Industrial Waste Water Generation and Treatment – Data Collection and Gaps to Questionnaire Requirements

Ms. Danijela Šabić

Statistical Office of the Republic of Slovenia
danijela.sabic@gov.si

Abstract

The Statistical Office of the Republic of Slovenia has been collecting data on water abstraction, water use, waste water generation and treatment within enterprises with a yearly survey since early 1980s. Efforts for diminishing reporting units' burden by a new sample design and a simplified questionnaire have been done in the past two years. The business register reorganisation will result in difficulties to assess the water flow by NACE activities. The industrial point sources which are submitted to operation monitoring of wastewater can not fulfil this requirement due to different reporting units' population. On the other hand, some data reliability improvement and missing data completion is feasible with the Environment Agency's co-operation.

1. Introduction

The notion of the importance of the environmental statistics was present at the Statistical Office of the Republic of Slovenia (SORS) already in late 1980s. For the domain of water balance, 5 different yearly surveys were introduced:

- public water supply
- urban waste water systems
- water exploitation and water protection from pollution in industry
- irrigation systems
- regulation of watercourses and protection against floods by surface waters.

With these surveys data on all the water abstracted and supplied, wastewater produced and treated, trends in water recirculation and re-usage, and works for protection against floods were collected. At that time this was a unique database of water balance in Slovenia.

2. Industrial waste water generation and treatment

While the volume of wastewater in public sewage network is regularly reported by managers of urban wastewater collecting systems, volume of wastewater produced by industry and discharged directly remains difficult to access. Some countries do not have any data, some use different models, others perform occasional surveys. SORS strives to follow not only the urban water supply and wastewater collection but also all self supply as the usage, the consumption, the wastewater treatment and discharge and the sewage sludge production and disposal by industry. These data are collected with the Survey on Water Exploitation and Water Protection from Pollution from the enterprises with main activities in sections C, D and E of NACE classification. The sample was designed using the Business Register. It was initially the same as for the annual survey on industrial production, i.e. a stratified sample of

all the entities in the Business Register with more than 20 employees and a sample from the entities with fewer than 20 employees for the activities with a small number of reporting units. It represented about 2 600 reporting units. The limit for the reporting obligation was fresh water consumption at least 1 000 m^3/year; entities with the consumption less than 500 m^3/year had to report it on an empty questionnaire and remained in the sample for the next year survey just to be on the safe side. The non-response rate was about 20%. From the received questionnaires only about 500 had consumption bigger than 1 000 m^3/year and were considered in the data aggregation. Burden to reporting units was substantial and the same holds for the superfluous work for SORS. In 2004 an analysis of sent questionnaires versus received responses was done. By keeping in the sample only units with water consumption more than 10 000 m^3/year, 98.45% of the total fresh water consumption would still have been reported. The sample was thus dropped to the size of 382 reporting units to which 232 new entities registered in 2003 were added as potential respondents. As some activities represent a substantially greater consumption of water, all the reporting units were checked for the (consumption of water): (number of employees) ratio. Taking into account the lower limit of water consumption of 10 000 m^3/year, no activity was identified as critical to be included in the sample regardless of the number of employees.

A business register is a helpful tool as a sampling frame for many statistical surveys. However, when a more detailed breakdown of the result to smaller territorial units or to different activities is needed, the structure of the register becomes very important.

Up to 2002 the Business Register of Slovenia was maintained by SORS and was at the same time the administrative and the statistical register. The principle in the Business Register of Slovenia Act that it is a public benefit to keep all the affiliates as individual records was at that time strictly respected. In 2002 the register passed to the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES) and became the Administrative Business Register (ABR). Now larger enterprises tend to assemble all their affiliates in just one entity and thus reduce their administrative burden. This is for SORS a great loss of information source for all business surveys and there is a threat that all statistical data at detailed levels of territory or activities will become less and less reliable. SORS started in 2003 to set up the Statistical Business Register (SBR), which is a copy of the ABR with additional variables from other sources to distinguish active enterprises from non-active legal units. It will be also a core for the Register of Statistical Surveys, defining for each survey also a list of reporting units. These will not be just entities of the SBR but also reporting units known from previous surveys which are no longer individual records in the Administrative Business Register kept by AJPES. This is only a partial solution. There is a legal obligation of answering only for the entities in the ABR and a high non-response rate is to be expected from all others. That is why SORS plans to put much effort during the procedure of adoption of a new act on the ABR in preparation for a more explicit article concerning rules for the registration of affiliates.

