General Direction of the National Center for Environmental Research and Training (Cenica)

A. P. Martínez Bolívar, Director of Research in Air Quality Monitoring and Analytic Characterization of Pollutants
J. Zaragoza Ávila, O. Fentanes Arriaga and S. Hernández Millán, Direction of Research in Air Quality Monitoring and Analytic Characterization of Pollutants, CENICA Tecamachalco/INE/SEMARNAT, Boulevard El Pípila No. 1. Col. Lomas de Tecamachalco, C.P. 53950, Naucalpan de Juárez, Estado de México. MEXICO
V. J. Gutiérrez Avedoy is the General Director of the CENICA, CENICA /INE/SEMARNAT, San Rafael Atlixco No. 186 Col. Vicentina Delegación Iztapalapa, C. P. 09340 UAM-I Edificio de Ciencia y Tecnología Ambiental "W"

Abstract—*The National Atmospheric Monitoring Program (Programa Nacional de Monitoreo Atmosférico - PNMA) is the answer to one of the main priorities of Mexico's Ministry of the Environment and Natural Resources (SEMARNAT) for its linkage to other sectors of the administration. Under a transversal scheme, this program proposes to create links with the various municipalities and Mexican States that currently have air quality monitoring systems, as well as with other branches of the Federal Government, in order to promote programs to inform and create awareness in the population, establish financing schemes and support local monitoring efforts, by strengthening their institutions and providing procedures, among others. Its main objective is to Establish an air quality monitoring program to guarantee adequate diagnostic and surveillance of air quality at the national level; to generate information that is real, valid, and comparable among the different sites and air quality networks in the Country which would serve as a foundation for the design and establishment of environmental policy for the protection of the health of the population and the well-being of ecosystems. This program is divided in three different stages with specific objectives, which upon implementation will serve as basis for the following stage. The first stage is the analysis and development of tools, where PNMA's main task is to produce a diagnosis of the current state of the air quality monitoring networks in the Country, and of the laws, institutions, and financial mechanisms that support them. Also, this stage focuses on the development of tools and/or procedures that will guide air quality monitoring practices at the national level, in order to guarantee quality systems and comparability of data. The second stage is the establishment of strategies for identifying the sites where it is a priority to instrument air quality monitoring programs. These strategies include the identification criteria, the launch of awareness and information campaigns, and the implementation of the various states' monitoring plans. Finally, the third stage, where the tools and strategies are applied to: monitor air quality in priority sites; obtain the homologation of monitoring practices; establish quality assurance and control programs which guarantee the veracity of the data generated by these air monitoring systems; and to set up national surveillance programs through audits. Last, this stage would help create a proposal for a Second National Atmospheric Program that would include countrywide multi-pollutant and toxic pollutants' monitoring networks in areas where the existence of these pollutants is suspected.*

Introduction

During the past three decades of environmental management, several programs have been established to control and diminish the air pollution levels in the main urban centers of Mexico since the 1970's and, more recently, in some medium-sized cities.

As of today, 18 locations in the Country are being monitored by automatic equipment and 24 others are being monitored manually. There is also monitoring by private and state companies, such as CFE and Pemex. The main pollutants are being measured, such as Sulfur Dioxide (SO2), Carbon Monoxide (CO), Suspended Particles (TSP, PM10 and PM2.5), Nitrogen Oxides (NO2 – NO - NOx), Ozone (O3), Lead (Pb), Hydrogen Sulfide (H2S), Heavy Metals, Sulfides, Nitrates, and other parameters such as solar radiation and atmospheric deposits, both dry and wet. Also, there is equipment for the determination of meteorological parameters, mainly wind direction and velocity, ambient temperature and humidity, which, associated to the pollution levels, ease the analysis of inverse trajectories and the prediction of future concentrations of the pollutants at ground level.

There are, nonetheless, within the Mexican Territory, areas that require greater attention, such as towns with a high degree of industrialization, areas at environmental risk, and degraded areas classified as critical, among others. Also, there is a need for local governments and communities to increase their efforts to obtain dependable information regarding the concentration of pollutants, their sources and effects in these places, a must for making decisions regarding the protection of health and ecosystems.

