

Reducing global environmental risks through the monitoring and development of alternative livelihood for the primary mercury mining sector in Mexico

Part I: Project Information

GEF ID

10086

Project Type

FSP

Type of Trust Fund

GET

CBIT/NGI

CBIT

NGI

Project Title

Reducing global environmental risks through the monitoring and development of alternative livelihood for the primary mercury mining sector in Mexico

Countries

Mexico

Agency(ies)

UNEP

Other Executing Partner(s):

INECC

Executing Partner Type

Government

GEF Focal Area

Chemicals and Waste

Taxonomy

Waste Management, Chemicals and Waste, Focal Areas, Hazardous Waste Management, Protected Areas and Landscapes, Biodiversity, Terrestrial Protected Areas, Emissions, Mercury, Land Degradation, Sustainable Land Management, Restoration and Rehabilitation of Degraded Lands, Income Generating Activities, Community-Based Natural Resource Management, Sustainable Forest, Influencing models, Demonstrate innovative approaches, Stakeholders, Civil Society, Community Based Organization, Non-Governmental Organization, Academia, Indigenous Peoples, Private Sector, SMEs, Individuals/Entrepreneurs, Type of Engagement, Information Dissemination, Partnership, Consultation, Participation, Beneficiaries, Communications, Awareness Raising, Education, Public Campaigns, Behavior change, Strategic Communications, Local Communities, Gender Equality, Gender Mainstreaming, Women groups, Sex-disaggregated indicators, Gender-sensitive indicators, Gender results areas, Access and control over natural resources, Participation and leadership, Knowledge Generation and Exchange, Access to benefits and services, Capacity Development, Capacity, Knowledge and Research, Knowledge Generation, Training, Workshop, Learning, Theory of change, Indicators to measure change, Knowledge Exchange, Field Visit, South-South, North-South

Rio Markers**Climate Change Mitigation**

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 0

Submission Date

6/12/2020

Expected Implementation Start

1/1/2021

Expected Completion Date

12/31/2025

Duration

5In Months

Agency Fee(\$)

668,325.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
CW-1-1	Quantifiable and verifiable tons of mercury eliminated or reduced	GET	7,035,000.00	51,068,844.00
		Total Project Cost(\$)	7,035,000.00	51,068,844.00

B. Project description summary

Project Objective

Prevent the risks to environment and human health from mercury through the control of primary mercury mining and enabled environmentally and socially sound alternative economic activities and livelihoods in the state of Queretaro

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Characterisation of primary mercury mining and reinforcement of control mechanisms	Technical Assistance	1. The Government monitors primary mercury mining and adopts an adequate regulatory framework.	1.1 Modifications to the existing legislative and regulatory frameworks on mercury production, management, use and trade, are developed with relevant government experts, representatives from NGOs and key stakeholders; 1.2 Relevant agencies' capacity to identify and quantify mercury sources, including ongoing monitoring of mercury emissions and releases in the primary mining sector enhanced; 1.3 Site specific remediation mapping and planning are undertaken;	GET	1,900,000.00	21,177,510.00

Introduction of alternative livelihood	Technical Assistance	2. Miners in Queretaro adopt alternative income generation activities.	2.1 Alternative economic activities and livelihoods for miners and local communities identified; 2.2 Awareness of miners and local communities of the Minamata Convention obligations enhanced;	GET	4,650,000.00	24,250,000.00	
Monitoring and evaluation	Technical Assistance	3. Project achieves objective on time through effective monitoring and evaluation	3.1 Periodic monitoring and terminal evaluation of project implemented and complete.	GET	150,000.00	1,100,000.00	
Sub Total (\$)					6,700,000.00	46,527,510.00	
Project Management Cost (PMC)							
					GET	335,000.00	4,541,334.00
Sub Total(\$)					335,000.00	4,541,334.00	
Total Project Cost(\$)					7,035,000.00	51,068,844.00	

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Recipient Country Government	SEMARNAT - DGGIMAR	In-kind	Recurrent expenditures	967,555.00
Recipient Country Government	SEMARNAT - UCAI	In-kind	Recurrent expenditures	725,829.00
Recipient Country Government	SERMARNAT - INECC	Equity	Investment mobilized	2,482,718.00
Recipient Country Government	SERMARNAT - INECC	In-kind	Recurrent expenditures	430,000.00
Recipient Country Government	Ministry of Wellness	In-kind	Recurrent expenditures	150,000.00
Recipient Country Government	SERMARNAT - QRO	In-kind	Recurrent expenditures	2,862,742.00
Recipient Country Government	State of Queretaro – Sustainable Development	Loans	Investment mobilized	40,000,000.00
Others	University of Queretaro	In-kind	Recurrent expenditures	3,150,000.00
GEF Agency	UNEP	In-kind	Investment mobilized	300,000.00
			Total Co-Financing(\$)	51,068,844.00

Describe how any "Investment Mobilized" was identified

The investment mobilised co-financing consists of a development fund set up by the Government of Queretaro to promote small and micro enterprises development in the state.

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
UNEP	GET	Mexico	Chemicals and Waste	Mercury	7,035,000	668,325
Total Grant Resources(\$)					7,035,000.00	668,325.00

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required



PPG Amount (\$)

200,000

PPG Agency Fee (\$)

19,000

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
UNEP	GET	Mexico	Chemicals and Waste	Mercury	200,000	19,000
Total Project Costs(\$)					200,000.00	19,000.00

Core Indicators

Indicator 4 Area of landscapes under improved practices (hectares; excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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2000.00	2000.00	0.00	0.00
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Indicator 4.1 Area of landscapes under improved management to benefit biodiversity (hectares, qualitative assessment, non-certified)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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1,000.00	1,000.00		
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Indicator 4.2 Area of landscapes that meets national or international third party certification that incorporates biodiversity considerations (hectares)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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Type/Name of Third Party Certification

Indicator 4.3 Area of landscapes under sustainable land management in production systems

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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Indicator 4.4 Area of High Conservation Value Forest (HCVF) loss avoided

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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1,000.00	1,000.00		
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Documents (Please upload document(s) that justifies the HCVF)

Title	Submitted
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Indicator 5 Area of marine habitat under improved practices to benefit biodiversity (excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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Indicator 5.1 Number of fisheries that meet national or international third party certification that incorporates biodiversity considerations

Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
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Type/name of the third-party certification

Indicator 5.2 Number of Large Marine Ecosystems (LMEs) with reduced pollutions and hypoxia

Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (achieved at MTR)	Number (achieved at TE)
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0	0	0	0
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LME at PIF	LME at CEO Endorsement	LME at MTR	LME at TE
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Indicator 5.3 Amount of Marine Litter Avoided

Metric Tons (expected at PIF)	Metric Tons (expected at CEO Endorsement)	Metric Tons (Achieved at MTR)	Metric Tons (Achieved at TE)
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Indicator 9 Reduction, disposal/destruction, phase out, elimination and avoidance of chemicals of global concern and their waste in the environment and in processes, materials and products (metric tons of toxic chemicals reduced)

Metric Tons (Expected at PIF)	Metric Tons (Expected at CEO Endorsement)	Metric Tons (Achieved at MTR)	Metric Tons (Achieved at TE)
560.00	140.00	0.00	0.00

Indicator 9.1 Solid and liquid Persistent Organic Pollutants (POPs) removed or disposed (POPs type)

POPs type	Metric Tons (Expected at PIF)	Metric Tons (Expected at CEO Endorsement)	Metric Tons (Achieved at MTR)	Metric Tons (Achieved at TE)

Indicator 9.2 Quantity of mercury reduced (metric tons)

Metric Tons (Expected at PIF)	Metric Tons (Expected at CEO Endorsement)	Metric Tons (Achieved at MTR)	Metric Tons (Achieved at TE)
560.00	140.00		

Indicator 9.3 Hydrochlorofluorocarbons (HCFC) Reduced/Phased out (metric tons)

Metric Tons (Expected at PIF)	Metric Tons (Expected at CEO Endorsement)	Metric Tons (Achieved at MTR)	Metric Tons (Achieved at TE)

Indicator 9.4 Number of countries with legislation and policy implemented to control chemicals and waste (Use this sub-indicator in addition to one of the sub-indicators 9.1, 9.2 and 9.3 if applicable)

Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
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1

Indicator 9.5 Number of low-chemical/non-chemical systems implemented, particularly in food production, manufacturing and cities (Use this sub-indicator in addition to one of the sub-indicators 9.1, 9.2 and 9.3 if applicable)

Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
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Indicator 9.6 Quantity of POPs/Mercury containing materials and products directly avoided

Metric Tons (Expected at PIF)	Metric Tons (Expected at CEO Endorsement)	Metric Tons (Achieved at MTR)	Metric Tons (Achieved at TE)
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Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
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Female	500	53,000		
Male	500	47,000		
Total	1000	100000	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

The project will eliminate the production of at least 140 tons of mercury and associated wastes from the Sierra Gorda region in the state of Querétaro. This is extrapolated to 4 years. The 19 mines surveyed during the Project Preparation Grant (PPG) period reported producing an estimated 102 tons of mercury each year. The project is expected to run five years, reducing production incrementally by 15 % each year, beginning in year 2. Thus in year 2, a reduction of at least 15 tons is expected. In years 3 and 4 reductions of at least 30 and 45 tons, respectively, are expected. By year 5 the project will result in at least a 50 % reduction in mercury production at the targeted mines. Thus cumulatively > 140 tons of mercury production is expected to be eliminated during the project's lifetime. Given the extensive environmental contamination in the region, the entire population of Sierra Gorda is expected to benefit from the project. There are approximately 100,000 people in the targeted municipalities of Cadereyta de Montes, Peñamiller, Pinal de Amoles and San Joaquin, of whom 53 % are expected to be female and 47 % are expected to be male. These beneficiaries will be reached through information, education and communication campaigns to encourage behavioural change. They will also benefit from significant reductions in the source of mercury contamination in their immediate environment. The physical footprint of individual mines can vary significantly. The surface area covered by each mine was not assessed as part of the mine inventory conducted during the PPG, though an indicative value can be derived from existing data. At present 189 mining concessions are listed in the Sierra Gorda as having been registered with the General Directorate of Mines at some point. The total area of these mines is given as 67,043 hectares, or approximately 350 hectares of surface area used per mine. On the surface then, the total area covered by these mines may exceed 6,650 hectares. Subterranean mercury mines in the Querétaro are primarily comprised of shafts oriented toward cinnabar veins, as opposed to open-pit mineral mines. Accordingly their utilized area is likely much smaller. The extracted material, including over-burden, tailings, and residual calcines are then deposited haphazardly around the mining area where they are subject to weathering and erosion. Thus their ecological footprint is significant. Conservatively, we estimate this footprint as 4,000 hectares for the 19 mines inventoried, of which 2,000 will benefit directly from this project.

Part II. Project Justification

1a. Project Description

A1.1. the global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description);

A1.1.1 The Global Mercury Cycle

Mercury is a naturally occurring silvery grey metal that is liquid at ambient temperature. It is found most commonly in mercury sulphide ore (cinnabar), which has a deep red lustre and which has been used in ornamentation for millennia. Mercury has a high expansion coefficient and amalgamates with several other metals, including gold and silver. These characteristics have led to several important applications, including use in thermometers, blood pressure measuring devices (sphygmomanometers), electric switches and, significantly, as an amalgamate in gold and silver mining operations.

Mercury is also highly toxic to humans. Mercury intoxication manifests in neurological and kidney impairments and autoimmune effects. Symptoms may intensify and/or become irreversible as exposure duration and concentration increase. Methylmercury intoxication is commonly known as Minamata disease, after a bay in Japan where methylmercury releases were the source of severe and irreversible effects on human health. Methylmercury, when circulated throughout the body, crosses the blood-brain barrier and accumulates in the central nervous system. Likewise it easily passes through the placenta, directly affecting fetuses in utero.[1]

Cinnabar is somewhat rare, occurring in shallow veins near volcanic areas around the world. In rudimentary mercury mining, cinnabar is crushed and heated. The mercury contained within quickly vaporizes and is captured by a fume hood. The free sulphur combines with oxygen to form sulphur dioxide, an irritant. The resulting quicksilver mercury can be immediately employable in industrial applications. However, because these systems are imperfect, fugitive emissions are common resulting in free mercury releases and significant environmental contamination.

Historically, mercury has been mined primarily in Central Asia, China, Europe, and the Americas (primarily the United States and Mexico). Spain alone accounted for more than one third of the mercury ever produced. Most countries wound down primary mercury production in the late 20th century as demand from chlor-alkali plants decreased and prices declined.[2] Formal mercury mining in Mexico, for instance, ceased in 1994. However increased demand from informal artisanal small-scale miners (ASGM) a decade and a half later incited several mines to maintain operations or begin anew.

On 16 August 2017 the Minamata Convention on Mercury came into force. The Convention, which was shepherded into existence by the United Nations Environment Programme (UNEP), currently has 128 Signatories and 120 Parties (countries where it has been ratified). The treaty covers a range of issues associated with mercury production and use, providing a list of acceptable uses and applicable phase out date or reduction target. Allowances include certain medical devices and industrial applications. With regard to primary mercury mining, Article 3 of the Convention states that Parties will enforce a ban on the formation of new primary mercury mines. It further states that those mines in operation would be permitted to continue for another 15 years from 16 August 2017. In this way, the Convention endeavours to influence both the supply and demand sides of the mercury trade. Reducing permitted applications in turn reduces demand and subsequently price, which in turn facilitates mine closures.

Accordingly several major mercury mines around the world have already closed. The most significant of these is probably the Khaidarkan mine in Kyrgyzstan. Two decades ago Kyrgyzstan was the second largest mercury producer after China with annual exports of around 600 tons. In 2010 Kyrgyzstan exported about 250 tons, while in 2018, it exported only 20 tons.[3] Formal mercury applications have also declined; the use of mercury in dental amalgam is decreasing at 5.6 % per year.[4] However, driven in part by high gold prices, the use of mercury in ASGM has continued to increase. Indeed, despite significant advances in the reduction of mercury emissions from the formal sector, net anthropogenic mercury emissions are actually increasing at 1.8 % per year.[5]

With the closure of many formal mercury mines, the demand for mercury in ASGM has perversely incentivised the creation of new informal sources. In Indonesia for example, one informal mercury mining area has been estimated to produce as much as 36 tons Hg/ year.[6] The largest such informal mining area in the Americas is centred around the Sierra Gorda of Querétaro, Mexico, a vast ecological preserve where mercury was first exploited more than 700 years ago. Mercury production here is equivalent in size to 1/8–1/4 of all mercury emitted from ASGM globally, and up to half of the mercury emitted from ASGM in the Americas.[7]

A1.1.2 Root Causes and Barriers to be addressed

The root cause of ongoing primary mercury mining in Querétaro is that the region lacks the requisite regulatory and technical capacity to encourage appropriate alternative sources of income and reduce informal mercury mining. The region is characterized by disparate incomes and high rates of informality; the informal sector in Mexico contributes to perhaps 30 % of GDP and likely more in the region.[8] The conditions created by the significant natural cinnabar deposits amount to a 'resource curse.' These conditions are compounded by the closure of mines elsewhere and the increase in informal gold mining throughout Latin America.

The proposed project takes an alternatives livelihood approach based on global best practice. The following barriers will be addressed:

- Social acceptance of change in their economic activity. Mercury-related mining has been carried out in the Sierra Gorda since at least late antiquity when cinnabar was excavated for use in ornamentation. Open-pit mines for elemental mercury appeared around the 13th century.[9] The industry greatly expanded in the 20th century, with an average of 400 tons of mercury being produced each year from 1950–1994.[10] Presently informal mercury mining comprises perhaps 30 % of all mining production in the region, though official statistics do not capture illicit activity.[11] This long and uninterrupted history has resulted in a number of associated challenges. Foremost among them is a skewed perception of risk with regard to mercury exposure. This familiarity of the hazard has resulted in a low sense of urgency among miners, the broader community and regulatory agencies alike.
- Lack of education/ training of the members in the mining communities. Informal mercury mining utilizes rudimentary and labour intensive methods and is amenable to the employment of a low skill workforce. It is also well compensated relative to other opportunities in the region. Communities centred around the Sierra Gorda have historically had less access to education and training, inhibiting their adoption of the more technical and high skill livelihoods.
- Significant data gaps related to Hg in the communities and surrounding environment. There is a lack of capacity to deal with the enormity of the environmental challenge presented by mercury mining in the Sierra Gorda. More than 700 years of mining have left the region heavily contaminated with residual mercury. Much of this is bound up in tailings, though erosion and other environmental transfer mechanisms have resulted in extensive contamination. In addition to mercury contamination, poor management of mine overburden has contributed to a broader ecological footprint. The actual extent of the contamination in the Sierra Gorda is not known because of a massive capacity gap in local regulatory agencies. What few studies have been done have been carried out periodically by academics and NGOs, providing an incomplete picture. Likewise there has been essentially no risk mitigation work executed to date, owing to an absence of local expertise and resources.
- Lack of alternative profitable economic activities in the Sierra Gorda area. Querétaro state is economically heterogenous with the 6th highest GDP per capita of all Mexican states.[12] It has large manufacturing, construction and service sectors. That prosperity has not however reached the culturally and geographically isolated Sierra Gorda region, which is characterized by low wages and limited employment opportunities. Thus while mining comprises perhaps 0.05 % of the GDP of Querétaro state, it is a dominant employer in the Sierra Gorda.[13] Surveys conducted during the PPG phase indicated that miners earn from 3–7 times more than non-miners, more than half of whom subsist on wages below the national minimum wage (Appendices 8,16).
- Lack of information/ dissemination concerning the health effects of mercury and the environment in the mining communities. There is a very low level of baseline knowledge in the region about the adverse health effects of mercury exposure. What little awareness exists results from ad hoc and disconnected efforts by researchers working on discrete projects. However there have been so systematic or sustained campaigns in the region. In the context of a long history of mercury mining, this lack of knowledge has resulted in a widespread sense of complacency about mercury's health risks.
- Need for transparency, accountability, and public information and stakeholder participation mechanisms. The existent regulatory regime is disconnected from the most affected communities, having conducted limited outreach or work onsite. Monitoring data are not stored systematically and are inaccessible to the public. This disconnect characterizes much of the state's interaction with the marginalized communities of the Sierra Gorda, resulting in a broadly shared scepticism of outsiders.

- Raising technical standards of research institutions to provide a better basis for decision making and management. Much of the existing data on mercury contamination in the region has been provided by independent academic researchers. For their part regulators do not have the technical capacity to collect and analyse environmental samples or manage the data produced. Academics share their data widely however a lack of consistency in approach has not supported management decision making.
- Legal gaps. The current legal framework is incongruous with the Minamata Convention. Article 4 of the Federal Mining Law (Ley Minera) grants legal status to mercury exploitation. Likewise Article 15 grants mining permission to concessions for a period of 50 years.[14] By contrast, Article 3 subsection 4 of the Convention provides an allowance of up to 15 years for mines in operation before the Convention's entry into force. Knowledge of the Convention at the state and regional levels is minimal, and non-existent in the affected communities.

A1.2. The baseline scenario or any associated baseline projects;

A1.2.1 Basic Geography

Querétaro is an ecologically heterogenous state centrally located in Mexico about 120 kilometres northwest of Mexico City (Figure 1). It is one of the smaller states with an area just over 11,600 km² (about ¼ the size of the Netherlands) and home to about 2 million people. Nearly 30 % of the state's GDP is derived from manufacturing. Business and construction make up 18 % and 11 %, respectively.[15]

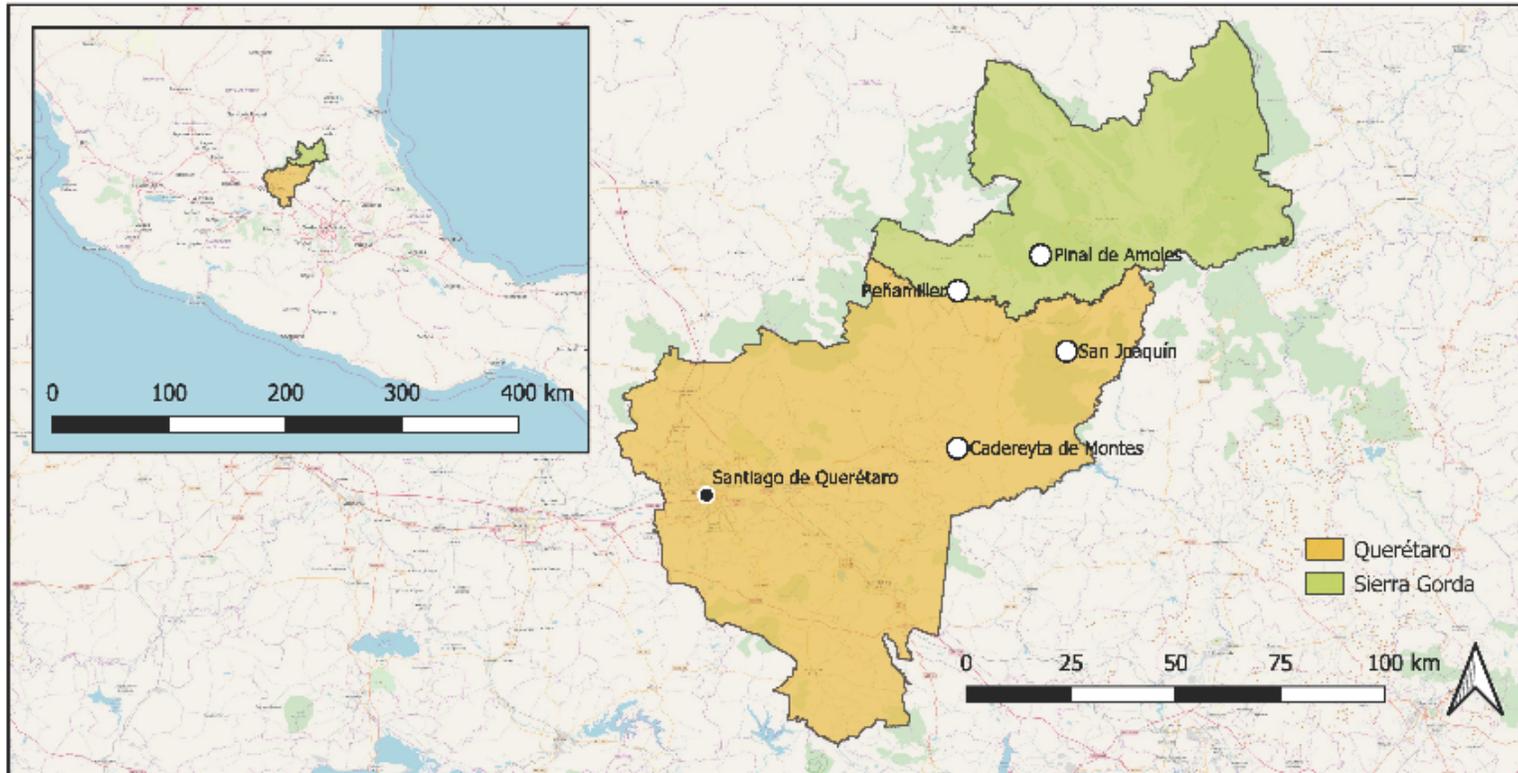


Figure 1: Relative location of Querétaro within Mexico and targeted municipalities.

