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PREPARATION OF INDUSTRIAL ASPECTS OF NATIONAL REPORTS FOR  
THREE COUNTRIES (ARGENTINA, EGYPT, THAILAND) FOR THE 1992  
UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT

US/INT/90/281

Part I: Summary report\*

Prepared for the Governments of Argentina, Egypt and Thailand  
by the United Nations Industrial Development Organization

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\* This document has not been edited.

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This Final Report is prepared by Environmental Resources Limited (ERL). The report summarises the outputs from a project in which UNIDO provided technical assistance to assist the Governments of Argentina, Egypt and Thailand in elaborating the industrial aspects required to complete the national reports to be submitted to the 1992 UNCED, which will assist UNCED to meet the objectives established in GA Resolution 44/228.

The project was executed as follows:

- UNIDO provided 3 consultants from ERL, one to each country. The consultants undertook short missions to the countries over the period June-July 1991.
- The consultants worked alongside the national working groups responsible for preparing the UNCED national reports, and provided assistance in preparing the analyses of the industry sector.
- The consultants prepared field reports while they were in the countries, so that these could be immediately input into the UNCED report preparation process without delay.
- The field reports were then submitted by ERL to UNIDO, so that UNIDO can comment on the reports and then submit them to the governments concerned through the official channels.

This report is essentially an overview of the complete project, focusing on the overall outputs of the project (Section 2), and the implications for further UNIDO activity (Section 3).

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**OUTPUTS FROM THE OVERALL PROJECT**

The outputs of the project are of two kinds:

- On-the-job technical assistance to staff of the national working groups preparing the UNCED national reports.
- Field reports on the industry sector, which can be input into the UNCED report preparation process in each country.

As part of the field reports, potential future activities for UNIDO and other donors were identified.

We summarise the outputs of the project in more specific terms by country below.

2.1

**ARGENTINA**

- The consultant provided additional expertise to the team of Argentine consultants engaged in preparing the UNCED national report. The consultant provided inputs to the UNCED national report as specific sections on "industrial impact on the environment" and on "health and ecological effects of industry".
- The consultant contributed to discussions with the Argentine consultants and the Commission Nacional de Politica Ambiental (CCNAPA) on the preparation of the overall UNCED report.
- The consultant reported on the further action required to target environmental problems associated with industry, which will be useful to UNIDO in planning further action in Argentina.

2.2

**EGYPT**

- Although unable to contribute directly to the UNCED national report, the consultant prepared a report on the industry sector for the Egyptian Environmental Affairs Agency, which may be used to supplement the information on the industry sector already contained in the UNCED national report.
- The consultant identified potential future actions for targeting environmental problems associated with industry in Egypt, and reviewed the current status of existing and planned initiatives in this area. The recommendations on the most effective form of future action will be useful to UNIDO and other donors in project identification during future missions.

2.3

**THAILAND**

- Through the technical assistance provided to the Thailand Ministry of Industry, the process of preparing the overall UNCED national report was initiated, the roles and responsibilities of contributors was clarified, and the main issues were identified. The consultant's mission therefore acted as a catalyst to the preparation of the overall UNCED national report.
- The consultant's mission resulted in the preparation of the draft Industry Sector Report, which will be the first completed input to Thailand's national report for UNCED.
- The consultant worked closely with staff of the Ministry of Industry, and to some extent the consultant mission provided skills transfer and institutional strengthening.
- In addition, the consultant assisted in the preparation of terms of reference and project design for two further UNIDO projects, and provided assistance with UNDP programming activities.
- As part of the report prepared by the consultant, attention is drawn to potential future activities in the field of industry and environment, which are appropriate for the involvement of UNIDO and other donors.

## **IMPLICATIONS FOR FURTHER UNIDO ACTIVITY**

As indicated in Section 2, all the field reports prepared by the consultants identified key areas for future activity to target the environmental problems associated with industry. The reports contain recommendations on what will be the most effective actions in the areas identified. For UNIDO, this information will be useful in helping to guide further UNIDO activity in each country. In particular the reports will be useful in the identification of project concepts for environment-related assistance which UNIDO could offer in the future, and as a background for further UNIDO missions in each country.

