



Ex post Evaluation for Environmental Preservation and Pollution control in the Mining Industry

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Report

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EX POST EVALUATION FOR THE ENVIRONMENTAL PRESERVATION AND POLLUTION CONTROL IN THE MINING INDUSTRY

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ACRONYMS

ANAMIMH: ASOCIACION NACIONAL DE MINERIA METALICA DE HONDURAS.
(NATIONAL METAL MINING ASSOCIATION OF HONDURAS).

BID: BANCO INTERAMERICANO DE DESARROLLO.
(INTERAMERICAN DEVELOPMENT BANK).

CESSCO: CENTRO DE ESTUDIOS Y CONTROL DE CONTAMINANTES.
(CENTER FOR THE STUDY AND CONTROL OF CONTAMINANTS).

DECA: DIRECCION DE EVALUACION Y CONTROL AMBIENTAL. (ENVIRONMENTAL
EVALUATION AND CONTROL DIRECTORATE).

DEFOMIN: DIRECCION GENERAL DE MINAS E HIDROCARBUROS.
(MINES AND HYDROCARBON GENERAL DIRECTORATE).

ESA: ECONOMIA, SOCIEDAD Y AMBIENTE.
(ECONOMY, SOCIETY AND ENVIRONMENT).

JICA: JAPAN INTERNATIONAL COOPERATION AGENCY.

USAID: UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

EX POST EVALUATION FOR THE ENVIRONMENTAL PRESERVATION AND POLLUTION CONTROL IN THE MINING INDUSTRY PROJECT

1. BACKGROUND

Mining, is one of the strategies defined by the government for attracting foreign currency, it is therefore necessary to strengthen the Environmental Unit of the Mines and Hydrocarbons General Directorate so that this extraction may be carried out without deteriorating the environment. Currently there is world consensus on preservation and protection of the environment, and Honduras is no exception, as in this country, both government institutions and the private sector are concerned about facing the causes that have any adverse environmental impact. Therefore the Japanese International Cooperation Agency (JICA) and the Mines and Hydrocarbons General Directorate signed an agreement (in April of 1997) to initiate the *Environmental Preservation and Pollution of the Mining Industry Project*. The general objective of this project is to determine appropriate technologies for the environmental conservation and control of mining industry pollution, thereby reducing any adverse impact on the environment. To achieve the general objective the project has carried out monitoring inspections through water and soil sampling (which are analyzed in laboratory) in active and inactive mines.

The environmental preservation project envisioned at starting point: the donation of laboratory equipment (to the Environmental Unit by JICA) to make water and waste analysis; to send Environmental Unit staff to Japan to carry out studies on environmental preservation and contamination control; to train technicians of other institutions related to the sector, through seminars on Environment and Mining; and to perform environmental diagnoses to share with communities where mining activity is carried out.

The project has been functioning for three years and the same as other projects that have JICA financing; this project is also subject to evaluations for effectiveness, efficiency, relevance, sustainability and impact. In this sense a mid term evaluation (in April of 2000) which concludes that most of the established objectives to date have been reached, an ex post evaluation was programmed that would allow an overall performance inference and possible lessons learned, to make adjustments for future projects of a similar nature.

2. EVALUATION POINTS

2.1. EVALUATION OBJECTIVES

The general objective of the evaluation is to determine, by means of an analysis, in an ex post way the effectiveness, efficiency, impact, relevance and sustainability of the project based on:

- A revision of the general objectives
- Conditions and initial inputs
- Initial activity plan
- Achievements in work frame implementation
- Achievements as far as activities done

The evaluation should also determine lessons learned, as well as generate conclusions and recommendations.