The northern third of the state is completely encompassed by the ecological preserve of the Sierra Gorda, which also extends into parts of the neighbouring states of Guanajuato, Hidalgo and San Luis Potosí. The Sierra Gorda is 380,000 hectares in size and ranges from 300 to 3,100 metres above sea level. It is the most ecologically diverse protected area in the country, having both nearctic and neotropical biogeographic realms. It contains more than 1,700 plant species and 600 vertebrates, including the black bear (*Ursus americanus*), the military macaw (*Ara militaris*), the spider monkey (*Ateles geoffroyi*) all six feline species present in Mexico: jaguar (*Panthera onca*), mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), margay (*Leopardus wiedii*), ocelot (*Leopardus pardalis*) and jaguarundi (*Herpailurus yagouaroundi*). It is home to approximately 30 % of all butterfly species in Mexico.

The Sierra Gorda also contains more than 600 human settlements, with a total population of just above 100,000 people residing within Querétaro.[16] The most significant of these is Jalpan de Serra with a population of 22,000. Most populated areas in preserve are far smaller (< 500 people). There are 189 documented mines within the Sierra Gorda; 146 of which were operated in recent years. The most significant mining region within the preserve surrounds the town of Pinal de Amoles where antimony, gold, lead, mercury, silver and zinc are all exploited. A previous GEF-supported project executed by UNDP and the Mexican Secretary of the Environment (SEMARNAT) noted a number of significant threats to the sustainability of the ecosystem, including mining, illegal logging, and clear cutting for agriculture.[17]

Querétaro itself is not a major contributor to overall mine production in Mexico, comprising just 0.42 % of the total value produced by mining each year. Indeed even within Querétaro mining employs just 3 % of the working population (about 10,000 people).[18] However of the ~200 tons of mercury exported by Mexico each year, it is probable that the majority originates from this area. Current estimates place total Mexican mercury reserves at around 26,892 tons with 11,750 tons being readily accessible in ores in Querétaro. The balance is formally held in chlor-alkali plants or contained in tailings piles where extraction is more difficult.[19]

Mercury has been mined in the Sierra Gorda for more than 700 years. Production ebbed during the colonial period as the Spanish opted to support their own mines by reducing output in the Americas. Following independence, foreign investment from the UK led to the reopening of established mercury mines in the region. Increased global demand for mercury in the middle of the 20th century resulted in a spike in production with an average of 400 tons being exported annually from 1950–1994 (Figure 2). From 1840–1994, Mexico produced an estimated 35,000 tons of mercury. Production declined in the 1990s following decreases in the global mercury price, with the last formal mine closing in 1994. Output then stayed low through 2010 when Mexico exported just 25 tons of mercury. In 2011, production spiked again with 134 tons of mercury being exploited and has remained elevated since. [20]

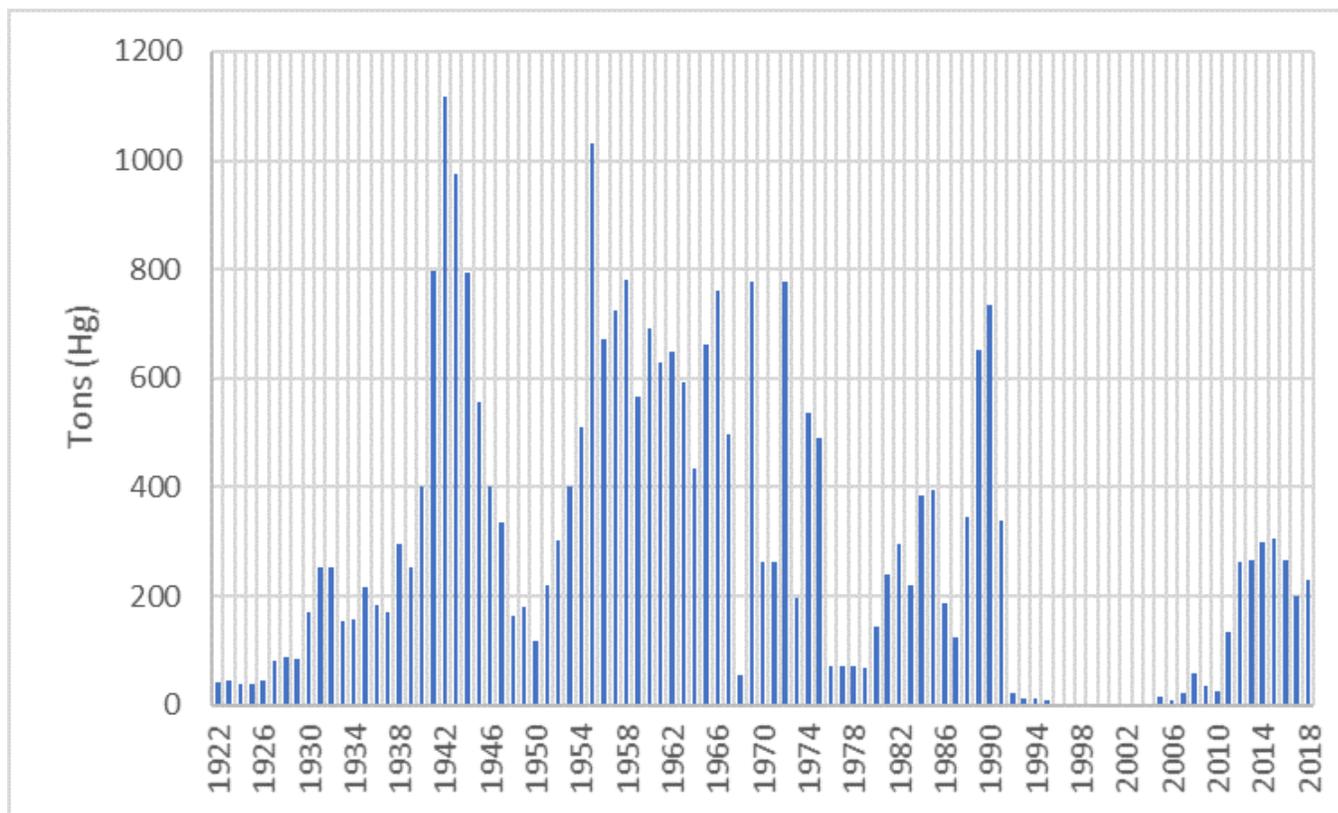


Figure 2: Mexico mercury exports 1922–1994[21]

Despite being the dominant source of illicit mercury in the Americas, remarkably little is known about the number and extent of informal primary mines in Querétaro. As a basis for intervention, the first regional survey of informal mercury mines was conducted by the Institute for Ecology and Climate Change (INECC) during the project preparation grant (PPG) phase. Thirty-four different primary mercury mines were identified in the 4 targeted municipalities. Of these only 7 were operating with current permits. The balance had all had previous authorisation which had since lapsed (Appendix 13). The location of the mines is presented in Figure 3.

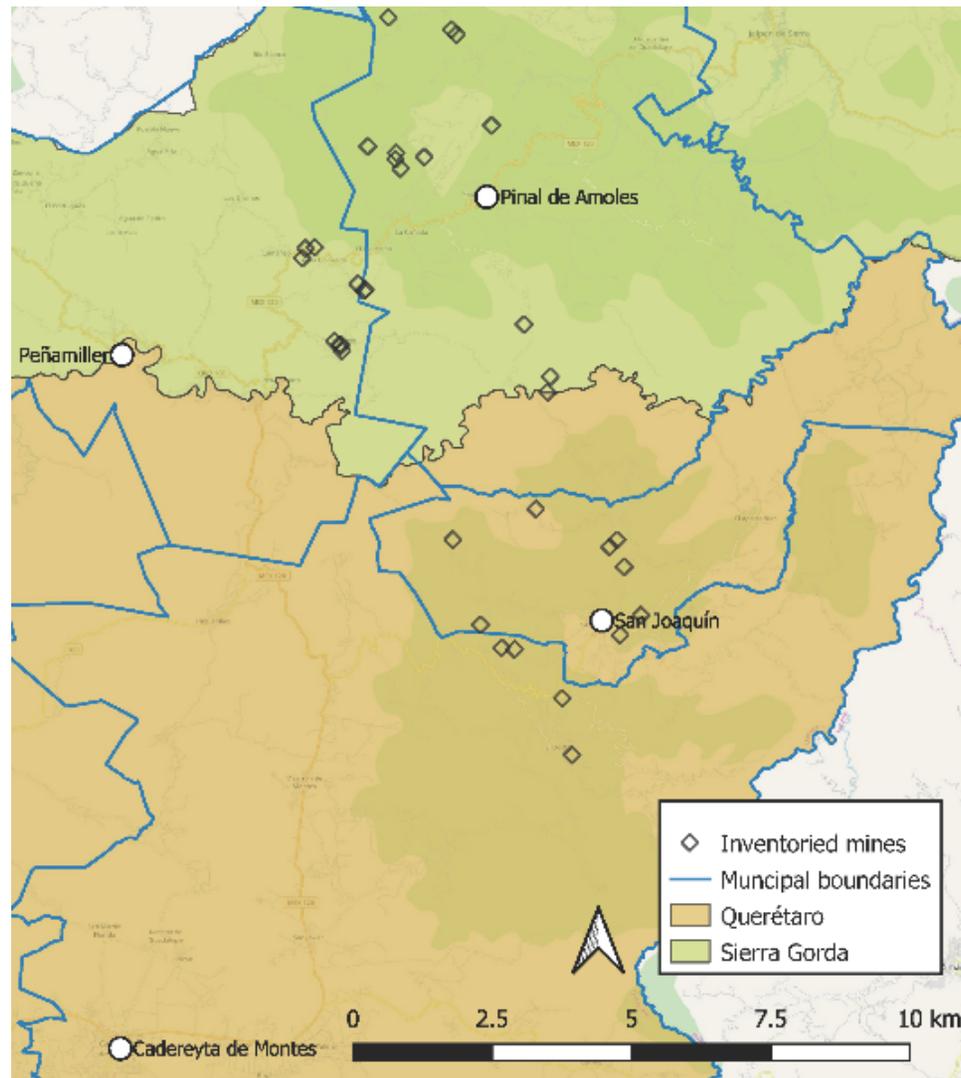


Figure 3: Locations of mines inventoried during the PPG

A1.2.2 Environmental Contamination

Centuries of mercury mining have left significant residual contamination in the Sierra Gorda. When bound up in its ore underground, mercury is relatively immobile in the environment. However during processing, veins are excavated and the ore is crushed and burned, liberating the mercury contained within.

Mercury evaporates at room temperature. At 24 degrees centigrade mercury in a confined space can result in acutely poisonous air levels.^[22] Thus miners working in subterranean shafts, where elemental mercury exists next to cinnabar, are highly at risk. In surveys conducted during the PPG phase by INECC, multiple miners reported the experience of having been 'gassed,' or disoriented, by acute exposure underground (Appendix 8).



Figure 4: Rudimentary mercury furnace in Querétaro

Once the ore is brought above ground, it is crushed and sorted to manually select high cinnabar containing material. Following sorting, it is burned (i.e. calcinated) in a wood-fired furnace encased in a rudimentary fume hood (Figure 4). The vapours condense on the fume hood and descend iron pipes to containers. The residual material (calcines) is haphazardly discarded with the mine overburden near the mine. The calcines still contain high levels of mercury that simply could not be accessed through this rudimentary process. Likewise the mine overburden, now excavated and crushed, presents a contamination risk. Poorly managed overburden can result in a range of ecological hazards such as acid mine drainage. Or, as is the case in mines near Pinal de Amoles, can contain elevated levels of hazardous materials like arsenic.

Human health studies carried out in the mines of Camargo, La Soledad, and Los Santos in the Sierra Gorda as part of the PPG by the Autonomous University of San Luis Potosi found elevated biological concentrations of mercury (Appendix 14a). Median concentrations of mercury in urine ranged from 51–295 µg/g creatine in the 66 miners studied (Table 1). For reference, the American Conference of Governmental Industrial Hygienists (ACGIH) utilizes a Biological Exposure Index (analogous to a No Observed Adverse Effect Level) of 35 µg/g creatine.[23] Concentrations of > 50 µg/g creatinine are associated with tremors and dose-related loss of colour vision.[24][25]

	Camargo	La Soledad	Los Santos
n	35	14	17
Minimum	55	10	0.8
Median	295	106	51.5
Maximum	4,964	310	355.3

Table 1: Urinary mercury concentration (µg/g creatinine) in miners assessed during the PPG

Sampling carried out during the PPG also identified elevated environmental concentrations in tap water and biota (Appendix 14c). These findings were generally consistent with other studies carried out in the region.[26] Tap water samples were taken from the mining communities of Bucareli, Camargo, and Llano de San Francisco using the method laid out in NMX-AA-051-SCFI-2001.[27] Of the 7 samples collected from taps in Bucareli, none of the drinking water samples found exceedances above the Mexican reference value of 1 µg/L. One sample of water used in irrigation had a concentration of 1.7 µg/L and therefore slightly above the reference value. All results (n=3) from Camargo exceeded the reference level with a maximum concentration of 4.5 µg/L, while 3 of the 7 samples in Llano de San Francisco exceeded the level (range: 1–7.5 µg/L).

Plant and animal samples collected throughout the Sierra Gorda indicated extensive mercury contamination of the local environment. With regard to plants, median foliar (leaf) concentrations for targeted areas ranged from 0.43–210.25 mg/kg mercury (Table 2). For reference, the applicable US EPA standard is 3 mg/kg (Toxicity Reference Value). Also as part of the studies carried out during the PPG, rodents were captured and analysed for mercury concentration. These studies found levels of mercury in mining areas more than 99x those captured and analysed from a control area. Table 2 provides summary statistics of the biota analysis.

	n	P25	Median	P75	% > TRV
Crop field (Los Santos Mine)	21	0.28	0.43	0.8	0
Extorax river	14	0.2	0.43	1.64	0

Table 2. Plant mercury concentrations (mg/kg, dry weight). Toxicity Reference Value (TRV)=3 mg/kg dry weight

Finally a limited number of analyses of mercury concentrations in ore and calcines were carried out during the PPG. Sampling both the original ore and the residual calcines facilitates an assessment of the efficacy of the ore processing in addition to informing a review of the extent of contamination. The exercise was carried out at one mine only, La Soledad. Here ore samples found a median mercury concentration of 6,170 mg/kg (0.6%) compared with a median mercury in calcine concentration of 85 mg/kg (0.008%). For context the Mexican permissible level for mercury in residential or agricultural soil is 23 mg/kg.[28] Table 3 provides summary descriptive statistics.

	n	Median (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)
Ore	3	6,170	5,155	12,439
Calcine	4	85	54	6,803

Table 3: Results of ore and calcine mercury analysis at La Soledad mine.

Twelve calcine samples were also collected at the Camargo mine, finding a mean mercury value of 256 mg/kg (range: 47–1,314 mg/kg). Residual calcines present an ongoing contamination risk both through direct deposition and release of mercury vapours.

Collecting and analysing environmental mercury samples can be costly and complicated, particularly in remote locations. Given the limited environmental analysis infrastructure in the Sierra Gorda, a comprehensive environmental assessment was not feasible during the PPG. As an alternative, the studies summarized above and included in the appendices were complemented by modelling emissions and releases based on available data. Modelling was conducted utilizing the UNEP Toolkit for Identification and Quantification of Mercury Releases, which uses limited inputs to calculate likely releases and environmental concentrations.^[29] The Toolkit, which was most recently updated in 2019, utilizes a number of assumptions in concert with field data to estimate releases and environmental concentrations. During the PPG phase, INECC used data from 19 of the mines inventoried to calculate likely releases and resulting environmental concentrations. The work built on previous efforts conducted as part of the Minamata Initial Assessment.

In total, the mines surveyed reported producing 102 tons Hg/ year. The mines varied widely in size and production, with the smallest (Durazno) being comprised of only a single miner and producing about 45 kg Hg/ year and largest (Camargo) being comprised of 132 miners and producing 21 tons Hg/ year. In total the mines surveyed produce nearly half of Mexico's mercury exports each year and release more than 2 tons of mercury into area soils each year. In addition the mines were estimated to release 758 kg of mercury to air and 182 kg of mercury to local water supplies. Table 4 presents summary data on each of the mines.

Mine	Municipality	Miners	Total Hg Produced (tons)	Air Hg Emissions (kg)	Water Hg Emissions (kg)	Soil Hg Emissions (kg)
Benedicto	Cadereyta de Montes	5	0.5	3.75	0.9	10.35
La Barranca	Cadereyta de Montes	20	3	22.5	5.4	62.1
La Lana (Fortaleza)	Cadereyta de Montes	4	0.55	4.13	0.99	11.39
Camargo	Peñamiller	132	20.904	156.78	37.63	432.71
Cristo Vive	Peñamiller	28	21	157.5	37.8	434.7
El Mono	Peñamiller	3	0.225	1.69	0.41	4.66
La Fe	Peñamiller	14	2.75	20.63	4.95	56.93
La Peña	Peñamiller	10	0.28	2.1	0.5	5.8
La Soledad	Pinal de Amoles	41	16.25	117	28.08	336.38
Las Higueras	Pinal de Amoles	2	0.078	0.59	0.14	1.61
Los Santos	Pinal de Amoles	80	30	225	54	621
Neri	Pinal de Amoles	17	1.6	12	2.88	33.12
El Ototal	San Joaquín	3	1	7.5	1.8	20.7
El Rosario	San Joaquín	8	0.13	0.98	0.3	2.69
Maravillas	San Joaquín	5	0.65	4.88	1.17	13.46
Santa Monica	San Joaquín	2	1.56	11.7	2.81	32.29
Durazno	San Joaquín	1	0.045	0.34	0.08	0.94
El Rosario I	San Joaquín	24	0.8	6	1.44	16.56
La Poza	San Joaquín	12	0.4	3	0.72	8.28
Total		411	101.72	758.07	182.00	2,105.67

Table 4: Mercury production and emissions of the 19 mines inventoried during the PPG.

The physical footprint of individual mines can vary significantly. The surface area covered by each mine was not assessed as part of the mine inventory conducted during the PPG, though an indicative value can be derived from existing data. At present 189 mining concessions are listed in the Sierra Gorda as having been registered with the General Directorate of Mines at some point. The total area of these mines is given as 67,043 hectares, or approximately 350 hectares of surface area used per mine. On the surface then, the total area covered by these mines may exceed 6,650 hectares. Subterranean mercury mines in the Querétaro are primarily comprised of shafts oriented toward cinnabar veins, as opposed to open-pit mineral mines. Accordingly their utilized area is likely much smaller. The extracted material, including over-burden, tailings, and residual calcines are then deposited haphazardly around the mining area where they are subject to weathering and erosion. Thus their ecological footprint is significant. Conservatively, we estimate this footprint as 4,000 hectares for the 19 mines inventoried.

A1.2.3 Regional economic diversity

Querétaro state is home to just over 2 million residents, 800,000 of whom live in the capital, Querétaro City (Santiago de Querétaro).^[30] The state has an advanced economy, with employment being primarily service-based (60 %). Only 5 % of people make their living in agriculture compared to 35 % working in industry or construction.^[31] The state receives about three quarters of a billion USD in foreign direct investment annually and enjoys the 6th highest GDP per capita of all Mexican states (140 % of the national average). Querétaro is an aviation manufacturing hub with a state aeronautical university and a Bombardier manufacturing plant.

