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**COMBINING ADMINISTRATIVE DATA AND SURVEY DATA TO PREPARE ESTIMATES OF
ENVIRONMENT PROTECTION EXPENDITURE – EFFORTS TO IMPROVE COVERAGE ON A TIGHT
BUDGET**

Submitted by the Central Bureau of Statistics Israel¹

Accounts of actual expenditure on public services for protection of the environment have been prepared by National Accounts Sector at the Central Bureau of Statistics in Israel since 1977.

During the last three years efforts have been made to add estimates of environment protection expenditure in private industries. The plan was to conduct a survey similar to the surveys conducted by countries (many OECD countries f.ex.) that compile statistics on industry expenditure on environment protection. Due to lack of funding, a full-fledged survey could not be conducted, and other ways of improving the coverage were sought.

An alternative plan for compilation of data has been constructed. The plan calls for a combination of existing administrative data from different sources with links to existing industry surveys and a supplementary small survey to obtain details on expenditure. The plan is to make step-by-step progress and cover one domain at a time.

The first step has been compilation on environment protection expenditure in the domain of waste water which was begun in 1998. This work has been done with very limited resources and some preliminary results are available.

Below the details on the background, the methodology and the preliminary results for the domain of waste water are presented.

I. Background

1. In Israel the first steps towards environmental accounting have been made more than 20 years ago. Accounts of actual expenditure on public services for protection of the environment have been prepared by National Accounts Sector at the Central Bureau of Statistics since 1977 (with an interruption in the period 1983-1991). These Accounts include expenditure by the central government, national institutions (the Jewish National Fund, the Jewish Agency, and the World Zionist Organization), local authorities (municipalities, local and regional councils, and town associations), non-profit institutions, and government companies supplying services for environmental protection. The data are obtained through a detailed analysis of financial reports combined with interviews with representatives from the relevant institutions and enterprises. Since 1992 the accounts are prepared in accordance with SERIEE recommendations. The preparation of the accounts has been financed by

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the Ministry of Environment (and in the first years by the unit of Environmental Protection Service at the Ministry of Interior).

2. The expenditure is classified by type of service according to the classification in SERIEE 1994. In addition classifications by operating sector and financing sector, and a breakdown of expenditure into current expenditure (with details on compensation of employees including imputation for unfunded pensions, purchases of commodities and services, consumption of fixed capital) and expenditure on fixed capital formation are given. The expenditure on public services for environment protection in Israel comes to 1.6% of GDP in recent years compared 1.3% of GDP in the beginning of the 1980's.

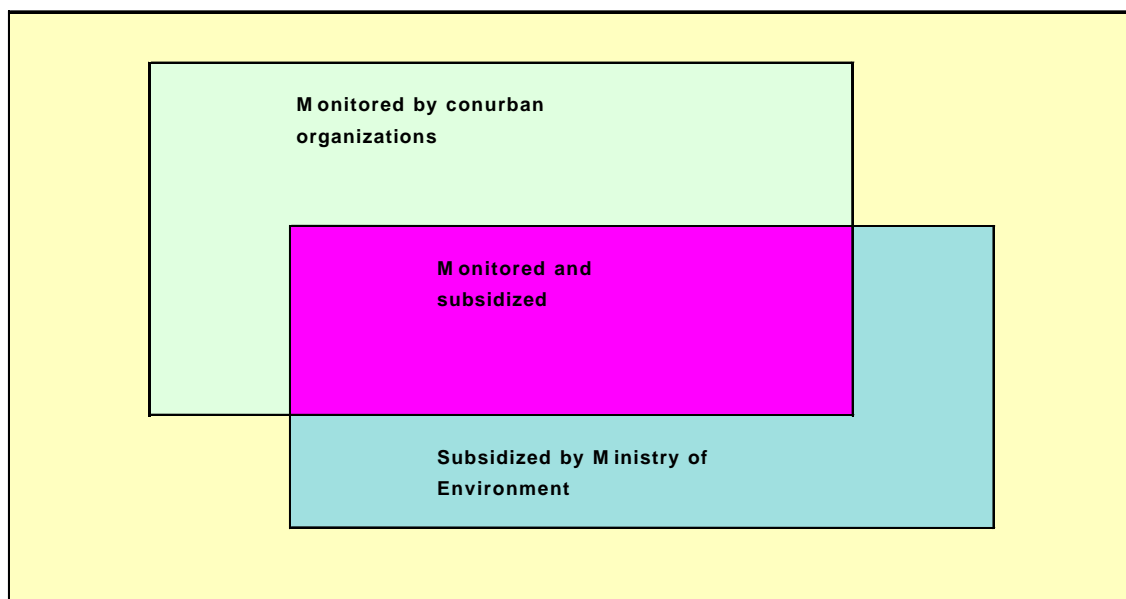
3. The main public expenditure in Israel is on waste management (37%), and protection of landscape, air and wild biota (34%). Smaller amounts are spent on sewage management (13%), general administration and other services (16%). However, it has been clear for a long time that this expenditure is only part of the environment accounts for Israel and in 1997-1998 a program for enlargement of the coverage of the accounts in accordance with the recommendations of SNA93 was prepared. Among other things it was planned to conduct a survey on environment protection expenditure in the private enterprises. However, so far it has not been possible to implement this program due to lack of finance.