2.2. PEOPLE INTERVIEWED FOR THIS EVALUATION

- Lic. Amilcar V. Zuñiga, Executive Director of DEFOMIN
- Ing. David Pineda, Head of Chemical Laboratory, DEFOMIN
- Lic. Cesar Rodriguez, Environmental Control and Development, DEFOMIN
- Dagoberto Fortin, Administrator of DEFOMIN
- Kinso Asari, JICA (project) Expert
- Koji, Kawakita, JICA Expert (DEFOMIN)
- Dr. Marco Guzman, Chemical Laboratory, DEFOMIN
- Lic. Miguel Angel Arévalo, Director of DECA, Environmental Secretariat
- Dr. Luis Munguía, Director of CESSCO, Environmental Secretariat
- Lic. Mirian Bueso, Director of ANAMIMH
- Renis Orlando Sandoval, Mayor San Ignacio
- Juan Carlos López, Municipal Environmental Unit of San Ignacio
- Rodolfo Hernandez, Environmental Department of the Entre Mares (Between Seas) Mining Company, San Ignacio

2.3. EVALUATION STUDY PERIOD

The consultancy will take place over a 5-week period starting from the moment of signing of the service contract.

2.4. EVALUATION METHODOLOGY

To achieve the evaluation objectives the quality verification indicators will be clarified (see table below) for each one of the points of the logical frame that has been designed for the project. How to determine efficiency, effectiveness, relevance, sustainability and impact is by means of the evaluation charts (see annex) for each one of the objectives being evaluated. The results of these qualifications are accompanied with information that is obtained from the interviewed people and the materials collected. The means of verification of the indicators will be made by interviews and using DEFOMIN files. The important suppositions, within the logical frame that will serve as a guide to the evaluation, are: The political and economic situation of Honduras continues to remain stable, DEFOMIN has financial stability, the facilities and equipment are secure, the mining companies cooperate with the project and the staff DEFOMIN has been assigned as project counterpart.

DEFOMIN PROJECT LOGICAL FRAME

PROYECT SUMMARY	VERIFICATION INDICATOR
<u>General Objective:</u>	
Promote mining industry development without causing contamination	No. of contamination cases caused by the mining industry. No. of Mines
<u>Project Purpose:</u>	
Do a joint study on the appropriate technology and on improving the skills and knowledge on environmental conservation, specifically on mining industry contaminant control.	<ul style="list-style-type: none"> • Policies • Guidelines • No. of mines surveyed • Other measures taken on contamination control.
<u>Results:</u>	
Research on present conditions of mining contamination	<ul style="list-style-type: none"> • Results from data collected • No. of samples analyzed by DEFOMIN
Improved technology on harmful material treatment by DEFOMIN	<ul style="list-style-type: none"> • Technical level of Staff • No. of seminars.
Environmental monitoring methods established	Policies, guidelines, and other monitoring measures carried out
<u>Activities:</u>	<u>Input</u>
1.1 Existing information, data collection and revision	On the Japanese side: Two long term experts Eight short term experts Equipment On the Honduran side Local cost budget Counterpart Office and space for equipment installation
Field surveys	
1.3 Environmental sample analysis	
2.1 Waste water treatment training	
2.2 Toxic (harmful) material treatment training	
2.3 Dam design and maintenance training	
3.1 Existing data and information collection	
3.2 Joint study on monitoring methodology	

3. INITIAL PROJECT PLAN

3.1. OBJETIVE OF ESTABLISHING A MINING ENVIRONMENTAL UNIT

The objective of establishing this unit is to provide continuity to the environmental preservation and pollution control of mining, which will use the donated equipment for monitoring and control activities, as well as staff trained for this type of work.

3.2 PROJECT OBJECTIVES

The technical team established by the project must have sufficient capacity to investigate any claims on negative external products of the mining or quarry industry that are made to the Mining and Hydrocarbon General Directorate (D.G.M.H. Among the specific objectives of the unit we have:

Improve the technology in the treatment of toxic and harmful substances

- Have strict control on environmental monitoring in mining areas.
- Establish measures to lessen negative environmental impacts produced by acid water drainage and heavy metals.
- Provide service of sample chemical analysis to any individuals or businesses interested in water, soil and mineral analysis.
- Provide technical training to staff from mining companies and technical staff from state agencies related to this activity.
- Form an inter-institutional communication network jointly with the international cooperation.