In this Section we bring together the parts of each field report dealing with potential future action.

### **3.1 ARGENTINA**

#### **3.1.1 Introduction**

Section 3.1 contains a brief identification and outline of areas in which action is needed (and on which international assistance could be focused) in order to bring about a reduction in and more effective control of industrial impacts on the environment in Argentina. This section is based on the review of data provided by CONAPA and from other sources, and interviews of government environmental employees, industrial representatives, and environmental consultants/researchers in Argentina. The institutional context, and the current policies targeting industrial environmental problems, are described in the field report.

It should be noted that the following only attempts to identify those initiatives that are needed; analysis of the costs and benefits of the listed initiatives, and comparison of their costs and benefits to those of other development priorities, are beyond the scope of this report but would be a desirable prerequisite to the adoption of the following initiatives.

We discuss potential future action under the following headings: policy, programs and institutional strengthening.

#### **3.1.2 Policy**

Industrial environmental policy should be considered in the following areas:

- Environmental impact assessment; requiring examination of the potential environmental impacts, identification of alternatives for reducing these impacts, and assessment of the full costs and benefits (including environmental externalities not currently considered) associated with industrial developments likely to have environmental impact.

- Toxic/hazardous substance and hazardous waste management; defining hazardous and toxic substances and hazardous wastes, establishing a notification and record-keeping system allowing "cradle-to-grave" mass-balance tracking of toxic and hazardous substances, establishing regulations for the handling of these substances and ultimate disposal of hazardous wastes by manufacturing industries and by the waste management industry.
- Emission standards; technology- and/or risk-based standards for end-of-the-pipe and end-of-the-stack contaminant emission levels should be developed based on a realistic assessment of the technology available to Argentine industry (standards currently exist, but these should be expanded to cover a wider range of contaminants, should be standardized nationwide, and should be rationalized based on the risks posed by industrial emissions to human health and to wildlife and other natural resources). The adoption of such a policy presumes the enhancement of monitoring capabilities: see below.
- Industrial safety and catastrophic accident prevention and mitigation; policies setting standards for and requiring: industrial safety programs, public information, and emergency response programs for industries handling quantities of hazardous substances large enough to pose major hazards to the surrounding community and environment in the event of an accident.
- A system of penalties or sanctions for violations of environmental regulations by industry which are commensurate with the degree of environmental degradation caused, and present effective incentives to comply with regulations; and
- Other financial instruments (such as user fees) designed to internalize the costs associated with environmental degradation, and to encourage environmentally sound practices by industry.

### 3.1.3 *Programs*

#### *Waste Management*

The current lack of an industrial waste management program was cited by several industry representatives and Argentine environmental experts as a contributing factor to contamination of land, air, and water resources. A comprehensive waste management program is needed, including:

- A survey of industrial waste arisings (volumes, types, and regional patterns; including both hazardous and inert industrial wastes).
- Identification and development of the required collection, transport, holding, and disposal capacities for inert solid wastes, including development of controlled sanitary landfill facilities.



- Determination and development of the management/treatment processes and capacities required for toxic and hazardous wastes.
- Institution of measures (policies, programs, and physical facilities) to separate different categories of wastes, and channel these to appropriate management streams.
- Identification of recyclable or reusable waste materials, and assessment and development of the appropriate recycling/reuse processes.
- Development of the policies and institutions required to implement the above measures.

In addition, current waste disposal practices should be investigated, as should the possibility that these practices have resulted in environmental degradation and have created current and future environmental hazards. If necessary, a program of hazardous site clean-up should be instituted.