4. Instead an alternative plan has been made. The plan calls for a combination of existing administrative data from different sources with links to existing industry surveys and the addition of a supplementary small survey to obtain details on expenditure. The plan is to make step-by-step progress and cover one domain at a time. The first step has been the collection of information on private environment protection expenditure in the domain of waste water during 1998. The data have been processed in the first months of 1999 and information from different sources has been combined. The results are expected to be published by the end of 1999.

II. The methodology

5. Partial data on the industries spending money on environment protection is available from at least two sources in Israel:
 - a) Special conurban organizations have been established in Israel to monitor environment pollution. These organizations are active in the main industrial areas of Israel. The departments in the organizations responsible for various domains of environment publish annual reports on pollution giving details on enterprises polluting the environment. From the departments it is possible to obtain lists of the monitored enterprises having made steps to prevent pollution and having installed environment protection equipment. The cost of installation and running of the equipment is not known to the organizations, but they are able to classify almost all of the equipment according to size.
 - b) Since 1995 the Ministry of Environment in Israel has granted financial support to encourage installation of equipment to prevent environment pollution. The Ministry declared that in future years stricter environment laws would become effective, but that the Ministry would provide financial support to enterprises installing the necessary equipment before the law was in force. A list of enterprises receiving financial support and the cost of the equipment installed is available from the Ministry. The enterprises are classified by industry and the domain of environment pollution is also registered.
6. Additional administrative data sources may be available for some domains.

Enterprises



7. The data from these sources may be combined and a list of enterprises by industry, location and domain of pollution prepared.

8. Data on number of employees and wages, and ISIC industry of these enterprises may be obtained from National Insurance Institute data. Data on revenue and number of employed persons may be obtained from VAT data.

Combination of data from administrative sources

1. Data from conurban organizations	2. Data from Ministry of environment	3. Data from the National Insurance Institute	4. VAT data
Name and address of enterprise	Name and address of enterprise	Name and address of enterprise	Name and address of enterprise
Installation of equipment for prevention of pollution	Installation of equipment for prevention of pollution		
Size of equipment			
Year of installation	Year of installation		
Region		Region	
Domain of environment pollution prevented	Domain of environment pollution prevented		
	Value of investment		
		Classification of the enterprise according to ISIC	
		Number of employees	
		Wages	
		ID number of enterprise in tax files	ID number of enterprise in tax files
		ID number of enterprise in business register	ID number of enterprise in business register
			Revenue of enterprise
			Number of employed persons

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9. Four groups of enterprises are obtained:

- A. Enterprises with data on size of equipment and data on value of equipment installed.
- B. Enterprises with data on value of equipment installed, but no data on size of equipment.
- C. Enterprises with data on size of equipment installed, but no data on the value of equipment.
- D. A (usually a smaller) group of enterprises that are known to have installed equipment, but the size and value of the equipment were not known.

