UNITED NATIONS DEVELOPMENT PROGRAMME

Global Project with participation from the governments of:
Brazil, Sudan, Tanzania, Zimbabwe, Indonesia, Lao

Project Number: GLO/01/G34

Project Title:
Removal of Barriers to the Introduction of Cleaner Artisanal Gold Mining and Extraction Technologies

Project Short Title:
Global: Mercury

Project Duration: 3 years

Management Arrangement:
UN Agency Execution

Designated Institution:
N/A

UN Implementing Agency:
United Nations Industrial Development Organization

GEF Implementing Agency:
UNDP

Project Sites:

Tapajós Reserve, Brazil; Nile/Sudan; Lake Victoria/ Tanzania; tributaries to Zambezi/Zimbabwe; Kahayan River, Kalimantan/Indonesia; Mekong/Laos

Beneficiary Countries:
Brazil, Sudan, Tanzania, Zimbabwe, Indonesia, Lao

Programme Officer: Andrew Hudson

Summary of UNDP and Cost-Sharing

UNDP:	Current	Previous	Change
Other (GEF)	$6,488,000		
AOS	$318,800		
Sub-total	$6,806,800		
GRAND TOTAL GEF	**6,806,800**		

Government inputs	**Parallel Co-financing**
Brazil	2,953,000
Sudan	2 00,000
Tanzania	1,630,000
Zimbabwe	5,450,000
Indonesia	2,089,000
Lao	60,000
Total, Gov'ts	12,382,000
UNIDO	670,000
Grand Total	13,052,000

Classification Information:

Brief Description:

Environmental impacts resulting from the application of mercury in the processing of gold within the artisanal mining sector and their effects on International Waterbodies require concerted and coordinated global responses. The long-term objective of the Project is to assist a pilot suite of developing countries located in several key transboundary river/lake basins in assessing the extent of pollution from current activities, introduce cleaner gold mining and extraction technology which minimize or eliminate mercury releases and develop capacity and regulatory mechanisms that will enable the sector to minimize negative environmental impacts. The Project will be co-funded by a suite of ongoing activities, which are financed through either the countries' own resources and/or bilateral programmes leading to a reduction of mercury emissions from the artisanal mining sector in the respective country. These costs are considered as co-financing. The resources needed for the execution of the GEF/UNDP/UNIDO Project are regarded as incremental costs and will be used inter alia for the development of monitoring programmes and in collaboration with participating Governments, development of policies and legislation that will lead to practical and implementable standards for artisanal gold mining. In order to ensure sustainability of the monitoring programmes, the Project will aim to build capacity of local institutions, e.g. local laboratories through training and material support so as to enable them to carry out continuous monitoring beyond the project three-year term. The Project will also aim to increase knowledge and awareness of miners, Government institutions and the public at large on the environmental impacts associated with the application of the current technology. This will be enhanced through introduction and demonstration of cleaner and efficient technology that apart from minimizing negative environmental impacts will improve earnings, health and safety.

The ultimate goals of the present GEF/UNDP/UNIDO project are:

1) to reduce mercury pollution of international waters by emissions emanating from small-scale gold mining,
2) to introduce cleaner technologies for gold extraction and to train people in their application,
3) to develop capacity and regulatory mechanisms that will enable the sector to minimize mercury pollution,
4) to introduce environmental and health monitoring programmes,
5) to build capacity of local laboratories to assess the extent and impact of mercury pollution.

On behalf of:	**Signature**	**Date**	**Name/Title**
UNDP	_____	_____	_____

UNIDO	_____	_____	_____
On behalf of Government of			
Brazil	_____	_____	_____
Sudan	_____	_____	_____
Tanzania	_____	_____	_____
Zimbabwe	_____	_____	_____
Indonesia	_____	_____	_____
Lao	_____	_____	_____

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LIST OF ACRONYMS/ABBREVIATIONS