#### *Industrial Emission Inventory and Quantification*

Efforts to characterize, to quantify, and ultimately to control industrial impacts on the environment are significantly hampered by a lack of centralized, comprehensive data on industrial emissions. While some data in this area are held by industrial organizations, NGOs, and national, provincial, and municipal government bodies, the readily available data are limited in detail, and scattered in their coverage. Little or no data are available for the majority of Argentine industry. A comprehensive program is needed to:

- Identify industrial activities and establishments releasing significant environmental emissions.
- Survey these industries (or a representative sampling of these industries) using one or a combination of methods including questionnaires, interviews, and site inspections, sampling and analysis, analysis of production/waste ratios, or others, and characterize and quantify industrial emissions.
- Develop a data base allowing analysis of industrial emissions nation wide by industry, or by region, metropolitan area, watershed, river reach, pollutant type; and
- Implement a requirement for reporting by industry of new or significantly changed emissions likely to have significant environmental impacts.

### *Environmental Monitoring*

A program of comprehensive environmental monitoring, is needed. The goals of such a program would be:

- A thorough characterization of environmental quality.
- Development of data adequate for the assessment of potential human health and ecological impacts associated with industry, identification and prioritization of environmental hazards. Development of such a monitoring capability would involve:
  - Acquisition of appropriate, state-of-the-art sampling and analytical equipment.
  - Development of institutional capabilities to plan effective, prioritized monitoring programs, to perform sampling, sample management, and analysis, and to process and analyze the environmental quality data generated; and
  - Training of monitoring agency staff in state-of-the-art sampling and analytical techniques, and in the use of the installed equipment.
  - Preparation of a prioritized monitoring program, focused initially on areas deemed most likely to exhibit high contaminant concentrations, and to be associated with significant human exposure and human health risks.

#### **3.1.4**      *Institutional Strengthening*

Institutional development and strengthening should focus on the enhancement of existing capabilities, and development of new capabilities where necessary, to implement the above-suggested environmental legislation and waste programs. This includes the development of focused, specific functional groups and centres of expertise. For example, institutions should be developed that are devoted to, and have a high level of expertise in:

- Industrial pollution control and emission reduction engineering.
- Inert industrial waste management.
- Hazardous/toxic substance and hazardous waste management.
- Environmental impact and human health risk assessment.
- Industrial safety and catastrophic accident prevention/mitigation.

- Environmental economics and policy, including development and assessment of fiscal instruments for encouraging environmentally sound industrial development; and
- Environmental monitoring.

Environmental institution development/strengthening should involve a training program for environmental institution staff, providing specialized training in state-of-the-art methods and technology. This training program should include upper management (providing an overview of environmental policy and implementation approaches); middle management (providing both an overview of approaches to environmental management, and a comprehensive review of applied techniques in specific areas), and environmental professionals (providing in-depth training in applied assessment techniques in specific areas).

## 3.2 EGYPT

### 3.2.1 Introduction

In this section we discuss the potential for future action to target industrial environmental problems in the following categories:

- Provision of pollution control technology in industry.
- Institutional strengthening and policy development.
- Training and awareness raising.
- Pollution monitoring.

These are the key areas which the consultant believes offer the greatest potential, and we recommend that in future work in Egypt, UNIDO should consider building on the project concepts offered in these areas.

In addition, particular projects currently being planned which we recommend UNIDO consider becoming involved with are as follows:

- *Industrial Restructuring, Energy Conservation and Pollution Control Project.* This project, currently being put together by the World Bank, focuses on the industrial plants in Helwan. The project aims to select, design and install energy efficient / pollution control equipment that is economically viable, as well as to develop capabilities within industry for the management of pollution control. The project will include a major environmental assessment of industrial activity in the Helwan area.
- *Human Resources and Manpower Development for Industrial Environmental Management.* This project, the first phase of which is currently being executed by the Alexandria High Institute of Public Health, aims to develop human resources for industrial environmental management at the

decision maker, engineer and industrial worker levels. Further funding is needed to carry through the further phases of the project.

- *Innovative Clean Technology.* Phase I of this project is currently being executed by the Alexandria High Institute of Public Health. The project aims to research appropriate clean technology solutions for industry in Alexandria, and to implement the solutions in future phases. Funding for Phases II and III is being sought from donors.

These projects are described in further detail in Table 6.2a of the Egypt field report.