The state benefits in part from its proximity to the national capital and relative stability. Its gross domestic product (GDP) has grown 4 times since 1980 at an average rate of 3.92 %/ year, compared with a rate 2.39 %/ year nationally (Figure 5).^[32]

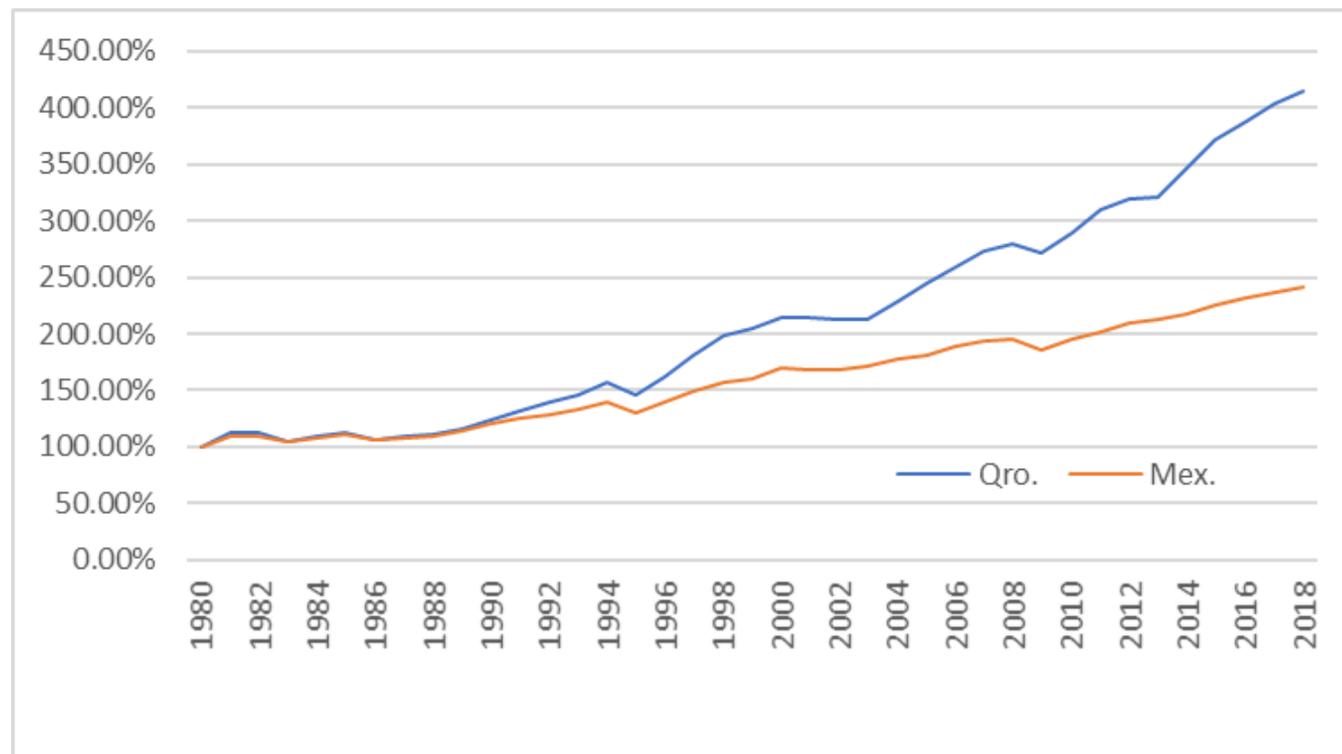


Figure 5: Gross domestic product growth of Querétaro versus Mexico nationally (2013 USD; base year: 1980)

The prosperity enjoyed by the capital, however, is not shared equally across the state. Indeed people living in the Sierra Gorda tend to have fewer employment opportunities and lower incomes. The four towns targeted by the present project for instance have poverty rates greatly exceeding those in the capital. In Mexico, poverty is defined both by income and by access to a number of services, including adequate housing and health care. San Joaquín, Cadereyta de Montes, Peñamiller, and Pinal de Amoles had poverty rates of 40.8 %, 51.8 %, 62.1 %, and 71.5 %, respectively, in 2015, the last year for which data are available. By contrast Querétaro City had a poverty rate of 23 %.[33]

A1.2.4 Economic composition by sector

Most of the Querétaro economy is comprised of the secondary and tertiary sectors, meaning those parts of the economy that either produce finished goods (secondary) or provide services (tertiary). In Querétaro these sectors contribute to nearly 95 % of the state's GDP. Querétaro manufactures transport equipment, food and beverages, and chemicals, among other goods. Altogether, manufacturing produced more than 267 billion MXN in 2017.

The primary sector is comprised of harvested or extracted products and makes up just 4.4 % of Querétaro's GDP and 5 % of employment.[34] The sector is diverse if not huge in economic terms, producing fish, meat, corn, and beans, timber and a range of mined materials. Only about 0.3 % (1.2 billion MXN) of Querétaro's GDP was derived from mineral mining in 2016.[35] Major mineral products include silver (40–120,000 tons/ year), zinc (1,000–6,000 tons/year), lead (700–1,200 tons/ year), gold (400–600 tons/ year), copper (400 tons–2,000 tons/ year), and more recently, kaolin, of which 25,000 tons were produced in 2016.[36] Nearly all mining mentioned above occurs in three municipalities – Colón, Cadereyta de Montes and Tequisquiapan – all of which are outside of the Sierra Gorda.

Mercury production, being illicit, is not tracked at the state level. International mercury exports, however, are recorded at the national level. In 2018 approximately 230 tons of mercury were exported from Mexico, with the majority likely coming from Querétaro. The current international price of mercury is about USD 2,000/ flask (34 kg), or about USD 59/ kilo. Thus the total value of mercury production from Mexico in 2018 could be estimated at around USD 13m (0.2 billion MXN), or about 1/6th of the total value of legitimate mineral extraction in Querétaro.[37] Miners surveyed during the PPG reported receiving about 600 Mexican pesos (~USD 32) per kilo of mercury, or about half the international price (Appendix 8). It is therefore likely that the actual contribution of primary mercury mining to the Querétaro economy could be as little as USD 7m (0.11 billion MXN), or just slightly more than 1/12th the value of legitimate mineral extraction in the state.

Querétaro also produces a number of non-mineral mining products, including stone aggregates, basalt, limestone and sand. Together the value of these outputs dwarfs that of mineral extraction and all other components of the primary sector, with an annual production of more than 10 billion MXN in 2016 (2.5 % of Qro. GDP).[38]

The geographic distribution of these sectors tends to reflect income, with secondary and tertiary sectors dominating employment in the south of the state near Querétaro City, and the primary sector being proportionately more important in the north near the lower income Sierra Gorda.[39] Additional information the regional economic composition is available in Appendix 12.

A1.2.5 Possible alternatives for small-scale miners

While mercury mining has been occurring for more than 700 years in Querétaro, there was essentially zero production from 1994 until 2011, when increases in the international price of gold drove up demand for illicit mercury use. During the 20th century the majority of mercury applications were not associated with gold production. Rather chlor-alkali plants and the healthcare industry largely drove demand. This is distinct from the 21st century when demand for mercury is primarily determined by the need to illegally amalgamate gold. Figure 6 overlays the international price of gold with Mexican mercury exports.

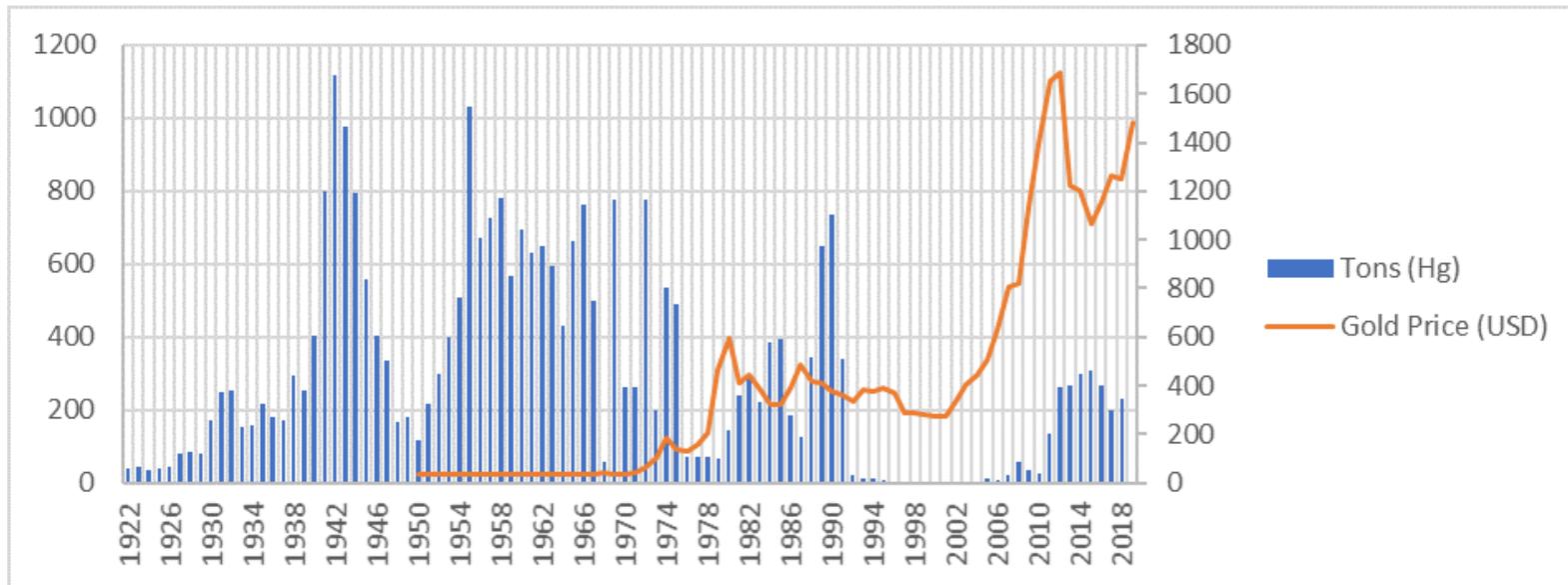


Figure 6. Annual mercury exports versus the international gold price

Mexican mercury exports, and in turn mercury mining in the Sierra Gorda, picked up significantly in 2011 when 134 tons were produced compared to 25 tons in 2010. In the most recent year for which data are available (2018), Mexico exported 230 tons of mercury. The 2018 UNEP Global Mercury Assessment estimated that ASGM was responsible for 37.7 %, or 838 tons (CI: 675-1000) of mercury emissions globally.^[40] Thus annual Mexican mercury production is equivalent in size to more than one quarter of global mercury emissions. Moreover, the 19 mines inventoried as part of the PPG alone produce more than 100 tons of mercury annually. Remarkably, these mines employ only about 400 people who bear an enormously disproportionate responsibility for global mercury emissions.

Because of the winding down of the mercury industry in Mexico in the mid-1990s, the miners currently working in the trade did not come of age in the mines. The average age of miners surveyed during the PPG was 43 years (SD=2.81), meaning that most miners were in their late teens when the formal mercury industry effectively ended. Informal mining began in earnest only 8 years ago (2011). Thus for these workers, mercury mining actually represents a new industry; one where capital costs and technical requirements are minimal and compensation is competitive. Informal mercury mining in the Sierra Gorda then is not a generationally shared cultural practice of 700 years, but rather a short-term temporary profession for a small number of workers that could be readily traded out for a comparable source of income. This perspective is consistent with views reported by the miners, 79 % of whom would prefer an alternative occupation if external support were provided to assist with the transition (Appendix 8).

A number of possible alternative livelihoods are already available in the region, including those in the primary and tertiary sectors of the economy. The primary sector may represent the most likely area to absorb workers displaced by the closing of illicit mercury mines. As noted above, non-mercury mineral mining in Querétaro is at least 6 times the size of the illicit mercury economy in value. Non-mineral mining is vastly larger at 50 times the size of the illicit mercury economy. At present, formal mining in the state employs about 10,000 people. The total number of miners at the targeted sites is just over 400, while the total number of primary mercury miners in Querétaro is estimated to be 700–1,000. It is therefore clear the entire sector cannot be absorbed by the formal mining economy. Moreover, only two of the targeted municipalities (Cadereyta de Montes and San Joaquín) are outside of the preserve where mining is permitted. However it is likely that formal mining would play a significant role in the absorption a percentage of displaced workers.

A second potential employment option in the primary sector is related to forest management. In the context of global climate change, the frequency and intensity of forest fires are increasing. A 2019 fire in the Sierra Gorda resulted in the loss of more than 3,250 hectares of forest. Mitigating the impacts of global climate change on the health of the Sierra Gorda will require deliberate forest management and a significant local workforce. Accordingly, the National Forestry Commission (CONAFOR) is a key stakeholder in the project.

A final potential employment area in the primary sector relates to non-timber forest harvesting. Owing to the Sierra Gorda's protected status, the type of exploitative activities allowed within its boundaries are somewhat limited. A number of *ejidos*, or communal farming villages, are registered with SEMARNAT and permitted to undertake certain types of non-timber harvesting, including that of oregano and pine nuts. A recent study by the local NGO Grupo Ecológico Sierra Gorda, IAP carried out as part of the PPG identified several possible ideal areas with the reserve that could be gazetted to promote these activities (Appendix 15).

One strong prospect for tertiary sector growth in the north of Querétaro is tourism. In 2016, tourism exceeded the economic output of all non-mineral mining (11 billion MXN). It is also growing. Tourism in 2016 grew by more than 7 % on the previous year, which in turn grew 11 % on 2014. The state maintains a robust hotel and transportation infrastructure and the capacity to absorb significantly more tourism. Querétaro hosts a number of sites of touristic interest in addition to the Sierra Gorda, including a wine country and archaeological sites.[41] Annual incremental growth in Querétaro tourism alone is 5 times the size of the entire illicit mercury economy. The Sierra Gorda already hosts a robust 'eco-tourism' economy comprised of a large number of tour companies that could continue to expand.

A1.2.6 Basic Social Characteristics

The state of Querétaro tends to be poorer, more indigenous and less educated in the north, where the Sierra Gorda is located. Only 2.9 % of people living in Peñamiller have completed tertiary education, compared to the state average of 21.5 % and 27.8 % in Querétaro City. More than 17.3 % of the people living in Peñamiller earn less than minimum wage compared to the state average of 6 %, and 3.8 % in Querétaro City.

Municipality	Total pop.	% Female	% Indigenous	% Tertiary education (> 15 years)
Cadareyta de Montes	69,549	52.7 %	46.1 %	6.0 %
Peñamiller	20,144	51.2 %	N/A	2.9 %
Pinal de Amoles	25,623	51.2 %	N/A	3.8 %
Querétaro City	878,931	50.8 %	14.4 %	27.8 %
San Joaquín	9,480	53.4 %	N/A	8.5 %
State average	2,038,372	51.2 %	18.5 %	21.5 %

Table 5: Social characteristic of select municipalities in Querétaro State

Forty-six percent of people in Cadareyta de Montes self-identify as indigenous, compared to the state average of 18.5 %, and 14.4 % in Querétaro City. The workforce in the north is also more heavily male, being comprised of 25.4 % female in Peñamiller compared to 39.7 % female in Querétaro City.[42] Tables 5 and 6 summarise general social and economic characteristics of the populations of the four targeted municipalities relative to Querétaro City and the state as a whole.

Municipality	% Female employed	Professionals	Farmworkers	Industry	Small-scale business	Undefined	% earning < minimum wage
Cadareyta de Montes	31.4%	13.9%	11.2%	30.4%	43.8%	0.7%	13.5%
Peñamiller	25.4%	10.9%	10.7%	32.2%	45.3%	0.9%	17.3%
Pinal de Amoles	26.2%	14.2%	22.6%	17.8%	43.0%	2.5%	25.9%
Querétaro City	39.7%	37.1%	0.6%	23.7%	37.6%	0.9%	3.8%
San Joaquín	33.4%	23.1%	12.8%	23.9%	38.6%	1.6%	16.9%
State average	37.4%	30.4%	3.8%	26.3%	38.6%	1.0%	6.0%

Table 6: Economic characteristics of select municipalities in Querétaro State

People from Querétaro are less mobile than residents of other states, tending to stay close to home. Only 10 % of people born in Querétaro were living outside the state in 2010, compared to a national average of 15 % or rates higher than 20 % in neighbouring San Luis Potosi and Hidalgo.[43] Rather people tend to move to Querétaro, with 7.45 % of the population in 2015 reporting having lived in a different state or country in 2010, compared with 3.45 % nationally.[44] Despite relatively low levels of emigration, Querétaro still receives around USD 500 million/ year in remittances.[45]

A1.2.7 Associated Projects

There have been a limited number of projects in the Sierra Gorda by international organizations. The most significant of these in the past 20 years was a 2001 GEF-supported, UNDP-implemented project focusing on biodiversity conservation (Biodiversity Conservation in the Sierra Gorda Biosphere Reserve; GEF ID: 887).[46] The project, which was executed by SEMARNAT, endeavoured to mitigate threats from small scale industries like livestock ranching and agriculture through the development of shared forest management responsibilities between the state (National Commission for Protected Areas) and a local NGO (Grupo Ecologico Sierra Gorda, IAP). The project included an alternatives livelihood component that resulted in a significant reduction in extensively grazed hectares. With regard to cattle grazing a remarkable 76 % reduction in grazed area was achieved through close collaboration with the community and targeted incentives. Moreover, the interventions resulted in overall increased earnings for the households that were engaged. Several of the approaches used by the project will also be employed in the present effort, including aligning robust communication and capacity building components. Moreover both the National Commission for Protected Areas and the Grupo Ecologico Sierra Gorda, IAP are envisaged as key stakeholders of the current project.

Both UNEP and UNDP are signatories of the UN Sustainable Development Framework for Mexico (2020-2025) which outlines certain priority areas including the promotion of basic rights, sustainable and inclusive economic growth, and mitigation of climate change gases in projects. The proposed project is fully consistent with the framework.

A1.2.8 Alternatives Livelihoods Projects

Alternative livelihoods projects are those that encourage people working in an environmentally damaging way to adopt some sort of behavioural change to mitigate those externalities. These approaches have existed for decades and are commonly employed in biodiversity projects. They have also been subject to considerable criticism. Siegal and Veiga (2010), for instance, argue that in the case of a related ecologically detrimental industry (artisanal small scale gold mining; ASGM), policy makers should embrace the economic potential of the sector rather than adopting policies intended to diminish it. They argue that the income afforded to the workers is considerably greater than alternatives in the rural, often poorer, areas of low- and middle-income countries where it commonly takes place. [47]

Owing to the significant investment in alternative livelihood projects and limited knowledge of their efficacy, the International Union for Conservation of Nature called in 2012 for a critical review of such projects. The most comprehensive response to date has been a 2015 systematic review by Roe, et al of 96 different studies covering 102 projects.[48] The authors differentiate between three types of alternative livelihoods projects: resource, occupation and method. In the first, an alternative resource is provided. In their example, farmed cane rats are provided as an alternative to bushmeat. In the second, occupation, less environmentally harmful income streams are promoted. And in the third, method, current technologies are improved to be less environmentally harmful. In the case of ASGM, mercury capturing retorts would be considered a method approach.

The current project is governed by the Minamata convention, which requires the full phasing down of primary mercury mines in a defined timeframe. Thus both resource and method approaches simply cannot be applied in this case. That is, alternative sources of mercury or improved processing techniques would not be acceptable. Accordingly, the project has adopted an occupation approach. In their review, Roe, et al (2015) identify a number of factors associated with successful occupation type projects. Referring to a project in Bangladesh, the authors note that parallel regulatory action to dissuade individuals from engaging in the undesirable activity had a complementary effect on results. A separate study from Tanzania found that when their livelihood was dependent on a given resource, in this case butterfly farmers working in forests, people were more likely to protect this resource. Likewise in ecotourism projects in Peru and Guatemala, individuals that worked in lodges or that ran homestays were more likely to be involved in conservation activities.

While many of the characteristics of successful alternative livelihood projects seem somewhat intuitive, that these assumptions are backed by academic rigor lends credence to the proposed approach. The current project envisages close engagement with regulatory authorities and the identification of sustainable livelihoods dependent on the preservation of the reserve. Both of these characteristics have been identified as central to successful projects. Throughout the remainder of the PPG phase additional alternative livelihood options will be identified and assessed in close collaboration with key stakeholders.

A1.2.9 Local Capacity

At the federal level SEMARNAT has been engaged on related work through its National Program for the Remediation of Contaminated Sites.[49] While the current project does not include a remediation component, assessment and preliminary recommendations are envisaged. It is therefore essential that this work tie in as much as possible with existing efforts. The national program is one of the more robust such efforts in the region. It includes a database of 994 potentially contaminated sites (SISCO). 24 of which are in Querétaro.

Also at the federal level, the executing agency for the project, the Ecology and Climate Change Institute (INECC) has extensive related capacity. INECC is a standalone federal research entity overseen by an advisory group comprised of different relevant government ministries. INECC is comprised of over 180 staff, nearly half of whom are dedicated to working on environmental health and pollution. The agency maintains its own laboratory which includes XRD, ICP-MS and AAS instrumentation. With regard to mercury analysis, the laboratory owns and operates one Lumex and two Tekran analysers. INECC regularly provides scientific consult to SEMARNAT on the issue of contaminated sites.