PCU = Project Coordination Unit
CTA = Chief Technical Advisor
SSME = Small-Scale Mining Expert
PADCT = Programa de Apoio ao Desenvolvimento Científico e Tecnológico
CNPq = Conselho Nacional de Desenvolvimento Cientifico e Tecnologico
CYTED = Ciencia y Tecnologia para el Desarrollo
Faperj = Fundaçao de Amparo a Pesquisa do estado do Rio de Janeiro
UNDP = United Nation Development Programme
UNIDO = United Nations Industrial Development Organization
GEF = Global Environment Facility
CETEM = Centro de tecnologia Mineral
NGOs = Non-Governmental Organizations
CPTF = Country Project Task Force
BPTF = Basin Project Task Force
GPTF = Global Project Task Force
UNEP = United Nations Environment Programme
MTRDC = Mineral Technology Research and Development Centre
SADC = Southern Africa Development Cooperation

Section A. CONTEXT

A.1 Setting

1. Artisanal mining which is sometimes used synonymously with small-scale mining means different things to different people. There is no universal definition of what constitutes an artisanal or small-scale mine. However, in this proposal, artisanal mining is used to refer to those mining activities carried out by individuals, families, and/or adhoc groups (some form of co-operatives) of indigenous people, the majority of which have no technical skills and lack adequate working tools. Similar activities in Brazil are commonly referred to as “Garimpos” and those carrying out the activities as “Garimpeiros”. Although the term “artisanal mining” is used in some countries, e.g., Zimbabwe, to refer to illegal alluvial gold mining activities, it is used in others to refer to those activities that are carried out without following conventional mining engineering norms. As such a good number of artisanal miners in countries like Brazil, Indonesia and Tanzania are licensed and there are policy drives to get all mining activities licensed as a way of transforming them into organized small-scale mining activities. Although there have been improvements by various countries in recognizing artisanal mining as a significant economic sector, the promulgation of legal frameworks that are conducive to this sector remains elusive. In Sudan, for example, the activities are not recognized by any legal framework although individuals can be licensed through special agreements in which conditions for conducting mining activities are set. Although there are visible attempts within the participating countries to transform this sector into an economic sector, the lack of adequate resources means that illegal activities are still wide spread.

2. Despite these activities being individually small, their combined economic and social impacts are substantial for the economies of many developing countries. Globally, it is estimated that up to 12% of

metallic minerals, 31% industrial minerals, 20% coal, 10% diamonds and 75% of gemstones production come from small-scale mining operations. In individual countries the economic benefits are even higher. For example, whereas in Brazil activities by Garimpeiros, are estimated to produce 50% of the country's total gold production averaging around 60 tons, it is estimated that in both Tanzania and Zimbabwe artisanal miners have the capacity to produce 10 tonnes of gold per year. On average, it is estimated that artisanal miners in Indonesia and Laos have annual gold production of nearly 50 and 0.5 tonnes respectively. Although statistics are hard to establish, estimates show that in Sudan where artisanal gold mining is relatively small, 10 tonnes of gold have been produced over the last thirty years (1970 to 1999). These activities provide considerable employment especially in the rural areas and thus contribute substantially to poverty alleviation. It was estimated in 1993 by the International Labour Organization, (ILO), that out of the 30 million or so mineworkers throughout the world, 6 million were engaged in artisanal mining in developing countries. Within the six participating countries, available figures show that nearly 2.0 million people are directly involved in artisanal mining activities and a number of those whose livelihoods depend on these activities in one way or another is over 10 million. Given the fact that rural poverty is prevalent in most developing countries, artisanal mining has room to contribute fully to economic and social development. It is now widely accepted by large mining companies the world over that artisanal miners are one of the most important tools for finding sizeable gold deposits. Artisanal mining also allows the exploitation of marginal reserves that would otherwise be classified as uneconomical.

3. Although artisanal mining has shown some positive contributions, it has also suffered negative conceptualization as a misnomer to mineral sector development by host Governments. Whereas some countries choose to ignore the existence of such activities, others lack adequate legal frameworks to regulate them. As a result, the activities are carried out illegally thus denying the host Governments the badly needed revenues. Even in countries that have enacted legal and regulatory frameworks for controlling such activities, the lack of adequate resources limits the capacity to institute them effectively. The combination of this and the lack of technical know-how and financial means make it difficult for miners to invest in appropriate technology. Mining and processing activities are carried out by manual means or through application of locally improvised but inefficient equipment and tools. As a result, the activities have become synonymous to negative environmental impacts, inefficiency, lack of adherence to health and safety standards, and activities that have negative social impacts. The uncontrolled use of mercury as a cheap means for recovering gold is now threatening the health of miners and members of communities far away from mining areas. Most of the negative factors tend to reinforce one another resulting in a vicious circle that is difficult to break. For example, the lack of regulatory mechanisms means that Governments lose the much-needed revenue that in turn makes it impossible to provide adequate control due to lack of resources. The lack of, technical know-how, access to credit facilities, and technical support coupled with poor organizational structures means that miners are unable to invest in technology and hence cannot improve their working methods. This results in negative environmental impacts, low productivity and hence earnings and the vicious circle continue.

