by travel distance. DST has about 250 field interviewers available for recruitment and payment for this number of staff is equivalent to about 15 full-time positions. ICBS has about 300 half time employees (80 hours per month) working as interviewers. At ICBS interviewers are paid by hours worked as well as travel distance and time.
- 4) Collective employment agreements governing work relations in Israel are less flexible compared to in Denmark.
- 5) DST operates on the commercial market carrying out interviews for private companies or by other governmental or educational institutions requiring a different emphasize on cost registration (especially registration of work time) and operational efficiency.

Findings:

1. The focus of the mission was discussion about a GIS based application for allocation of interviews to interviewers. In Israel, all individuals or households in the samples are identified with (x, y) coordinates. It makes very good sense and effectiveness to allocate interviews interactively from a map showing the location of the respondent and the associated interviewers. The first step in multi-field surveys will be to define the future geographical domains.
2. The application should be based on a revised organization of field interviews so the supervisors and interviewers should cover multiple surveys. A new organization will provide greater flexibility and optimal use of resources by reducing transportation distance and travel time, and more optimal use the advantage GIS based application for allocation of interviews. The task of reorganizing interview work, training interviewers and supervisors, and not least committing staff members and supervisors to the new organization should not be underestimated. Supervisors should act as regional leaders for ICBS. It will easily take at least one year to build a new organizational structure.
3. The description of a new allocation tool has to prioritize what is most important and what are nice to have. Fundamentals should be built up step by step (in modules).
4. The questionnaires must be set with the same program and the questionnaires must be simple and easy for the respondent's to answer. Pedagogical and clear communication of the question

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is a prerequisite for obtaining high quality answers from the respondents. It will also make it easier for supervisors and interviewers to handle multiple surveys. In this work, it might be considered including the possibility of collecting data over the Internet (Web-based interviews) since some respondents may prefer this option (especially if it can be done by the use of a smart phone). It is considered an international trend that more and more respondents prefer to provide information over the internet instead of face to face interviews or phone interviews. At DST twice as many responses are collected over the internet compared to personal interviews.

Challenges:

As discussed during the contracting phase it can be necessary to reconsider the member state experts currently allocated to component D. This will be clarified during the next activity (July 10-14). As expected the current Danish experts have great experience in optimization and quality assurance of data collections, but their experience with GIS tools for this purpose is limited. The project management of Statistics Denmark has had great difficulties in finding relevant experts for this among the NSI's that we usually work with. Currently a number of solutions are being evaluated by the RTA and the MS project leader. If the required competences are not available inside NSI's GIS experts with experience in administrative GIS systems i.e. applications to allocate services such as home or health care for households and individuals could be relevant. Alternatively experiences from private companies work with optimisation could be considered by the ICBS (Traveling Salesment Problem).

1. General comments

This mission report was prepared as part of the Twinning Project: "Support to the Israeli Central Bureau of Statistics (ICBS) in Enhancing the Quality of Official Statistics". This was the first mission devoted to position analysis of methodology to allocate interviewers' workload in multi-field surveys within Component D: *Methodological and geo-spatial tools for improving the quality and efficiency of field surveys*.

The overall purpose of this activity is to present and discuss methodologies for improving the design of field surveys, taking into account the constraints dictated by each survey (reference time, allocation to filling in the questionnaires etc.).

The main activities of the mission were:

- *Presentation of the current situation in ICBS regarding the planning of field surveys, sampling, and the allocation of workload to interviewers.*
- *Presentation of the current situation at Statistics Denmark and the EU regarding the planning of field surveys, sampling, and the allocation of workload to interviewers.*
- *Discussion and defining various indicators / metrics that develops tools that measure efficiency and enable cost reduction in field allocation interviewers in field surveys.*

The position analysis assisted the ICBS and the Twinning Project experts in getting an overview of the present situation regarding methodology to allocate interviewers' workload in multi-field surveys in Israel.

MS experts presented the background and the strategy behind their planning of field surveys, sampling, and the allocation of workload to interviewers.

The position analysis thus established the current state of play regarding planning and sampling of field surveys. Furthermore, the position analysis contrasted the current situation with European best

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practices and thereby formed the basis for discussing a long-term plan for improving the quality and efficiency of field surveys in an International perspective.

The experts would like to express their thanks to all officials and individuals met for their kind support and for the valuable information they provided, which highly facilitated the experts' work.

The views and observations stated in this report are those of the consultants and do not necessarily represent the views of EU, ICBS or Statistics Denmark.