3.3. INITIAL ACTIVITY PLAN AND INPUT

The environmental unit is composed of several sections: Environmental Technical Section, Laboratory Section and Administrative Section. The Environmental Technical Section performs monitoring and evaluation in the working mines zones and checks compliance of any established norms. The Laboratory Section performs the chemical analysis, establishes sectorial norms based on the analysis. The Administrative Section is in charge of staff training, maintaining communication with other institutions and administers the funds that the laboratory generates.

Scope of work of the Environmental Unit Sections for Mining

Environmental Technical Section	Laboratory Section
<ol style="list-style-type: none"> 1. Maintain a strict control of environmental monitoring in the mining areas, through the exploration, extraction and abandonment stages. 2. Establish negative impact reduction measures produced by mining activities. 3. Provide assistance for the design of tail dams, as well as to supervise those under construction and inspect those in operation. 4. Invigilate compliance, by the mining industry, of the security and environmental safety norms. 5. Evaluate environmental impact on the mining exploration and exploitation. 6. Make recommendations for the solution of environmental problems that may arise. 7. Verify the compliance of environmental contamination control norms by the mining metallurgy industry. 8. Participate in preparing mining sector diagnosis, development plans and associated research 	<ol style="list-style-type: none"> 1. Make qualitative and quantitative chemical (or physical) analysis of the water, soil and mineral samples. 2. Establish norms and systems to facilitate the process of registering and quality controlling the analysis. 3. Adequately register the reception and delivery of the laboratory analysis results. 4. Efficiently administer the funds that are generated by the services provided by the laboratory section.

4. PROJECT ACHIEVEMENTS

4.1. PROJECT IMPLEMENTATION FRAME

The *Environmental Preservation and Pollution of the Mining Industry* project appears at a timely moment, to support the initiatives of environmental preservation in the areas with mining exploitation potential. The project settles within the offices of the General Directorate of Mines and Hydrocarbons that later becomes the Mining Development Directorate. Project planning contemplated the installation of a chemical laboratory for the analysis of samples and a unit with personnel for environmental monitoring and follow up. The project is designed in such a way to work within the DGMH with technical personnel from JICA (two long term and 8 short term experts) and the counterpart personnel who should be Ministry of Natural Resources staff that have the appropriate training and are willing to be trained in the environmental area and that of control of pollutants of the mining industry. The proper operation of the project would depend administratively on the DGMH and JICA. Staffing, facilities and operation expenses would be the responsibility of the DGMH and the administrative expenses of the experts on JICA; furthermore a good project execution would be the result of good management on behalf of both institutions.

4.2. PROJECT ACHIEVEMENTS IN TERMS INITIAL INPUTS

The project inputs would be the laboratory equipment, payment of the expert's salaries and operative expenses covered in their entirety by JICA. The government of Honduras financed the physical facilities, the salaries and operation expenses of counterpart personnel.

From interviews with people that participated in the initial phase of the project most of the inputs arrived appropriately (experts, laboratory equipment, training and operation expenses for the experts). However, the delivery of the counterpart inputs suffered delays, counterpart personnel assigned to the project was not enough nor the most suitable, people were assigned with very diverse studies and related to environmental monitoring or to laboratory analysis. As far as laboratory personnel was concerned they had to make use of CESCO staff, and some other people from other divisions of the Ministry of Natural Resources. On the other hand the training given by the experts, carried out at the beginning had little impact, because of a lot of staff rotation much of the training was lost when counterpart personnel abandoned the project. These problems together with the problems of a lack of prompt per diem expense assignment to counterpart personnel made project programming suffer unforeseen delays. Additionally, at the end of 1998 Hurricane Mitch produced a halt in government activities, affecting negatively the programming and good operation of the project. But in spite of these setbacks the project continued to make its presence felt within the mining sector.