4. In all the participating countries, women are major participants in artisanal mining activities. In Laos it is estimated that almost 80% of all artisanal gold panners are women. In Zimbabwe, the majority of the 350,000 estimated artisanal miners are in gold digging and panning with 50% comprising of women and children. In Tanzania, 26% of all 600,000 artisanal miners are estimated to be women most of which mine gold and gemstones. In Sudan it is estimated that 35% and 10% of the miners is comprised of women and children in the Southern Blue Nile and Eastern Bayuda Desert regions respectively. Despite these impressive figures, the number of women miners with mineral

rights is still limited. In other words the majority of women operators are still in the illegal miners category. Direct entry into mining production activities is often determined by taboo, socio-cultural factors, financial and economic capacity, technology and organizational aspects.

Artisanal Gold Mining Activities in International Waterbodies

5. The selection of countries participating in this project was done based on the intensity of mercury based artisanal gold extraction activities and their impacts on water bodies of global significance. In the South American region, the Amazon Basin is the largest drainage system in the world with an area of about 6.0 million square kilometres. The Amazon River has a total length of 6400 kilometres, which is slightly shorter than the Nile. Stretching almost 2760 kilometres from north to south at its widest point, the Basin occupies a great part of Brazil and Peru, significant parts of Columbia, Ecuador and Bolivia and a small area of Venezuela. Almost two-thirds of the Amazon's main streams and by far the largest portion of its Basin are within Brazil. More than two thirds of the Basin is covered by an immense Amazon Rain Forest which represents about half of the Earth's remaining rain forest and constitutes the largest reserve of biological resources. Artisanal gold mining activities in the area are probably the most in the world with one of the largest area, Tapajos in the Para State occupying an area of up to 2.9 million hectares. At the peak of the gold rush in the 1980s, it was estimated that nearly 1.0 million people were directly involved in the activities, with 400,000 of those being in the Tapajos area alone. Available figures show that nearly 1,000 tonnes of mercury were dumped into the Amazon Basin during the 1980s and nearly 130 tonnes are currently dumped annually.

6. Within the participating countries of the African Region, the significant International Waterbodies include the Nile River system, Lake Victoria and the Zambezi River system. The Nile River system is composed of the Blue Nile (Abbai) River that originates from Lake Tana and the White Nile that rises from Lake Victoria. Sudan occupies a major part of the River Nile basin. Along its course (6825 km), the Nile drains a total area of 2.96 million square kilometres from the Equator up to the Mediterranean coast in Egypt. Areawise, the Nile basin represents one tenth of the African continent. Mining along the Nile covers nearly 2,000 km^2 in the Southern Blue Nile region with mine workings developed in old river terraces along the riverbanks and its tributaries at the foothills of the Ethiopian highlands. It is estimated that nearly 120,000 people are engaged in these activities. On the other hand, Lake Victoria which has an area of more than 70,000 km^2 is Africa's largest lake and second largest in the world only to North America's Lake Superior. The Lake, which is surrounded by one of the most highly populated areas in the world and is shared by Tanzania (51% of the Lake area), Uganda (43%) and Kenya (6%), is a source of employment for nearly 30 million people. The Lake Victoria Goldfields which cover almost 200,000 km^2 is estimated to employ nearly 300,000 people and produce nearly 70% of the country's total gold production. Nearly 12 tonnes of mercury are released to the environment in Tanzania alone. More than 50% of artisanal gold panning activities in Zimbabwe are carried out within the Zambezi River system (more than 2400 kilometres are panned) and its tributaries. The Zambezi flows along the northern and Southern borders of Zimbabwe and Zambia respectively before cutting across central Mozambique on its way to the Indian Ocean. There are about 350,000 gold panners in the country with as many as 300 panners concentrated in every kilometre of the widely panned sections of the Zambezi River system river and releasing nearly 12 tonnes of mercury annually to the environment.