Monitoring the air quality is fundamental to identify and provide the necessary information to evaluate the air quality of each region and its trends, as a tool to develop control and prevention strategies, air quality management plans, and integral environmental policies, among other applications. Because of this, a decision was made to develop a National Program of Atmospheric Monitoring to define the practice of air quality monitoring, to establish monitoring sites of national interest and to guarantee its quality.

Program

Following is a summary of the National Program of Atmospheric Monitoring (PNMA), whose main objective is the institution of a program for air quality monitoring that will guarantee a diagnosis and vigilance of the air quality at the national level which in turn will generate real, valid and comparable information between the different sites and networks in the Country, as a fundamental instrument for the establishment of environmental policies to protect the health of the population and the ecosystems.1

Because of the reach, diversity, and cost of instituting a program such as this, specific objectives were established through a process split in stages with definite time spans. So, the program consists of three stages whose specific objectives and interactions are summarized in figure 1.

Stages

First Stage (Short Term, From 2003 to 2004)

During this first stage the actual state of the air quality networks and monitoring stations of the Country is to be evaluated, as well as their legal support, assistance from institutions and finance sources to establish a diagnostic and national requirement. Also, the procedures that will rule the practices of air monitoring will be established at the national level, setting up a Reference Framework for Air Monitoring Procedures. The main objective of this stage is diagnosing the present situation of the monitoring networks in order to identify the fundamental requirements of the monitoring systems and their strengths and weaknesses, in order to develop strategies to strengthen them.

1. *Diagnosis of the present situation of the air monitoring networks at the national level.*

To carry out this work a questionnaire has been designed that includes technical information of the tools that constitute the monitoring systems, administrative information and information on resources and operation problems for each monitoring system.

State laws and rules will have to be compiled and reviewed, as well as those of a regional or local character if they exist, and also the air quality plans and control programs. With this information, the needs and weaknesses of the legal framework at the federal, state and local level in the subject of air quality monitoring will be identified.

State governments and, if possible, municipal governments, will be asked to provide information on the institutions in charge of environmental management within their territory, in order to establish the needs and required strengthening of the institutions within each region to establish Air Monitoring Programs.

From the information obtained in the questionnaire, in which sources of financing for the existing air monitoring networks will be identified, a review and update of the finance instruments or strategies that have supported the development of these networks will be carried out,

