

Technical note on the Environmental Protection Expenditure Account of Mexico



National Institute of Statistics
and Geography (INEGI) of
Mexico

Environmental Protection Expenditure Account of the public sector

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1 Introducción

Nowadays, a condition for achieving economic growth in balance with the environment is to provide and apply basic tools for management, research, and environmental education, among others. In this sense, in our country it is possible to identify some of these tools through monetary expenditures carried out by the General Government and public companies of direct control to achieve these objectives.

To that effect, taking advantage of the recommendations enrolled in the System of Environmental and Economic Accounting – Central Framework (SEEA-CF), and in the European System for the Collection of Economic Information on the Environment (commonly known as SERIEE), it's possible to have a record of the actions for the prevention, control and abatement of air, water and soil pollution, as well as the actions for environmental damage prevention and the management of natural resources, among other activities, by developing the Environmental Protection Expenditure Account (EPEA).

EPEA coverage of Mexico's public sector (as part of the economic and ecological accounts of Mexico, SCEEM), is determined by the activities of Ministries, Public Companies of Direct and Indirect Control, and State Governments, including the Federal District and municipal governments.

2 The Environmental Protection Expenditure Account in the SEEA-CF

Coverage

The environmental Protection Expenditure Account (EPEA) is designed as a satellite account of the System of National Accounts 2008 (Chapter 29), i.e. follows the principles of both accounting and categorization of economic transactions. Moreover, it classifies economic units of the country according to their main, secondary or auxiliary activity, to determine the specialized, non-specialized or other type of producers.

Specialized producers

Under the EPEA framework, it refers to units of the national economy whose main activity is to provide goods and services for environmental protection. They include producers who are part of the General Government, private specialized producers and Nonprofit Institutions both public and private. Some of the activities undertaken by such producers specifically refers to the collection, transportation and management of waste, as well as the collection, management and treatment of wastewater.

Non-Specialized producers

This category includes units of the national economy engaged in environmental protection activities as secondary activities or for their own final use (auxiliary activities). Example of such producers are

those government units who reforest as a secondary activity, or private companies that recycle paper, plastic or wood for their own use in production processes.

Other Sectors

Includes institutional sectors such as Households, the General Government (in its capacity as collective consumer on behalf of Households), and Rest of World, which may make expenditures on behalf of the environment without being the type of producer of those described previously. Expenditures reported by this group of economic units relate to activities of management, education, research and development, among others on environmental matters. Households particularly spend on services such as garbage collection.

Table 2.1. Institutional Sector Classification according to the EPEA

Characteristic producers			Consumers				
Specialized		Non-specialized	Other producers (IC)	Households	Government and NPI	(GFCF)	Rest of the World
Public sector	Private sector						
Provide goods and services of environmental protection (mainly non-market, but not exclusively)	Provide goods and services of environmental protection (exclusively for the market)	Produce environmental protection goods and services as a secondary activity. Invest in environmental protection auxiliary activities	Purchase goods and services to protect the environment (intermediate consumption)	Purchase environmental protection goods and services	Consume only non-market environmental protection services	Acquisition of movable and immovable assets. Includes infrastructure costs	It benefits and also makes transfers

Source: OECD/Eurostat. Environmental Protection Expenditure and Revenue Joint Questionnaire/SERIEE. Environmental Protection Expenditure Account. Luxembourg. European Communities, 2005

Selection criteria

Causa finalis

To be considered within the boundary of the environmental protection, it is necessary to consider the weight of the criterion of purpose (*causa finalis*) of activities, actions, or part of them, that is, they must have as its main objective the protection of the environment. According to SEEA-CF and SERIEE, should be excluded the actions and activities that do not have as a priority objective the protection of the environment, even when the environment benefits as a result of those actions and activities¹. However, Mexico's experience indicates that this approach should be considered more flexible given the level of disaggregation of some data and information sources.

Classification of Environmental Activities

The recommendations to identify environmental protection activities are referenced to the Classification of Environmental Protection Activities and Expenditure (CEPA 2000) and the recent classification of Environmental Activities². This classification complements the environmental protection activities with those whose end result is the saving, reduction and management to conserve natural resources.

3 Development of the calculus – Monetary units by level of government

Federal Government and public companies

Regarding the Central Government and public enterprises, it's collected and analyzed information from various documents among which stands out the Account of the Federal Treasury of the country. These documents are collected, endorsed and audited by the Ministry of Finance and Public Credit (SHCP). An important feature of this source of information is that it allows obtaining data from government agencies under one budget program structure, allowing the identification of programs, activities or part of them focused on environmental protection. Under this scheme, as a first step are listed such programs using the programmatic economic financial functional exercise with the accrued programmable spending³.

The identification process is supplemented with a review of the documents: *Programmatic Analysis of the accrued budget exercise, Compliance analysis for*

Regarding the moment of registration of EPE, they follow the general principle of national accounting, i.e. transactions between institutional units must be registered when rights and obligations are born, when are modified, or when are cancelled, that is, in compliance with the principle of accrual basis.

¹ ONU. System Environmental-Economic Accounting Central Framework, 2012. pp 89. European Commission - EUROSTAT. SERIEE European System for the collection of economic information on the environment — 1994 Version, 2002. pp 28.