7. River Mekong in Laos and River Kahayan in Central Kalimantan, Indonesia are the significant International Waterbodies within the Asian participating countries. The River Mekong which is about 4,500 kilometres long and is a life-stay for almost 50 million people and their cultures sets out at the Qinghai plateau in Western China before flowing into Laos, Myanmar, Thailand, Cambodia and Vietnam. Although the upper portions of the river are characterized by turbulence, the lower Mekong is more placid, and the annual flooding supports a biologically diverse ecosystem. In Laos, alluvial mining activities are carried out as seasonal activities during the dry non-agricultural season mainly by dredging on the River Mekong and its tributaries. Up to 3,000 miners have been found at any one time working on River Mekong. The Kahayan River, is the largest river in Central Kalimantan and drains directly into the Java sea and thus with effects to Singapore, the Islands of Sumatra, Java, Bali and others. Most activities are based on alluvial operations within the river systems with a few mining hard rock gold veins. However, even those in hard rock mining transport the ore to the rivers for processing. The Kahayan River in Central Kalimantan and the Tapian River in North Sulawesi are known to have a high concentration of miners per kilometre length. It has been reported that more than 2,000 illegal miners would converge on single mining site following a reported gold recovery. In Indonesia where artisanal gold mining activities are carried out either through village cooperative units or through illegal operations and are found in the provinces of West and Central Java, Sumatra, Central and East Kalimantan, North Sulawesi and others, nearly 180 tonnes of mercury are released to the environment annually.

Negative Environmental Impacts due to Artisanal Gold Mining

8. Artisanal gold mining activities within the participating countries under review show negative environmental impacts that tend to overshadow their positive contributions. Mining is carried out either by pitting in both hard rock and in old riverbed alluvium or by dredging existing riverbeds all of which generate substantial amounts of rubble. Whereas obscured pits in abandoned areas are dangerous to people and animals, the mined rubble blanket the top fertile soil and thus lead to loss of grazing and agricultural land. The exposed mined areas are susceptible to accelerated erosion from both wind scour and surface runoffs and may lead to Acid Mine Drainage. Piles of tailings most of which contain toxic chemicals, e.g., mercury, are directly washed into rivers resulting to siltation and water pollution problems. Pools of stagnant water left behind during washing and abandoned flooded pits turn into breeding grounds for Malaria spreading mosquitoes. Poor sanitation from mining camps, hydrocarbons from machinery, uncontrolled use of explosives and others, add to pollution of surface and ground water systems. During PDF-B phase of this project, it was revealed that mercury is directly released into rivers and lakes through adding mercury during panning of the alluvial ore or washing of the hard rock-based ore within the waterbodies that is transported from far areas. The key concerns here are the direct release of mercury into the waterbodies, its accumulation and subsequent methylation to organo-mercury and hence transfer into the food chain through the aquatic ecosystem. The behaviour and fate of mercury in the environment is much dependent on its chemical form with the metallic, divalent and mono-methylated forms being of most concern. The oxidation or conversion of metallic mercury to the divalent form occurs in the presence of oxygen, certain types of bacteria, SH-compounds with affinity to divalent mercury or the acidity environment, e.g., that found in most forest rivers. The formation of methyl mercury from the divalent mercury is then aided by bacteria that are found in bottom sediments in rivers, estuaries and oceans, intestines, faeces, soils and yeast. These processes are crucial to the transfer of the rather inactive metallic mercury released by gold miners to the food chain. The transformation of inorganic mercury to an organo-metallic compound, methyl mercury, is the most significant in terms of uptake and accumulation of mercury by man as this compound can block enzymes and so damage essential metabolic processes.