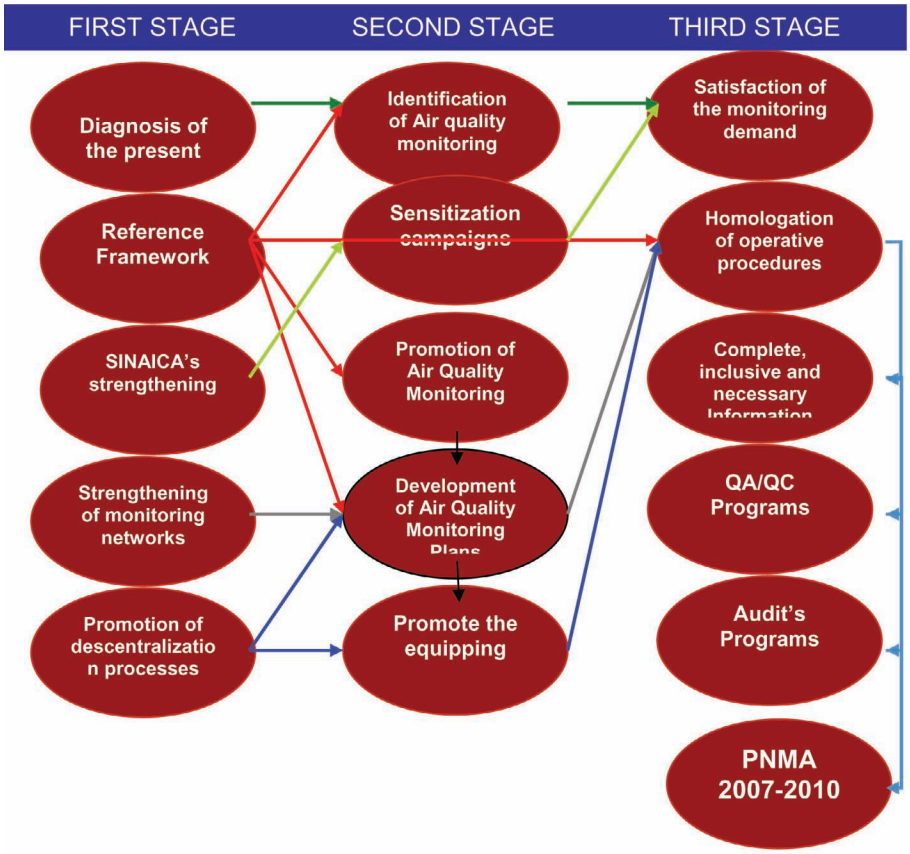

Figure 1. National Program of Atmospheric Monitoring (PNMA) stages.

new possible national or foreign sources of funds will be identified and strategies or financial instruments applied in other countries will be identified, such as funds, taxes, penalties, compensations, emission-exchange mechanisms, permits, credits and others, establishing conceptual designs of financing schemes, in order to organize a range of possibilities for the financing of the institution, operation and maintenance of the monitoring systems.

The feasibility of establishing, in the long run, a market of credits or bonds for the reduction of emissions in which the cities might exchange a reduction of emissions within their territory for additional benefits from the Federal Government will be analyzed. Air quality monitoring would have a leading role in the verification and auditing of these reductions. These emission credits might be commercialized internationally in accordance with strategies and policies established in this regard.

2. *Establishment of the reference Framework for Air Quality Monitoring Procedures.*

In order to establish a reference framework to standardize monitoring practices, data handling and information distribution that will serve as a guide to reach a quality monitoring system at the national level, during this stage the Reference Framework for Air Quality Monitoring Procedures will be developed. This framework will provide, as mentioned before, the basis for the unification of procedures at the national level, supplying the tools required for the establishment of quality standards that will make possible the comparison between air quality monitoring systems. For this purpose, with the aid of the Japanese Agency for International Cooperation, JICA, and based on EPA documents, six manuals are being developed, which include:

- Goals and components of the air quality monitoring systems.
- Design of the installation of air monitoring systems.
- Operating instructions for the air monitoring systems.
- Maintenance and calibration of air monitoring systems.
- Quality control and quality assurance of air monitoring systems.
- Federal procedure for auditing air monitoring systems.

3. *Strengthening of the Air Quality National Information System (SINAICA)*

Also, during this stage, the Air Quality National Information System (SINAICA) is being strengthened, in order to establish an integral management system of the air quality data generated in the Country. The SINAICA

is an ongoing project that gathers and distributes through the web page of the National Ecology Institute, http://sinaica.ine.gob.mx/presentacion.html, the data generated by the main automatic air quality monitoring networks of Mexico in order to publicize the current and historic situation of the air quality in different cities in the Country. This information is openly available through the Internet, being useful for specialists in the subject, researchers, employees from the three levels of government, the private sector, and general population interested in finding out the levels of concentration of critical air quality pollutants. Currently, it includes information on air quality from the monitoring networks from the metropolitan areas of the cities of Mexico, Guadalajara, Toluca and Puebla. During 2004, INE's monitoring stations and the air quality monitoring networks from Salamanca, León, Celaya, Irapuato, Monterrey, Ciudad Juárez, Tijuana-Rosarito-Tecate and Mexicali are being included. In the long run, the SINAICA should be the institutional medium that integrates the data from all the air quality monitoring stations in Mexico, including both continuous and manual, and public and private measuring stations from sites of national interest.

4. *Strengthening of air quality monitoring and evaluation of the capacity of the cities currently participating*.