### 3.2.2 *Provision of Pollution Control Technology in Industry*

During the consultant mission to Egypt it was not possible to identify specific industrial projects that need to be targeted for pollution control, beyond those which have already been identified and are currently being planned (these are shown in Table 6.2a of the field report). There is certainly an important need for funding of pollution control technology and implementation in Egypt, and the following are recommendations as to how this should best be achieved.

- *Develop an Area-Wide Approach.* Many industrial plants in Egypt are clustered into key industrial regions. These include, for example, the Helwan area and the Shoubra el Kheima area. It is appropriate to develop area-wide programmes for tackling pollution from industry in these areas, including the development of shared waste treatment facilities, combined in-plant training schemes, provision of pollution control equipment in several plants bringing economies of scale. This approach is being taken up in recent initiatives, such as the World Bank work targeting the Helwan area, in which an environmental assessment of the whole area is to be undertaken. This approach is recommended for other regions in Egypt. Of key importance here is the coordination between donors, as area-wide programmes will often be too large for funding by a single donor agency.
- *Target Projects which have Already Been Identified.* Much work has been done in identifying plants which need pollution control equipment. It is not appropriate to launch further plant identification missions before making use of the extensive surveys of industry on a plant by plant basis undertaken by GOFI with USAID and GOE funding. Many of the pollution control projects identified in the USAID funded Industrial Sector Pollution Control Project, for example, have been the subject of preparation of pollution control plans, but have not yet been implemented due to lack of funds. In addition, GOFI and EEAA have identified numerous plants for which pollution control is a priority.

- *Focus on Clean Technology.* In future projects for the design and implementation of pollution control technology it will be important to focus on appropriate clean technology rather than costly end-of-pipe treatment. In Egypt there is much scope for the application of clean technology in industry, and many applications need not be costly. This includes waste minimisation to reduce total volume and toxicity of a waste through source reduction, recycling and treatment. The scope for the application of innovative clean technology to Egyptian industry has been examined for several key industries in Alexandria (Hamza, 1991).
- *Coordinate of Activities.* It will be essential for donor agencies to coordinate their funding priorities and their activities in the field of industrial pollution control. It is understood that steps are being taken to improve donor coordination.

### 3.2.3

#### *Institutional Strengthening and Policy Development*

- *Coordination of Activity* In the field report attention was drawn to the overlap of responsibilities in certain areas relating to pollution control. This is a key area in which policy development for the future will be important. EEAA, which is currently being restructured, will play a key role in advising on such policy development. Technical assistance will be important to make sure that the experience of other countries in developing environmental policy is taken into account in Egypt, and that coordination of environmental policy can be targeted in the most effective way for combating environmental pollution in all of Egypt's industry, public and private sector. The monitoring and control of industry in the private sector and the various public sector ministries is an important focus.
- *Development of Legislation* The problems of enforcement of environmental legislation in Egypt are related to the content of legislation itself. New legislation is coming out which may address the issues. The key problem is in the pollution standards being very rigid, setting targets which are very difficult to reach by industry and which may require investments in pollution control which are not optimal in terms of efficiency and overall pollution control. It may be appropriate to review industrial pollution legislation, and perhaps introduce a graded set of targets. Technical assistance in the review and preparation of industrial pollution legislation may be needed.
- *Development of Policy on Enforcement* Related to the above points, policy should be developed for enforcement of environmental standards. There is a need for clarification of responsibilities for enforcement between the ministries, and ideally for one agency, perhaps EEAA, to take a coordinating role. This should be developed with coordination of environmental monitoring and measurement. Assistance may be needed in the development of such policy.