2. Assessment and results

All of the foreseen activities were carried out following the plans in the ToR; cf. *Terms of Reference (Annex D1 - 1)*. Outcomes were favorable, and results and conclusions are described in the following section.

ICBS presented:

- *Introduction to Survey Department at ICBS (Annex D1 - 4)*
- *Introduction to component D and activity D1 (Annex A1 - 5)*
- *Geocoding administrative files at ICBS (Annex D1 - 6)*
- *Current situation using GIS' tools for allocation of workload – longitudinal survey as a case study (Annex D1 - 7)*
- *GIS' tools usage in surveys (Annex D1 - 8)*

The MS experts gave presentations on:

- *Introduction to field survey at Statistics Denmark (Annex D1 - 9)*
- *Organisation and management of field surveys at Statistics Denmark (Annex D1 - 10)*
- *IT portal and digital communication with field workers (Annex D1 - 11)*
- *IT support for monitoring field workers (Annex D1 - 12)*

2.1 Current situation at ICBS assessed

ICBS had prepared comprehensive presentations giving the experts an excellent overview of the current situation for field surveys at ICBS. Some of the challenges that ICBS find most significant were highlighted.

2.1.1 Organization and responsibility

The main function of the Survey department at ICBS is to plan, monitor and perform surveys. Surveys include field surveys, telephone interviews as well as web based-surveys.

In figure 1 the organizational structure of survey Department at ICBS is outlined. For field surveys the most important Units are ***The Central Survey Headquarter, three Data Collection Centers, two Regional Centers and 35 Domains*** (Please see organizational structure in Figure 1).

The Central Survey Headquarter is located at ICBS in Jerusalem and the three Data Collection Centers are located in Haifa, Tel Aviv and Jerusalem. Each Data Collections center is managed by a District Manager and in Tel Aviv they are assisted by two Regional Manager as well due to its large size.

The Jerusalem District is organized slightly different since the Data Collection Center is a part of the CATI Center and thus has three managers.

Each Data Collection Center manages a number of *Domains* i.e. an enumeration area for which a supervisor is responsible. At present the total number of domains are 35. Each domain has one full time Supervisor for managing the Domain and the interviewers associated with their specific Domain. Each domain/supervisor is responsible for only one survey (except in Jerusalem where each domain is responsible for multiple surveys). The supervisor in each domain is responsible for 8-12 field interviewers (adding up to nearly 300 field interviewers in total). The domain supervisors as well as the regional managers operate from the Data Collection Centers. The geographical area covered by each supervisor/domain differs between each survey.