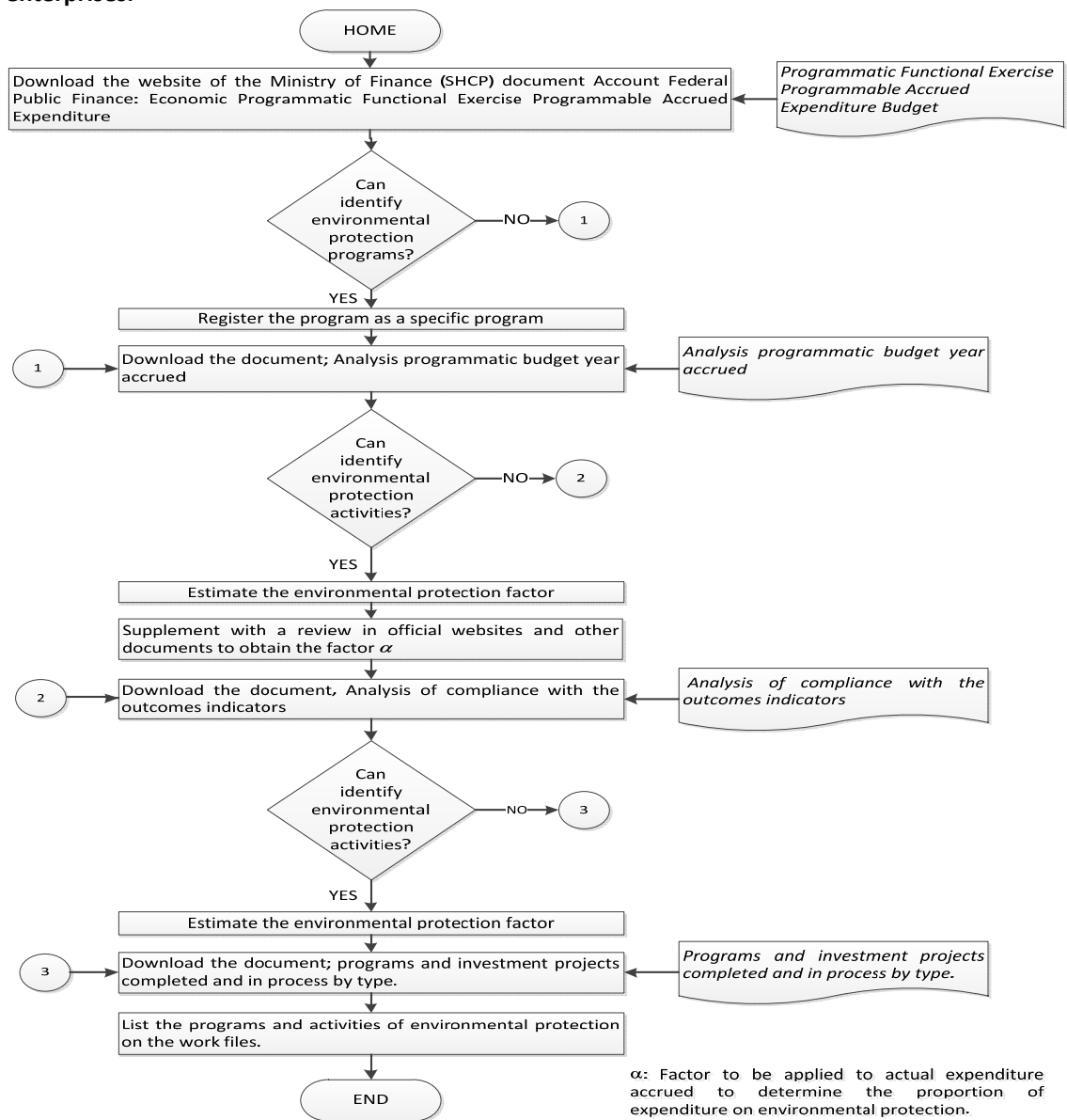
² ONU. System Environmental-Economic Accounting Central Framework, 2012. pp 90-91.

³ Document part of the Account of the Federal Treasury and shows the accrual expenditures exercised by unit of the Central Government and public companies under the country's budget program classification.

performance indicators, and Investment programs and projects completed and in process by type. The first one provides details of actual expenditure variations accrued, where it is possible to detect the development of environmental protection activities. The second document describes the activities undertaken in the form of indicators by program, and allows obtaining the percentage of spending on environmental protection compared with fiscal year. The third one identifies the investment in studies, projects and works completed or in progress during the year of study.