10. For all four groups number of employees, industry, wages, revenue are compiled. The list of enterprises may further be linked to existing data obtained from industry surveys, though not all enterprises will be in the survey sample.

11. An important step in the processing of the data is the establishment of a database with all available data on the enterprises including data on installation of environment protection equipment by year of installation. Among other things such a database may be used to compute capital stock and depreciation of the equipment and will also be of assistance in estimations of other current costs for the enterprises having installed equipment.

12. A short questionnaire asking for details on current and capital expenditure will be sent to the enterprises in groups C and D. The estimates of expenditure may be prepared separately for each industry, size of equipment, size of enterprise (determined from revenue and employment data) and age of the enterprise. It may be assumed that expenditure in enterprises, where only the size of equipment, size of enterprise and kind of economic activity are known, is equal to expenditure in similar enterprises where data on expenditure are known.

13. Separate estimates for current and capital expenditure may be made. For those known to have installed equipment in the past, only estimates for current expenditure has to be made. The value of depreciation of the equipment may be computed. For enterprises having installed equipment in the present year estimates of current and capital expenditure may be made.

14. At the first stages it is not planned to add estimates for expenditure in enterprises not covered by the list. The assumption is that the main polluting enterprises are monitored, and that remaining smaller enterprises do not initiate installation of environment protection equipment. This assumption may be reasonable for some domains (for instance waste water), but for other domains such as air pollution, which may not be monitored to the same extent, the assumption may not be reasonable. The plan is to check the assumption at least once by preparing a list of enterprises not being monitored. Then it will be possible to compute their share of revenue in the revenue of the industry - using VAT data. Not all industries are polluting, so the computation should only be made for the relevant industries. It is then possible to sample enterprises not being monitored or subsidized, collect data on their expenditure on environment protection, and add estimates on the expenditure of enterprise not being monitored or subsidized. A priori we assume that the expenditure by non-monitored and non-subsidized enterprises is small.

III. Further work and uses

15. If the necessary finance will be available in the future, another extension of the work will be to use the results to plan sample surveys covering all enterprises. Since the annual results of the work with administrative data may be used as indicators between surveys, such surveys would have to be conducted less frequently. The cost of such surveys may also be reduced since the work with administrative data may be of assistance in planning the surveys - to know on which industries to concentrate the efforts of obtaining data.

16. The link between a number of data sources and the establishment of a database with time series on enterprises allows analysis of the data on environment protection expenditure in a broader context. Examples of possible analyses are: the influence of environment protection on the revenue of the enterprise, the influence of environment protection on productivity (after linking with industry surveys), analysis of environment protection by region - influence of environment protection on environment quality by region (linking aggregate data by region with physical data).

IV. The collection of data for the domain of waste water

17. The first step in the implementation of the combination of administrative data was to collect data on environment protection expenditure in the domain of waste water. Data from the conurban organizations and the ministry of environment for the year 1995 were collected, and the lists were combined and linked with data from the VAT authorities and the National Insurance Institute in the first months of 1999. The groups of enterprises were distributed as follows:

- 2% were enterprises with data on size of equipment and data on value of equipment installed.
- 7% were enterprises with data on value of equipment installed, but no data on size of equipment. (But the value of equipment in these large enterprises was high and came to 2/3 of total capital expenditure (after adding estimates)).
- 73% were enterprises with data on size of equipment installed, but no data on the value of equipment.

- 18% were enterprises that were known to have installed equipment, but the size and value of the equipment were not known.

18. In addition a questionnaire was sent to the enterprises by mail. In the questionnaire the enterprises were asked to provide details on current expenditure: labour cost, expenditure on current purchases, cost of services provided by other agencies (such as local authorities), levies - and on capital expenditure: expenditure construction and equipment. Only part of the enterprises responded. But it was possible to build estimates for the expenditure using all the available data on the enterprises.