- *Development of a National Policy on Hazardous Waste Management* There is an important need to develop a national policy to coordinate and manage disposal of hazardous waste, which is currently carried out by private contractors in an unregulated way.
- *Development of Scheme for Registration of Industry and Control of Industry Discharge Permits* Significant progress has been made in the area of industrial registration, and discharge permits are also issued in Egypt. As part of the improvement in coordination of environmental pollution control, these existing procedures should be streamlined.
- *Development of Procedures for Environmental Impact Assessment* Technical assistance may be required in development of a procedure for EIA appropriate to the institutional context for environmental management in Egypt.
- *Assistance to EEAA* The EEAA is currently at a key point in its development, due to its restructuring and expansion. Technical assistance to the nascent departments of EEAA would be valuable in maximising the opportunities for developing the capacity of EEAA.
- *Establishment of an Environmental Information Centre* Information on industrial pollution is very scattered in different institutions at present. Assistance would be very valuable to establish an information centre which would gather information on environmental issues in general, including industrial pollution. Such information would include research, government reports, consultant reports, donor studies etc., and it should be indexed in a computer. The ideal location for such a centre would be in EEAA, which is currently planning to develop its information and computer capacity. As a specific example, it will be important to computerise the information being gathered at present in the project to prepare a map of industrial pollution in Egypt (EEAA/GOFI). Assistance in this area may be appropriate.

### 3.2.4

#### *Training and Awareness Raising*

- *In-plant Training.* In-plant training in environmentally sound working practices is a key need in Egyptian industry. Such training would be very cost effective in reducing pollution through better handling, storage of raw materials, maintenance of existing pollution control equipment etc. Allied to this is the need to improve occupational health and safety. Such training could be provided by industrial training teams based in a university or institutions such as the National Research Centre or the High Institute for Public Health in Alexandria, which would mount training programmes in specific areas. Such programmes would need to be monitored and reviewed, and held regularly. Funding for this activity is an important priority.
- *Development of Training Capacity at the Technician Level* The area of greatest need for strengthening of environmental education capacity in Egypt is at

the level of diploma, or technician level: this level technicians need to be trained to work in industries directly and to work in the waste water treatment plants that are being set up. Funding for establishment of a course for such technical skills, focusing on developing practical skills rather than theoretical skills, is an important priority. Such a course could be located at any one of several universities or research centres in Egypt.

- *Visits to Pollution Control Operations in Other Countries.* Staff of government institutions with responsibilities for pollution control would benefit significantly by being able to visit pollution control operations in the developed world or other parts of the developing world. This would give them practical experience of how pollution control can work. Funding for such initiatives is more appropriate than funding of theoretical training, which is already available in Egypt.
- *Awareness Raising* The raising of awareness of industrial pollution issues is an important focus for Egypt. This is necessary for the whole Egyptian population, in particular targeting the industrial workers of Egypt. This can be combined with the in-plant training initiatives identified above, but also additional measures are appropriate:
  - Use of television as a media for building awareness of industrial pollution.
  - Education in schools.
  - Briefing for journalists.

### 3.2.5 *Pollution Monitoring*

As has been indicated in the field report there are a number of institutions with capacity for environmental monitoring. Projects are already being funded to develop the existing capacity through training, for example at El Tebbin Metallurgical Institute.

The need in pollution monitoring is for coordination of the efforts of the different organisations. In addition it is important that the results of all the various initiatives aimed at monitoring pollution are interpreted together so that an overall indication of the health of the environment becomes possible. This may require the development of models for the interpretation of existing data.

## 3.3 *THAILAND*

### 3.3.1 *Introduction*

During the consultant mission to Thailand, the consultant prepared a draft Action Plan for the Future, which is based on an early draft prepared by the Ministry of Industry (MOI), and discussions with staff in MOI, other

government agencies and UN officials. The draft Action Plan presented in the field report does not therefore necessarily represent the views of MOI or the final version of the Action Plan that will be prepared for the national report for UNCED.

Nevertheless, the field report identifies a number of key priorities for targeting industrial pollution, and outlines resource requirements which will be needed to implement the action plan. The potential for further UNIDO assistance can be seen in this context.