During this stage, the monitoring of the air quality in Mexico will be strengthened, promoting the updating of the networks and their equipment when required, in accordance with the results obtained with the diagnosis. The Federal Government will offer technical support in the design of programs to strengthen the current monitoring systems and will also look for financial mechanisms to support them. It also includes the formalization of transfer agreements and safekeeping of the equipment that several sites have received form the Federal Government.

5. *Promotion of the decentralization processes*

Promoting the formalization of agreements for the transfer of responsibility over the equipment to the state authorities will commit them to take charge of its installation, operation and maintenance. This would promote the observance of the decentralization programs.

The duration of the first stage would be one year. Its activities and tasks are listed in table 1.

Products:

- Diagnosis of the current state of air quality monitoring and its projected future potential. Inventories of monitoring networks and stations and their equipment, current situation of rulings, institutional framework and finance sources.
- Conceptual design of finance schemes
- Reference Framework of Procedures for Air Quality Monitoring for the validation of instruments, networks and systems and the coordination of the efficient handling of data and the distribution of reliable information, such as:
- Criteria for the design of monitoring networks.
- Protocols for operation, maintenance, calibration and data handling.
- Criteria for quality assurance and quality control.
- Criteria for the evaluation of air quality monitoring systems.
- Strengthening of SINAICA
- Training programs
- Agreements for the transfer of measuring equipment to the states or municipalities that have received them.

Second Stage (Medium Term, From 2005 to 2006)

During the second stage of this program the criteria and strategies for the determination of the sites which require air quality monitoring will be defined. Required networks and their equipment will be defined, having in mind items like institutional and legal strengthening in accordance with state and municipal governments, so that plans for the instrumentation of state monitoring programs be developed. The main objective is the determination of those sites that require air quality monitoring in Mexico and the setting of priorities. Needed activities include the following:

6. *Identification and prioritization of the sites which require air quality monitoring in Mexico*

This strategy requires, in the first place, the definition of criteria for the determination of those sites where it is required to establish an Air Quality Monitoring Program. Among these criteria will be the socio-economic characteristics of the site, its climatic and topographic characteristics and the claims from the inhabitants. Also, non-complying and high risk areas will be designated, as well as areas that require special attention, which will be given priority. Once the criteria are defined, an investigation will be made to identify the areas or sites that require air quality monitoring in the Country. From these areas, priorities will be selected based on the impact on the population or the environment.

7. *Support of campaigns for the sensitization and promotion of the importance of establishing Air Quality Monitoring Programs*.

This strategy foresees the design of a model of sensitization and awareness to promote the participation of the population in the solution of environmental problems, with the support of other Government Departments such as the "Secretaría de Educación Pública" and, potentially,

Table 1. Short term activities (First Stage).

Short term objectives	Activity	Task
1. Diagnosis of the present situation of the air monitoring networks at the national level	I. Gather and update the information at the national level	1. - Take inventory of the Country's monitoring networks.
		2. - Take inventory of the equipment in the Country's monitoring networks. 3. - Analyze the handling of air quality monitoring data.
	II. Analyze the legal basis and the institutional development	1.- Review the legal framework 2. - Define legal requirements 3. - Review the institutional framework
	III. Identify finance sources and mechanisms	1.- Identify finance sources and mechanisms 2. - Find new finance sources and mechanisms 3. - Establish alternatives sources of financing
2. Establishment of the reference Framework for Air Quality Monitoring Procedures	IV. Establish the reference Framework for Air Quality Monitoring Procedures	1. - Define protocols for the design, operation, maintenance, and calibration of networks and data handling. 2. - Establish criteria for quality control and assurance. 3. - Define procedures for the evaluation of air quality monitoring systems. 4. - Define requirements for data handling and information distribution at the national level. 5. - Establish the National Reference Framework for Air Quality Monitoring Procedures 6. - Establish norms and regulations. 7.-Evaluate the main monitoring networks in the Country.
3. Strengthening of the Air Quality National Information System (SINAICA).	V. Strengthen the Air Quality National Information System (SINAICA).	1. - Define the basis for strengthening the SINAICA 2. - Consolidate the SINAICA
4. Strengthening of air quality monitoring and evaluation of the capacity of the cities currently participating	VI. Strengthen and evaluate the capacity of existing monitoring networks	1. - Design programs to strengthen existing monitoring networks 2. - Offer technical support.
5. Promotion of the decentralization processes	VII. Foster the compliance with decentralization processes.	1. - Formalize transfer agreements for measuring equipment with those states or cities that have received them.

of international organizations. The goal is to promote collective actions for the improvement of daily life conditions of those involved.