4.3. PROJECT ACHIEVEMENTS IN TERMS OF ACTIVITIES

The activities of the project were very well defined from their beginning, and within the context in which the project was executed most of the activities that had been planned were carried out, therefore:

4.3.1. Field surveys

A total of 78 visits to 49 mine sites took place. The findings were that most of them were not contaminating, and this was due to the fact that most of them were not being exploited. Places with possible problems of contamination summed to a total of 6, three active mines and two where gold is being extracted by hand, as well as one abandoned mine. The survey of each one of the sites was precise and descriptive, pointing out the main characteristics of the surroundings. The first field trips were for recognizing purposes, followed by monitoring activities for environmental impact on the potential sites and of mine operation sites once the counterpart personnel was qualified in monitoring techniques and sample analysis. In order to do the environmental monitoring and the sample analysis the Japanese experts developed two manuals to serve as methodological guides. One for Laboratory called “Analysis of Internal Standards, Methods and Norms” done in March of 2000. This manual contains the internal standards, methods, norms and limits established for the environment, for samples obtained in mining areas. For the environmental monitoring unit a manual was developed that determines how to take field samples, the regularity with which they should be taken and the use of the field equipment.

Table Summary of Mining Site Visits

Mine	No. of visits	No. of samples taken	No. of parameters measured	No. of field instruments used	No. of types of laboratory analysis made
San Andres	4	53	8	4	3
El mochito	2	28	7	7	3
Aqua Fria	3	28	6	5	1
Baldoquin	4	17	7	3	2
San Martin	1	17	7	4	3
Clavo Rico	4	14	7	4	1
Las Animas	3	12	5	6	3
La Victoria	2	8	5	3	1
Vueltas del Rio	1	8	5	5	1
Cruz de Oro	1	5	3	1	1
Yuscaran	2	5	3	1	1
El Raton	3	5	3	4	1
Portillo del Oro	1	5	5	2	1
Guavabillas	2	4	4	2	1
Moramulca	1	4	3	1	1
El Ocote	2	4	4	2	1
Guainiquil	3	3	7	4	1
El Oro	2	3	6	3	1
Las Minas	4	3	7	3	1
La magnolia	1	3	4	3	1
Pochota	1	3	5	2	1
La Lagunita	1	2	3	1	1
El Carmelo	2	2	4	2	1
Cacamuya	1	2	4	0	3
Parra de Uva	1	1	3	1	1
El Pique	2	1	5	3	1
Canan	2	1	0	0	0
El Transito	1	1	2	1	1
Potosí	1	1	6	3	1
Mina Potosí	1	1	0	0	3
Pinolapa	1	1	0	0	1
El Guayabo	1	0	0	0	0
Cueva del Tiare	1	0	0	0	0
La Vitamina	1	0	0	0	0
El Mamo	1	0	0	0	0
La Mina	1	0	0	0	0
La Gurfina	1	0	0	0	0
El Potrero	1	0	0	0	0
Santa Rosa	1	0	0	0	0
El Orayne	1	0	0	0	0
Ing. Amilcar Cruz	1	0	0	0	0
Mairena	1	0	0	0	0
Quebrada Grande	1	0	0	0	0
Balfate	1	0	0	0	0
Canteras Aguas Calientes	1	0	0	0	0
Matasano	1	0	0	0	0
Santa Ines	1	0	0	0	0

Mine	No. of visits	No. of samples taken	No. of parameters measured	No. of field instruments used	No. of types of laboratory analysis made
Chanton	1	0	0	0	1
Tepanauare	1	0	0	0	0
Total	78	245			11

Source: Annex , Mine Reports

4.3.2. Sample analysis

During the 78-mine site visits, in project implementation 245 field samples were taken. However, more than 70% of those samples were taken at nine mining sites (San Andres, El Mochito, Agua Fria, Baldoquin, San Martin, Clavo Rico and La Victoria) and 14 of them were only visual inspections.