A1.2.10 Legal framework

Several laws relate to the establishment and operation of mining sites covered by this project. The most relevant legislation (*Ley Minera*; Mining Law) is generally inconsistent with the requirements of the Minamata convention. Specifically Article 4 of the Mining Law designates mercury as an exploitable mineral product.[50] Likewise Article 15 defines the lifetime of a mining concession as 50 years from its entry into the Public Mining Registry. This is incongruous with the Convention, Article 3 subsection 4 of which provides an allowance of up to 15 years for mines in operation before the Convention's entry into force.[51] Adequately meeting the Convention's obligations, including banning mercury export for use in ASGM, will require modification to this key law. To do so will require the active participation of agencies at all levels of government to ensure its appropriate

application. Additionally there must be an effort to proactively engage the mining sector to inform them of forthcoming regulations and facilitate a winding down of operations. Specific recommendations for modifications to the Mining Law are outlined in Minamata Initial Assessment and include removing mercury from the list of exploitable minerals and shortening the duration of existing concessions.[52]

The General Law of Ecological Balance and Environmental Protection ('Ecology Law') also considers aspects of mining, including Environmental Impact Assessment requirements (Article 5, subsection 3), considerations of ecological criteria in mine operations (Article 99, subsection 11), and placement of tailings piles and waste materials in a minimally ecologically damaging manner (Article 108, subsection 3).[53] Given the informal nature of current primary mercury mine operations, it is highly unlikely that they comply with the spirit of this law. Anecdotal evidence from site inventories indicates no meaningful consideration for the ecological footprint of mines or processing sites. Chapter 2 of the same law considers atmospheric pollution from stationary and mobile sources, including the installation of emissions controls. Such controls are absent at informal cinnabar processing sites.

The General Law of Ecological Balance and Environmental Protection in Hazardous Waste Materials ('Hazardous Waste Law') considers the generation of hazardous waste at mining sites and requires the construction of tailings ponds.[54] Some of the inventoried sites have rudimentary tailings ponds, though few are likely to meet the spirit of this law.

Finally Mexico has a number of laws relating to workers' protections, including the Safety, Hygiene and Work Environment Law ('OSH Law'). The OSH Law contains numerous requirements related to worker safety more generally. Article 16 of this law specifically requires annual risk assessments of worker safety at mining sites, or more frequently if there have been major changes made to mine operations.[55] Again, owing to the informal and rudimentary nature of these sites, it is highly unlikely that such risk assessments are conducted in a formal manner or by appropriately trained individuals.

A1.2.11 Theory of change



A1.3. the proposed alternative scenario with a brief description of expected outcomes and components of the project;

As noted above, the proposed project endeavours to improve regulatory capacity and support the adoption of alternative livelihoods to mitigate environmental and human health risk resulting from primary mercury mining. The following barriers have been identified to be addressed:

- Social acceptance of change in their economic activity
- Lack of education/training of the members in the mining communities
- Significant data gaps related to Hg in the communities and surrounding environment
- Lack of alternative profitable economic activities in the Sierra Gorda area
- Lack of information/dissemination concerning the health effects of mercury and the environment in the mining communities
- Need for transparency, accountability, and public information and stakeholder participation mechanisms.
- Raising technical standards of research institutions to provide a better basis for decision making and management.
- Legal gaps

The project is structured around two overarching components. Outputs associated with the first component are designed to enhance the capacity of regulatory agencies to monitor, assess and mitigate emissions associated with primary mercury mining in Querétaro. The component is ultimately intended to cultivate a legislative and regulatory environment that will result in the permanent closure of primary mercury mines and the effective ending of the new mercury mine development. The second component is intended to support the transition of primary mercury miners toward more sustainable and less harmful income generating activities. The component will identify alternative livelihoods, assess their viability and encourage their adoption. The project will focus initially on the 19 mines in the Sierra Gorda region identified in the baseline, about half of which sit in the preserve itself. Over the course of the project, additional mines may be integrated.

The alternative scenario is outlined below by component and associated outcomes, outputs and activities.

Component 1: Characterization of primary mercury mining and reinforcement of control mechanisms.

This component aims to improve the capacity of regulators to better characterize the primary mercury mining sector in Querétaro, including its releases and emissions. In addition, the component is intended to cultivate a regulatory environment that will result in the permanent closure of primary mercury mines and the effective ending of the new mercury mine development in accordance with and within the timelines defined in the Minamata Convention. With regard to characterization, the project will leverage domestic and international expertise to develop a monitoring infrastructure adequate to understand the extent the severity of contamination in the region. Previous assessment work in the region has been carried out largely by academic institutions, resulting in snapshots of specific geographies at a given moment in time. The activities proposed under this component will result in a more comprehensive and detailed picture of the contamination allowing for the assessment of changes over time. High priority sites will be identified and assessed, and remedial strategies will be proposed.

With regard to the regulatory environment, the project will conduct an assessment of the existing legal and regulatory frameworks and develop and share recommendations on how they might be modified. The component is intended to facilitate compliance with the Minamata Convention, with a particular emphasis on Article 3 on the supply and trade of mercury. Ultimately the activities undertaken as part of this component are intended to result in the closure of existing mines and a cessation of new mine development, which are envisaged to occur outside the time horizon of this project.

Major outcomes will be achieved in part through a review of existing laws and regulations, as well as through capacity building of regulators. Possible legislative overlaps and gaps will be identified as will other barriers to compliance with the Convention. The results of this review will be shared with federal, state and local governments and inform subsequent capacity building efforts.

Expected Outcome:

The Government monitors primary mercury mining and adopts an adequate regulatory framework.

Expected Outputs:

Output 1.1 Modifications to the existing legislative and regulatory frameworks on mercury production, management, use and trade, are developed with relevant government experts, representatives from NGOs and key stakeholders.

An assessment of the federal legislative and regulatory frameworks will be carried out to identify overlaps or gaps that contribute to incomplete compliance with the Convention. The review will form the basis of any suggested modifications to the existing frameworks. The effort will focus on the identification of appropriate legislative or regulatory mechanisms to close existing mines and halt the formation of new mines.

This output is targeted at the federal level, though enforcement will be primarily carried out by regional and local regulators. Thus the activities associated with this output will work to facilitate coordination between the various levels of government. In addition, to the extent possible, the perspective of the miners will be integrated into the component for the purpose of easing enforcement.

The Minamata Initial Assessment outlines suggested modifications to existing laws. These will form the basis of the proposed legal review, which will in-turn inform the regulatory review.

Specific activities

Activity 1.1.1 Collation of previous legal and regulatory assessments

As a basis for further activities, relevant existing Mexican laws and regulations have been identified and reviewed. This has been done as part of the Minamata Initial Assessment as well part of the PPG phase. These reviews have resulted in the identification of possible modifications to existing legal and regulatory frameworks. As part of this activity these assessments will be aggregated into a coherent set of recommendations.

Activity 1.1.2 Field consultations

In parallel with the desk study (activity 1.1.1) structured interviews and surveys will be conducted with regulators and other key stakeholders in Querétaro to assess their awareness of Mexico's obligations under the Minamata Convention and determine barriers to implementation. Interviews and surveys will also be conducted with other key stakeholders, including NGOs and academic researchers. The consultations will serve to provide a practical perspective to the process and will directly contribute to raising awareness of the Convention.

Activity 1.1.3 Drafting of modifications proposal

Jointly with relevant experts, including those of the Global Mercury Partnership, modifications to existing laws and regulations will be drafted. The modifications will consist of specific changes to the text of existing documents as well as contextual information justifying the modification. Where appropriate, the creation of new laws or regulations may be proposed. The justifications will be based on the collated previous studies and field consultations. Together this text will serve as the modifications proposal.

Activity 1.1.4 Workshops to review modifications proposal

Workshops will be held at the federal and state level to review the proposed modifications with key stakeholders, including those responsible for adopting any changes and miners themselves. The workshops will also serve to raise awareness of Mexico's obligations under the convention. To the extent possible, feedback from the workshops will be integrated into the modifications proposal.

Activity 1.1.5 Engaging responsible parties

During the drafting of the modifications proposal (activity 1.1.4) and integration of stakeholder feedback (activity 1.1.5), parties responsible for the adoption of the modifications will be engaged. The parties will be apprised of the process undertaken as part of this output and of Mexico's obligations under the Convention. Their feedback will be solicited and integrated whenever possible. Much of this consultation is envisaged to occur as part of activities 1.1.4 and 1.1.6. Following the completion of the final modifications proposal, these parties will be directly engaged for the purpose of encouraging adoption of the modifications.

Activity 1.1.6 Monitoring adoption of modifications

To encourage the adoption of the legal and regulatory modifications, a monitoring process will be established for the life of the project. The process is envisaged to include semi-annual workshops to review progress against the adoption of the proposal and identify barriers. To the extent possible the proposal will be adapted in response to practical barriers in order to encourage adoption during the life of the project.

Activity 1.1.7 Training of regulators

Trainings of regulators will be conducted to improve the application of existing regulations. In the event that the modifications proposed as part of this output are adopted, the trainings will support the application of new regulatory mechanisms. Trainings are contemplated on an annual basis in Querétaro and to be held in conjunction with other related training (including under Output 1.2).

Output 1.2 Relevant agencies' capacity to identify and quantify mercury sources, including ongoing monitoring of mercury emissions and releases in the primary mining sector enhanced

An assessment of regional capacity to monitor mercury emissions and releases will be conducted and a monitoring regimen will be proposed and supported. The regimen will include the utilization of existing laboratory capacity and technical expertise. It will also include the addition of new mechanisms to improve monitoring, with an emphasis on leveraging existing resources.

In addition the project will develop a strategy for the sound management of closed mines and residual mercury mine attributable hazardous waste present throughout the region. The strategy will include an action plan with mandates and budget allocations for government responsibilities. Many of the informal mines currently operating utilize shafts that were abandoned by formal operators decades ago. Proper closure of these shafts may have discouraged further activity. Thus the project will endeavour to build capacity to close mines over the long term. Likewise much of the residual contamination in the region results from centuries of poor mine-waste management. The project will therefore develop an approach to prioritizing sites based on their relative ecological and human health risk, characterize those sites and develop preliminary remediation plans. To do so the project will rely on the extensive experience available in Mexico as well as international expertise, including that from the Global Mercury Partnership.

The site inventory and emission estimates calculated during the PPG phase identified some of the more significant mercury sources in the Sierra Gorda region. This inventory will be completed, identifying all active and inactive mines in the region. These will form the basis of further site identification and assessment work.

Specific activities

Activity 1.2.1 Needs assessment of regional monitoring capacity

Environmental assessment work carried out during the PPG indicated that laboratory and technical capacity exist in the region, however the robustness of that infrastructure was not assessed. As part of this activity a survey of regional laboratories will be conducted to determine the available equipment, technical capacity and associated costs for supporting a monitoring regimen. In addition structured interviews and surveys will be conducted with regulators, academic and research bodies to identify potential gaps in capacity, training or other resources. The results of the assessment will inform subsequent measures to support the development of such a regimen including its possible scope and additional needs.

Activity 1.2.2 Development of monitoring regimen

Following the needs assessment completed as part of activity 1.2.1 a proposal for a monitoring regimen will be developed building on the experience of mercury mines closure in other parts of the world (e.g. Almaden and Idrija). The proposal will determine a practical scope for the regimen given financial and capacity limitations, and logistical challenges. At a minimum the scope of the regimen will be consistent with Mexican law, allow Mexico to meet its obligations under the Convention, and identify high priority sites for remediation. Once the regimen is developed, measures to support the implementation of the regime will be identified.

Activity 1.2.3 Support for rollout of monitoring regimen

The monitoring regimen will be proposed to responsible parties and its adoption will be supported. Likely measures to be support the regimen rollout include training and capacity building workshops for regulators with domestic and international experts, joint field visits and assessment activity, and limited procurement of field-portable sampling equipment and instrumentation. In addition the it is envisaged that the project will directly support or carry out monitoring activities for its duration. Finally, this activity will include an inventory of all active and inactive mines in the region.

Activity 1.2.4 Preliminary risk assessments at active and abandoned mining sites including the characterisation of environmental contamination

As part of the rollout of the monitoring regimen (activity 1.2.3) a series of visits will be conducted to areas affected by mining waste. The purpose of these visits will be both to develop capacity within relevant regulatory agencies as well as to carry out more in-depth characterizations of potentially contaminated areas. The assessment will contemplate both mercury and non-mercury wastes as well as both ecological and human health risk. The assessments will include a basic conceptual site model and preliminary risk assessment. Proper personal protective equipment (PPE) will be distributed and site specific health and safety protocols will be reviewed with the participants in advance of the visit. Compliance with health and safety protocols, including proper use of PPE, will be required to access the site.

Output 1.3 Site specific remediation mapping and planning are undertaken

The project will identify possible environmental risk reduction measures and take steps to facilitate future remediation work. The output will include detailed mapping of contaminated areas and the development of alternatives matrices to assess possible remediation measures against various criteria. The criteria will include considerations such as cost, logistical feasibility, sustainability, community acceptance and effectiveness. Given the extensive historic contamination in the region it is unlikely that all contaminated areas can be remediated. Accordingly, high priority areas will be determined based on their relative ecological and human health risks. The relative severity and intended use of each site will inform the alternatives chosen, which will include both administrative (e.g. fencing) and engineering (e.g. excavation) controls. This output will benefit from improved environmental monitoring capacity developed as part of Output 1.2 as well as encouraged closure of ongoing operations under Output 1.1. The output will draw from international experience including that of the Global Mercury Partnership.

Specific activities

Activity 1.3.1 Selection of sites for assessment

Based on the results of the preliminary assessments carried out as part of activity 1.2.4 high priority locations will be identified according to their relative ecological and human health risk. The selection criteria and selected sites will be shared with key stakeholders to ensure transparency in the process.

Activity 1.3.2 Detailed site assessment

Detailed site assessments will be carried out at a limited number of high priority locations in a manner consistent with SEMARNAT's National Program for the Remediation of Contaminated Sites. The detailed site assessments will engage a smaller number of more technical regulators than the preliminary assessments (1.2.4). They will include additional environmental sampling, interviews with relevant stakeholders, and a more robust assessment of risk. The assessment will be guided by the conceptual site models and sampling done as part of 1.2.4.

Activity 1.3.3 Development of alternatives matrices

Alternatives matrices will be developed based on the results of the of the detailed site assessment. The matrices will assess possible remediation measures against various criteria, including cost, logistical feasibility, sustainability, community acceptance and effectiveness. In the event that the site is a mine, the alternatives matrix will evaluate different mine closure options against these criteria. This will apply both to mines that have been previously closed as well as those that have remained in operation. Proper personal protective equipment (PPE) will be distributed and site-specific health and safety protocols will be reviewed with the participants in advance of the visit. Compliance with health and safety protocols, including proper use of PPE, will be required to access the site.

Activity 1.3.4 Initial estimation of remediation costs

An initial remediation cost estimate will be calculated for the likely alternative at sites where a detailed site assessment was carried out. The estimate will be preliminary in nature and will be intended to serve as the basis for more the selection of a detailed remediation proposal. At this stage the estimate will be insufficient to allow for detailed budgeting of remediation costs. The cost estimates may be informed by the execution of pilot activities.

Component 2: Introduction of alternative livelihoods

This component will be informed by the results of assessment work carried out during the PPG phase and outlined above. The critical assumption is that viable and sustainable alternatives exist to primary mercury mining in the Sierra Gorda region. The existence of these livelihoods has been confirmed by surveys of the miners themselves, regional economic data, a literature review, and an assessment of previously conducted projects. Significantly, primary mercury mining represents a new and potentially temporary industry for the majority of workers, most of whom were teenagers or younger when formal mercury mining ended in Mexico in 1994. Surveys of the miners confirmed their preference for an alternative livelihood over the dirty and dangerous work of mining.

Querétaro's economy is one of the healthier and more heterogeneous in Mexico and could absorb the relatively small workforce displaced by the closure of illicit mines. Possible low-skill positions in tourism, non-mineral mining and non-timber harvesting offer the most likely options. The existing literature on the subject of alternative livelihoods confirms that the general approach adopted by this project is consistent with best practice. Additionally, a previous project executed in the Sierra Gorda successfully encouraged the adoption of alternative livelihoods (GEF ID: 887).

Expected Outcome:

Miners in Querétaro adopt alternative income generation activities

Expected outputs:

Output 2.1 Alternative economic activities and livelihoods for miners and local communities identified

This output will draw from information collected as part of the baseline. Specifically alternative income generating activities will be identified, analysed and evaluated jointly with key stakeholders, including international experts with relevant experience, the local government, academia, NGOs, the miners themselves, and the community, among others. As noted above, possible alternatives have already been identified as part of the baseline, including non-timber harvesting, unskilled labour in tourism, forest management, and non-mineral mining. These options will be further evaluated and stress-tested. Viable options will be encouraged among workers displaced by the closure of illicit mines.

To support the adoption alternative livelihoods, an information, education and communication (IEC) program will be developed and implemented. The program will be comprised of workshops, community meetings and other outreach activity, as well as a human health monitoring program in target locations.

Specific activities

Activity 2.1.1 Alternative economic activities are evaluated by regional experts

As part of the baseline a number of alternative sources of income to primary mercury mining were identified, analysed and reviewed. These include non-timber harvesting, forest management, low-skilled employment in the tourism industry, and non-mineral mining. On the surface, each of these seems to represent viable alternatives. Non-mineral mining is a major low skill employer in parts of the Sierra Gorda region, while tourism is expanding rapidly across the state. There is a need to present these alternatives and others to key stakeholders in a structured manner and solicit feedback. The approach will involve a nuanced assessment of needs in individual communities. Those living near the active formal mining areas in Cadereyta de Montes, for example, will be more likely to transition to this industry, while those in the preserve may be more likely to engage in non-timber harvesting.

As part of this activity, each alternative will be reviewed independently by experts on the local economy from NGOs, the government, and academia. Alternatives will be proposed to the experts in a structured manner to solicit feedback. Based on the feedback a draft plan for the implementation of alternative livelihoods will be developed covering all four targeted municipalities.

Activity 2.1.2 Alternative economic activities options are shared with key stakeholders

Following the expert consultation, the draft implementation plan (2.1.1) will be presented to key stakeholders in a workshop setting to solicit feedback and amend as necessary. Key stakeholders from the miners themselves, community leaders and NGOs will be consulted about their perspectives of the viability of the plan and the draft will be adapted accordingly.

Activity 2.1.3 Technical training in alternative livelihoods is provided at pilot sites

Based on reception of the alternative livelihoods implementation plan, a select number of communities will be targeted for the initial rollout. A criteria for the selection of the communities will be developed and will likely include proximity to mines, gender composition, and feasibility of alternative livelihoods uptake. Implementation will be supported through training programs and through locally available project staff, local NGOs, engaged government representatives and community leaders. Where successful alternatives are identified they will be shared with stakeholders elsewhere in the region to support their broader diffusion.

Activity 2.1.4 Business development and access to funds

In cases where alternative livelihoods involve upfront capital costs, the project will assist individuals with acquiring assistance. Sources of financing will primarily come from the State of Queretaro available grants.

Activity 2.1.5 Monitoring and modification

Over the course of the project, the efficacy of the plan will be periodically monitored against indicators (established as part of Output 2.2) and modified as required. To assure a unbiased assessment, the project will establish baseline indicators from which progress will be measured. Disinterested key stakeholders will assist in the assessment and proposal of modifications.

Output 2.2 Awareness of miners and local communities of the Minamata Convention obligations enhanced.

Prior to the introduction of alternative livelihoods, the project will establish a set of baseline measurements to reflect specific environmental, health, gender, and social conditions. Part of this has already been done during the PPG through the social and economic analyses (Appendix 12,16) as well as the assessment of miners' perspectives included in the gender gap analysis (Appendix 8). The baseline will be utilized to both inform the development of alternatives livelihoods approaches and to assess the efficacy of their promotion. This baseline will assist in the development of an effective information, education and communication (IEC) program targeted at the miners. Specifically, the miners will be informed of Mexico's obligations under the Convention and forthcoming measures that will impact their livelihoods. The output will also include human health monitoring to assess mercury exposure of the miners and community.

Specific activities

Activity 2.2.1 Collection of baseline indicators in target communities

As part of activity 2.1.3, the project will collect detailed of baseline data on environmental, health, gender, and social conditions. These data will serve as indicators from which the efficacy of the alternative livelihoods implementation will be assessed. These data will complement the already extensive data collected as part of the PPG (Appendices 12–16). Additional environmental data will be collected as part of activity 1.2.4 above. Social and gender conditions will be taken from the reports completed as part of the PPG and supplemented with additional inquiry where required. As part of this activity, these various data sources will be aggregated to a set of coherent and clear baseline indicators for the project. They will also be used to inform the alternatives livelihoods plan (2.1.2) as well as the development of the IEC program (2.2.3).

Activity 2.2.2 Design and execution of information, education and communication (IEC) program

Using data collected as part of the baseline as well as part of activity 2.2.1 the project will develop an IEC campaign for the purpose of informing miners and communities about Mexico's obligations under the Minamata convention. Compliance with the Convention will necessarily result in lost livelihoods for the miners and may have significant economic implications for some communities in the region. Surveys carried out during the PPG indicated that awareness of the Convention and its implications remains low among miners. Through this activity, miners will be apprised of the significance of the Convention and encouraged to adopt one of the more resilient livelihoods promoted as part of Output 2.1.

Activity 2.2.3 Broader diffusion of lessons learned

The project will document lessons learned during execution across all outputs. These will be compiled in an accessible format and shared more broadly in Mexico. In particular the process of identifying, analysing and evaluating alternative livelihoods will be presented. The purpose of doing so is to promote the development of more sustainable livelihoods in similar contexts throughout the country. As part of this activity, key stakeholders in Federal and State governments, NGOs, academia and other relevant groups will be approached. Moreover, lessons learned will be disseminated internationally through the Global Mercury Partnership as part of their knowledge management responsibilities.