9. Available data indicate that the amount of mercury released during burning of the amalgam is approximately in the ratio of 1.2 - 1.5:1 to the amount of gold produced. There are clear indications that mercury pollution from small-scale mining is a threat to public health not only in the proximity of mineral processing activities, but also in the mining villages themselves and even far downstream of contaminated rivers. As it is shown with the limited data in Annex I, mercury poisoning in both Tanzania and Zimbabwe is already a cause for concern. For example, whereas the WHO threshold limit for mercury level in urine is 50 ng/ml, miners in Tanzania show level of up to 411 ng/ml. New results from UNIDO projects in Ghana and Philippines give evidence that approximately 50 percent of gold mining communities in these countries must be considered as mercury-intoxicated, i.e. the threshold limits in body fluids are by far exceeded and the neurological symptoms can be detected.

10. At present, there is not any single "off-shelf " solution to problems related to artisanal mining. The introduction of cleaner mining and extraction technology would go a long way to minimize the activities impacts to the environment, maximize the socio-economic benefits and ensure that operations are sustainable and adhere to health and safety standards. Although piecemeal solutions have been tried in many countries, a more holistic approach is required in dealing with artisanal mining problems. Attempts to such an approach that will ensure the introduction of cleaner mining and extraction technologies is a priority for UNIDO, the executing agency of this proposal.

International and National Actions

11. The plight of artisanal and small-scale mining has attracted the world attention since the seventies. In 1972, the United Nations Department of Economic and Social Affairs published the proceedings from a seminar organized to discuss small-scale mining activities. Although a number of meetings have since been held and strategies laid on how to transform the sector, there have been limited actions "on the ground". A meeting of different international organizations and mining experts that was convened in Harare, Zimbabwe in 1993 in search for solutions to artisanal mining problems, came up with what is known as "The Harare Guidelines on small / Medium-Scale Mining". The implementation of the guidelines whose main objective was to provide a framework for encouraging development of small and medium-scale mining as legal sustainable activities was left to individual countries and have had limited impacts.

12. In 1995 the World Bank hosted a "Round Table on Artisanal Mining" meeting in Washington to chart out a strategy for dealing with the sector's problems. The meeting came up with what the Bank published as a proposal for assistance known as "A Comprehensive Strategy Towards Artisanal Mining" aimed at minimizing the negative side effects and thus maximize socio-economic benefits of artisanal mining. The strategy which has since been implemented in a number of countries identified the negative side effects of artisanal mining as being; unacceptable environmental practices; poor social, health and safety conditions; illegal mining and marketing and waste of resources. Where it has been implemented, the programme has succeeded in strengthening the institutional capacity and introducing internationally competitive legal, regulatory and fiscal frameworks and hence enhanced the process of legalizing the artisanal mining activities. This programme however has not adequately addressed itself to finding solutions to problems associated to artisanal mining environmental impacts. With the increase in poverty in the developing world and the lack of coordinated international actions, the amount of mercury that has is released to the environment from artisanal gold mining activities is bound to keep increasing.

13. Following the problems of the gold rush experienced during the 1980s, the Brazilian House of Representatives commissioned the Centre for Minerals Research, CETEM, of the Brazilian Research Council, to evaluate the state of the art of the operations, propose solutions, and advise the House on possible control legal measures. Through a four-year programme, comprehensive descriptions of the activities, data related to mercury and particulate matter pollution, proposals for control legislative measures, were produced. However, practical implementations of the findings of this programme were hampered by the lack of adequate resources especially when dealing with such a large area like the Amazon Basin. On the other hand, the Government of Tanzania in collaboration with the World Bank formulated the Mineral Sector Development Technical Assistance Project in 1994 in order to provide the Government with necessary technical, managerial and material support for the implementation of its new private sector oriented mining development strategies. One of the major components of the US $13.9 million five-year project was to improve the economic, social and environmental performance of the artisanal mining in order to encourage and expand private investment in the mining sector. Although the project resulted in the country's first mining environmental legal and regulatory framework, it has not addressed itself fully to the negative environmental impacts resulting from artisanal mining activities. The European Union in collaboration with the Government of Zimbabwe has embarked on a US $38.7 million project part of which will be spent on development and control of the small-scale mining sector. Although there are similar programmes in other countries, most have not addressed themselves to the artisanal mining environmental problems of a global nature.