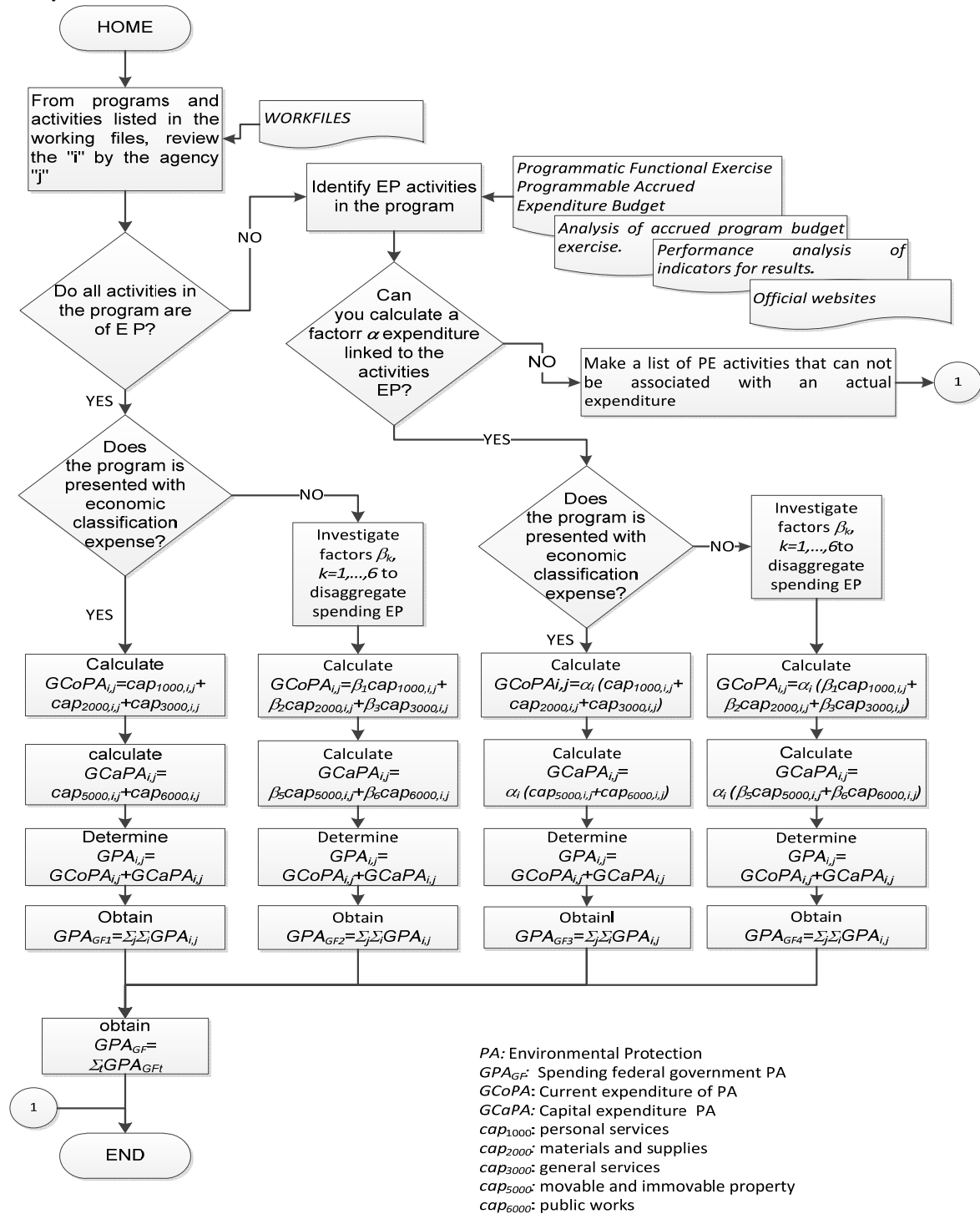
However, when the sources of information described above show evidence of the implementation of activities of environmental protection and it is not possible to obtain a percentage or a disaggregation on purely environmental spending, the official websites of each of the units are consulted to obtain the factor (α) required.

Diagram 1. Determine environmental protection activities in the central government and public enterprises.



Having identified the programs, activities and α factor in each economic unit of the Central Government and public enterprises, the measurement of current and capital expenditure is determined according to the following process.

Diagram 2. Methodological route for measuring the EPE of the Central Government and public companies



State Governments

To measure the state governments EPE, were used both public accounts and administrative records. It is worth noting that depending on the state government, information can be presented with various functional and/or economic classifications, or even combinations of these.

Economic classification of the expenditure

This classification presents the costs incurred by state governments under either total expenditure or by department or agency that comprises it. In addition, allows identifying items, concepts or chapters of expenditure for obtaining current and capital expenditure.

Table 3.3. Economic clasification of the expenditure

Chapter	Concept
1000	Wages and salaries
2000	Materials and supplies
3000	General services
4000	Transfers
5000	Machinery and equipment
6000	Public works
7000	Financial investment, economic provisions, grants, other expenditures and pension, retirement and other
8000	Shares of income, federal grants and reallocated spending
9000	Public debt, current liabilities and other

For measuring the EPE are considered the chapters 1000, 2000, and 3000 that determine the current expenditure. Chapter 1000 is the value added, and the sum of Chapters 2000 and 3000 results in intermediate consumption and consequently the sum of the three components yields the gross value of the production account of the Environmental Protection Expenditure. The aggregation of the chapters 5000 and 6000 provides the concepts of capital spending.

Administrative classification

The administrative classification presents information from state governments as administrative units that perform the expenses. In the context of measuring the EPE, the information presented in this classification allows detecting dependencies and agencies engaged in environmental protection activities as part of their primary duties.

It is important to note that most state governments conduct their expenses according to ministries, decentralized or deconcentrated agencies that cover different functions, in which case facilitates identification and registration of GPA. To mention some examples, in the case of the state of Aguascalientes is identified the Ministry of Environment of Aguascalientes (SMAE), the Water Institute (INAGUA) and the Attorney for Environmental Protection (PROESPA); while in the state Guanajuato is presented the expenditure of the Ministry of Sustainable Economic Development (SDES), the Water Commission of Guanajuato (CEAG), the Institute of Ecology of Guanajuato (IEEG) and Environmental Attorney and Land Management of Guanajuato (GTO PAOT).