3. Data collection and gaps to questionnaire requirements

In the process of the accession the EU legislation has been adopted in Slovenia. Water Framework Directive lays on the implementation of many new databases in competence of the Ministry of the Environment and Spatial Planning (MESP) and the Aarhus convention lays on the public access to environmental data. All this has introduced a sort of collision in national activities. SORS being bound by the act on the protection of individual data could not be of help to MESP in establishing initial lists of the ones obliged to report according to different decrees, neither could SORS report collected data for further analysis at lower

territorial levels – municipality is already problematic usually having just one public water supply or urban wastewater collecting system manager. On the other hand, MESP collects only data explicitly asked for in decrees and has no right to enlarge the reporting obligation. The principle of SORS is to find new possible data sources and to reduce the reporting units' burden to data not reported elsewhere. The Joint Questionnaire Inland Water section is thus reported jointly by SORS and the Environment Agency of the Republic of Slovenia (EARS) of MESP. The division of responsibilities for Tables 4, 5, 6 and 7 of the JQ which deal with wastewater treatment and discharges is showed in Table 1.

Table 1: Data source in Joint Questionnaire Inland Water Section, Table 4 to Table 7

No. of table in the JQ	Title	Data source
Table 4	National population connected to wastewater treatment plants	EARS, SORS
Table 5	Treatment capacity of wastewater treatment plants	EARS
Table 6	Sewage sludge production and disposal	SORS, EARS
Table 7	Generation and discharge of wastewater	SORS, EARS

The estimated percentage of the national population connected to wastewater treatment plants was based on the population in settlements as the managers keep only records of the number of physical connections to the wastewater collection network. Data were adjusted for the year 2002 with the data from the Population Census where data on the equipment of dwellings were collected. The next Population Census will not provide this kind of data as it will be based on data from registers. A register of dwellings is foreseen but the needs of different parties have not yet been presented and harmonised.

Sludge production and disposal in urban wastewater treatment plants is reported by EARS. Data make part of the Urban Wastewater Treatment Plants (UWWTP) database, while Industrial Pollution Sources (IPS) do not report on sludge production. Data will be provided by SORS's survey in industry. In both cases data are available only in tons, as the volume of sludge in cubic meters is for reporting units very difficult to estimate.

As for the volume of wastewater generated and discharged by domestic sector, the problem remains in calculating the share of others than households. The managers of urban wastewater collecting systems distinguish mainly only between households and other users. Usually the price of the water supplied or the all-in charge is different for these two categories and that price is in the domain of each municipality. The main activity of each enterprise is known, but the additional data capture would sometimes cause too big expenses. This is one of the problems which are due to the fact that the whole system of urban infrastructure collapsed in 1995 by the introduction of the European concept of municipalities. The previous 65 municipalities were split in 193, each with its own responsibility for public services. The actual managers in many cases serve a number of users, which does not allow an economic justification and severe lack of funds for investments occurs. The actual policy of MESP is to take different measures to force municipalities to find their interest in geographical associations to facilitate an efficient maintenance of public services. It is to expect that bigger public authorities will properly handle also all the computerised administration.

The most problematic remains the estimation of the non-point sources contribution of wastewater. The Ministry of Agriculture, Forestry and Food took over the responsibility to cover this domain but for the moment no data are available.

In 2003 and 2004 both SORS and EARS were involved in the 2001 Multi-Beneficiary Programme for Statistical Co-operation with the Candidate Countries – Environment Statistics. Data availability about wastewater in Candidate Countries was the focus of that project. The situation in Slovenia was assessed as satisfactory in comparison to other countries and no funds were allotted to Slovenia for the improvement of data collection. A statistical analysis of the effluent measurements collected by EARS has been done instead with the aim to provide solid coefficients to be used in other countries for similar situations where no measurements are implemented (Šabič and Zec 2004). After the presentation at the final workshop, the International Office for Water from Limoges, France, expressed their interest to include our data in the emission factors database they are building for the European Environment Agency. The mentioned database is now in the process of evaluation.

Nevertheless, SORS took the opportunity of close co-operation with EARS to review data collection of both institutions. Databases on UWWTP and on IPS at EARS have been compared to the water data collected on public sewage network and on water exploitation and water protection from pollution on SORS in terms of aggregates and in terms of the list of reporting units for the year 2002.