The establishment of the model would be followed by the implementation of campaigns by the state governments, which may consist of workshops, talks and propaganda, among others. It will probably be required to design didactic material to support the development of community workshops. An increase in the awareness of the populace in environmental problems will translate into public pressure for the generation and dissemination of air quality data as a first step towards the development of environmental policies in accordance with the particular problems of each location.

8. *Promotion of the establishment of local, state or regional air quality monitoring programs through government, academic or private organizations.*

Together with the divulgation of information and the sensitization of the populace, it will be necessary to promote among the authorities and the academic and private organizations the development of monitoring programs to determine the actual state of the air quality in their localities. Both the decision makers and the pertinent organizations should be conscious of the environmental problems and particular risks of their districts.

The design and establishment of the monitoring program will vary from site to site, leaving the responsibility in the hands of either the department of ecology, urban development, health care or other government agency or to industrial, scientific or higher education organizations. Whichever is the case, it is a real necessity to involve those organizations interested in the planning, design and operation of the system. Because of this, there is a need for campaigns so that the different participants exchange

information and reach a consensus and understanding of the environmental problems. These campaigns will be made through congresses, forums or interdisciplinary workshops.

9. *Support to the states in the development of their program of instrumentation of air quality monitoring in those regions that require it.*

This strategy foresees the strengthening and/or establishment of the legal framework that will commit each state to develop a State Plan of Air Quality Monitoring in the regions that require it. The review of the legal framework referred to in the first stage of this program will produce guidelines for the legal requirements in need of being strengthened or implemented. It is recommended that, together with the establishment of the required legal framework, criteria be defined to allow each state to determine and include in its plan or program the kind of environmental parameters that should be measured, the number of stations required, their location and their time and area coverage.

Likewise, measures will be taken to obtain and provide technical support from SEMARNAT to each state in the development of its State Air Quality Monitoring Plan in the regions that require it. The establishment of procedures in accordance with the Reference Framework of Air Quality Monitoring Procedures will be promoted.

10. *Promote the equipping of the air quality monitoring networks at the national level.*

Within this strategy, it is foreseen to develop and institute alternative methodologies for air quality monitoring, proven and validated by national and international organizations, in those regions where conditions do not permit the use of automatic instruments, to facilitate the adoption of monitoring programs.

Likewise, with alternative methodologies for air quality monitoring it will be possible to develop programs to promote the equipping of monitoring networks set to accomplish the particular goals of each region. The steps needed to design the programs will be included in the program model in which all details for their orchestration will be specified. Once again, the goal of these programs will be the guidance of air quality monitoring so it will fulfill the local needs of each community at a reasonable cost. These programs will be added to those for strengthening the established networks that were initiated during the fist stage and will continue throughout the three stages of this plan.

The duration of the second stage would be two years. Its activities and tasks are listed in table 2.

Products:

- National criteria for the identification of sites that require air quality monitoring.
- Location of the regions that require air quality monitoring in Mexico
- Selection of prior sites.
- Model of diffusion and sensitization
- Campaigns of diffusion and sensitization
- State programs for setting up air quality monitoring
- Programs to promote the equipping of monitoring networks

Third Stage (Long Term, From 2007 to 2008)

After having produced during the first stage the Reference Framework of Procedures for Air Quality Monitoring to standardize, evaluate and strengthen the air quality monitoring systems and to coordinate the efficient handling of data and the diffusion of reliable information in the Country, and having spread the information contained within this reference framework in the second stage, in order to develop strategies for setting up new systems of air quality monitoring it will be necessary the production of a program to coordinate the homologation of procedures and to support the different locations in the development of quality assurance and control programs that comply with the criteria established in the aforementioned reference framework. To verify the compliance of the established procedures, a program of vigilance and environmental audits will be defined which will evaluate the networks using local groups of regional accredited inspectors.