Functional classification

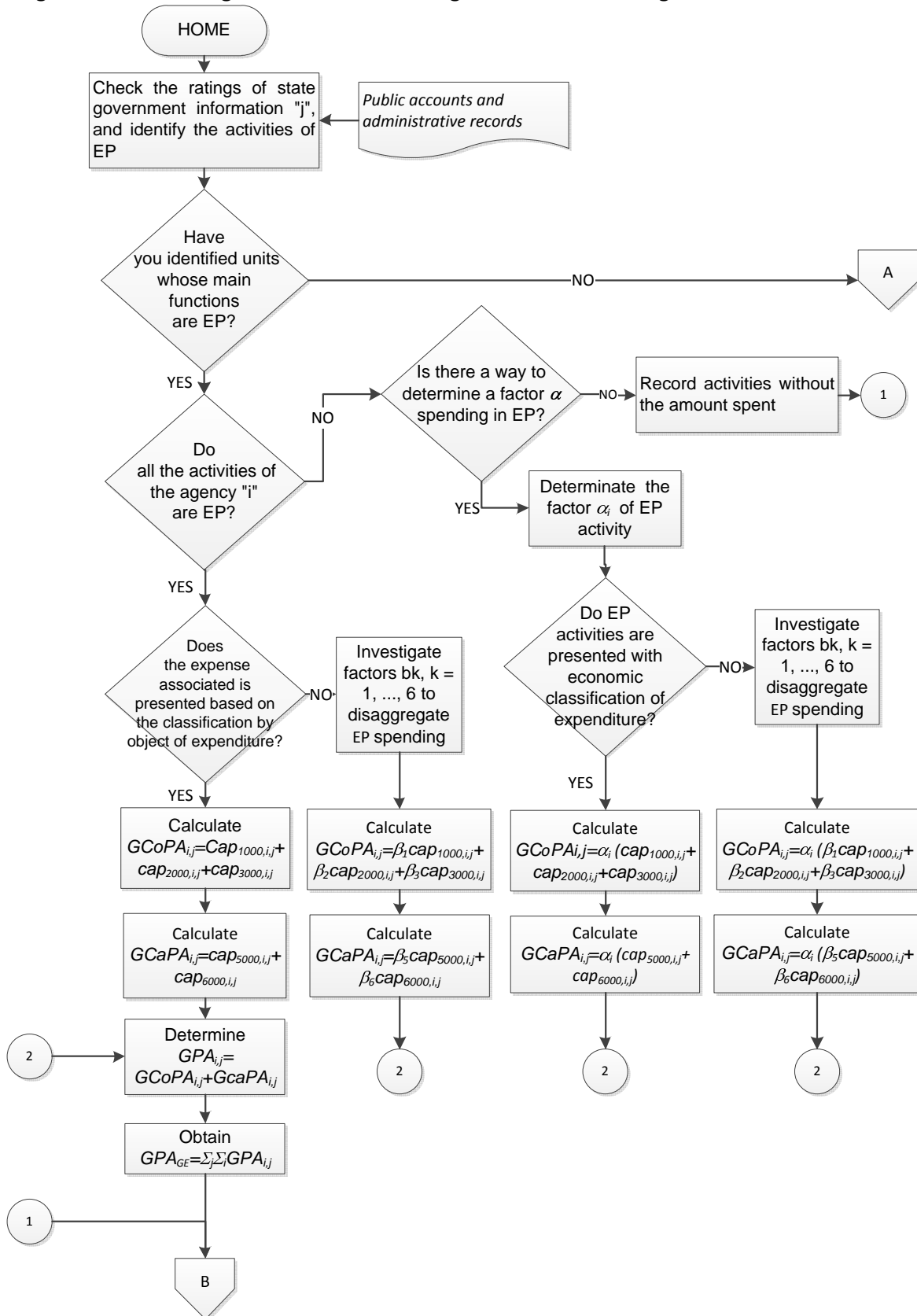
This classification determines the administrative units which perform environmental protection activities as primary, secondary or auxiliary functions.