Where samples at mine sites were taken, analysis was mainly made of Ph, sample temperature; free cyanide, total cyanide, heavy metals and water flow in creeks. In mine site visits up to 7 field instruments were used, the Peach meter being the most used one, and only on 8 occasions were more than three instruments used for measurements. Laboratory tests were conducted for 31 mine sites, and lab equipment used was almost entirely that of the Atomic Absorption Spectrometer. Other types of lab analysis were done in only 7 sites (usually Cyanide Analysis). The following table shows a summary of the equipment used, parameters and lab analysis most used.

**Summary Table of the Field and Laboratory Equipment Used,
and parameters measured in the Mine sites.**

	Description	El Mochito Mine (Las Vegas, Santa Barbara)	San Andres Mine (Copan)	Other Active Mines	Other Non Active Mines	Total
Field Equipment						
	Field Peach meter	2	4	13	38	57
	Conducting meter	1	3	6	14	24
	Portable Turbidity meter	1	2	4	7	14
	Photo meter –Field Color meter	1			1	2
	Pack Test	1			3	4
	Thermometer		2			2
	Chronometer			1	4	5
	Portable Conducting meter			3	13	16
	Flow meter	1				1
	Field Kyuritsu Photo meter		1	3	2	6
Total	7	12	30	82	131	
Parameters Measured						
	pH	2	4	14	38	58
	Sample temperature	1	4	14	36	55
	Environment temperature		3	10	19	32

	Description	El Mochito Mine (Las Vegas, Santa Barbara)	San Andres Mine (Copan)	Other Active Mines	Other Non Active Mines	Total
	Conductivity temperature		1	10	14	25
	Heavy metals		3	9	19	31
	Flow volume		1	2	4	7
	Total cyanide	1	4			5
	Free cyanide	1	1			2
	Iron	1	1		2	4
	Dissolved Oxygen	1				1
	Electro conductivity	1	2	2	12	17
	Manganese	1			1	2
	Turbidity	1	1	1	6	9
	Zinc				1	1
	Hexavalent chrome		1			1
	Total	10	26	62	152	250
Laboratory Equipment Used						
	Atomic absorption spectrophotometer	2	3	12	40	57
	Cyanide analyzer	2				2
	Pack Test				2	2
	Total cyanide analyzer		4			4
	Ultraviolet Ray Spectrophotometer		1			1
	Mercury analyzer			1		1
	Total	4	8	13	42	67

Source: Annex A, Mine Reports

4.3.3. Waste water treatment training

The lack of Honduran counterpart personnel at the beginning of the project caused training delays for water and soil analysis for the detection of metals and non-metals, as well as with the use of the cooperation donated equipment. To solve the problem two people were transferred to the project, one from CESSCO and the other from DECA. This allowed the project to begin the phase of waters and soil analysis, mainly due to the fact that these employees already had certain experience in laboratory analysis, which was complemented with indications from the long-term experts. The employees that were incorporated later to the laboratory were trained by their partners, and that same year (1998) a scholarship was granted to Lic. Miriam Bueso for her to receive a training course in Japan on Water Pollution Control. By February of 1999, 441 samples of water and 45 soil samples had been analyzed. Unfortunately due to personnel rotation part of the training was lost.

4.3.4. Tail dam design and maintenance training

The arrival of a Chilean expert and three Japanese short term experts 1998 allowed personnel training in tail dam design and maintenance, as well as on environmental monitoring and technology for the treatment of harmful substances. The presence of the experts allowed training to be carried out in two seminars (one in March and another in September of the same year) in which, besides project counterpart personnel, also people involved in the environmental preservation participated as well. Also in this area two counterpart staff traveled to Japan that same year to carry out studies on Environmental Administration and Mining Industry Development, and on Environmental Protection. The training on Treatment of Harmful Substances and Environmental Monitoring was carried out in 1999 as well as the training in Control of Water Pollutants, a large part of this training also got lost because those qualified had to leave the project. The seminars (organized by the project) helped inform the mining sector on the activities that the project carries out, and to inform them of the data of what is happening in the mining activity and what is being done for the protection of the environment. The main topic of the seminars was basically Environment and Mining, and in all them participation by people related to the mining activity and/or with environmental protection was fostered.