For SORS's survey on urban sewage network, all the public wastewater collecting systems are reporting, not all of them having a WWTP or using a WWTP managed by others. Taking account that for the country all the wastewater volume has to be recorded, SORS decided to continue with its own survey. Aggregated data of the volume of treated wastewater showed that EARS data exceed SORS data by 12% (Šabić 2003). Comparison at lower territorial units showed that not all the rainfall or brackish water has been reported to SORS as they were to EARS.

This led to a revision of the questionnaire which is now 100% in line with the JQ. This fact is only a necessary but not a sufficient condition for getting adequate data. Some cells remain empty because when not measured no method exists for their estimation. In 2004 after the MESP project to define agglomerations in line with the Urban Wastewater Directive we even adapted the questionnaire to the agglomerations instead of settlements. Due to the late communication between MESP and wastewater collecting systems managers, we could not get data at that level. As the whole administration for individual systems is still kept at the level of settlements, we gave up the new concept until it becomes a standard.

For SORS's survey on water exploitation and water protection from pollution, during the mentioned project the sample was still the larger one with more strict lower limits than the ones in the legal acts of EARS (Rule on the Reporting Form on the Periodical or Permanent Measurements for Providing Operational Monitoring of Waste Waters, OJ 1/01, 106/01, 13/04). After the sample reduction the list of reporting units became more similar to the list of industrial pollution sources with the obligation to provide the operational monitoring of wastewater to EARS. There are still differences in the content of data collected:

- water resources: for the self supply volume of water SORS asks also for the type of water source;
- wastewater treatment: EARS is interested in the type and volume of pollutants that IPS produce, while SORS keeps records on the eventual treatment of wastewater inside the enterprise as on the volume of water reused or in recirculation. These data are essential to asses the growth of the environment protection care in the business community;
- sludge production and disposal: EARS asks these data only to UWWTP, while SORS provides data also on sludge produced in enterprises.

The idea to enlarge the EARS questionnaire and to obtain a direct access of SORS to those data could not been implemented in a short time of the Phare project. The system for operational monitoring of reporting, which is also a direct link to wastewater taxation running at EARS, complies with all the legislative requirements of the Decree on the Emission of Substances and Heat in the Discharge of Wastewater from Pollution Sources and of the Regulations on the Initial Measurements and Operation Monitoring of Wastewater. Any addition in the sense of data or reporting units is out of the EARS's scope.

From the national point of view, double data collection is not rational, but from the point of view of each institution the priority is to fulfil the growing demand of international and national reporting obligations with equal or even smaller staff. For the time being there is little room for extra projects. One of possible solutions is the way data collection on waste runs. EARS expressed their interest in individual data on waste from one of the yearly surveys conducted by SORS. Due to the data protection the only possibility was to do it vice versa: EARS performs the data collection with the later support of SORS in editing and data analysis. Despite the interest on both sides, things are moving slowly. Although the survey has been running under this principle for 2 years already, the formal contract on co-operation between EARS and SORS has not yet been signed.

4. Conclusion

In this paper only the situation on wastewater data collection in Slovenia has been presented. The actual situation in Slovenia on water abstraction, water supply and water use is even less organised. Databases on water payments, taxes and concessions are not completely computerised, water measurement is not all over mandatory and even then the controlling system is not put in place.

All the numerous activities going on in different institutions should be more centralized. In this sense the European Environment Agency recommendation for national points of harmonised environmental database which will report the verified national data to different international bodies is most welcome. At the same time also the knowledge of the existence of such points and of available and reported data should be widely spread inside the country and in different international activities. The lately experienced ignorance of the Joint Questionnaire data availability by some international associations should not be a practice.

References

1. Lešnjek, A., 2005, Quality improvement of the Slovenian Business Register, Joint UNECE/Eurostat Seminar on Business Registers, Luxemburg

2. Šabić, D., 2003, Data requirements for Eurostat/OECD Joint Questionnaire, Proceedings of 14th Mišič day, Maribor (Slovene)

3. Šabić, D. and Zec, M., 2004, Statistical analysis of monitoring data from Urban Wastewater Treatment Plants in Slovenia, 2001 Multi-Beneficiary Programme for Statistical Co-operation with the Candidate Countries – Environment Statistics, Final Report