A1.4. alignment with GEF focal area and/or Impact Program strategies;

The project clearly aligns with CW-1-1 'Strengthen the sound management of industrial chemicals and their waste through better control, and reduction and/or elimination.' The Sierra Gorda mines are the largest source of elemental mercury used in ASGM in the Americas. Minimizing the quantity of mercury entering the sector will directly result in reduced fugitive emissions downstream. The project aims to do this by both improving regulation and incentivizing alternative livelihoods. Activities under the first component are proposes to strengthen the capacity of local and national agencies to regulate and monitor the informal sector. Those under the second component are focused on identifying and promoting sustainable alternative livelihoods. Taken together these actions are intended to ultimately eliminate informal mercury production in the region.

The Sierra Gorda itself is a vast ecological preserve having both nearctic and neotropical biogeographic realms. It contains more than 1,700 plant species and 600 vertebrates. To the extent that the project aims to shift informal sector miners toward more sustainable industries reducing their ecological impact it is consistent with the GEF Impact Program on Sustainable Forest Management.

A1.5. incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing;

The mines in the Sierra Gorda region are the most significant source of illicit mercury supply in the Americas. Accordingly, the mercury extracted here presents local, regional and global hazards for public health and ecosystems. Absent intervention by the GEF, the Sierra Gorda mines would continue unabated production of mercury for further illicit uses downstream (i.e. ASGM). The Mexican government has robust technical know-how and capacity that has had difficulty penetrating this remote corner of Querétaro. The project is built around an honest assessment of that capacity and a targeted leveraging of existing resources to more effectively reduce mercury production.

The proposed intervention is comprised of two overarching components. As part of the first, an improved regulatory environment is supported. The component draws from international best practice and includes a review of existing laws, regulations, and capacity. Based on the results of that review, the project will undertake a series of actions to develop and buttress a regulatory regime adequate to comply with Mexico's obligations under of the Minamata Convention. The component is largely catalytic in nature; mobilizing and supporting an existing infrastructure to facilitate a more effective policy response. Legal and regulatory reviews carried out before the project, including the Minamata Initial Assessment and work done during the PPG phase, will form the basis of this component. Trainings will support existing government staff to more effectively enforce regulation. Regional and national laboratory capacity and expertise will be utilized to improve environmental monitoring, while existing federal contaminated land programs will be engaged on remediation components. By strategically mobilizing these existing assets, the project has a baked-in exit strategy enabling a winding down of support in the short time horizon of the project.

The second component relates to the development of alternative livelihoods. Here too the use of GEF resources is governed by a strategy of more effectively utilizing existing capacity. The state of Querétaro is one of the higher income and more economically heterogenous in Mexico. Querétaro has an advanced manufacturing sector that include aeronautics components manufacture. It is also well endowed naturally with various exploitable mineral and non-mineral resources, and rich ecological areas that attract tourists. Tourism in Querétaro is already a larger financial asset than either mineral or non-mineral mining in the state and is growing rapidly. Because of the diversity, scale and proven viability of these economic alternatives, well-placed efforts to move the relatively few displaced mercury miners into new professions have a higher likelihood of success. Importantly, this is a distinct approach from identifying and encouraging the development of nascent income streams. While this too will form an aspect of the overall approach (e.g. potential employment in forest management or non-timber harvesting) the success of the component will largely depend on these existing areas to absorb displaced workers. The state of Queretaro and other key partners in the project have committed to large amount of co-financing to assist this transition.

Support from the GEF will enable key interested actors in the Mexican government to exploit the opportunity provided by the Convention to reduce mercury production in Querétaro. In particular, researchers at INECC have identified the outlines of a successful policy and have laid the foundation for an intervention. However, a lack of targeted financial resources and in-house expertise on mobilizing such an effort have limited forward progress. Without an investment from the GEF, it is likely that the substantial capacity in Mexico, including the preliminary work by INECC, would continue to go underutilized on this issue. This would in turn result in ongoing production in the mines and increased costs in the form of externalities, many of which would be borne downstream. In addition, the current momentum and time-limited nature of environmental and social assessment data, imply that foregoing an investment now would result in incurring related opportunity costs.

A1.6. global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF);

Environmental and biological analyses carried out in the region during the PPG and in separate academic studies identified elevated mercury concentrations in a range of media. Median mercury in urine concentrations from miners at 3 different mines ranged from 1.5–8.5x applicable guidelines (i.e. 35 µ/g creatinine), indicating significant occupational exposure. The highest human sample analysed exceeded applicable guidelines by an exceptional 142 times (4,964 µ/g creatinine). Likewise residual mercury concentration in calcines (i.e. processed material) was detected at levels up to 6,803 mg/kg, higher than the median value of assessed ores. These concentrations result from a combination of

fugitive emissions, inefficient processing and inadequate personal protective equipment. As part of the PPG, 19 mines were inventoried and assessed with the UNEP Toolkit for Identification and Quantification of Mercury Releases. It was estimated that more than 3 tons of mercury are released into the immediate environment annually from these 19 mines alone. Even at very low concentrations mercury can have adverse ecological impacts, including on certain freshwater microorganisms, fish, birds, mammals and soil invertebrates. Impacts include psychological effects, decreased growth rates and death.[56]

Once in the environment elemental mercury (Hg^0 ; the form used in industrial applications) can migrate through upper troposphere and be deposited globally. It can be converted to the more bioavailable methylmercury (CH_3Hg) through interactions with various microorganisms. Methylmercury is lipophilic and bioaccumulative, meaning that organisms tend to absorb it more quickly than they expel it. These characteristics in turn contribute to its tendency to biomagnify, meaning that creatures further up the food chain contain proportionally more mercury; shark or albacore have proportionally more mercury than salmon, for instance. Accordingly humans consuming fish vast distances from mercury sources can incur mercury-attributable disease.

In addition to the 3 tons of inadvertent releases to the local environment, the 19 mines targeted by this project deliberately produce 102 tons of mercury annually for illicit use in ASGM. In this sector mercury is combined with pulverized ore to concentrate very small pieces of gold through amalgamation. The amalgam is then heated under a torch to release the mercury as a vapour and recover the gold left behind. In some cases this mercury vapour is captured through fume hoods of various designs, however in the vast majority of scenarios these vapours are freely released. Much of the burning of amalgams in South America occurs in gold shops located in residential settlements often established to support the industry. When assessed, these communities invariably exhibit elevated environmental mercury concentrations.[57] Thus, those most highly exposed to mercury downstream are often non-miners. As noted above, when these releases occur the mercury is cycled and deposited globally where it continues to pose human health and ecological risks.

A1.7. innovativeness, sustainability and potential for scaling up;

This is the second project relating to primary mercury mining to be supported by the GEF. The first, implemented by UNEP as part of GEF-5 from 2012–2015 (GEF ID: 4985), effectively contributed to the cessation of activities at a formal primary mine in Khaidarkan, Kyrgyzstan. Most other formal mercury mines around the world were compelled by economic conditions to cease operations by the end of the 20th century. The GEF has also co-financed a number of projects relating to informal sector employment, including those relating to mercury use in gold mining. However, to date the GEF has not yet financed a project relating to the informal exploitation of mercury. The project is therefore by its very nature innovative.

The project will rely substantially on existing resources and capacity within Mexico. Component one will draw heavily on the legal and regulatory analyses that have already been conducted. Individuals who were directly involved with this work at INECC will form a central part of the executing team. Component one will also rely on the significant technical expertise with INECC and SEMARNAT, as well as the regional and national laboratory capacity, to characterize the extent and severity of contamination in the region. Likewise the success of component two will depend on the capacity of the Querétaro economy to absorb workers displaced from the closure of mercury mines. The state is one of higher income and more economically diverse in the country. The project's objective is to encourage a coalescence of these significant resources around this issue. Of note, informal mercury mining can be considered a new industry in the region. While the practice dates back more than 700 years, nearly all production stopped here in 1994. The mines in operation today have only recently been opened. The region's economy is not dependent on their production, which altogether is equivalent in value to less than 1/6th of formal non-mineral mining or 1/7th of tourism.

The regulatory regime developed by the project will primarily utilize state and national resources. Likewise alternative livelihoods will be supported largely by market forces and, in the event that additional capital costs are required, with grants from the state government. The project is intended to open these channels of support rather than provide the support directly from GEF funds. In this way the project will act as a catalyst allowing for sustained activity after GEF financial support has ended.

At present the project focuses on 19 distinct mines within the four targeted municipalities. These 19 mines are estimated to produce upwards of 102 tons of mercury annually. While the mines covered by this project are likely the most significant, there are a large number of other producers. Indeed estimates of the size of the illicit mercury production in the region range from 200–500 tons (Appendix 8). The infrastructure developed as part of this project will be employed at these other areas as well. The regulatory

modifications will be readily scalable as they will rely on material changes in the federal law and the development of new technical capacity within existing agencies. Likewise the majority of identified alternative livelihoods rely on existing sectors of the economy such as non-mineral mining and tourism. Given their relative size, and in the case of tourism, growth, these areas should be amenable to absorbing an increased workforce.

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- [37] Recently developed estimates present ranges of up to 500 tons/ year of informally produced mercury in Mexico. Official statistics are utilized as part of the baseline, though will be further evaluated and informed by the project.
- [38] SEDESU (n 41).
- [39] INEGI, 'Intercensal Survey 2015' <http://en.www.inegi.org.mx/programas/intercensal/2015/default.html#Tabular_data> accessed 22 January 2020.
- [40] UNEP (n 14).
- [41] SEDESU (n 41).
- [42] INEGI, 'Intercensal Survey 2015' (n 46).
- [43] INEGI, 'Migración' (*Censos y conteos. Población y Vivienda. Encuestas en hogares. Especiales. Encuesta Nacional de la Dinámica Demográfica. ENADID*, 2010) <<https://www.inegi.org.mx/temas/migracion/default.html#Tabulados>> accessed 22 January 2020.

- [44] INEGI, 'Intercensal Survey 2015' (n 46).
- [45] INEGI, 'Anuario Estadístico y Geográfico de Querétaro 2017' (n 20).
- [46] 'Biodiversity Conservation in the Sierra Gorda Biosphere Reserve | Global Environment Facility' <<https://www.thegef.org/project/biodiversity-conservation-sierra-gorda-biosphere-reserve>> accessed 27 January 2020.
- [47] Marcello M Veiga and Shefa Siegel, 'The Myth of Alternative Livelihoods: Artisanal Mining, Gold and Poverty ' (2010) 41 Article in International Journal of Environment and Pollution 272 <<https://www.researchgate.net/publication/249920467>> accessed 24 January 2020.
- [48] Dilys Roe and others, 'Are Alternative Livelihood Projects Effective at Reducing Local Threats to Specified Elements of Biodiversity and/or Improving or Maintaining the Conservation Status of Those Elements?' (2015) 4 Environ Evid 22.
- [49] 'Programa Nacional de Remediación de Sitios Contaminados (PNRSC) | Secretaría de Medio Ambiente y Recursos Naturales | Gobierno | Gob.Mx' <<https://www.gob.mx/semarnat/documentos/programa-nacional-de-remediacion-de-sitios-contaminados>> accessed 27 January 2020.
- [50] *Ley Minera*. Cámara de diputados del H. Congreso de la Unión (1992) http://www.diputados.gob.mx/LeyesBiblio/pdf/151_110814.pdf
- [51] <http://www.mercuryconvention.org/Portals/11/documents/Booklets/COP3-version/Minamata-Convention-booklet-Sep2019-EN.pdf>
- [52] 'Development of Minamata Initial Assessment in Mexico' <<http://www.mercuryconvention.org/Projectdetailview/tabid/5403/language/en-US/Default.aspx?Id= 2028>> accessed 27 January 2020.
- [53] H Congreso de La Unión, 'LEY GENERAL DEL EQUILIBRIO ECOLÓGICO Y LA PROTECCIÓN AL AMBIENTE'.
- [54] H Congreso de La Unión, 'REGLAMENTO DE LA LEY GENERAL DEL EQUILIBRIO ECOLÓGICO Y LA PROTECCIÓN AL AMBIENTE EN MATERIA DE RESIDUOS PELIGROSOS'.
- [55] H Congreso de La Unión, 'REGLAMENTO FEDERAL DE SEGURIDAD, HIGIENE Y MEDIO AMBIENTE DE TRABAJO'.
- [56] Dean W Boening, 'Ecological Effects, Transport, and Fate of Mercury: A General Review' (2000) 40 Chemosphere 1335.
- [57] Paul Cordy and others, 'Characterization, Mapping, and Mitigation of Mercury Vapour Emissions from Artisanal Mining Gold Shops' (2013) 125 Environmental Research 82.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.



Figure 7: Project map and coordinates

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities Yes

Private Sector Entities Yes

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

The majority of principal stakeholders will come from Mexican government agencies responsible for the development and enforcement of laws and regulations as well as those responsible for supporting the welfare of vulnerable communities. In addition the Government of the State of Queretaro, local NGOs, mining groups and municipal authorities will be engaged as key stakeholders. Finally Mexican academics and international experts will be engaged to support successful execution of the overall project.

Stakeholders will be engaged through formal semi-annual in-person stakeholder workshops in Querétaro City as well as through ongoing project activities such as training workshops and consultations. During the semi-annual workshops, progress against indicators will be reviewed, necessary adjustments will be discussed and proposed, and next steps will be decided. All documentation generated as part of the project will be available on the project's server to which all stakeholders will have access. An assessment of need and resource allocation will be made where required to ensure that all principal stakeholders are able to attend the semi-annual meetings. These costs are not expected to be significant given the small geographic size of the state. In addition, hard copies of project documentation will be made available for stakeholders without readily available access to a computer. Table 7 below provides the agencies presently envisaged as the principal stakeholder. Additional stakeholders will be engaged when required.

Stakeholder	Engagement in project preparation	Proposed engagement in project
International		
UNEP	IA coordinated the development and design of the project and consulted with stakeholders.	UNEP Chemicals and Health Branch GEF unit, with the support of UNEP's Direction for Latin America and the Caribbean Region (ROLAC) and Mexico's Office, is the IA responsible for implementing the project components, in line with project budget and workplan. Will lead consultations with the national project partners, as well as coordinating and overseeing the Executing Agency. UNEP will have decision rights on the PSC and hold one vote.
Global Mercury Partnership	Consulted during project preparation phase on technology options	The Global Mercury Partnership will provide targeted technical assistance and assist in identifying actions for mercury waste management and feasible remediation at identified contaminated sites in the region. The Partnership will also draw on the 'South-south' experience of its members to inform mine successful mine closure. Finally the Partnership will be a key partner in facilitating Knowledge Management.
National and State Government		
General Direction of Integral Management of Materials and Risky Activities (DGGIMAR) o	As host of the Minamata Focal Point, DGGIMAR has been the main partner in the d	As main counterpart, DGGIMAR will chair the Steering Committee meeting and ensure the project addresses the national priorities in the implementation of the Minamata Convention on mercury. With other agencies. DGGIMAR will a

f the Secretariat of Environment and natural Resources (SEMARNAT)	development of the project	Also ensure environmental risks are adequately addressed by the project. DGGIMAR will have decision rights on the PSC and hold one vote.
Secretariat of Environment and natural Resources (SEMARNAT-QRO)	Has been consulted through DGGIMAR at the federal level.	Will act as the project contact of SEMARNAT in the state of Querétaro. With other partners, will ensure effective and timely execution of project activities. SEMARNAT-QRO will have decision rights on the PSC and hold one vote.
National Institute of Ecology and Climate Change (INECC)	EA jointly drafted ProDoc with stakeholders.	As Executing Agency, with the guidance of DGGIMAR, INECC will undertake project activities as per project document and workplan agreed at the Steering Committee meetings. INECC will be in charge of the reporting to UNEP (quarterly financial and progress report and annual Project Implementation Report). INECC will have decision rights on the PSC and hold one vote.
Government of the State of Queretaro	Coordinated actions in each one of the municipalities, provided information and co-financing confirmation to develop ProDoc baseline	The Secretariat of Environment and Natural Resources of the State of Queretaro will assist the project in the identification of the current status of the mines at a municipal and state levels. It will also assist on the sound waste management of the tailings generated during the mercury extraction process. Through the collaboration of the Secretariat of Sustainable Development (SEDESU) it will also support the alternative economic livelihood activities in the region. With other agencies, the State of Queretaro will ensure environmental risks are adequately addressed by the project.
Ministry of Health (SS)	Provided information related to health risks and provided local co-financing confirmation	Will assess and make the necessary linkages between mercury exposure and risks to human health. Will propose actions to reduce mercury exposure and risks in the communities of the region. Will ensure health risks are adequately addressed by the project.
Ministry of Economy (SE)	Provided information regarding the mining concessions situation in the state of Queretaro and provided co-financing confirmation	Will support the enforcement of regulations related to mercury and the proper application to the mercury mining sector.
Mexican Geological Survey (SGM)	Provided information on the feasibility of mineral exploitation in the state of Queretaro	Will assist the mining communities in the identification of alternative mineral extraction in the region as a sustainable activity. Will provide assistance in the characterization and identification of potentially contaminated sites.
Federal Attorney for Environmental Protection (PROFEPA)	Provided information on the mercury trade	Will support the enforcement of regulations related to control mercury trade in the global market and regulations involved in the mercury mining sector. Will co-lead on matters related to authorizations for active mercury mining sites in the region.
National Institute of Women (INMUJERES)	Provided information on gender perspective in the municipalities	Will support the enforcement of regulations related to gender perspectives and the proper application in the mining sector. Will assist co-lead on gender issues on the region.
Regional actors		

Municipal Governments of the Sierra Gorda	Provided information of the possible economic alternatives.	Will assist the federal and local governments to establish direct communication with the mining communities and assist the project in the implementation of the alternative economic livelihoods.
University of Queretaro	Analysis of the socioeconomic profiles and gender perspective in the mining communities.	Will be performing tasks and collecting information for the assessment of the social risks and provide technical advice in order to address these issues. Will also assist in the workshops for raising awareness on the mercury environmental risks for the communities.
University of San Luis Potosi	Analysis of the environmental and health risks associated to the primary mercury mining in the state of Queretaro.	Responsible for collecting information for the assessment of mercury human health exposure in the mining communities. It will also assist in the development of scientific and technical advice on mercury pollution for the government as well as the communities.
Mining communities of Sierra Gorda	Provided consultation and evaluation of the proposed alternative livelihoods.	Will attend workshops on alternative livelihoods for to assess of feasibility of proposed approaches. Will also facilitate communication within the municipal governments and communities.
Ecological Group of Sierra Gorda	Provided consultation and evaluation of the proposed alternative livelihoods.	NGO with broad experience assisting communities of the Sierra Gorda region. Will assist the project by sharing experience on feasible alternative livelihoods and will establish communication channels between communities and government authorities.
Mining Association of Queretaro AC	Consulted on the mercury production baseline and evaluation of the alternative livelihoods.	Mining group where most of the communities work. Will assist the project by sharing the raising awareness of the mercury issue and the transition to feasible alternative livelihoods within the communities of the Sierra Gorda.

Table 7. Principal Project Stakeholders

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement.

Select what role civil society will play in the project:

Consulted only;

Member of Advisory Body; Contractor; Yes

Co-financier; Yes

Member of project steering committee or equivalent decision-making body; Yes

Executor or co-executor; Yes

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

Despite making regular annual progress, Mexico maintains one of the larger gender employment gaps in the OECD. In 2019, only Turkey had a lower employment rate for women. Corporate leadership in the country is also largely male. In 2017, only 7.5 % of the largest publicly traded companies were headed by women, well below the 22.3 % average for OECD countries. Only Estonia, Japan and Korea were lower in the OECD.[1] The UNDP gender development index is a metric that endeavours to combine the relative wellbeing of women with regard to health, knowledge, and living standards. Of the 181 countries for which a ranking was available in 2018, Mexico ranked 96th, above only Turkey and South Korea in OECD.[2] A related but distinct UNDP metric, the gender inequality index is intended to measure women's reproductive health, empowerment and the labour market. Of the 178 countries for which a ranking exists for 2018, Mexico ranked 79th, last in the OECD. By contrast, Mexico's political leadership is the 4th most female in the world; at the close of 2018 both chambers of Congress were approaching 50 % female. For context, the US was less than 25 % female while the UK was less than 30 % female. All Latin American countries with the exception of Argentina (~40 % female) were less than 31 % female.[3]

Mexico is highly unequal from an economic perspective. The Gini coefficient is a widely used measurement of economic inequality in a given country, with 0 representing perfect equality and 100 representing complete inequality. The global average is < 40. In the last year for which data are available (2016) Mexico's Gini coefficient was the highest in the OECD at 48.3. The next highest country in the OECD was Spain with Gini coefficient of 36.1. The inequality in Mexico is also regional. Chiapas, Oaxaca, and Guerrero each have extreme poverty rates > 20 %, compared to a national average of 7.4 %. By contrast a relatively small 2 % of Querétaro residents live in poverty.[4]

Mexico maintains a number of programs intended to benefit vulnerable groups and improve their relative role in society. The national institute for women (INMUJERES) was established in 2001 and works on a range of issues including promoting an improved gender perspective across Mexican institutions and combating rape. The PROSPERA program provides conditional cash transfers to low-income households. A recent analysis by the World Bank found that beneficiaries of the programme were much more likely to improve over their parents with regard to education, assets holding, and income.[5] Mexico's gender inequality and development indices have been consistently improving since 1985 (the first year for which data are available) – both in absolute terms and relative to other countries. However, despite these significant and laudable efforts gender and economic inequality remain intractable issues in Mexico. Accordingly the proposed project has integrated a gender perspective into all major outputs.