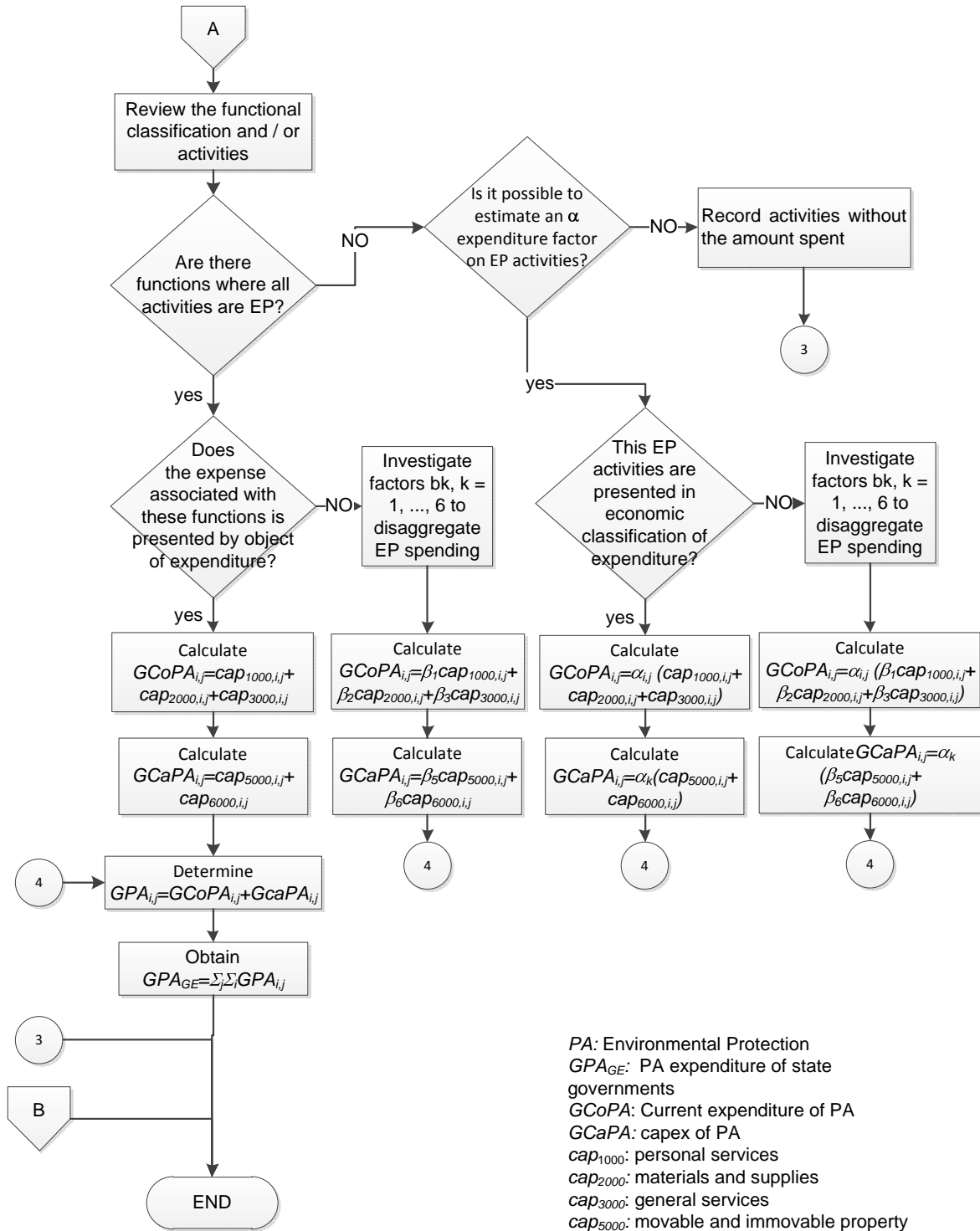
The above becomes very important especially when it comes to identifying the activities of environmental protection of institutions and organizations dedicated to different areas of competence. For example, activities of fire control of forests that are considered costs of protecting biodiversity and are carried out by the Secretaries of Rural Development, or actions to protect and preserve the environment made by units who are responsible for the infrastructure in roads or bridges, to name some of them, can be developed by units that have the primary function to regulate transport or road infrastructure maintenance.

As part of quality assurance and control in the process of measuring the EPE, the various classifications in which information is presented have been carefully reviewed, this in order to avoid possible omissions and duplication of amounts (double counting).

In the diagram below, can be seen the methodological route implemented to obtain the EPE of state governments.

Diagram 3. Methodological route for measuring the EPE of the state governments.





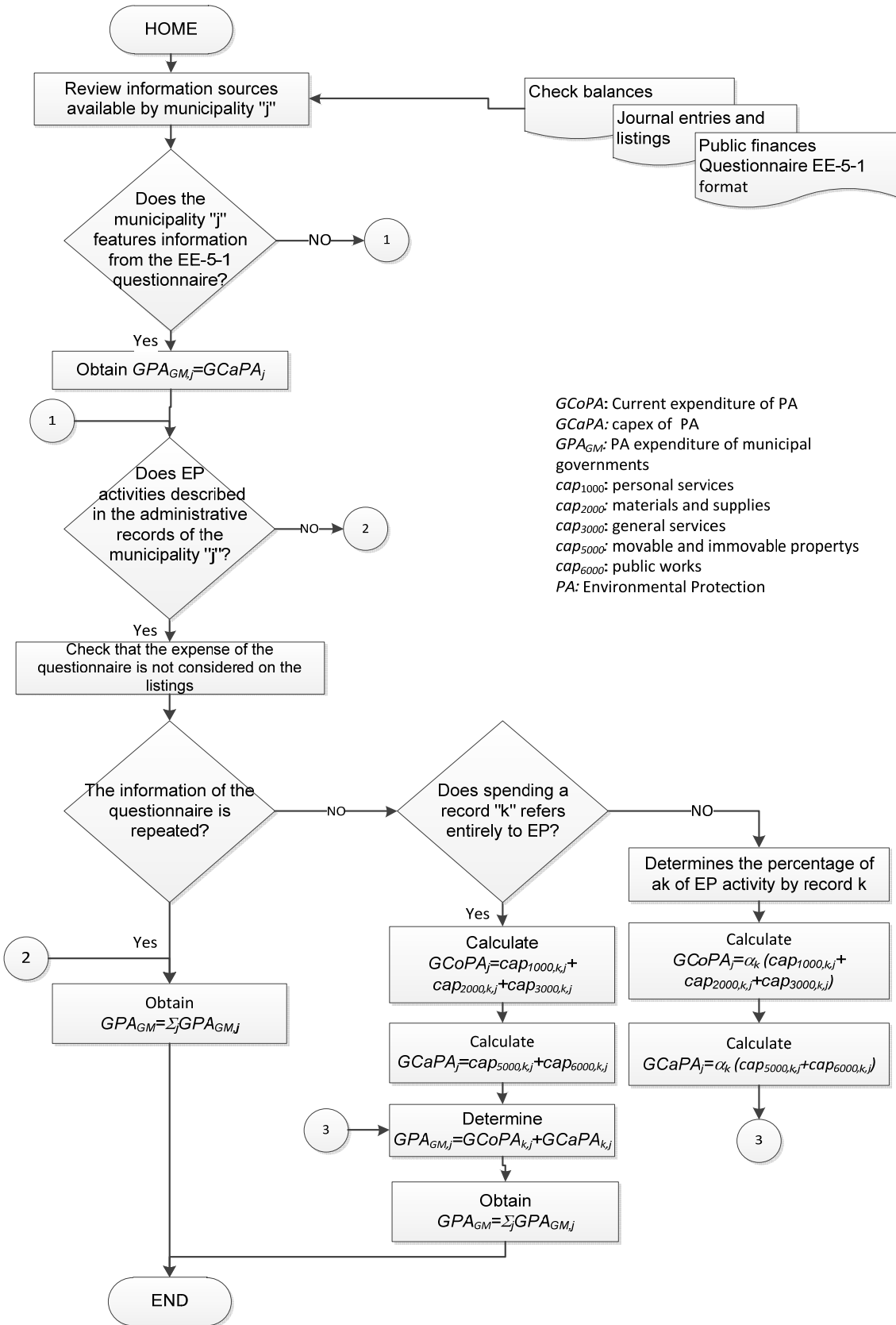
In particular for the measurement of the EPE of the capital city, It has now been developed an application by programming in JAVA, with which can be directly accessed to the internet site where it can be downloaded the source of information in PDF. The program transforms the table with more than 60 000 records (about 1600 pages) in which are reported in the costs incurred by this unit as a whole, to convert this information into a data table supported by the software INFORMATICA⁴. Once the data table is obtained, the EPE measurement process is performed in a systematic way using previously established classifiers as well as operations in the module set INFORMATICA. This process has helped reduce considerable time in the pretreatment of the source of information for the case of the Federal District Government as well as the calculation process. It is expected that in the medium or short term, this process can be implemented to other sources of information that have structures defined in the presentation of data.