The main goal of this stage is to satisfy the demand for air quality monitoring from the sites identified as priorities. Likewise, to give continuity to the National Atmospheric Monitoring Program, during this stage a new National Program 2007 – 2010 will be designed in order to develop and establish regional networks for multiple pollutants.

11. *Satisfaction of the demand for air quality monitoring from the sites identified as priorities.*

Once the selection criteria for the sites which require air quality monitoring in the Country have been defined, and after selecting those sites which are classified as priorities, strategies to fulfill the demand for air quality monitoring of these will be applied, in accordance with the states' plans for setting up air quality monitoring which were defined during stage 2 of this plan. For this purpose, technical support and advice will be given to identify finance sources for the states in which these sites are located.

Also, in order to strengthen training and technical updating, the establishment of regional training centers

Table 2. Medium term activities (Second Stage).

Medium term objectives	Activity	Task
6. Identification and prioritization of the sites which require air quality monitoring in Mexico.	VIII. Identify and prioritize the sites which require air quality monitoring in Mexico.	1. - Establish criteria for the identification of locations that require an air quality monitoring program. 2. - Identify and prioritize sites
7. Support of campaigns for the sensitization and promotion of the importance of establishing Air Quality Monitoring Programs.	IX. Foster campaigns for the sensitization and promotion of the importance of establishing Air Quality Monitoring Programs.	1. - Design campaigns 2. - Implement sensitization and promotion campaigns.
8. Promotion of the establishment of local, state, or regional air quality monitoring programs through government, academic or private organizations.	X. Promote the establishment of local, state, or regional air quality monitoring programs through government, academic or private organizations.	1. - Organize congresses, forums, and workshops.
9. Support to the states in the development of their program of instrumentation of air quality monitoring in those regions that require it.	XI. Back the states in the development of their program of instrumentation of air quality monitoring in those regions that require it.	1. - Strengthen and/or establish the framework of rules that commit each state to develop a State Air Quality Monitoring Plan in those regions that require it. 2. - Define the procedure to support those regions that require it in the development of their State Air Quality Monitoring Plan.
10. Promote the equipping of the air quality monitoring networks at the national level.	XII. Foster the equipping of the air quality monitoring networks at the national level.	1. - Develop and institute methodologies adapted to the specific monitoring needs of the participating locations. 2. - Design programs to foster equipping.

will be promoted in those locations around which monitoring activities be concentrated which show a quality performance in agreement with the standards established in the reference framework, making use of the strengths and capacities of certain locations. Three regional centers might be established: Northern Border, Pacific Region and Southeast Region.

The regional centers will also offer guidance in the definition of strategies for the financing of equipping, installing and operating these networks, as well as alternative finance sources that will be established in agreement with the Federal Government and with national and international organizations. The regional center will serve as guide and facilitator in the negotiations that need to take place during the design, installation and operation of a monitoring system.

Likewise, the Federal Government might support the establishment of programs for equipping the air quality monitoring networks and stations, in accordance with the states' programs or plans for setting up air quality monitoring so that its demand will be satisfied in the locations identified as priorities.

12. Homologation of operative procedures at the national level.

The establishment of the Reference Framework of Air Quality Monitoring Procedures will allow the instrumentation of a program to coordinate the homologation of procedures at the national level and to support the different locations in setting up whichever measures are required.

The homologation of procedures at the national level will promote the compatibility and comparability of data and the validation of procedures between the different monitoring networks, will increase the quality and will permit the evaluation of monitoring practices, data handling and information spread, making the technical review programs and the nationwide audits more efficient.