Outputs	Gender Action Plan and Resources Required	Target and means of verification
<p>Output 1.1 Modifications to the existing legislative and regulatory frameworks on mercury production, management, use and trade, are developed with relevant government experts, representatives from NGOs and key stakeholders.</p>	<p>Gender Specialist to comment on proposed modifications to legislative and regulatory frameworks with regard to their impact on vulnerable groups and suggest possible changes. Gender Specialist to be consulted while developing workshop programs to ensure adequate consideration of gender.</p> <p>Budget: Gender Specialist</p>	<p>Gender review of legislative and regulatory frameworks and workshops received and annexed to reports.</p>
<p>Output 1.2 Mexico has the capacity to identify and quantify mercury sources, including ongoing monitoring of mercury emissions and releases in the primary mining sector.</p>	<p>Gender Specialist to review training document and workshop agendas to ensure adequate consideration of gender.</p> <p>Budget: Gender Specialist</p>	<p>Gender review of workshops and training materials received and annexed to reports.</p>
<p>Output 1.3 Site specific remediation mapping and planning are undertaken</p>	<p>Gender Specialist to review detailed site assessment and proposed alternatives to ensure adequate consideration of gender.</p> <p>Budget: Gender Specialist</p>	<p>Gender specific recommendations included in detailed site assessment and alternatives reports.</p>
<p>Output 2.1 Alternative economic activities and livelihoods are implemented in Querétaro</p>	<p>Gender Specialist to review proposed livelihoods and ensure adequate consideration of gender.</p> <p>Gender Specialist to review the selection of stakeholders to be invited to trainings to make sure that the trainings will include a gender perspective and bring in women's organizations and national gender experts</p> <p>Budget: Gender Specialist; cost elements of training budget</p>	<p>Gender review of workshops and training materials received and annexed to reports.</p>
<p>Output 2.2 Miners and communities are aware of the Minamata Convention obligations and adopt safer practices and alternative livelihoods.</p>	<p>Gender Specialist to review the selection of stakeholders to be invited to workshops.</p> <p>Gender Specialist to review the training materials for the IEC campaign and ensure that: awareness raising activities are developed taking into account expertise on women's and gender issues, e.g. through active outreach to women's organizations and gender experts and their inclusion in guiding and designing awareness raising activities.</p> <p>Budget: Gender Specialist; cost elements of seminars, trainings and campaigns budget</p>	<p>Gender specific and principles of equal opportunity included in training materials</p>

Table 8. Gender Action Plan

[1] OECD, 'Employment: Employment and Unemployment Rate, by Sex and Age Group, Quarterly Data' <<https://stats.oecd.org/index.aspx?queryid=54744>> accessed 9 February 2020.

[2] 'Human Development Data (1990-2018) | Human Development Reports' <<http://hdr.undp.org/en/data#>> accessed 12 February 2020.

[3] Inter-Parliamentary Union, 'Women in Parliaments: World Classification' <<http://archive.ipu.org/wmn-e/classif.htm>> accessed 11 February 2020.

[4] CONEVAL (n 40).

[5] Arturo Aguilar and Giacomo De Giorgi, 'Long-Term Effects of PROSPERA on Welfare'.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources;

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women

Does the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

The second component of the project is wholly focused on influencing private sector actors away from informal mercury mining and towards more sustainable livelihoods. Through activities relating to the promotion of alternative livelihoods the project will engage a range of private sector actors including the minters themselves, owners and operators of non-mercury mines, non-timer harvesters, eco-tour operators and others. The funds available through the State of Queretaro are accessible to the private sector actors in the region for their development.

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Risk	Risk ranking	Mitigation measures
Operational/delivery risks		
Political instability and shifting priorities	Medium	The institutionalization of the project and the National Coordination Committee will be encouraged, limiting its reliance on any one or set of individuals who may be susceptible to replacement due to political changes.
Local support is not provided or is not adequate for project needs	Medium	Have clear country and co-finance agreements and ensure country commitments to the established agreements. A detailed survey of locally available capacity has been conducted during the PPG and confirmed to exist in the country at a federal, regional and municipal levels.
Lack of transparency in financial management and distribution	Low	Clear terms or reference in advance of work. Regular reporting of disposed funds against activities completed. Execution coordinated via EA to increase scrutiny of financial transactions.
Limited mobility of project team due to the ongoing COVID-19 pandemic inhibits project execution	High	<p>The project team completed much of the PPG during the pandemic, successfully engaging stakeholders in completing the project documents and supporting materials. These methods of working will be utilized in the rollout of the project including the inception meeting and much of Outputs 1.1 and 1.2.</p> <p>The phased approach of the project envisages the majority of field work and in person meetings beginning in Year 2 (2021). In the event that the current situation has not improved and movement is restricted (domestically and internationally) the project will be adjusted accordingly, including utilising remote guidance of international experts and an increased reliance on local experts.</p>
Technical risks		
Environmental assessment inadequately characterizes site	Low	Engage national and international experts, including through the Global Mercury Partnership, with assessment experience at similar sites. Calibrate and test equipment in advance of field visits. Take a percentage of redundant samples for analysis in a laboratory.
Environmental safeguard risks		
Accident or spill during the field waste operations.	Low	The envisaged site assessments will not include the significant disruption of material.
Injury resulting to investigators during site visits	High	A number of safety hazards are present at these locations. Investigators will receive site-specific health and safety training. Protective equipment will be provided. Confined space entry will not be permitted.
Increased COVID-19 exposure risk to project staff and targeted communities	Medium	Best practices with regard to personal hygiene, PPE, social distancing and other measures will be followed by project staff. Compliance will be monitored by the project manager.
Social risks		
Disregard for the environmental and health impacts of the mercury mines	Medium	A robust IEC campaign will engage key community leaders who maintain authority in the mining communities. Alternative livelihoods such as non-timber harvesting and eco-tourism will encourage a valuing of environmental resources.
Poor uptake of alternative livelihoods	Medium	The project will rely on expanding the role of existing alternative livelihoods

hoods.		that have demonstrated success, particularly those in growth areas like tourism. The project will engage the community and relevant experts in the design and execution of the program. Specific attention will be paid to the changing economic situation due to the COVID-19 pandemic and alternatives with the lowest impact will be implemented first to allow for the situation to settle.
Increases in the price paid for mercury resulting from external or internal forces affects adoption of alternatives livelihood	Medium	Regulators at federal, national and municipal levels in a cohesive legal framework that is adequately punitive to discourage further primary mining. Alternative livelihoods will be supported sufficient to provide real competition to mining.
Climate change adversely impacts tourism (e.g. through forest fires) reducing employment in this sector	Low	Tourism is one of several possible alternatives identified. Other alternatives, such as non-timber harvesting and mineral and non-mineral mining are less vulnerable to climate risks.

Table 9. Identified social, economic and environmental risks and their impact level and mitigation measures

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

The organizational structure for the coordination and management of the project is illustrated in Figure 8. each management body is described below.

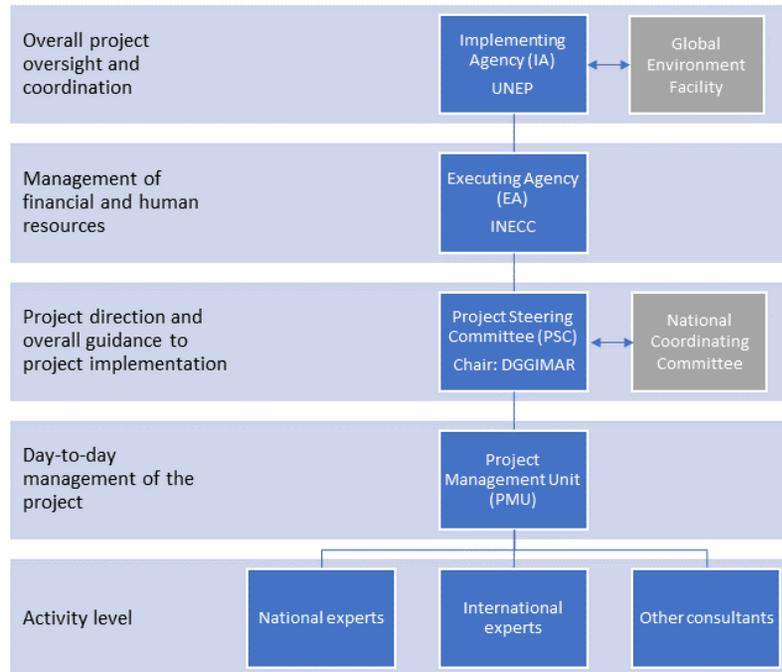


Figure 8. Institutional Arrangements and Coordination

- **Implementing Agency (IA):** UNEP will serve as the IA. The IA will be responsible for the overall project supervision, overseeing the project progress through the monitoring and evaluation of activities and progress reports of the established components. It will be responsible for quality assurance procedures, organise contracting with Executing Agency (EA), approve progress reports and clear disbursement. The IA will also monitor progress to ensure the proper quality of outputs. UNEP will report project implementing progress to GEF. The IA will also take part in the Project Steering Committee (PSC) and can request PSC to meet outside of the planned schedule as deemed necessary.
- **Executing Agency (EA):** INECC will serve as the EA. The EA is responsible for the overall management of the financial and human resources directly related to project execution in the country, with the guidance of DGGIMAR. It will function as the general oversight for the project and will be accountable to the implementing agency and PSC for the achievement of project outputs and outcomes. The EA will take guidance from the GEF implementing agency and the PSC in all matters concerning the project. In the delivery of its functions, it will be a member of the PSC and the National Coordinating Committee.

· **Project Steering Committee (PSC):** The PSC will be chaired by DGGIMAR and provide project direction and overall guidance to project implementation, making critical decisions on strategic matters. Four members of the PSC will have decision rights, each with one vote: DGGIMAR, INECC, SEMARNAT-QRO and UNEP.

The PMU will serve as the Secretariat and provide annual workplans for endorsement and regular progress reports. The PSC will consist of representatives of the beneficiary country, the IA, and the EA. It will also ensure the timely delivery of project outputs and the eventual achievement of the project outcomes by reviewing workplan and progress reports. Additional stakeholder representatives from academia, NGOs and other relevant areas may be invited to join the PSC during the project execution as observers. At all times, the PSC and its activities will comply with the policies, conditions and regulations of the UN and the GEF.

· **National Coordinating Committee:** Mexico will establish a national coordinating committee to ensure efficient project delivery with all relevant national stakeholders. Mexico will designate a National Focal Point during the inception phase, to act as the liaison between the government, the EA and project partners. The National Focal Point will be fully involved in project delivery, including the selection of the national consultants and experts, advising on the development of the project progress, and ensuring alignment with national regulations and the issuance of environmental and other permits required for the operation of the project sites. The PSC and National Focal Point will also facilitate collaboration of the project with other country initiatives, stakeholders and institutions.

· **The Project Management Unit (PMU)** will be responsible for the day-to-day management of the project. The PMU will be composed of a Project Manager and other project staff. The decision of the location of the PMU will be made at first steering committee meeting. The host institution(s) will be expected to provide in-kind co-financing for the PMU (office space and/or rent). The PMU will regularly provide updates to the PSC and will submit monthly progress reports.

- o Annual workplans and progress reports will be submitted to the PSC for endorsement. The PMU will also be responsible for the daily project finances with approval from the PMC.
- o Regularly coordinate with DGGIMAR and the PSC
- o responsible for the efficient and timely preparation and execution of project activities
- o responsible for the daily management of financial and human resources for the project
- o provide on-the-ground coordination to facilitate project execution
- o prepare concept notes, plans, summaries, and reports as required by the project in a timely manner
- o facilitate coordination meetings and other related dialogues with the guidance of DGGIMAR and INECC
- o form part of any technical working group that may be established by the project
- o identify, develop, and foster contacts and relationships that will be beneficial for the project
- o execute the project communication strategy including information dissemination with the guidance of DGGIMAR and INECC
- o apply the project's knowledge management approach
- o execute a regular project monitoring plan
- o functions as secretariat of the PSC

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

This project supports the national priorities of Mexico, particularly on the issues related to economic development and management of chemicals and wastes. The project's relation to specific plans is outlined below.

United Nations Development Assistance Framework

The Mexico United Nations Development Assistance Framework (UNDAF) is currently being updated. The Executing Agency will liaise during inception with UN country teams to anchor project results in the next UNDAF. Linkages will also be developed at this stage to facilitate consistency with and reporting against the Voluntary National Reviews (VNR), OneUN programming and United Nations Sustainable Development Cooperation Frameworks (UNSDCF).

National Development Plan (2019–2024)

The project is consistent with the principles laid out in Mexico's National Development Plan (2019–2024). Specifically the project will support sustainable growth as outlined in section 2 (Component 2) as well as the development of science and technology defined in section 3 (Component 1). The project's execution through the government agency INECC and integrated involvement of other government agencies will support progress on the national plan.

State of Queretaro Development Plan (2016-2021)

The project will support Working Axis 1 which refers to improved quality and living conditions for people to allow equity of opportunity, inclusion and social cohesion. I will do this by targeting vulnerable communities in the north of the state. It will also support Working Axis 2 which focuses on the planned economic development allowing access to goods and services, decent work and fair income.

Minamata Convention

The most relevant national priority to this project is Mexico's role as a Party to the Minamata Convention. This project will assist Mexico is complying with a range of obligations, including the following:

National Action Plan (NAP)

Development of National Action Plan (NAPs) for ASGM is an obligation under Article 7 of the Minamata Convention on Mercury for each participating country under the Programme as they have all declared the sector as more than insignificant. Because the ASGM sector is closely linked to complex economic development and poverty issues, the Convention allows flexible, country-specific solutions through the development of a tailored National Action Plan. Annex C of the Minamata Convention provides a list of elements that must be included in the development of the NAPs:

- Strategies to eliminate worst practices and promote mercury-free methods
- Steps to facilitate the formalization or regulation
- Baseline estimates of the quantities of mercury used and the practices employed
- Strategies for managing trade and preventing the diversion of mercury
- Strategies for providing information to ASGM affected communities
- A public health strategy on the exposure of miners and their communities to mercury
- Strategies to prevent the exposure of vulnerable populations, particularly children and women of child-bearing age, especially pregnant women
- Strategies for mercury-free ASGM and market-based mechanisms or marketing tools

Mexico will develop the NAP with GEF support which is currently under preparation with UNEP.

NAP Global Component

All GEF-funded UNEP implemented NAP projects contain “National information exchange, capacity building and knowledge generation” components coordinated by UNEP and the Global Mercury Partnership. In order to facilitate the development of NAPs, the Partnership undertakes activities to ensure project implementors receive support and information throughout the process. Accordingly the Partnership (i) has developed a roster of ASGM experts, (ii) develops and shares information on methods, (iii) offers assistance with the development of the baseline estimates and national overview of the sector, (iv) and facilitates communication and regional cooperation between countries and executing agencies developing NAPs.

Minamata Initial Assessment (MIA)

An MIA project provides an opportunity for a country to undertake a mercury inventory, determine and agree upon the measures it will take to implement the Convention, estimate associated costs and communicate this information in a concise and clear manner to Government partners, national stakeholders, national and international experts and consultant. MIAs for the ASGM sector provide a baseline guide for the development of the detailed inventory established by NAP project. The implementation of the MIA in Mexico helped strengthen national decision-making toward an effective ratification of the Minamata Convention on Mercury and helped reinforce national capacity towards the implementation of future obligations.

Mexico recently completed an MIA funded by the GEF:

Country	GEF ID	IA	EA	Start	End
Mexico	5875	UNEP	INECC	October 16 2015	July 31 2018

The project proposal “**Mercury trade assessment and control in Latin America**” (1.99m USD) involves objectives such as identifying and controlling major flows of mercury supply and trade assessment, regulation and control measures to reduce illegal trade at a global, regional and local level, to reduce the exposure to local populations from uncontrolled movements of mercury. Mexico being a participant country will look to create a harmonized regional system for mercury trade, which is also aligned with national circumstances, regulatory frameworks and to prevent illegal trade. This is important to notice due the nature of primary mercury mining sites in the Sierra Gorda of the state of Querétaro fall directly on the objectives sought and have the potential to be identified, regulated and assessed by the established measures on the efforts of this project.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

The Knowledge Management Strategy for the project will be closely linked to the monitoring and evaluation function and coordinated by the EA. It is an important function because of the broad relevance of alternative livelihoods in Mexico. The project also needs very specific technical expertise on contaminated sites management and long-term capacity building. Mexico will benefit from the close coordination initiated during the PPG that will continue through the project to share experiences and coordinate activities.

UNEP will maintain regular communication throughout the project in order to obtain up-to-date information and share results of the project components and ensure smooth and effective implementation of activities. Given the multiple partners involved in the project, UNEP will be cautious of redundancy and keep partners apprised of project progress and developments. As the results of this project are planned to be used for future projects, there will be a strong emphasis on documenting activities and outputs while developing user-friendly communication materials ensuring further dissemination. Much of this will be done through the Global Mercury Partnership given its significant experience with mercury mining projects elsewhere.

At the country level, the project will also develop or build on existing country-specific communication and knowledge management plans or platforms to ensure efficient cascading of information down to the community level and to ensure sustainability of interventions. These mechanisms will be embedded in existing federal, local government or academic institutions facilitating use of knowledge products after the end of the project.

9. Monitoring and Evaluation

Describe the budgeted M and E plan

Project M&E will be conducted in accordance with established UNEP and GEF procedures and will be provided by the EA. The M&E plan includes an inception report, annual review and final evaluations. The Project Manager will be responsible for stakeholder engagement, gender monitoring, and outreach to the broader community in the country. The M&E plan will be reviewed and revised as necessary during the project inception workshop to ensure project stakeholders understand their roles and responsibilities vis-à-vis project monitoring and evaluation. Indicators and their means of verification may also be fine-tuned at the inception workshop. Day-to-day project monitoring is the responsibility of the project management team but other project partners will have responsibilities to collect specific information to track the indicators. It is the responsibility of the Project Manager to inform UNEP of any delays or difficulties faced during implementation so that the appropriate support or correlative measures can be adopted in a timely fashion.

The project Steering Committee will receive periodic reports on progress and will make recommendations to UNEP concerning the need to revise any aspects of the Results Framework or the M&E plan. Project oversight to ensure that the project meets UNEP and GEF policies and procedures is the responsibility to the Task Manager in UNEP-GEF. The Task Manager will also review the quality of draft projects outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

At the time of project approval 80% percent of baseline data are available. Baseline data gaps will be addressed during the first year of project implementation. The main aspects for which additional information are needed are:

- Identification and in-depth socio-economic assessment of sound alternatives to mercury mining;
- Upgrading and reinforcement of monitoring mercury in health and environment in the Sierra Gorda region;
- Upgrading and reinforcement of environmental and health impacts of mercury mining.

Project supervision will take an adaptive management approach. The Task Manager will develop a project supervision plan at the inception of the project which will be communicated to the project partners during the inception workshop. The emphasis of the Task Manager supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring. Progress vis-a-vis delivering the agreed project global environmental benefits will be assessed with the Steering Committee at agreed intervals. Project risks and assumptions will be regularly monitored both by project partners and UNEP. Risk assessment and rating is an integral part of the Project Implementation Review (PIR). The quality of the project monitoring and evaluation will also be reviewed and rated as part of the PIR. Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources.

A mid-term management review or evaluation will take place after 12 months of project execution as indicated in the project milestones. The review will include all parameters recommended by the GEF Evaluation Office for terminal evaluations and will verify information gathered through the GEF tracking tools, as relevant. The review will be carried out using a participatory approach whereby parties that may benefit or be affected by the project will be consulted. Such parties were identified during the stakeholder analysis (see **section A.3** of the project document). The project Steering Committee will participate in the mid-term review and develop a management response to the evaluation recommendations along with an implementation plan. It is the responsibility of the UNEP Task Manager to monitor whether the agreed recommendations are being implemented.

In line with UNEP Evaluation Policy and the GEF's Monitoring and Evaluation Policy the project will be subject to an independent Terminal Evaluation (TE). The Evaluation Office will be responsible for the Terminal Evaluation (TE) and will liaise with the Task Manager and EA throughout the process. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will also have two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, the GEF, executing partners and other stakeholders. The direct costs of the evaluation will be charged against the project evaluation budget. The Terminal Evaluation will be initiated no earlier than six months prior to the operational completion of project activities and, if a follow-on phase of the project is envisaged, should be completed prior to the submission of the follow-up proposal. Terminal Evaluations must be initiated no later than six months after operational completion.

The draft TE report will be sent by the Evaluation Office to project stakeholders for comments. Formal comments on the report will be shared by the Evaluation Office in an open and transparent manner. The project performance will be assessed against standard evaluation criteria using a six-point rating scheme. The final determination of project ratings will be made by the Evaluation Office when the report is finalised and further reviewed by the GEF Independent Evaluation Office upon submission. The evaluation report will be publicly disclosed and may be followed by a recommendation compliance process.