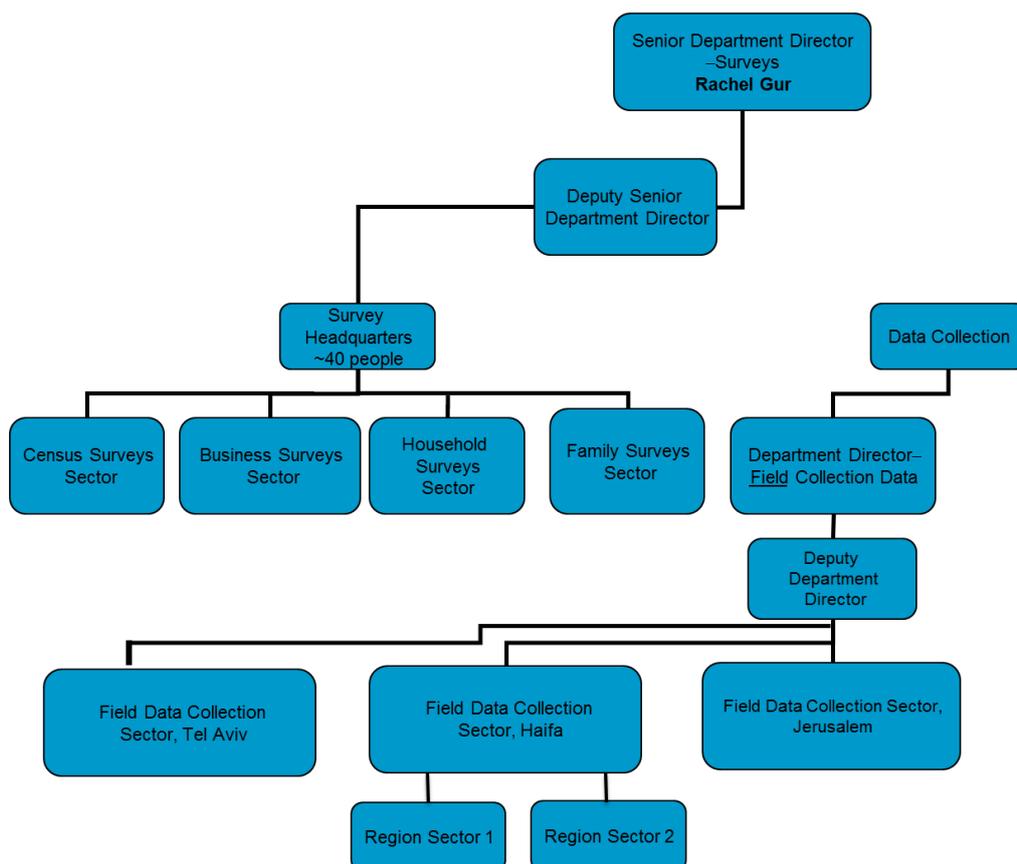


Figure 1: Diagram of the organizational structure for field surveys at the Survey Department at ICBS (Slightly modified from appendix Annex D1 – 4 presented by Rachel Gur).

Main tasks of Survey Headquarters

The main tasks of the Survey Headquarters are:

- **Thorough study of the survey topics:** written material, meetings with experts in the field (e.g. the subjects Units, the Methodology Department and the IT department)
- **Building tools for conducting the survey:** questionnaire, work procedures, computerized collection systems, training material
- **“Testing of tools”:** Piloting the tools, pretest
- **Training:** creating a training system, classroom training of coordinators and interviewers, planning and conducting individual training
- **Planning the budget required for the survey**
- **Checks and supervision**
 - Quality checking of the interviewers
 - Progress of the enumeration

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- Accompanying field interviewers
- Keeping to schedule and budget
- **Drawing conclusions and learning lessons:** Writing summary reports for every survey
- **Allocation of workload**

Main tasks for the Data Collection Centers (Center Manager, Region Manger and Supervisors)

The main tasks for the Data Collection Centers are:

- Recruitment of interviewers
- Data collection from the interviewers
- Managing the interviewers and managing the collection of the data:
 - Assigning workloads
 - Arranging interviewers' mobility in geographic areas/between surveys
 - Administrative management of the interviewers
- Handling refusals to respond
- Dealing with response burden
- Training and teaching in guidelines
- Checks and monitoring
 - Checking the enumeration
 - Accompanying interviewers
- Administrative checks
 - Efficiency of enumeration route
 - Time invested in an enumeration unit
 - Work hours reporting

Main tasks for the interviewer

The main tasks for the Interviewers are:

- Training
- Preparation
- Driving to the respondent
- Performing the field Interview

2.1.2 Field surveys performed by ICBS

The Survey Department runs about 50 surveys, distributed among

- (i) Family/individual surveys
- (ii) Household surveys
- (iii) Business surveys
- (iv) Census surveys.

At the ICBS four major field surveys are carried out on a regular basis. These are:

- Labour Force Survey (Lfs) – *Monthly panel survey with 18.000 respondent*
- Household Expenditure Survey (Hh) – *Yearly Survey with 14.000 respondent*
- Social Survey (Ss) – *Yearly survey with 10.000 respondent*
- Longitudinal Survey – *18.000 respondent*

For these four surveys ICBS enjoys a field response rate of approximately 80%.

The samples of these surveys are drawn and allocated separately for each survey except in Jerusalem.

2.1.3 Methods

Field surveys are performed by face-to-face interviews either by means of using a laptop computer – CAPI or by data collection using paper questionnaires in the case of the Household Expenditure Survey.

2.1.4 Drawing of sample units

The Central Population Register (CPR) is used as the basis for sampling individuals and households for Social Survey and for the Longitudinal Survey. The Dwelling Register is used as the basis for sampling dwelling units for the Labor Force Survey and the Household Expenditure Survey. The Central Population Register is updated three times a year and consists of about 9 million records/individuals distributed among nearly 500,000 addresses. The main supplier to the Central Population Register is the Population & Immigration Authority. The Dwelling Register is updated once a year (May-June) and consists of about 3.7 million records (addresses). The sources of the Dwelling Register are 10 different suppliers that provide service for property tax purpose.

2.1.5 Geo-coding

For both registers addresses are not always as accurate as needed e.g. the addresses might only be a partial address, it could be an old address or the record can lack address information entirely. Nevertheless, ICBS has built an address geocoding application that uses algorithm and address dictionaries in order to translate addresses both back and forth in time as well as assigning incomplete addresses to a defined Statistical area.