Municipal Governments

The main sources of information used for measuring the municipal government's EPE correspond to Government Finance Statistics, same ones that integrate the costs incurred by these units of government through checking balances, journal entries or listings, as well as in the annual questionnaire of municipal public finance (Form EE-5-1). The process is analogous to state governments, that is, the information is reviewed in full and thorough investigation to identify the activities and costs associated with prevention, control and abatement of environmental pollution. Based on the purpose of the expenditure, are determined those expenses for current or capital expenditure. This process is carried out by municipality, is added by state and eventually becomes an aggregate nationwide.

Diagram 4. Methodological route for measuring the EPE of the municipal governments

⁴ INFORMATICA is commercial software purchased by the INEGI which is composed of four modules whose purpose is to carry out a process of systematization of the System of National Accounts of Mexico.



GCoPA: Current expenditure of PA
GCaPA: capex of PA
GPA_{GM}: PA expenditure of municipal governments
cap₁₀₀₀: personal services
cap₂₀₀₀: materials and supplies
cap₃₀₀₀: general services
cap₅₀₀₀: movable and immovable property
cap₆₀₀₀: public works
PA: Environmental Protection

4 Result tables

Below are some examples of tables for the presentation of the Environmental Protection Expenditure of Mexico's public sector.

Our country, like USA and Canada, has a policy to present economic information based on the North American Industry Classification System (NAICS); therefore the following is a table related to this classification where it has been registered expenditure on environmental protection according to the economic activity.

Environmental Protection Expenditure by activity performed, according to NAICS industry (Million pesos)			
2011	ENVIRONMENTAL PROTECTION EXPENDITURE ^{2/}		
	Current expenses	Capital expenditures	Total
11 Agriculture, Forestry, Fishing and Hunting	1 865.8	807.5	2 673.3
21 Mining, Quarrying, and Oil and Gas Extraction	4 417.5	13 086.9	17 504.4
22 Utilities	14 280.7	13 789.7	28 070.4
23 Construction	4 292.6	25 899.3	30 191.8
31-33 Manufacturing	0.0	0.0	0.0
48-49 Transportation and Warehousing	0.0	0.0	0.0
54 Professional, Scientific, and Technical Services	12 802.1	1 106.3	13 908.4
56 Administrative and Support and Waste Management and Remediation Services	2 714.3	2 050.4	4 764.7
61 Educational Services	2 234.6	380.1	2 614.7
81 Other Services (except Public Administration)	0.0	0.0	0.0
93 Public Administration	19 512.4	16 748.9	36 261.3
Other Sectors: 43-46, 51, 52, 53, 55, 62, 71, 72 y SIF	0.0	0.0	0.0
Households ^{1/}	3 547.6	0.0	3 547.6
Total Production Activities	65 667.7	73 869.0	139 536.6

^{1/} This sector includes algebraic purposes adjustment even though net domestic product does not influence the calculation of production by economic activity.

^{2/} Referrals to the Federal Government as well as public companies; expenditures Executive of the 32 states and municipal governments in defense and remediation

Source: INEGI. Sistema de Cuentas Nacionales de México. Cuentas económicas y ecológicas de México, 2003 - 2011. Base year 2008.

A further proposal is the presentation of the EPE according to functional classifications; the following chart shows the arrangement of results based on the Environmental Protection Group Classification of Environmental Activities.