4.3.5. Data and Information Collection

Field data collection was done through the Monitoring Groups and the Chemical Analysis group made the laboratory analyses and there is also a Data Collection Group that is in charge of gathering all types of information linked to environmental contamination related to mines. And it is these three groups that form the specialized team on control of the mining contamination.

4.3.6. Monitoring Method Study

The main points of environmental monitoring are: a) collection of existing data, b) field surveys and c) the establishment of a plan for environmental monitoring. At the end of the project 79 reports had been done that contained information on samples, time of monitoring, equipment used, and necessary laboratory analysis tests, as well as qualitative observations made by the people that participated in these evaluations; for each report a conclusion was given, that could be that more observations were needed, to results that needed prompt decision making to solve environmental problems. Many of the conclusions were technical recommendations for mining companies of how to solve problems in the handling of tail dams. The results of these monitoring activities also were good to clarify doubts that some environmental groups and residents of mining regions have, on possible water and soil contamination. Most of the observations generated by the monitoring lead to deeper investigations of the detected problems.

5. EVALUATION RESULTS

5.1. IN TERMS OF EFFICIENCY

5.1.1. Was the size of the cooperation project appropriate compared to the goals of the sector and with the purpose of the project?

R /: The most widespread answer among the interviewed people (more than 80%) is yes, although some think that the project should have lasted one more year.

5.1.2. Was the time frame in which the cooperation was carried out relevant?

R /: In general Yes. The project implementation filled a need originated with the approval in 1993 of the Law of the Environment. The Japanese experts were dispatched in a timely fashion, but the arrival of the equipment and the recruiting of counterpart personnel had initial delays (the first six months).

5.1.3 Was the support system of the cooperation project appropriate?

R /: The support given by JICA was appropriate and timely, the central government support had problems of administrative support and of recruiting personnel at the beginning of the project. The director of DEFOMIN was changed several times during the life of the project, and that had a negative impact on project continuity. The support offered by the other organizations involved in the protection of the environment was very uneven; CESSCO at the beginning of the project lent one of its employees so that the laboratory project could begin to work, however as time went by, the results of the project did not fill the expectations of CESSCO, who has pointed out that the results of the analyses done by DEFOMIN are not conclusive and have little impact in the control of environmental contamination. However this point of view of CESSCO can be originated in the perception that there is duplicity of functions with this institution. DECA is the government office in charge of watching over mitigation measures, to which the mining companies have committed themselves to do, and in view of the fact that they lack an appropriate laboratory for monitoring their mining site, they see the project (now a unit of DEFOMIN) as a support for the monitoring trips, since both institutions carry out combined monitoring of the mines that are in operation. The relationship with other environmentalist organizations was limited to sharing information during the seminars that they or the project carried out.

5.1.4. Were there appropriate relationships with other cooperation projects?

R /: The relationship with other donor agencies was limited to dealing with environmental problems where interests converged, there was continued interest in the environmental preservation of Lake Yojoa, in which there has been interest on behalf of IDB, USAID and CIDA.

5.1.5 Were the mid term evaluation results used in an appropriate manner?

R /: The results of this evaluation were presented a short while before the project concluded, this only allowed the use of this analysis in remaining time frame of the project. However, due to this evaluation the administrative support to the unit improved.

5.2. IN TERMS OF EFFECTIVENESS

5.2.1. Up to what point were project results achieved?

R /: As far as training, all counterpart staff were trained, however, due labor instability inside the institution that caused the departure of technical personnel, the benefit of this training was limited. Less than 30% of the total personnel trained by the project work at this moment in DEFOMIN. Before this project was implemented, Honduras didn't have an institution that could do environmental monitoring and laboratory analysis for mining activity, the project allowed that monitoring be expanded, mainly in those areas where exploitation is gathering force. There is consent in the mining sector that the project has been a fundamental part for the improvement of the quality of services of environmental surveillance.