13. Supply of complete, inclusive and necessary information for the rational management of air quality.

The supply of complete, inclusive and necessary information for the rational management of air quality will depend strictly upon the compliance with the monitoring goals set when the network or the system were designed.

The Data Quality Objectives derive from the monitoring objectives. The former are defined as the criteria that clarify the study objectives, define the appropriate types of data acquisition and specify the allowed error levels of potential decisions. The procedure to establish the DQO is one of systematic planning to generate enough air quality data to guarantee the use for which they were designed and, at the same time, improve the effectiveness of planning, the efficacy of design and the safekeeping of results (EPA 1998; EPA 2002).

One of the main tasks will be fostering the establishment of systematic planning procedures, like the procedure to establish DQO, to generate criteria with which can be evaluated if the data are of the correct type, quantity and quality to sustain the DQO (EPA 1994).

Once the criteria are defined, they will be spread through the regional centers, requesting an evaluation or estimate of the quality of the data obtained through the various monitoring systems, in order to verify the data's compliance with the DQO.

The review of the DQO, the design of the sampling process and the review of the monitoring system will show if the data obtained complies with the established goals. The validation of the monitoring systems and the data obtained will provide the guidance to review and establish the quality control and assurance programs for the data that will guarantee that these are of sufficient quality for the goals set.

The Federal Government will ask the main urban centers in Mexico and those networks whose data are included in the SINAICA to validate their monitoring systems providing them with the technical support they require. Guaranteeing that the information contained in the data transmitted by the SINAICA is complete, inclusive, and necessary for the rational management of the air quality will be a priority.

Distributing data that ensure high quality will allow more precise estimates of the levels and trends of urban pollutants and their potential effects in the ecosystems and in the population's health, which will provide better options for their reduction.

14. Supporting the Country's air quality monitoring networks in the review, or definition and institution of quality assurance and control programs.

Due to the fact that the measurement of the air pollution is carried out by different government agencies, groups and organizations with different equipment, number of stations and laboratories and with different monitoring objectives, the Quality Assurance and Control component is essential to guarantee any monitoring program, since it provides the certainty that the data produced comply with the requisites of the established standards, such as the data quality criteria set in the DQO.

Because of this, every organization or state involved in air quality monitoring must review and/or develop its Quality Assurance and Control program, describing the monitoring project, measurement requirements and defining the specific Quality Assurance and Control activities that must be applied to the project with the purpose of complying with its objective and the specified DQO. The Air Quality Monitoring Procedures Reference Framework, developed during the first stage, will guide the production and review of these programs.

Likewise, the regional centers will offer training courses and technical support for the development and inception of the quality assurance and control programs, and the Federal Government will support these regional centers. Those cities that do not have an air quality monitoring program, but would like to institute one, will also receive technical assistance.

15. Establishment of audit programs.

An audit is defined as the systematic and independent review and evaluation of the systems and activities that constitute a procedure to determine if the end products reach the specified objectives (EPA 1998). The Environmental Protection Agency defines several kinds of audits for established monitoring systems.

Based on national and international experience, the kind of audits that will have to be performed by every monitoring system in Mexico and their frequency will be determined.

The evaluation and characterization of the main monitoring networks in the Country started during this program's first stage will be an important information input for the establishment of the audit programs. It is suggested that the following audits be established (EPA 2000):

- Program of local and regional technical audits: Their purpose would be to verify the fulfillment of the quality control and assurance programs of the local and regional monitoring systems.
- Network review or inspection audits: Dedicated to verifying the observance of the established recommendations for the local monitoring systems.
- Performance audits: Through the application of this kind of audits an evaluation system of the performance of the measurement instruments of the monitoring systems would be established.

Once the audits to be performed throughout the monitoring systems in the Country and their frequency are defined, the authorities responsible for these will be designated at the state, regional and federal level.

A program will be established that will divide the Country in regions within which the audits will be developed and supervised. CENICA, with the support of the regional centers, will coordinate these audits. Also, through accreditation schemes, interested citizens will be able to participate in the process, being first accredited as private auditors to increase the efficiency of these procedures.