19. The estimates of expenditure were prepared separately for each industry and size of equipment. It was assumed that expenditure in enterprises, where only the size of equipment, and industry were known, was equal to expenditure in similar enterprises where data on expenditure were known. For the food and chemical industries the size of the enterprise was also taken into account when estimating expenditure.

20. Separate estimates for current and capital expenditure were made. For the enterprises known to have installed equipment before 1995, only estimates for current expenditure were made. These estimates did not include depreciation of the equipment. For enterprises having installed equipment in the present year (1995) estimates of current and capital expenditure were made. No estimate for expenditure in enterprises not covered by in the list was added. The assumption was that the main water polluting enterprises are monitored, and that remaining smaller enterprises do not initiate installation of environment protection equipment.

V. Preliminary results

21. Total expenditure on environment came to 58 million NIS in 1995 - a relatively small amount compared to the public expenditure in the same domain, which came to 529 million NIS.

22. Current expenditure on environment protection of private enterprises in the domain of waste water amounted to 14 million NIS, compared to the public expenditure of 205 million NIS in 1995. Capital expenditure amounted to 44 million NIS - about 15% of the public capital expenditure (324 million NIS). The largest amount of current expenditure was in the industries of chemical, plastic and rubber products, and refined petroleum and its products (67.2%) and in the food manufacturing industry (16.7%).

23. Environment protection expenditure in private industries is expected to be higher in the years after 1995, since the payment of subsidies only started in 1995. Subsidies paid for environment protection expenditure in the domain of waste water in 1995 came to 4,924 thousand NIS.

Expenditure on environment protection in private enterprises - waste water 1995

Industry	Current expenditure NIS Thousand	Capital expenditure NIS Thousand	Total expenditure NIS Thousand	Total expenditure Percents
Total	14,257	44,224	58,481	100.0
Manufacture of food products	1,590	7,402	8,992	16.7
Manufacture of textiles	679	727	1,406	1.6
Manufacture of footwear, leather and leather products	130	727	857	1.6
Manufacture of wood and wood products	39	278	317	0.6
Manufacture of paper and paper products	39	450	489	1.0
Publishing and printing	213	249	462	0.6
Manufacture of chemicals and chemical products, plastic and rubber products, and refined petroleum and its products	2,022	29,703	31,725	67.2
Manufacture of non-metallic mineral products + Mining and quarrying	117	1,056	1,173	2.4
Manufacture of basic metal and metal products (excl. machinery and equipment)	372	421	793	1.0
Manufacture of electronic equipment	89	328	417	0.7
Building	600	0	600	0.0
Motor vehicles, motorcycles and bicycles - sale maintenance and repair and retail trade of fuel	1,008	981	1,989	2.2
Health services and welfare and social work	78	0	78	0.0
Sewage and refuse disposal and sanitation services	39	0	39	0.0
Not classified	230	1,902	2,132	4.3

VI. Limitations to the estimates

25. Only monitored or subsidized enterprises are covered - the assumption is that the enterprises not monitored or subsidized are small and do not initiate installation of environment protection equipment.

26. The response to the survey was only partial, so that the estimates of cost of equipment and current expenditure for enterprises with no financial data, which did not respond, are of a limited reliability.

VII. Conclusion

27. The use of administrative data allows an enlargement of the coverage of the estimates of expenditure on environment protection on a very limited budget. One of the advantages of the use of administrative data is that one can make step-by step progress in the work. The first step was to cover waste water pollution prevention, which is especially important in Israel - the next step will be to cover air pollution prevention.

28. An important outcome of the work is the establishment of a database containing a wide range of data on enterprises having installed environment protection equipment, and annual computations of capital stock and depreciation of such equipment.

29. Such a database allows analysis of the influence of environment protection in a broad context including linkages with physical data on environment.

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