5.2.2. Up to what point have the project purposes been achieved?

R /: The opinion of most of the interviewees was that most of the purposes were achieved, however, an actual percentage of what has been achieved has not been measured. The mid term evaluation established that two thirds of the planned activities had already been achieved. Most of the interviewees assured that the objectives were achieved almost entirely. However, in the opinion of people that were involved in the project, the objectives achieved go from 50 to 80% depending on the goal analyzed.

Table: Initial Purpose Implementation Percentages

Activity	Implementation percentage according to the mid term evaluation	Final Implementation percentage (according to the experts)	Comments
I. Present situation survey 1. Information data collected 2. Field survey 3. Environmental samples analysis	75% 75% 80%	80% 80% 80%	The majority of those involved in the project consider that in general the majority of objectives were achieved. But also some of the project participants feel that a little more than 50% were achieved.
II. Improved techniques for the treatment of harmful wastes 1. Waste water treatment 2. Harmful substance treatment 3. Tail dam design and maintenance	70% 75% 75%	80% 80% 80%	
III. Environmental monitoring methods established 1. Data collection. 2. Field survey 3. Monitoring of mining areas established	75% 75% 80%	80% 80% 80%	

5.3 IN TERMS OF IMPACT

5.3.1. Up to what point has the project contributed to improving the mining sector?

R /: Due to this project a government unit has been established that addresses the needs of people regarding environmental contamination in the mining areas. The existence of this unit contributes to maintain the dialogue between the communities, municipal governments and mining companies when there are conflicts of interests. The credibility of the services that the unit provides has contributed to lessen the concerns of the environmental groups. The nonexistence of a legal frame of regulations of the mining activity probably limited the impact of the project in implementing greater environmental practices by those that are in mining.

5.3.2. Up to what point has the project contributed to regional development?

R/: The fact that the municipalities, in mining areas, have been involved in activities of environmental surveillance, has increase awareness of environmental matters within the communities. Also, the fact that there is contamination monitoring in the mining sector makes the businesses pay more attention to protecting their workers and neighbors, which eventually must develop into social economic improvements.

5.3.3. Have there been negative impacts?

The first corrective recommendations that the project made to the mining sector first caused certain misunderstandings among mining concerns, above all those regarding the introduction of costly environmental practices. The dwellers organized in environmental groups have had the perception that the project has been causing promotion of environmental deterioration because they have not been stricter with the mining companies. Fortunately, these points of view do not represent the majority of people involved in this sector.

5.4. IN TERMS RELEVANCE

5.4.1 Was project planning relevant?

R/: In general yes. Technically the project was very well conceived, but it should have been done within a more explicit and detailed frame of environmental regulations.

5.4.2 Were the needs of Honduras completely understood?

R/: The technical needs were understood, as well as the urgency in priority of the project. Planning did not take into account the administrative weakness that DEFOMIN was going through, which to a large degree is why the project objectives were not reached at a 100% level. Also the lack of a legal frame of mining environmental regulations contributed to minimizing to a certain degree the projects impact. But not withstanding these obstacles, the decision to implement the project was very appropriate.

5.4.3 Has the cooperation planning process been relevant?

R/: To a large degree Yes. Since the level and focus of the goals was appropriate and the quality of inputs very good. The project laboratory is probably the best one in the entire Honduran mining sector. The lab equipment arrival was delayed due to transport and entry process, which caused delay in the lab analysis planned for project initiation. The Honduras support was not well understood since there were administrative weaknesses and labor instability within DEFOMIN that had a negative effect on the project.

5.4.4 Has the implementation schedule been relevant?

R/: During the first six-month there were delays, but from then on it proved to be more useful.