Statistical areas: Urban localities with more than 10,000 residents are divided into statistical areas. These are small geographic units as homogeneous as possible, which it is possible to reflect the unique characteristics of certain areas within a locality. A residential statistical area generally numbers 3,000 – 4,000 persons

By using the address geocoding application exact x,y coordinates can be found for 74.5% of the addresses in the Central Population Register and for 79% of the addresses in the Dwelling register. However, for each register respectively 98.6% and 92.5 % of the records can be associated with a defined Statistical area.

Geocoding to a statistical area is regarded as sufficient for most field allocation needs.

2.1.6 Allocation of workload

The workload allocation is performed centrally at ICBS. Before workload allocation to specific Interviewers is initiated, the four steps shown in Figure 2 are performed:

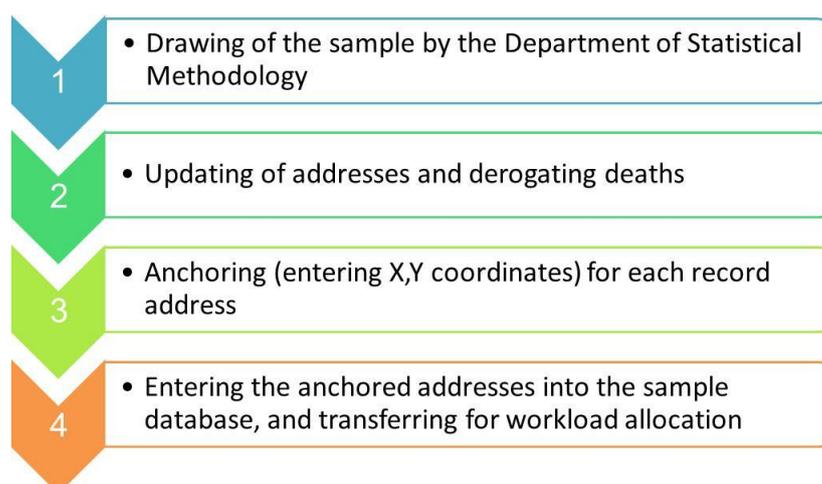


Figure 2: Project stages before workload allocation (From appendix Annex D1 – 7 presented by Luba Fackterovich).

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For each of the four major recurring surveys the ICBS has developed a workload allocation system.

The system allows creations of monthly workloads containing addresses for each individuals or households in the workload. After that workloads are manually assigned to the interviewers. The workload allocation system provides a geographic display of the distribution of individuals or households in the sample (respondents). The display uses three layers of information:

- (i) Roads and Streets
- (ii) Locality borders
- (iii) Buildings and addresses

The interviewers' home address, qualifications such as e.g. language skill are not taken into account at this stage of allocating workloads.

2.1.7 Monitoring field work and interviewers

Supervisors monitor and guide the interviews.

2.1.8 Remunerating system for interviewers

Each interviewer is hired by ICBS to work approximately 80 hours per month. The interviewers usually work on a single survey only. The interviewer is paid by the hour for training, transportation and interviewing. In addition, the interviewer will be paid separately per kilometer driven or public transportation expenses.

2.1.9 Cost associated with surveys

Cost for conducting field surveys can basically be divided into salaries and cost associated with travel of the Interviewers, IT related costs, rent of Office space and other running costs. Below some of the major expenses are listed.

Salaries:

- Salaries for staff members in the central surveys headquarters ~ 40 full time persons per year (including staff members for telephone interviews and web questionnaires)
- Salaries for staff members of Subject Units (according to time used) ~ xx full time persons per year
- Salaries for staff members from the Methodology Department (according to time used)
- Salaries for staff members from the IT Department (according to time used)
- Salaries for staff members from the HR Department (according to time used)
- Salaries for managers of Data Collection Centers including regional managers and managers in Jerusalem ~ 6 full time persons per year
- Salaries for domain supervisors ~ 35 full time persons per year
- Salaries for interviewers ~ 150 full time persons per year (salary is based on an hourly fee, therefore the calculation is an estimation)

Cost associated with travel of the interviewers:

- Travel distance and time

IT related costs:

- Computers
- Programs

Other Costs:

- Rental of office space

2.1.10 Main contrast between collection of field survey data at DST and ICBS

In table 1 the main contrast between collection of field survey data at DST and ICBS is listed.