UNIDO's Relevant Experience

14. Over the years, UNIDO has gained a lot of experience in dealing with artisanal related problems especially in developing countries. In 1995, UNIDO initiated a programme named "High Impact Programme No 4" with the main theme being to "Introduce New Technologies for the Abatement of Global Mercury Pollution". Following the launch of this programme, an international workshop was conducted in November 1995, in Jakarta, Indonesia on "Ecologically Sustainable Gold Mining and Processing" and it attracted 41 participants from 14 countries. Based on the recommendations of the workshop and with support from the donor community and host Governments, UNIDO initiated programmes in a number of countries, e.g., Cameroon, Ghana, Philippines, and Tanzania, aimed at assessing the potential for the introduction of new technologies for the abatement of mercury pollution. These programmes, some of which are ongoing, have enabled UNIDO to gain experience and appreciation of the magnitude of the mercury pollution problems, project co-ordination and establishment of working relationships with Governments and local institutions. In addition, during the PDF-B phase of this project, UNIDO conducted preliminary investigations in the six countries participating in order to establish the intensity of the artisanal mining activities and their impacts on the International Waterbodies. Review of previous related studies, identification of the "hot spots" areas (rivers and waterbodies) and estimation of levels of pollution resulting from the application of mercury around these areas, were carried out. Apart from establishing the most affected International Waterbodies, barriers limiting the introduction of cleaner technologies were established in each of the participating countries.

Current options for developing sustainable artisanal mining

15. The barriers limiting artisanal miners from adopting sustainable and cleaner technology results from the fact that both the miners and the relevant Governments find themselves in negative circles of cause and effect. The application of poor technology leads to low productivity that in turn results in low revenue earnings and hence inability to invest in appropriate technology, it traps miners in crude

and inefficient working methods and hence results in severe negative impacts to the environment, health and safety. On the other hand, the institutional weaknesses that lead to inability to enforce the existing legislation results in illegal operations, poor environmental, health and safety standards and loss of the badly needed fiscal revenues. The loss of fiscal revenues makes the authorities unable to perform their regulatory functions and hence perpetuates uncontrolled artisanal mining. In order to develop artisanal mining into sustainable and environmentally acceptable activities, both negative circles must be broken.

16. In view of the difficulties facing both miners and the governing authorities, the increase in knowledge and awareness and the introduction of efficient and cleaner technologies are at present the best option for developing environmentally acceptable activities. Prior to such intervention measures, the baseline data regarding environmental, technological and socio-economic issues, should be established. The increase of knowledge through training should make use of the UN Train-X network and its training development methodology in order to create course modules that are targeted and that can be easily adapted by others. Both training and awareness campaigns should be developed through involvement of miners and their organizations in order to enhance their acceptability. Such programmes should provide special considerations for women whose direct entry into artisanal mining activities is often limited by socio-cultural issues and the strenuous nature of the activities.

17. Since there is medical evidence that women and the unborn are especially vulnerable to mercury, it is regarded as indispensable to give priority to women miners during training and awareness campaign programmes so that the majority of them can adopt cleaner technology. Demonstration of efficient and cleaner technologies should be conducted in selected demonstration sites so as to enable miners appreciate the monetary and non-monetary benefits. Assistance should be provided to Governments to enable them develop policies and legislation that would lead to implementable standards. Development of enforcement programmes and capacity to enable local institutions carry out continuous monitoring, are essential for promotion of environmentally acceptable artisanal gold extraction activities.

Importance of the GEF Intervention

18. It is now widely accepted that the problems associated with artisanal mining in developing countries are similar and require integrated solutions and partnership between different players. The problems relate to protection and effective resources utilization, to general environmental conditions in areas surrounding the mines and in remote areas receiving mine waste and contaminants and to safe working and health conditions of miners. Whereas most attempts indicate appreciation of the extent of the negative environmental impacts resulting from these activities, no single programme within the six countries has addressed itself to the effects of these impacts on International Waterbodies. The significance of the waterbodies surrounded by these activities has not been taken into consideration in some of the work that has attempted to solve artisanal mining problems. The work done during PDF-B phase of this project indicated the barriers to include little awareness amongst miners, the public and Government institutions on the impacts resulting from mercury pollution, lack of adequate policies and regulatory frameworks, application of poor technology, and lack of access to information and technology and the overall lack of local capacity to carry out continuous monitoring on mercury pollution.