Classification of Environmental Activities - Overview of classes (Percentage structure)

CLASSES	2011 ^(P)		
	Current	Capital	Total
Environmental Protection Expenditure in the Public Sector	65 667.7	73 869.0	139 536.6
Protection of ambient air and climate	985.5	1 422.6	2 408.2
Wastewater management	2 722.4	24 012.0	26 734.4
Waste management	9 268.8	2 186.5	11 455.3
Protection and remediation of soil, groundwater and surface water	412.2	7 806.3	8 218.5
Noise and vibration abatement (excluding workplace protection)	0.1	0.0	0.1
Protection of biodiversity and landscapes	4 616.5	5 637.2	10 253.7
Protection against radiation (excluding external safety)	99.5	19.1	118.6
Research and development for environmental protection	12 786.9	1 105.1	13 892.0
Other environmental protection activities	34 775.8	31 680.1	66 456.0
Management activities	13 799.3	8 193.3	21 992.6
Education	2 106.4	396.1	2 502.4
Others activities	18 870.2	23 090.7	41 960.9

(P) Preliminary figures from this year

Source: INEGI. Sistema de Cuentas Nacionales de México. Cuentas económicas y ecológicas de México, 2003 - 2011. Base year 2008.

In this order of ideas, other functional classifications that could be implemented for the final presentation of the EPE, could be according to group activities: remediation, prevention, management and research and development; according to the type of producer who generates expenditures to protect the environment; or according to the public sector component. This may help guiding decisions on spending and the needs of the countries, because it shows when we spend more on remediation than prevention of environmental damage.

5. Sources of information

Variable	Source
Environmental protection expenditure of the Secretaries of State and entities of direct and indirect budgetary control	<p>Account of the Federal Treasury. SHCP. http://www.shcp.gob.mx/EGRESOS/contabilidad_gubernamental/Paginas/cuenta_publica.aspx</p> <ul style="list-style-type: none"> - Programmatic economic financial functional exercise of the accrued programmable spending - Programmatic Analysis of the accrued budget exercise - Performance analysis of results indicators - Investment programs and projects completed and in process by type
Environmental protection expenditure by state governments	<p>Public Accounts of the 31 states. SHCP. http://www.shcp.gob.mx/Estados/Paginas/CuentasP%3%bablicasEstatales.aspx</p> <p>State public finances. INEGI http://www.inegi.org.mx/sistemas/olap/proyectos/bd/consulta.asp?p=10961&c=23707&s=est&cl=4#</p> <p>Administrative records by state government. Internal Information, INEGI.</p>

<p>Environmental protection expenditure by municipal governments</p>	<p>Public Account of the Federal District Government http://www.finanzas.df.gob.mx/egresos/cp2010/index.html</p> <ul style="list-style-type: none"> - Expenditure Guidance of the General Development Program - Programmatic-Budgetary Results - Analytical Expenses <p>State public finances. INEGI http://www.inegi.org.mx/sistemas/olap/proyectos/bd/consulta.asp?p=10961&c=23707&s=est&cl=4#</p> <p>Administrative records by municipal government. Internal Information, INEGI.</p> <ul style="list-style-type: none"> - Journal Entries - Monthly Survey on State Public Finance, Form EE-5-1 - Checking balances
<p>Other sources</p>	<p>Use of income account of the institutional sectors accounts. INEGI. http://www.inegi.org.mx/sistemas/biblioteca/detalleSCNM.aspx?c=17183&upc=0&s=est&tg=50&f=2&pf=Cue</p> <p>Official Websites</p> <ul style="list-style-type: none"> - Federal government secretaries - Parastatal sector entities - State governments - Federal District government - Municipal governments

6. Challenges

Environmental module in Economic Censuses

In INEGI there is interest in having a higher EPE coverage, particularly in the group of economic units in the private sector. In this sense, the absence of recurrent and specialized information sources in environmental issues is part of the main areas of opportunity for measuring the EPE in this economic sector.

In this regard, technical cooperation between different areas of the Institute, such as the National Accounts; Censuses and Surveys; Geography and Environment; as well as various environmental sector agencies in Mexico like SEMARNAT, has resulted in the inclusion of a specific module on the environment in the framework of the Economic Census.

In this sense, the first environmental module was part of the 2009 census survey, in which were included environmental spending issues, green jobs and qualitative variables that complemented environmental – economic information.

The work undertaken by the aforementioned areas has produced great results, like having an update of the proposal (almost definitive) of the environmental module that will add to the Economic Census of 2014, in which will be captured relevant information such as environmental expenditures with functional classification and by type of expense: current and investment.

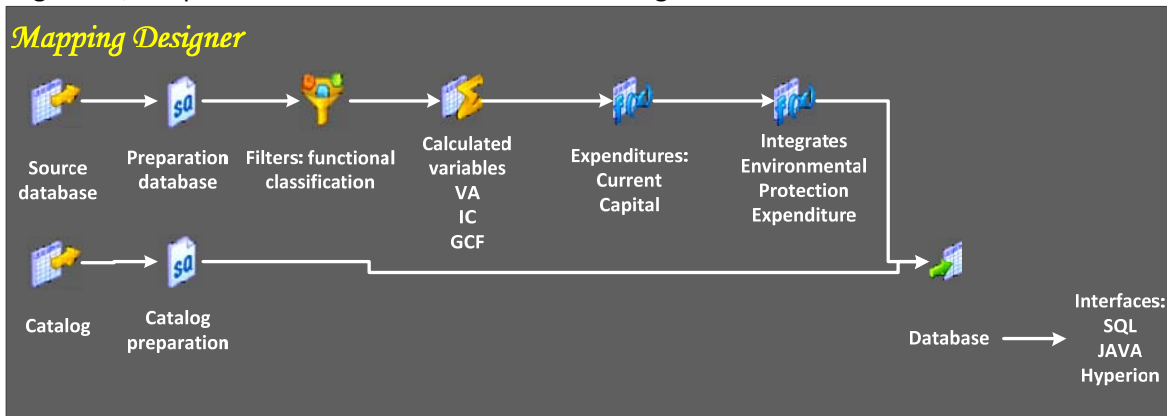
Additionally, are incorporated qualitative issues on management activities, removal and disposal of waste, environmental standards, and specific expenditures for wastewater treatment, air emissions and pollutants to the ground.