M&E activity	Purpose	Responsible	Budget	Timeframe
Inception workshop & report	Review of project activities, outputs and intended outcomes: detailed work planning	EA	10,000	Within two months of project start
Steering Committee meetings	Review of progress against approved workplan and budget and help provide advice to the Project Manager to ensure project achieves desired outputs and outcomes; Provide guidance to project Manager so that project business case remains valid, especially among stakeholders whose behaviour must change if project is to achieve its planned results; Provide guidance to Project Manager on needed changes or revisions of project	EA	50,000	Steering Committee meetings will be organised annually
Quarterly financial reports	Assess that resources are being utilised optimally according to the approved workplan	EA	10,000	
Quarterly progress reports and annual	Progress and effectiveness review, including for GEF; Documentation of lessons learnt	EA	10,000	
Project Implementation Report	Progress and effectiveness review, including for GEF. Documentation of lessons learnt	EA/IA	10,000	
Mid-term Review	Reviews effectiveness against implementation plan; Highlights technical outputs; identifies lessons learned and likely design approaches for future projects; assesses likelihood of achieving design outcomes	IA	25,000	2.5 years after inception
Terminal Report	Reviews effectiveness against implementation plan; Highlights technical outputs; identifies lessons learned and likely design approaches for future projects; assesses likelihood of achieving design outcomes	EA	10,000	1 month after the completion of the technical activities
Terminal Evaluation	Reviews effectiveness, efficiency and timelines of project implementation, coordination mechanisms and outputs. Identifies lessons learned and likely remedial actions for future projects, highlights technical achievements and assesses against prevailing benchmarks	UNEP Evaluation Office	35,000	6 months after the completion of the technical activities
Financial Audit	Reviews use of project funds against budget and assesses probity of expenditure and transactions	EA	0	
Total M&E Cost			150,000	

Table 10. M&E Activities

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

Primary mercury mining is an illicit, male-dominated profession with grave occupational hazards. Miners are regularly exposed to disease-inducing levels of environmental mercury. Contamination migrates offsite where non-miners incur exposure. Mercury is a neurotoxicant with well-known associations between exposure and decreased economic output.^[1] Thus it is reasonable to assume that reducing mercury exposure in the Sierra Gorda will result in knock-on economic benefits in the region. A lack of adequate controls at mines, including during excavation in confined spaces, and crushing and burning of cinnabar result in a number serious safety hazards. As with neurological insults, physical injuries can be economically debilitating, particularly in low-skill manual labour.

Primary mercury mining is subject to a number of external pressures on income, including fluctuations in the international price of mercury, unscrupulous brokers in the mercury trade, and challenges implicit with working in an illegal sector. During surveys carried out as part of PPG, miners reported being paid approximately half the international mercury price for their product (Appendix 8). Operating illegally, they simply cannot benefit from the various protections afforded by the formal economy and thus accept this rate.

The alternative livelihoods proposed by the project will present more sustainable, gender-balanced and safer options for this vulnerable population. As opposed to informal mercury mining, several of the alternatives identified will depend on and in-turn contribute to the ecological health of the region. These include eco-tourism and non-timber harvesting. Previous studies of alternatives livelihoods interventions have identified environmental benefits when the introduced livelihoods depend on the protection of natural resources, as is the case here. An obvious exception is non-mineral mining, which is expected to be central to the project, and which conversely depends on a disruption of the natural environment. Importantly, in this case non-mineral mining takes place outside of the preserve in Cadereyta de Montes only and is carried out formally. Thus it is subject to the kinds of environmental safeguards and worker protections that informal primary mining is not.

[1] Leonardo Trasande and others, 'Economic Implications of Mercury Exposure in the Context of the Global Mercury Treaty: Hair Mercury Levels and Estimated Lost Economic Productivity in Selected Developing Countries' (2016) 183 Journal of Environmental Management 229 <<http://www.ncbi.nlm.nih.gov/pubmed/27594689>> accessed 9 February 2020.

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE
Medium/Moderate			

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

Precautionary Approach

The project will take precautionary measures even if some cause and effect relationships are not fully established scientifically and there is risk of causing harm to the people or to the environment.

Human Rights Principle

The project will make an effort to include any potentially affected stakeholders, in particular vulnerable and marginalized groups; from the decision making process that may affect them.
The project will respond to any significant concerns or conflicts raised during the stakeholder engagement process.
The project will make an effort to avoid inequitable or discriminatory negative impacts on the quality of and access to resources or basic services, on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups.

Screening checklist	Y/N/ Maybe	Comment
Safeguard Standard 1: Biodiversity, natural habitat and Sustainable Management of Living Resources		
Will the proposed project support directly or indirectly any activities that significantly convert or degrade biodiversity and habitat including modified habitat, natural habitat and critical natural habitat?	N	Many of the mining sites are located illegally in protected areas. The project aims to move employment away from this sector and into sustainable livelihoods that do not adversely impact protected areas.
Will the proposed project likely convert or degrade habitats that are legally protected?	N	
Will the proposed project likely convert or degrade habitats that are officially proposed for protection? (e.g.; National Park, Nature Conservancy, Indigenous Community Conserved Area, (ICCA); etc.)	N	The project will introduce several potential alternative livelihoods. Consistent with international best practice, several of the alternatives introduced will rely on the conservation of natural habitats (e.g. eco-tourism, non-timber harvesting).
Will the proposed project likely convert or degrade habitats that are identified by authoritative sources for their high conservation and biodiversity value?	N	
Will the proposed project likely convert or degrade habitats that are recognized- including by authoritative sources and /or the national and local government entity, as protected and conserved by traditional local communities?	N	
Will the proposed project approach possibly not be legally permitted or inconsistent with any officially recognized management plans for the area?	N	Formal non-mineral and mineral mining is also envisaged as a potential alternative livelihood, though these operations are already well established and located outside of protect

plans for the area.		ed areas. The relative adverse impacts of transitioning the small Hg mining workforce to the formal sector are not expected to be significant.
Will the proposed project activities result in soils deterioration and land degradation?	N	
Will the proposed project interventions cause any changes to the quality or quantity of water in rivers, ponds, lakes or other wetlands?	N	
Will the proposed project possibly introduce or utilize any invasive alien species of flora and fauna, whether accidental or intentional?	N	
Safeguard Standard 2: Resource Efficiency, Pollution Prevention and Management of Chemicals and Wastes		
Will the proposed project likely result in the significant release of pollutants to air, water or soil?	N	The project aims to reduce mercury extraction and processing and introduce alternative livelihoods that have been proposed based on feasibility studies carried out in the region. In total, 140 tons of mercury emissions will be reduced as part of the project. One of the proposed alternatives (non mineral and mineral mining) potentially presents risks related to waste management. Importantly, these industries are formal and regulated in the state of Queretaro and accordingly present a significantly lower risk than the primary mercury mining being reduced.
Will the proposed project likely consume or cause significant consumption of water, energy or other resources through its own footprint or through the boundary of influence of the activity?	N	
Will the proposed project likely cause significant generation of Green House Gas (GHG) emissions during and/or after the project?	N	
Will the proposed project likely generate wastes, including hazardous waste that cannot be reused, recycled or disposed in an environmentally sound and safe manner?	N	
Will the proposed project use, cause the use of, or manage the use of, storage and disposal of hazardous chemicals, including pesticides?	N	
Will the proposed project involve the manufacturing, trade, release and/or use of hazardous materials subject to international action bans or phase-outs, such as DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Convention on Persistent Organic Pollutants or the Montreal Protocol?	N	
Will the proposed project require the procurement of chemical pesticides that is not a component of integrated pest management (IPM) ^[2] or integrated vector management (IVM) ^[3] approaches?	N	
Will the proposed project require inclusion of chemical pesticides that are included in IPM or IVM but high in human toxicity?	N	
Will the proposed project have difficulty in abiding to FAO's International Code of Conduct ^[4] in terms of handling, storage, application and disposal of pesticides?	N	
Will the proposed project potentially expose the public to hazardous materials and substances and pose potentially serious risk to human health and the environment?	N	

Safeguard Standard 3: Safety of Dams		
Will the proposed project involve constructing a new dam(s)?	N	This project does not involve activities related to dam construction, rehabilitation and safety.
Will the proposed project involve rehabilitating an existing dam(s)?	N	
Will the proposed project activities involve dam safety operations?	N	
Safeguard Standard 4: Involuntary resettlement		
Will the proposed project likely involve full or partial physical displacement or relocation of people?	N	No residential resettlements will be carried out as part of the project.
Will the proposed project involve involuntary restrictions on land use that deny a community the use of resources to which they have traditional or recognizable use rights?	N	Because the project involves the transition of workers from informal and dangerous employment to sustainable livelihoods, it implicitly involves a risk of displacement. This will be minimized through a phased approach, deliberate involvement of workers as a major stakeholder, and feasibility studies. The Environment and Social Management Framework developed for this project has concluded that no safeguard for involuntary settlement was needed for this project.?
Will the proposed project likely cause restrictions on access to land or use of resources that are sources of livelihood?	N	
Will the proposed project likely cause or involve temporary/permanent loss of land?	N	
Will the proposed project likely cause or involve economic displacements affecting their crops, businesses, income generation sources and assets?	N	
Will the proposed project likely cause or involve forced eviction?	N	
Will the proposed project likely affect land tenure arrangements, including communal and/or customary/traditional land tenure patterns negatively?	N	
Safeguard Standard 5: Indigenous peoples ^[5]		
Will indigenous peoples be present in the proposed project area or area of influence?	Y	The north of Querétaro, where the project will take place, has a higher proportionate percentage of indigenous people in the population than the rest of the state. It is very likely therefore that these communities will be involved in the project.
Will the proposed project be located on lands and territories claimed by indigenous peoples?	M	
Will the proposed project likely affect livelihoods of indigenous peoples negatively through affecting the rights, lands and territories claimed by them?	N	
Will the proposed project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	M	A safeguard for indigenous people will be triggered when an individual mine or sustainable livelihood is located in an area with indigenous people (IP). In such cases, indigenous peoples' plan (IPP) will be required from the proponent and must be coordinated with the National Commission for Indi
Will the project negatively affect the development priorities of indigenous peoples defined by them?	N	
Will the project potentially affect the traditional livelihoods, physical and cultural survival of indigenous peoples?	N	
Will the project potentially affect the Cultural Heritage of indigenous peoples?	N	

nous peoples, including through the commercialization or use of their traditional knowledge and practices?		igenous People (NCIP).
Safeguard Standard 6: Labour and working conditions		
Will the proposed project involve the use of forced labour and child labour?	N	Child labour is illegal. The project will not cause the increase of local or regional unemployment as displaced workers will be engaged in alternative livelihoods. The project sites will comply with the Labour and Working conditions standards as well as national laws.
Will the proposed project cause the increase of local or regional unemployment?	N	
Safeguard Standard 7: Cultural Heritage		
Will the proposed project potentially have negative impact on objects with historical, cultural, artistic, traditional or religious values and archaeological sites that are internationally recognized or legally protected?	N	UNEP bans projects that adversely impact any critical physical cultural heritage. The Environmental and Social Management Framework developed for this project concluded that such a safeguard was not needed for this project.
Will the proposed project rely on or profit from tangible cultural heritage (e.g., tourism)?	N	
Will the proposed project involve land clearing or excavation with the possibility of encountering previously undetected tangible cultural heritage?	N	
Will the proposed project involve in land clearing or excavation?	N	
Safeguard Standard 8: Gender equity		
Will the proposed project likely have inequitable negative impacts on gender equality and/or the situation of women and girls?	N	The project will assess potential roles, benefits, impacts and risks for women as well as men in the preparation and implementation of the project with the aim of supporting equality of opportunity and treatment for both women and men. Through the environmental, social and economic safeguard screening processes, the project will avoid, minimize, and/or mitigate any adverse gender issues that may rise during the implementation of the project. By eliminating the use of mercury, the project will benefit women and children who are usually extracting the mercury at the site and at their living spaces (respectively).
Will the proposed project potentially discriminate against women or other groups based on gender, especially regarding participation in the design and implementation or access to opportunities and benefits?	N	
Will the proposed project have impacts that could negatively affect women's and men's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services?	N	
Safeguard Standard 9: Economic Sustainability		

<p>Will the proposed project likely bring immediate or short-term net gain to the local communities or countries at the risk of generating long-term economic burden (e.g., agriculture for food vs. biofuel; mangrove vs. commercial shrimp farm in terms of fishing, forest products and protection, etc.)?</p>	<p>N</p>	<p>The implementation of the safeguards mentioned previously will ensure that the project will not generate long-term economic burden, in particular through the destruction of natural resources through deforestation and others that may follow alternative mining activities.</p> <p>The projects will also promote, as part of its design, planning, implementation and monitoring; the financial sustainability of the activities implemented, including those that will occur beyond the project intervention period.</p>
<p>Will the proposed project likely bring unequal economic benefits to a limited subset of the target group?</p>	<p>N</p>	<p>The project will consider various project modality options and undertake approaches that do not generate welfare disparities, especially for the poor, during or beyond the project intervention period.</p>

[1] Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to “women and men” or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

[2] “Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/ipm/en/>

[3] “IVM is a rational decision-making process for the optimal use of resources for vector control. The approach seeks to improve the efficacy, cost-effectiveness, ecological soundness and sustainability of disease-vector control. The ultimate goal is to prevent the transmission of vector-borne diseases such as malaria, dengue, Japanese encephalitis, leishmaniasis, schistosomiasis and Chagas disease.” (http://www.who.int/neglected_diseases/vector_ecology/ivm_concept/en/)

[4] Find more information from http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/CODE_2014Sep_ENG.pdf

[5] Refer to the Toolkit for the application of the UNEP Indigenous Peoples Policy Guidance for further information.

Upload available ESS supporting documents.

Title	Module	Submitted
GEF Mexico Mercury ESERN	CEO Endorsement ESS	

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Project Objective	Objective level Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks	UNEP MTS reference* and link to SDGs
<i>Prevent the risks to environment and human health from mercury through the control of primary mercury mining and enabled environmentally and socially sound alternative economic activities and livelihoods in the state of Queretaro</i>	Number of tons of reduced emissions from primary mercury mining	104 tons of Hg emitted or produced from 19 assessed mines annually. Baseline to be revised following monitoring data from activity 1.2.2 and 1.2.3	Mid-Point Target: 50 tons Hg production reduced End of Project Target: 140 tons Hg production reduced over the life of the project	Mercury exports reports; Updated country level reporting; Project final report; Project terminal evaluation report;	That mining communities are willing to adopt alternative livelihoods; That the Mexican government experiences limited change in key positions; That external drivers (i.e. Hg market price) remain stable.	UNEP MTS 2018 - 2021: Political and legal, institutional and fiscal strategies and mechanisms for sound chemicals management developed or implemented in countries within the framework of relevant MEAs and SAICM; SDG 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination; SDG 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.
	Number of people benefiting from the alternative economic activities and livelihoods	None. Alternative livelihoods have not yet been introduced.	Mid-Point Target: 150, 51 % female End of Project Target: 400, 51 % female			

Component 1: Characterization of primary mercury mining and reinforcement of control mechanisms						
Outcome 1	Outcome Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks	
The Government monitors primary mercury mining and adopts an adequate regulatory framework.	Number of new regulations and enforcement protocols adopted to implement article 3	The current regulatory and legal frameworks are incongruent with the Minamata Convention	Mid-Point Target: At least 3 regulations or protocols adopted End of Project Target: At least one revision to existing laws and 5 new regulations or protocols adopted	Project final report National government websites	That adequate will exists in the Mexican government to comply with the Convention; That governments experience limited turnover of trained staff.	
	Monitoring system	There are several inconsistent though disconnected efforts by researchers	Mid-Point Target: Draft system developed	Updated country level		

	monitoring system operational	ted efforts by researchers. No regular monitoring my government in conducted.	End of Project Target: Monitoring system fully operational	Updated country level reporting	
Component outputs	Output Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks
Output 1.1: Modifications to the existing legislative and regulatory frameworks on mercury production, management, use and trade, are developed with relevant government experts and representatives from NGOs and key stakeholders.	Number of existing legislative and regulatory frameworks modified; Number of gender reviews of legislative and regulatory frameworks and workshops received and annexed to reports.	Several previous efforts have been made to determine the modifications required to facilitate compliance with the Convention. These have not yet been synthesized or adopted.	Mid-Point Target: At least 3 draft regulations or protocols modified End of Project Target: At least 5 draft regulations or protocols modified; One gender review received	Modifications proposal Workshop reports and list of participants National Government websites	That the current high level government interest is maintained over the medium term; That different levels of government can successfully work together.
Output 1.2: Relevant agencies' capacity to identify and quantify mercury sources, including ongoing monitoring of mercury emissions and releases in the primary mining sector is enhanced.	Number of monitoring needs assessment; Number of monitoring regimens developed; Number of preliminary risk assessments; Number of mines inventoried; Number of gender reviews of training materials	There are several inconsistent though disconnected efforts by researchers. No regular monitoring my government in conducted.	Mid-Point Target: Completion of monitoring needs assessment; development of one monitoring regimen; At least 75 mines inventoried; 3 preliminary risk assessments conducted. End of Project Target: at least 10 preliminary risk assessments conducted; All mines in the Sierra Gorda inventoried; One gender review of training materials	Completed assessments; Workshop reports and list of participants.	That interest in the project at the local government level remains strong; That access to sites is not restricted; That miners are forthcoming with information related to their practice.
Output 1.3: Site specific remediation mapping and planning are undertaken.	Number of sites identified for remediation targets and establishment of priority areas; Number of Gender specific recommendations included in detailed site assessment and alternatives reports.	No remedial investigations have been carried out.	Mid-Point Target: At least 3 potentially contaminated sites identified; at least 1 detailed assessment consistent with SEMARNAT's National Program for the Remediation of Contaminated Sites. End of Project Target: At least 10 potentially contaminated sites identified; at least 3 detailed assessment consistent with SEMARNAT's National Program for the Remediation of Contaminated Sites; at least 3 alternatives matrices developed with inclusion of preliminary costing; At least one set of gender specific recommendations	Site remediation reports uploaded at the National Government websites and attached to project reporting	That interest in the project at the local government level remains strong; That access to sites is not restricted; That miners are forthcoming with information related to their practice.

			mmendations included in reports.		
Component 2: Introduction of alternative livelihood					
Outcome 2	Outcome Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks
2. Miners in Queretaro adopt alternative income generation activities.	Percent of targeted miners adopting alternative livelihoods	Miners are not currently leaving the practice. There is a robust regional economy in which miners can be integrated.	End of Project Target: At least 40 % (n=80) of targeted miners have adopted alternative livelihoods.	Final report	That suitable alternatives can be identified; That market conditions to not change to disproportionately favor primary Hg mining; That government adequately applies regulations prohibiting primary Hg mining.
Component outputs	Output Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks
Output 2.1: Alternative economic activities and livelihoods for miners and local communities identified.	Number of alternative livelihoods identified; Number of miners trained in alternative livelihoods; Number of gender reviews of workshop and training materials received and annexed to reports.	Miners are not currently leaving the practice. There is a robust regional economy in which miners can be integrated.	Mid-Point Target: Five alternative livelihoods identified; at least 100 miners trained in alternative livelihoods. End of Project Target: At least 200 miners trained in alternative livelihoods; At least one set of gender reviews of workshop and training materials received and annexed to reports.	Final report	That suitable alternatives can be identified; That market conditions to not change to disproportionately favor primary Hg mining; That government adequately applies regulations prohibiting primary Hg mining.
Output 2.2: Awareness of miners and local communities of the Minamata Convention obligations enhanced.	Increased awareness of miners and communities on Minamata Convention obligations reported; Percentage of training materials with gender specific and principles of equal opportunity included.	No current IEC or similar activities. There is very limited knowledge among miners or regulators of the Minamata Convention	Mid-Point Target: at least 50 % of mining communities report awareness of the Convention; 100 % of materials include gender and principles of equal opportunity. End of Project Target: at least 100 % of mining communities report awareness of the convention; 100 % of materials include gender and principles of equal opportunity.	Project reporting Sign in sheets	That access to sites is not restricted; That miners are willing recipients of IEC campaign.