5.5 IN TERMS OF SUSTAINABILITY

5.5.1. Is there organizational sustainability in the implementing agency?

R/: The project-implementing agency now has an environmental unit and a chemical laboratory. Sustainability within the organization will depend on the quality of reports it makes and the measures it takes to foster the environment. The management system is not well organized, but it is improving and the administrative practices that caused delays are being corrected. There is more awareness in avoiding personnel rotation within these units and administrative red tape is being addressed within the institution. Nevertheless, political changes in the country can endanger the sustainability of the units, or at least endanger its proper functioning.

5.5.2. Has the implementing agency got financial sustainability?

As the project has become an environmental unit and a chemical laboratory, the operation costs are in a certain way guaranteed by the state. Since the beginning of the project the possibility that the project could sell services for a recovery of costs has been considered, that would allow it to cover partly or entirely its operation costs. At the moment the mining companies are paying for the monitoring services and for the laboratory analyses, but the current revenues for the sale of these services are not enough to assure financial self-sufficiency. As mining expands, the need for these services will also increase, so that in the future independent financial sustainability from state resources may be possible.

5.5.3. Is there sustainability in Human, Equipment and Technical resources?

The technology transferred by the Japanese experts is one that is used in all the activities of environmental monitoring and laboratory analysis. Making procedure manuals for these activities has allowed the techniques learned to be able to be continued to be used as they were planned for. The loss of qualified personnel was a loss for the project, but new people have learned from those that were already qualified, and, in general one can say that the employees that have been in charge of the units as a result of this project can carry out most of the monitoring activities and analysis, in a satisfactory way. However, incorporating personnel with better knowledge of geology and the environment would contribute to the strengthening of human resources of these units. The equipment assigned to the project is of good quality and up to now has needed little maintenance. There is need for making small repairs, and there is concern over possible future failures. The facilities from the beginning have been below project expectations and they still continue to be so, but the new administration has among its concerns to look into improving these facilities.

6. LESSONS LEARNED

- In planning a project such as this, there is a need to evaluate the real capacity of the counterpart institution, in order to fulfill project agreements.
- The experts need to have a clear notion of the actual conditions within which they are going to work, in order to be more effective in technology transfer. On the other hand, it is also convenient that the experts would also be familiar with the language and culture of the project country; this facilitates communication with counterpart personnel.
- Counterpart personnel should be selected and be ready before project initiation, to avoid delays in its programming.
- It is convenient that the counterpart guarantee, as far as possible, the permanence of trained personnel.
- The project has served to catalyze within the Honduran mining sector.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1. CONCLUSIONS

- Counterpart personnel rotation was a negative element of impact on project effectiveness.
- A need in Honduran society was covered by the project, a state entity in charge of monitoring and analyzing environmental contamination caused by the mining industry.
- The project was of the right size, was well conceived and was implemented at the right moment within the needs in the environmental and mining ambiance of Honduras. (just 4 years after the Environmental Law was approved)
- Project efficiency was decreased due to the administrative weakness of the counterpart. In spite of this it has shown signs of improvement.
- The project was relevant since from the start of the project the technical needs in mining were well understood.
- The most important impact of the project is that of serving to catalyze as far as environmental contamination is concerned, between the population in mining areas and mine operators.
- Project sustainability will depend in large measure on the quality of services that it will continue to generate.
- To a great degree the objectives of the project were achieved.

7.2. RECOMMENDATIONS

- The effectiveness of a project such as this one can improve substantially if counterpart personnel is suitable, in terms of mining knowledge as well as in terms of environmental preservation.
- The Japanese experts can improve their effectiveness and efficiency to the extent that they improve their verbal communication in the Spanish language.
- A future detailed regulation on environmental norms will facilitate the effectiveness of the project (now units of DEFOMIN)
- It is convenient to assure that most counterpart personnel will remain within the institution during the entire life of the project.
- For projects of similar nature it is convenient that the counterpart institution should inform of the degree of its administrative capacity, so the experts will not have to perform administrative activities that were not originally planned.