Table 1: Main contrast between collection of field survey data at DST and ICBS

	ICBS	DST
Basic information		
· Number of field surveys per year	50	50
· Number of interviews per year	50.000	30.000
Staff members and interviewers dedicated for field survey		
· Central Staff	6	1
· De-central staff (Region, domains)	35	3
· Field Interviewers	300 part time employés ~ 150 full time persons per year	250 (part time) ~ 15 full time persons per year
Remunerating system for interviewers	Based on time	Based on performance
Methods		
· Workload allocation	Central – based on geo-coding	Decentral – based on addresses
· Multi/single survey workload	Single	Multi

2.1.11 Challenges for efficiency and cost reduction in field surveys

Remunerating system for interviewer

Currently the remuneration system for interviewers is entirely based on hours worked. In a very sharp contrast to Denmark and private companies undertaking field work on behalf of NSI's no performance incentives are reflected in the remuneration structure. As interviews are paid by distance travelled the individual interviewer has no financial incentives to optimize his or hers travel time and expenses.

Based on the discussions between the Statistics Denmark and the ICBS the possibilities of introducing a performance based remuneration structures might not be possible due the labor market agreements detailing the work conditions in Israel.

Any change and associated improvements in the efficiency must therefore come from the supervisors assuming a direct management role in relation to the administration of budgets and resources.

Allocating multi survey workload

At present, the samples are drawn separately for each survey. Moreover, the distribution of the workload units between the field interviewers is also performed independently for each survey. Each survey has its own constraints dictated by its methodology: data collection period, time span feasible for collection, reference period, and so on.

Effective and economic work processes would maximize the time allocated by interviewers to data collection and minimize travelling time. ICBS is looking for a GIS based methodology that would yield optimized planning and allocation of workload units to interviewers, to reduce travel time and increase data collection time, by combining data collection for various surveys while taking into account their respective constraints. Such methodologies would most likely require interviews to work on more than one survey inside a defined geographical area.

2.1.12 Indicators for a GIS based application for allocation of interviews

Several indicators are relevant. The most important are:

- Average distance from each interviewers homeaddress to the allocated sample units
- Average distance between the allocated sample units to each interviewer
- Number of interviews per interviewer with respect to capacity (including estimated time needed per interview, timeframe for fulfilling the interview)
- Proportion selection units previously interviewed by the interviewer (panel surveys).
- Physical boaders (road distance)

Supplementary information:

- Language skills
- Religious, gender or other bonds
- Preference with respect to long transport by car

3. Conclusions and recommendations

From a simplistic comparison between the survey organisations of the ICBS and Statistics Denmark (staff numbers and numbers of interviews conducted) it seems that there is a potential for reducing costs. The potential may be very significant.

Based on Danish experiences the improvement potential in changing the organisation of the field work is large and much easier realized than the improvements that can be realized by introducing GIS tools into the process of allocating interviewers to respondents.

Further discuss and develop the business case

Compared to the Danish experience it is recommended that the ICBS revisits the decision to use only GIS for optimization as other initiatives may provide more gains for a smaller effort. This was partially discussed during this activity and is recommended to be continued during the next activity in early July.

Introduce additional MS expertise to this component

As experienced at the time of contracting is more than difficult to locate MS expertise with relevant experience in the area between GIS and survey methodology. The RTA and the MS project leader are therefore still looking for additional MS experts to introduce into the component.

Change of remuneration structure

The most radical step would be for the ICBS to introduce a performance base remuneration. Introducing a situation where the ICBS basically is “paying by the interview” seems incompatible with the agreements covering the Israeli labour market.

Consider the organisational structure

It is recommended that the ICBS focuses on the organisation of work in parallel with developing tools. Some of these organisational issues are found in the recommendations below;

Assign Interviewers to multiple surveys

It is recommended that the ICBS changes to an organisation of work where interviewers work on different surveys at the same time inside a well-defined geographical area. Preferably close to their home. Danish experiences show that interviewers without any problems can work on at least 5

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different surveys at the same time and in Jerusalem allocation of workload from multiple surveys to each interviewer also seems possible.

Assign supervisors to geographical areas

Supervisor's should be assigned to new geographical areas and oversee all surveys inside their area. This will allow them to optimize travel time.

Standardize tools across surveys

To allow field interviewers to work on multiple surveys it is crucial that all surveys are conducted using the same standard software tools with similar designed user interfaces. Respondents could be displayed on a map supporting the field working in deciding the optimum travel route.

Develop a geographical tool for assigning interviewers to respondents

Inside a given geographical area a map / geographical tool should be developed for assigning respondents to interviewers. The tool must show all active surveys and can then be used by the supervisor to assign respondents to field workers.

Table 1: Actions needed for moving forward as well as for preparing the next mission.

Action	Deadline	Responsible person
Reconsider the MS staff of component D – in order to better cover the combination of GIS and survey methodology		