Table 11. Results framework

US Government comments	Response
<p>Some general concerns about the approach under Outcome 2 "Miners in Queretaro adopt alternative income generation activities". In light of the long history of mining and the prior statements of lack of alternative livelihoods, the outputs proposed are not as robust as we may have hoped – can GEF expand on this?</p>	<p>While it is stated that the means of livelihood are limited in the Sierra Gorda, in the 6th paragraph of section 1a, it is also noted that until recently, the activity was secondary and Mexico only became a net mercury exporter in 2013. On this basis, much of the mining activity increase has been in recent years, indicating that some of the workforce only recently changed from previous income generation activity to mining. On the other hand, the State of Queretaro has one of the strongest economies of the country and is also one of the smallest. Among the largest co-financers of the project, the Ministry of Economy and the State of Queretaro will be key partners to further identify and develop alternative income generating activities, focussing initially on the newest portion of the mining workforce (i.e. people who, until recently, were not involved in mining) and the economic centres of the State, less than 200km away from the mining area. Further vocational training will need to be developed with these partners as well as the Ministry of Employment and Social Security for the long-term mining workforce. Thorough socio-economic assessment and analysis of the alternative livelihood options have been undertaken during PPG as demonstrated in the text of the CEO endorsement document and its annexes.</p>
<p>Output 2.1 sites the development of pilot projects but does not discuss how they will be structured to ensure uptake of the lessons learned by the target communities. Can GEF expand on how it will go beyond simple involvement of the community?</p>	<p>The output will be complemented by development of training material and dissemination work together with the Autonomous University of Queretaro and the Mexican Geological Services which is an institute of the Ministry of Economy and which actively participated in the PIF formulation missions.</p>
<p>Output 2.2 assumes that eco-tourism or reforestation will provide adequate and enticing alternatives. Can staff provide empirical evidence for this assumption prior to substantial investment in work in this area? It would also be good to address the re-mining for the silver as a target livelihood for the community. Since the proposal mentions this as an objective for some in the community, it may be more fruitful to ensure that not only are there better environmental safeguards, but that the project (might) support the implementation of higher yield, lower impact approaches for metals recovery as a viable option.</p>	<p>Ecotourism is one of the options which will be considered in the project. Ecotourism is already an established sector in the area during the formulation mission, the PIF development team had the opportunity to visit 2 ecotourism sites. The proximity of the region to Mexico City (4 hours by road) and the high ecosystem value of the Sierra Gorda biosphere reserve contribute to the sector's economic health. However, other economic activities (mining and non-mining) have also been assessed. Close collaboration with key co-financing partners (Ministry of Economy, Ministry for the Development of Agriculture, State of Queretaro) and the stakeholders will define the options selected at each municipality.</p>
<p>Could the agency expound on why the three potential alternate livelihood options (eco-tourism, reforestation, and mining extraction of alternative minerals) are assumed to provide adequate and alternate livelihoods?</p>	<p>The three potential alternate livelihood options (eco-tourism, reforestation, and mining extraction of alternative minerals) are ongoing, formal activities in the region. Ecotourism is already an existing market in the region as we could see during the field visits because the biosphere reserve attracts people from Mexico City. Forest management (not necessarily reforestation) is key to the health of the high-altitude forest and CONAFOR, the federal agency for forest management, is a key stakeholder of the project. Finally, several minerals deposits in the area</p>

	<p>a have been identified, providing a natural option for the existing mining force. Additionally, other options have been identified during the PPG and are detailed in the text and its annexes.</p>
Norwegian-Danish constituency comments	
<p>We appreciate the approach used in this project, especially the fact that the project includes the introduction of alternative livelihoods for the local population when mercury mining ends. The project includes drafting of relevant regulation which we would assume Mexico was prepared to undertake without GEF support.</p>	<p>Assessment of new regulations was done as a result of the MIA project. Mexico was indeed prepared to undertake these revisions and additions but the project will ensure additional stakeholder consultations are undertaken. The budget for this output has been reduced to account for the in-kind co-financing from the Government.</p>
France comments	
<p>The project is interesting because it deals with primary mining, risk management and alternative livelihoods. However, it deserves a number of clarifications:</p> <ul style="list-style-type: none"> • Take into account the informal sector in risk analysis (involvement, membership, risks of "putting back into service" abandoned sites, etc.) • Plan activities with the informal sector which is a crucial factor of impact • Better explain the synergy with past and current programs and projects in order to demonstrate complementarity and avoid duplication (in particular, the project must be in line with the GEF project "Development of Minamata Initial Assessment in Mexico") • Clarify the role of stakeholders, especially the private sector • Detail the standardized method for developing or updating the national characterization and the national risk management approach in relation to mercury. 	<p>Consideration for the informality of the sector has been taken on-board in the project design. The State of Queretaro has also undertaken additional monitoring of the area which has been key to the development of the project.</p> <p>With regard to the re-opening of mines, the significant investment in the identification and promotion of alternative livelihoods coupled with improved regulation and monitoring is intended to dissuade further activity. Improved mine closure will also be explored as part of component 1.</p> <p>The project builds upon the results of the MIA. Having the same executing agency will also ensure full complementarity.</p> <p>A stakeholders analysis has been undertaken during the PPG and is presented in the document.</p> <p>Mercury risk assessment have been derived from the experience gained during MIA project implementation.</p>
STAP Comment	Response
<p>STAP believes that the barriers have been correctly identified. However, the role of illegal demand and markets, in this case from South America, as a significant driver and barrier need to be considered. This is particularly important since this seems to be a strong economic incentive to continue mercury mining because of the current low wages for alternative economic activities in the region.</p>	<p>We are thankful to the STAP for their helpful comments. We note that a parallel MSP is being developed to address the informal Hg trade at a regional level.</p>
<p>The proposal intends to address the issue of sites contaminated with mercury. However, the type of remediation technology to be deployed was not mentioned. STAP recommend that the proponent explore the detailed scientific literature on this topic especially in the context of ongoing discussions on the topic within the Minamata Mercury Convention. Example publications include: https://www.osti.gov/pages/serve/ostc/purl/1265700; https://slu.in.org/download/frames</p>	<p>This article is a helpful review of existing remediation approaches. We note that remediation activity is not envisaged as part of the project, though this review will be used to inform alternatives matrices developed as part of detailed site assessments.</p>

ets/purl/1265799, <https://cluin.org/download/remed/542r07003.pdf>; <https://cluin.org/download/remed/542r07003.pdf>

Yes, however, the alternative livelihoods element is complex because this will involve a major economic and cultural change for the communities involved. The proposal does not specify in detail the proposed alternatives and what criteria will be used to decide the alternative(s) chosen. Reconversion of mining communities is not an easy task, in particular when the community is culturally linked to mining activities. STAP recommends that further work be done to assess the best methodological approach for the alternatives, including the participation of the community, relevant stakeholders and project staff. The project deals with sites contaminated by mercury. However, the type of remediation technology to be deployed is not mentioned. STAP recommends that the project's proponents explore the detailed scientific literature on this topic especially the discussions on this topic in the Minamata Mercury Convention. Publications include: <https://www.osti.gov/pages/servlets/purl/1265799>; <https://cluin.org/download/remed/542r07003.pdf>; https://cluin.org/contaminantfocus/default.focus/sec/Mercury/cat/Treatment_Technologies/; https://www.researchgate.net/publication/274729292_In_situ_remediation_technologies_for_mercury-contaminated_soil; <https://link.springer.com/article/10.1007/s11356-015-4316-y>. It is unclear from the PIF whether Mexico already has a policy on contaminated site management. If so, it will be important this policy is assessed, and if necessary, strengthened. If there is no such policy, this would be an important output for the project to develop.

The proposal now includes significant discussion on alternative livelihoods. Significantly, because primary mercury mining ended in Mexico in 1994 and began again on ly in 2011, it effectively represents a new industry to the majority of workers. This is discussed in some detail above.

With regard to mercury remediation, this is not envisaged as a component of the project. Mexico's existing programs on contaminated site management are now more fully described and integrated into the project. Specifically the SISCO site management program is summarized and will serve as the basis of approaches applied in this project.

No. The basic assumption is that the chain of activities and their outcomes will work smoothly. Given the challenge associated with creating an alternative livelihood (see above) STAP recommends that alternative options should be considered (Plan B) in case if the ideal option for change does not work out

In an effort to be more consistent with the Minamata Convention, which bans primary mercury mining, activities related to improving Hg mining practices have been removed.

With respect to the Global Environment Benefits, there is a discrepancy between the amount of mercury to be reduced in the section on GEBs and information in the Core Indicators in the PIF. While the former indicates that 560 tons will be reduced, the later states that 140 metric tons of new mercury input to the global market will be prevented. This needs to be clarified. Furthermore, it is not clear how these numbers were derived. STAP recommends that a detailed analysis of how the GEBs were calculated should be presented. Further, while the project is presented as a chemicals and waste project, the Core Indicators suggest that the project will generate landscape benefits, which is valid. But nothing is said about this in Section 4 on Global Environmental Benefits. It is also likely that the project will also generate biodiversity

The narrative now includes the following text "*The project will eliminate the production of at least 140 tons of mercury and associated wastes from the Sierra Gorda region in the state of Querétaro. The 19 mines surveyed during the Project Preparation Grant (PPG) period reported producing an estimated 102 tons of mercury each year. The project is expected to run five years, reducing production incrementally by 15 % each year, beginning in year 2. Thus in year 2, a reduction of at least 15 tons is expected. In years 3 and 4 reductions of at least 30 and 45 tons, respectively, are expected. By year 5 the project will result in at least a 50 % reduction in mercury production at the targeted mines. Thus cumulatively > 140 tons of mercury production is expected to be eliminated during the project's lifetime.*"

Biodiversity benefits have also been included

<p>likely that the project will also generate biodiversity benefits, but this seems not to have been considered. STAP, therefore, recommends that information on potential landscape and biodiversity benefits should be provided.</p>	<p>Biodiversity benefits have also been included.</p>
<p>This is a major deficiency in the PIF. STAP believes that the stakeholder analysis needs to be more detailed, including identification of additional stakeholders, their roles, and the strategy for engaging them</p>	<p>Stakeholder analysis has been provided.</p>
<p>The PIF indicates that the project will ensure there are opportunities for women to contribute to and benefit from the project's outcomes, and that this will be explored and interventions designed to specifically benefit women. However, the proposal is silent on how this will be done. STAP recommends that this be done fully during the PPG stage</p>	<p>Socio-economic analysis has been undertaken during the PPG and the gender strategy derives from this.</p>
<p>Not provided in the PIF. Given that the project relates to landscape and biodiversity management, a climate risk assessment should be carried out, and if any substantial risk is identified, adaptation measures should be incorporated into the project's design</p>	<p>Climate change has been identified in the risk matrix and has been categorized as a low risk. Specifically, one alternative livelihood option (ie tourism) is highly vulnerable to climate change. The others (e.g. non-timber harvesting, non-mineral and mineral mining) are much less vulnerable.</p> <p>Climate change could also be a potential driver for improved forest management and increased employment in this sector. The following text has been added: <i>"A second potential employment option in the primary sector is related to forest management. In the context of global climate change, the frequency and intensity of forest fires are increasing. A 2019 fire in the Sierra Gorda resulted in the loss of more than 3,250 hectares of forest. Mitigating the impacts of global climate change on the health of the Sierra Gorda will require deliberate forest management and a significant local workforce. Accordingly, the National Forestry Commission (CONAFOR) is a key stakeholder in the project."</i></p>
<p>The use of UN Environment Live Platform as a knowledge management tool is an interesting approach for addressing the dissemination of information and lessons learned throughout the project development phase. It is also good that the project intends to engage the expertise of the Global Mercury Partnership. The Partnership offers opportunities to learn from ongoing activities as well as for knowledge generation and dissemination.</p>	<p>UNEP live is no longer being actively supported. Accordingly the GMP will serve as the primary knowledge management platform.</p>
<p>Take into account the informal sector in risk analysis (involvement, membership, risks of "putting back i</p>	<p>Informal sector is considered and through the work with the Municipalities and the local NGOs/CSOs informal a</p>

s (involvement, membership, risks of "putting back into service" abandoned sites, etc.)	the municipalities and the local NGOs/COCS informal actors will be approached.
Plan activities with the informal sector which is a crucial factor of impact	The targeted miners are all informal and are a key stakeholder and beneficiary of the project.
Better explain the synergy with past and current programs and projects in order to demonstrate complementarity and avoid duplication (in particular, the project must be in line with the GEF project "Development of Minamata Initial Assessment in Mexico")	The Minamata Initial Assessment provided much of the data used in the development of the baseline. The EA for the proposed project, INECC, authored the MIA which includes recommendations for modifying existing laws. Output 1 picks up where the MIA left off through the collation of previous legal and regulatory assessments (activity 1.1.1).
Clarify the role of stakeholders, especially the private sector	The narrative now includes a stakeholder analysis with private sector partners including the Mining Association of Queretaro AC (trade group) and the informal miners themselves.
Detail the standardized method for developing or updating the national characterization and the national risk management approach in relation to mercury.	These activities are envisaged under output 1.2 and 1.3 which assess and improve the existing monitoring regimen in Queretaro.

ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF:			
<i>Project Preparation Activities Implemented</i>	<i>GETF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
PPG Management	15,000	15,000	0
Consultants	100,000	100,000	0
Travel	25,000	20,000	5,000
Subcontract	45,000	45,000	0
Meetings	15,000	5,000	10,000
Total	200,000	185,000	15,000

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/CBIT Trust Funds or to your Agency (and/or revolving fund that will be set up)

N/A

ANNEX E: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.



ANNEX F: Project Budget Table

Please attach a project budget table.

UN Environment GEF BUDGET (US\$)

Project Title: Reducing global environmental risks through the monitoring and development of alternative livelihood for the primary mercury mining sector in Mexico

Project Number: 10086

Project Implementing Agency: UN Environment

Project Executing Agency: National Institute of Ecology and Climate Change (INECC)

Project implementation period:

From: Jul-20 To: Jul-25

Class	Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Component 1							
Output 1.1							
010	Staff & Personnel (Including Consultants)						
011-0101	Legal expert	15,000	0	0	0	0	15,000
011-0102	Communication expert	10,000	0				10,000
011-0103	Technical Assistance	1,800	1,800	1,800	1,800	1,800	9,000
	Subtotal	26,800	1,800	1,800	1,800	1,800	34,000
120	Contract Services						
011-1201	Initial workshop	20,000					20,000
011-1202	Gap analysis workshop	5,000					5,000
011-1203	Regional consultation workshop	10,000					10,000
011-1204	National and regional consultation		10,000				10,000
011-1205	Training of national regulators			2,000	2,000	2,000	6,000
011-1206	International Expertise (Global Mercury Partnership)	2,500	2,500				5,000
	Subtotal	37,500	12,500	2,000	2,000	2,000	56,000
160	Travel						
011-1601	Travel for workshops	2,000	2,000	2,000	2,000	2,000	10,000
	Subtotal	2,000	2,000	2,000	2,000	2,000	10,000
Output 1.1 Total		66,300	16,300	5,800	5,800	5,800	100,000

Staff & Personnel (Including Consultants)						
012-0101	Sampling staff	75,000				75,000
012-0102	Health risk assessment expert		30,000	30,000		60,000
	Environmental risk assessment expert		30,000	30,000		60,000
	Subtotal	75,000	60,000	60,000	0	195,000
120	Contract Services					
012-1201	International training on monitoring best practices	30,000				30,000
012-1202	Training of national experts on monitoring	50,000				50,000
012-1203	Periodic monitoring	40,000	40,000	40,000	40,000	200,000
012-1204	Joint field sampling	35,000		32,500		100,000
012-1205	Identification of hot spots		100,000			100,000
012-1206	International Expertise (Global Mercury Partnership)			10,000	5,000	20,000
	Subtotal	155,000	140,000	82,500	45,000	500,000
125	Operating & Other Costs					
012-1251	Communication costs	14,000	14,000	14,000	14,000	70,000
	Subtotal	14,000	14,000	14,000	14,000	70,000
130	Supplies, Commodities & Materials					
012-1301	Consumables for monitoring	5,000	5,000	5,000	5,000	25,000
	Subtotal	5,000	5,000	5,000	5,000	25,000
135	Equipment, Vehicles & Furniture					
012-1351	Monitoring equipment reinforcement	40,000	40,000	40,000	40,000	200,000
	Subtotal	40,000	40,000	40,000	40,000	200,000
160	Travel					
012-1601	Travel for workshops	2,000	2,000	2,000	2,000	10,000
	Subtotal	2,000	2,000	2,000	2,000	10,000
Output 1.2 Total		291,000	261,000	203,500	106,000	1,000,000

010 Staff & Personnel (Including Consultants)						
013-0101	Characterization staff of hot spots		90,000	85,000		175,000
013-0102	Technical Assistance	15,000	15,000	15,000	15,000	75,000
013-0103	Remediation technology options evaluator			15,000		15,000
	Subtotal	15,000	105,000	115,000	15,000	265,000
120	Contract Services					
013-1201	Detailed assessment consistent with SEMARNAT's National Program for the Remediation of Contaminated Sites		25,000	25,000		50,000
013-1202	...		100,000	110,000		200,000

013-1202	Detailed environmental sampling of hot spots		120,000	110,000			230,000
013-1203	Consultation with local stakeholders		10,000				10,000
013-1204	National consultation meetings with national experts for remediation options identified			10,000			10,000
013-1205	Diffusion meeting with relevant authorities			15,000			15,000
013-1206	International Expertise (Global Mercury Partnership)				5,000	5,000	10,000
	Subtotal	0	155,000	160,000	5,000	5,000	325,000
125	Operating & Other Costs						
013-1251	Communication costs	20,000	20,000	20,000	20,000	20,000	100,000
	Subtotal	20,000	20,000	20,000	20,000	20,000	100,000
130	Supplies, Commodities & Materials						
013-1301	Consumables for detailed environmental sampling	5,000	5,000	5,000	5,000	5,000	25,000
	Subtotal	5,000	5,000	5,000	5,000	5,000	25,000
135	Equipment, Vehicles & Furniture						
013-1351	Environmental equipment reinforcement	15,000	15,000	15,000	15,000	15,000	75,000
	Subtotal	15,000	15,000	15,000	15,000	15,000	75,000
160	Travel						
013-1361	Travel for consultations	2,000	2,000	2,000	2,000	2,000	10,000
	Subtotal	2,000	2,000	2,000	2,000	2,000	10,000
	Output 1.3 Total	57,000	302,000	317,000	62,000	62,000	800,000
	COMPONENT 1 TOTAL	414,300	579,300	526,300	173,800	206,300	1,900,000

Component 2						

010 Staff & Personnel (Including Consultants)

021-0101	Legal expert	100,000					100,000
021-0102	Technical assistance	20,000	20,000	20,000	20,000	20,000	100,000
021-0103	Exploitable reserves expert	250,000	250,000				500,000
021-0104	Market expert	100,000	100,000				200,000
021-0105	Economic expert		100,000	100,000			200,000
021-0106	Financial expert		100,000	100,000			200,000
021-0107	Technical studies evaluator staff		125,000	125,000			250,000

021-0108	Sociologist expert		100,000	100,000			200,000
021-0109	Gender expert		100,000	100,000			200,000
	Subtotal	470,000	895,000	545,000	20,000	20,000	1,950,000
120	Contract Services						
021-1201	Business plans for the implementation of selected alternative livelihoods developed			100,000	100,000		200,000
021-1202	Consultation workshop on perspectives of viability alternatives	15,000	15,000				30,000
021-1203	Comparative feasibility analysis of proposed activities			50,000	50,000		100,000
021-1204	Implements plan executed			655,000	655,000		1,310,000
021-1205	Business development capacity for the local populations			50,000			50,000
021-1206	Difussion workshop		20,000	20,000	20,000	20,000	80,000
	Subtotal	15,000	35,000	875,000	825,000	20,000	1,770,000
125	Operating & Other Costs						
021-1251	Communication costs	20,000	20,000	20,000	20,000	20,000	100,000
	Subtotal	20,000	20,000	20,000	20,000	20,000	100,000
130	Supplies, Commodities & Materials						
021-1301	Consumables for studies development	5,000	5,000	5,000	5,000	5,000	25,000
	Subtotal	5,000	5,000	5,000	5,000	5,000	25,000
135	Equipment, Vehicles & Furniture						
021-1351	Additional equipment	15,000	15,000	15,000	15,000	15,000	75,000
	Subtotal	15,000	15,000	15,000	15,000	15,000	75,000
160	Travel						
021-1601	Travel for workshops	2,000	2,000	2,000	2,000	2,000	10,000
	Subtotal	2,000	2,000	2,000	2,000	2,000	10,000
Output 2.1 Total		527,000	972,000	1,462,000	887,000	82,000	3,930,000
010	Staff & Personnel (Including Consultants)						
022-1101	Expert indicators developer	50,000					50,000
022-1102	Technical Assistance	30,000	30,000	30,000	30,000	30,000	150,000
	Subtotal	80,000	30,000	30,000	30,000	30,000	200,000
120	Contract Services						
022-1201	Regular collection of information	15,000	15,000	15,000	15,000	15,000	75,000
022-1202	Development of information material	75,000					75,000
022-1203	Integration of annual report	30,000	30,000	30,000	30,000	30,000	150,000
	Subtotal	120,000	45,000	45,000	45,000	45,000	300,000
125	Operating & Other Costs						

120	Operating & Other Costs						
022-1251	Communication costs	25,000	25,000	25,000	25,000	25,000	125,000
	Subtotal	25,000	25,000	25,000	25,000	25,000	125,000
130	Supplies, Commodities & Materials						
022-1301	Consumables	2,000	2,000	2,000	2,000	2,000	10,000
	Subtotal	2,000	2,000	2,000	2,000	2,000	10,000
135	Equipment, Vehicles & Furniture						
022-1351	Monitoring of indicators	15,000	15,000	15,000	15,000	15,000	75,000
	Subtotal	15,000	15,000	15,000	15,000	15,000	75,000
160	Travel						
022-1601	Travel for dissemination events	2,000	2,000	2,000	2,000	2,000	10,000
	Subtotal	2,000	2,000	2,000	2,000	2,000	10,000
Output 2.2 Total		244,000	119,000	119,000	119,000	119,000	720,000
COMPONENT 2 TOTAL		771,000	1,091,000	1,581,000	1,006,000	201,000	4,650,000
MONITORING AND EVALUATION							4,350,000
120	Contract Services						
0ME-1201	Monitoring and Evaluation	30,000	30,000	30,000	30,000	30,000	150,000
MONITORING AND EVALUATION TOTAL		30,000	30,000	30,000	30,000	30,000	150,000
PROJECT MANAGEMENT COSTS (PMC)							
010	Staff & Personnel (Including Consultants)						
PM-0101	Project management - staff	62,000	62,000	62,000	62,000	62,000	310,000
	Subtotal	62,000	62,000	62,000	62,000	62,000	310,000
160	Travel						
PM-1601	Travel Project management	5,000	5,000	5,000	5,000	5,000	25,000
	Subtotal	5,000	5,000	5,000	5,000	5,000	25,000
PMC Total		67,000	67,000	67,000	67,000	67,000	335,000
USD GRAND TOTAL							7,035,000