### 3.3.2 *Priority Environmental Targets*

The rapid rate of industrial growth and the changing structure of Thailand's manufacturing industry call for a comprehensive programme of actions to tackle the potentially harmful environmental impacts of industrialisation; this programme should be an integral part of a nationwide approach to environmental protection. The MOI has identified the following as its environmental priority areas:

- *Hazardous Waste.* The MOI gives high priority to the development and use of hazardous waste treatment and disposal facilities, particularly for industrial estates and for small-medium sized factories.
- *Water Pollution.* The MOI will continue to give high priority to control of industrial BOD loadings and monitoring of use of waste water treatment plants, as well as to the setting and enforcement of appropriate effluent discharge limits.
- *Air Pollution.* The control of industrial emissions of SO<sub>2</sub> and SPM are a priority target, particularly in populous area.
- *Greenhouse Gases and Ozone Depleting Substances.* The MOI is giving priority to the development of a country paper and action plan for ozone depleting substances, and to the development of national policies and action plans to deal with greenhouse gases.

The MOI's action plan to combat industrial pollution from 1992 onwards will make use of the full range of mechanisms available to the government. These mechanisms include legislation and standards setting, monitoring and enforcement, technology transfer, institutional strengthening and training, the use of market mechanisms such as charges and subsidies, and tapping all available funding sources, eg. those available through international negotiations.

In particular, it appears that there may be greater scope for using market mechanisms than is presently the case. To date, efforts to control industrial pollution have focused on developing the appropriate regulatory framework. Now that this is largely in place, the emphasis should be directed towards monitoring and enforcement, as well as on using market mechanisms to



create an appropriate framework of incentives for industries to limit and treat their own wastes. There should therefore be an investigation into the scope for greater use of market mechanisms for control of industrial pollution.

The MOI is recommending a number of regulatory policy adjustments and the use of appropriate market mechanisms. The actions proposed by the MOI include:

- The study and construction of industrial waste treatment centres with central government funding, which are then leased to the private sector to operate, with rents and fees paid to the government in order to cover the investment costs in the long term.
- A reduction in the maximum sulphur content in fuel oil and diesel oil from 3.5% to 2% immediately, with a goal of reducing it to 1% in the long run.
- Prohibition of the establishment of new highly polluting factories or the extension of existing facilities for existing highly polluting factories in the Bangkok area, to include any factories burning coal or lignite.
- Establishment of air emission standards for industry.
- Improved monitoring and enforcement of industrial pollution regulations and standards through actions to increase private sector activities and the strengthening of the DIW's resources.
- IEAT to set up industrial estates to accommodate high polluting factories, to facilitate the effective collection and treatment of industrial wastes.
- A review of BOI promotional policies, with additional incentives for environmentally responsible inward investment. The BOI should also adopt EIA screening techniques for all proposed foreign investment.

### 3.3.3

#### *Requirements for Assistance*

For the action plan being developed by the MOI, and in line with the UNCED sectoral analysis guidelines for preparation of sectoral reports, the MOI is currently assessing the implementational requirements for its action programme according to a number of criteria. The requirements for implementing the action programme are likely to include the inputs outlined below.

#### *Technical and Know-how Requirements for Corrective Actions*

The MOI identifies a need for assistance with technology transfer, development of appropriate technologies, expert advice and expert training in the following technical areas:

- All aspects of hazardous waste treatment, including collection, transportation, treatment, disposal, waste exchange and manifest systems.
- Clean technologies for all types of industries.
- Organic waste treatment eg. for distilleries.
- Air emission standards.
- Odour control of waste water treatment.
- Textile waste water treatment.
- Micro-pollutant analysis.
- Central industrial waste water treatment facilities.
- Privatisation techniques for industrial waste treatment and disposal facilities.
- CFC recovery and recycling techniques.
- CFC substitutes.
- Greenhouse gas reduction technologies for industry.

#### *Institutional, Human Resource and Training Requirements*

The MOI identifies a number of requirements for integrating the environmental and development goals for the industrial sector, in particular:

- The DIW needs to increase its staffing levels to ensure proper monitoring and enforcement.
- More laboratories are needed to analyse waste effluents and emissions, both in the BMR and in other provinces.
- More well-trained environmental engineers and scientists are needed if the action programme is to be implemented.
- The capacity of domestic educational establishments must be increased in order to provide government agencies and the private sector with qualified environmental experts.
- More financial resource are therefore required if the DIW is to have the capacity to implement the MOI's action programme.