

ANNEX-1

TECHNICAL INFORMATION ON THE INTEGRATED SOCIAL ASSISTANCE INFORMATION SYSTEM (ISAIS) DATA WAREHOUSE & BUSINESS INTELLIGENCE PROGRAM (Ref: TOR-SP/TURA/2020-A)

Integrated Social Assistance Service Information System (ISAIS) is an operational information technologies system where all actions and processes (application, payment, accounting, audit, monitoring and reporting) related to all social assistance programs implemented or supported by the Directorate General of Social Assistances are carried out in electronic medium.

Before going into the details of Data Warehouse and Business Intelligence applications, we believe that it would be useful to make a positioning of these systems and touching upon the main differences compared to the operational system.

Operational System: These are the systems built upon the priority to transfer into electronic medium the processes that are run by the people performing in any field in real life with a view to speeding up and facilitating these processes and to increasing the accountability by recording such processes. ISAIS, in terms of its structure and characteristics, is an operational system developed for Social Assistance implementations.

Operational Database: This is the name of database to store and record the data generated by the systems defined in the above article. These types of databases are developed solely based on user's needs and priorities of the operational systems. Therefore, in designing the structure of database, the main function is to ensure that users carry out the processes quickly. Reporting for statistics and analysis is a second-degree priority for this type of databases. These types of databases generally show better performance in running quick processes on more limited data sets.

Data Warehouse: These are structures for effective storing of the data the size of which increases in time. Unlike the operational database, they are database systems specialized to store the large-scale data related to the past cases, as they are not required to create responses to systems where critical users' operations are run constantly ("receiving the applications for assistances" is such type of an operation in our case). Their main priority is to store properly the data to serve as the base for business intelligence applications which can produce results by carrying out analysis on large-scale data. To summarize roughly, these are structures where the information stored in operational databases are recorded in frozen versions between the defined time periods without losing their earlier versions. Therefore, if any registry in the operational database has been updated for five times for instance, the five different versions are stored in data warehouse and, thereby, it stores larger size of data when compared to that of operational database.

Business intelligence Applications: These are special applications which transform large size of data produced by the operational users in their daily routine activities into information through supporting it with such functions as combining, summarizing, calculating etc. They can carry out within minutes the analysis on dense data which would take months with human power. Besides they can present the results

of the analysis in different forms and formats addressing the needs of users at various levels. They can add new qualities to these data from different resources and they can, for instance, classify these data on a map. They provide interfaces that can translate the request by personnel with field expertise but limited IT knowledge into low-level computer language and help them get results by running the relevant inquiries. They can support the policy and plan makers through analysis. They can calculate the situational changes by modifying different criteria on the available data, run the possible case scenarios and create simulations. Carrying out such operations on operational system would lay a huge burden on the systems and deplete the resources allocated for normal use of the system and, thereby, causing the failure of normal activities of the operational system. Therefore, in practice, it is preferred that such functions are carried out by specialized business intelligence applications using the information stored at the data warehouse.

In accordance with the above-mentioned background information, some of the details of IS AIS and the operational database are given below:

DBMS type	Oracle RDBMS
Number of Database	1
Database scheme	1
Database version	11g
Number of tables	552
Number of Foreign keys	676
Number of Indexed columns	1,616
Number of Indexes	1,436
Number of FUNCTION columns	544
Number of PROCEDURE columns	15,562
Database server (windows, linux) info	OEL
Vt Scheme field	6 TB

While performing an operation, IS AIS actively uses most of these tables. Although the number of registries around 10 million creates a serious workload for an operational database, it is still at a manageable level. The systems can carry such a load though certain technical performance optimization. However, the

number of registries at the level of around 100 million is no longer manageable through ordinary performance measures and requires structural changes. When the amount of data reaches up to billions, then the functions start to have negative effects on the use of the system.

Under the prevailing conditions, it has become very hard to carry out processes or obtain statistics on the past household visit information and operations on history tables. For this reason, data is transferred to different mediums to carry out such operations and, therefore, the analysis that should be done routinely within the scope of programs cannot be performed on the system and the operation of the system is maintained through additional efforts. However, as these operations cannot be performed automatically, it creates a dependence on the personnel carrying out the operations and simple human errors by these persons have negative effects on the quality of the information produced.

Currently, the fact that Integrated ISAIS is an operational database brings together an additional limitation. The system keeps past status information for the data produced directly by the system. But this does not apply especially to the data retrieved through external institution databases query (Title Deed, Vehicle, Social Security, Health Insurance etc.). Therefore, the applications for effective monitoring of the development of households throughout the process cannot be provided efficiently. The only resource for this purpose is the special records on the household history: However, as this data is not kept in fully formatted version, an analysis cannot be made on these data and we cannot access frozen data on a household's specific moment in the past. Although this may seem quite simple initially, it brings about many limitations regarding the accountability and complicates many functions such as simulation-contingency scenarios.

Expectations from the System to be developed:

- 1) It is expected that the analysis and the statistical operations that cannot be carried out at all or conducted at workforce costs currently will be carried out easily and free from human errors. They will even be presented in the form of visualized reports customized according to users' types. Thus, meaningful information will be produced from the tacit data which is currently available in the system and is extremely crucial for developing policies. As an example, the system has information on the children who are at schooling age but not attending the school. However, reporting these data is costly. But business intelligence applications can carry out such simple reporting within seconds and present it to the policy-makers on the map including neighborhood details.
- 2) It will be possible to provide the decision-makers automatically at certain time periods, e.g. overnight, with the critical reports and non-standard cases. The system creates the report and/or warning automatically and sends it to the relevant user in the form of e-mail/message or smart phone notification messages. This will provide the system with a very critical functionality such as conveying to the relevant ASDEP personnel any negative conditions/cases determined by the Foundation during a household visit or reporting such cases to the relevant departments monthly.
- 3) It is expected that access will be provided to the snap-shot of households in the past. Thus, both the control and accountability will be increased and the changes of the households in time, e.g. their "before/after assistance" conditions, will be monitored.
- 4) The trends of change of the programs will be monitored instantly. Monthly application/approval/rejection statistics will be provided to the users on the map in the form of

analysis and they can even be cross-analyzed. For instance, such data as the Foundations' application/approval rates on the basis of programs will be received on heat maps.

- 5) The Foundations' performance measurements will become automated on the determined indicators. Performance criteria such as the ratio of the number of children attending school in a given area/conditional cash transfer provided in that area or critical information such as time elapsed from application until the household visit will be displayed in suitable formats.
- 6) **"What-if scenarios"** will be conducted to show how the changes to be made on the criteria of the available data would affect the program in place. For instance, the answer for the questions such as **"If the program condition of less than 4 days of absence in a month is changed to 3 days, how many additional children would start receiving payment?"**.
- 7) The analyses and reporting to be carried out through these applications will contribute to the development of social protection tools to be implemented for foreigners in our country in the future.