The compliance of the audit activity will have to be backed by highly qualified personnel. CENICA will

offer excellent training supported by international environmental agencies.

The Federal Government will ensure the fulfillment of the regional audit programs and will verify compliance among regional centers and local monitoring systems.

Establishment of the National Atmospheric Monitoring Program, PNMA 2007 – 2010

Having diagnosed the current situation including the legal, institutional and financial requirements, and having established the tools to fulfill these requirements and strategies, the next phase of the National Atmospheric Monitoring Program, PNMA, will be designed to support the state plans for the institution of air quality monitoring and to provide the equipment that these plans will require.

Additionally, this program should introduce a model of technical support to include the tools, products, and strategies developed during stages 1 and 2 of this program, in order to continue providing guidance and technical assistance to the other monitoring networks already established in the Country.

This second phase of the PNMA 2007 –2010, should also foresee the design and institution of a national/regional network to monitor multiple pollutant conditions in the main metropolitan areas and in the rural or suburban areas that require it, as well as pollutants classified as dangerous or toxic in the areas of the Country where their existence is suspected or proved.

All of this effort will only make sense if it is possible to commit all participants in the institution and long term preservation of this program.

The duration of the third stage would be two years. Its activities and tasks are listed in table 3.

Products:

- National operative program
- Quality assurance and control programs.
- Audits' program
- National Atmospheric Monitoring Program, PNMA 2007 – 2010

Every specific objective of each stage results in activities and tasks required to reach the established goals. These activities and tasks, as aforementioned, are listed in tables 1, 2, and 3.

References

EPA 1994. Guidance for the Data Quality Objectives Process. EPA QA/G-4. United States Environmental Protection Agency. Office of Research and Development. Washington, D.C. 20460 EPA/600/R-96/055, September 1994.

Table 3. Long term activities (Third stage).

Long term objectives	Activity	Task
11. Satisfaction of the demand for air quality monitoring from the sites identified as priorities.	XIII. Satisfy the demand for air quality monitoring from the sites identified as priorities.	1. - Strengthen the programs for training and technical updating. 2. - Offer assistance in the identification of finance sources. 3. - Promote equipping programs
12. Homologation of operative procedures at the national level.	XIV. Homologate operative procedures at the national level.	1. - Establish a strategy for compliance with the Reference Framework. 2. - Develop standard procedures per monitoring type. 3. - Establish a single operation program.
13. Supply of complete, inclusive, and necessary information for the rational management of air quality.	XV. Supply complete, inclusive, and necessary information for the rational management of air quality.	1. - Establish criteria to evaluate compliance with DQO data. 2. - Spread evaluation criteria. 3. - Validate the main monitoring systems in the Country, especially those included in the SINAICA.
14. Supporting the Country's air quality monitoring networks in the review, or definition and institution of quality assurance and control programs.	XVI. Support the Country's air quality monitoring networks in the review, definition and institution of quality assurance and control programs.	1. - Review and/or define quality assurance and control programs. 2. - Start quality assurance and control programs.
15. Establishment of audit programs. audits at the national level.	XVII. Establish audit programs.	1. - Define the type and frequency of 2. - Design a national audit program.
16. Establishment of the National Atmospheric Monitoring Program, PNMA 2007 – 2010.	XVIII. Design the PNMA 2007 – 2010.	1. - Design the PNMA 2007 – 2010.

EPA 1998. Quality Assurance Handbook for Air Pollution Measurement Systems. Volume II: Part 1 Ambient Air Quality Monitoring Program Quality System Development. United States Environmental Protection Agency. Office of Air Quality Planning and Standards. USA 1998.

EPA 2000. Guidance on Technical Audits and Related Assessments for Environmental Data Operations. EPA QA/G-7 Final. United States Environmental Protection Agency, Washington, DC, January 2000.

EPA 2002. National Ambient Air Monitoring Strategy. United States Environmental Protection Agency. Office of Air Quality Planning and Standards. USA, 2002.