Systematization process

As part of the activities of the Base Year Change of the System of National Accounts of Mexico, the Institute has been given the task of implementing a systematic process which allows standardize both information sources and calculation processes. In this sense, to systematize the measurement of the EPE of the public sector were elaborated diagrams following IDEF-0⁵ methodology, flow charts like those shown in this technical note, descriptive documents, forms, glossaries and calculation reports, to serve as a guide for the design of an algorithm that is compatible with the institutional software INFORMATICA.

⁵ IDEF0 o IDEFØ (Integration Definition for Function Modeling). Established as a method designed to model actions and activities of an organization or system.

In general, the process can be observed in the following scheme:



7 Technical issues to be addressed

Specific transfers

In the process of measuring the Environmental Protection Expenditure of the public sector, due to its complexity, we still must engage in very specific topics, such as the case of the so called specific transfers in environmental protection.

Although the manuals SEEA-CF and SERIEE indicate that the National Expenditure on Environmental Protection must consider specific transfers (without counterpart and not related to other elements of national expenditure), it describes examples of this type of economic transactions or, where applicable, a method for indicating whether a transfer is specific to the environmental protection or not.

In the case of Mexico and other international experiences in which this topic has been exposed, is broadly agreed that the transactions marked as transfers often are addressed to other activities unrelated to those that were originally targeted. In this sense, in the measurement of Mexico's EPE has been opted to track these transactions in all available information sources, to the extent that the transfer expense associated to environmental protection will add to national spending as long as it is proved through a very intensive and thorough study, that it has not been registered elsewhere and that resources indeed have been earmarked for environmental protection and not to other needs.

The economic classification in which the expenditure in all economic units of the public sector is presented, allows identifying expense items that refer to transfers; however the functional, administrative or programmatic classifications are those that let you select a criteria for their incorporation into the total expenditure.

8 International cooperation

SEEA Implementation

As part of the overall implementation of SEEA-CF in countries, INEGI has taken some of the tasks on the subject of Environmental Protection Expenditure. An example is the bilateral cooperation with the Economic Commission for Latin America and the Caribbean (ECLAC), whose objective is the development of a methodological guide for measuring the Environmental Protection Expenditure of the Public Sector, same that will be implemented first by some pilot countries and subsequently applied to all countries in the region. Additionally, it will support in the translation of this guide to the English language as well as in the development of an international guide for measuring the EPE.

ECLAC Guide

En diciembre del año 2012, el INEGI fue sede de un taller internacional sobre cuentas ambientales y gastos en protección ambiental en el cual asistieron representantes de países como Perú, Chile, Colombia, Costa Rica, El Salvador, República Dominicana y de la CEPAL. Además de compartir experiencias en materia de cuentas ambientales entre los países participantes, la reunión también sirvió para trabajar de manera conjunta algunos ejercicios prácticos sobre el tema de GPA.

In this context, the participation of ECLAC officials set the tone to start technical cooperation for the development of the guide. This year, were performed the necessary tasks to develop the first draft of the methodological guide, same that has been enriched by the exchange of opinions between ECLAC and INEGI. Currently this proposal is in its final stages of review to obtain a first draft that will serve for a pilot study.

Subsequently will be collected the opinions of the countries that implement the guide so as to incorporate comments and suggestions, and set the path to the final version of the guide.

9 New aspects

The information generated in the framework of the EPEA, in addition to its mission as stated both in the SEEA-CF as in SERIEE, can meet other needs of statistics on topics that are currently taking a high degree of importance. Such is the case of the measurement of green jobs of the sector of environmental goods and services, that are also included in Chapter 4 of the SEEA-CF, as well as supporting the generation of Green Growth Indicators.

Green jobs

In the context of the *Technical Expert Consultation on Labour Statistics: Moving Towards a Statistical Definition of Green Jobs*, Mexico shared its experience in the measurement of the EPE of the public sector and in the contributions made to the document "Considerations for the measurement of Jobs green".

During the meeting it was stated that for defining green jobs and their measurement it should be within the framework of SEEA-CF, since the Environmental Activities Classification embodied in this statistical standard allows to define a frontier specifically of that group of activities which include both environmental protection and management of natural resources.

Additionally, it was noted that actual expenditure on these activities shows not only the expenditures made for the purchase of goods and services or works developed, but can also register the expenses incurred for the payment of personal services (wages and salaries), information that is relevant for measuring green jobs.

Environmental goods and services sector

Finally, the measurement of the EPE serves as an input for measuring the Environmental Goods and Services Sector (EGSS). In spite of following two different optics, the EPEA focused on spending and the EGSS on production, both aggregates stick to the SNA accounting standards; use the Environmental Activities Classification to define their coverage; and identify specialized and non-specialized producers, and consumers; among other similarities.

In that vein, much of the measurement of EPE must be considered when generating statistics about the EGSS measurement.