19. The proposed GEF intervention will show, through the establishment of the envisioned demonstration projects, how the current uncontrolled artisanal mining activities can be transformed into more organized, environmentally acceptable and sustainable operations. In each of the participating countries, the programme will aim at assessing the extent of mercury pollution, raising awareness and increasing knowledge of the miners and the public, introducing and demonstrating the application of cleaner and efficient technology, assisting the Government to put in place practical and implementable policies and legislation and building capacity to ensure continuous monitoring of mercury pollution on the surrounding waterbodies. This programme will also help to demonstrate to relevant Governments on the approach towards abatement of mercury pollution. The absence of the proposed GEF intervention will not only allow the continuation of unorganized artisanal mining and its negative effects, but will allow the incremental build-up of mercury pollutants within the targeted international waters and its eventual transmission to other countries and regions.

A.2 Development Objective/Strategy

Long-term Objective

20. The long-term objective of this project is to protect international waters from mercury pollution emanating from small-scale mining operations. Measures and methods to reduce this pollution will be demonstrated in a pilot suite of developing countries located in several key transboundary river/lake basins. The main tools for reducing the pollution consist in assessing the extent of mercury pollution from current activities, introducing cleaner gold mining and extraction technology that minimize or eliminate mercury releases and developing capacity and regulatory mechanisms that will enable the sector to minimize negative environmental impacts. Experience acquired by UNIDO over the years in dealing with artisanal mining problems in countries like Ghana, Philippines and Tanzania has shown that the complexity associated with achieving the project goals while meeting the needs of miners and their organizations, the Government and other parties, require a combination of these "tools", *vide* Annex III.

Broad Development Objective

21. The broad development objectives of the six participating countries is to transform the current artisanal mining activities into organized activities in order to enhance incomes of the participating members of the population, minimize negative environmental impacts and enhance development of the mineral sector and hence the economy. Like in many developing countries, artisanal mining activities are carried out in the six participating countries mainly as a way of dealing with poverty by the rural populations. Its popularity is enhanced by the fact that its entry does not require much investment and in most cases it operates outside the formal business procedures. With little or no mining knowledge, minimal investment capital and poor legislative frameworks, most activities are unorganized, unregulated and their formal recognition is only recent following the new international drive to fight poverty. As a result, the short-term gains envisaged by miners in order to break away from poverty have largely been outweighed by the negative impacts caused by these activities to the environment, health and safety of the miners and the neighboring communities. In addressing the negative environmental impacts resulting from these activities, some Governments have initiated programmes to address the issues related to the uncontrolled use of mercury in the recovery of gold. However, since most activities have been operating outside the legal framework, major efforts are still

directed towards putting in place legislative and regulatory frameworks upon which artisanal mining activities can be conducted.

Global Environmental Objective

22. The global environmental objective is to assist developing countries create conditions necessary to minimize mercury pollution and other negative environmental impacts on International Waterbodies resulting from artisanal gold mining and extraction activities. Most artisanal gold mining activities within the participating countries are carried out within basins of major ecological significance and that cross geographical boundaries to many countries, e.g., the basins of the Amazon, River Nile, Lake Victoria, River Zambezi, River Mekong and River Kahayan in Indonesia. As such, the negative environmental impacts on the International Waterbodies within these basins are bound to affect many countries most of which do not even have gold mining activities. Whereas the Amazon Basin is the largest drainage system in the world with more than two thirds of its area covered by an immense Amazon Rain Forest which represents about half of the Earth's remaining rain forest and constitutes the largest reserve of biological resources, estimates show that gold mining activities dump nearly 130 tons of mercury annually within Brazil alone. Nearly 200 tons of mercury is dumped into the environment by these activities in Indonesia and the amount is on the rise in other countries due to the increase in artisanal gold mining activities. The Governments of the participating countries, acting unilaterally are unable to finance the high initial start up costs of dealing with mercury related pollution problems. The proposed project will lead to the establishment of the extent of mercury pollution, increase of knowledge and awareness on environmental issues, introduction and demonstration of the application of efficient and clean technology and provision of assistance to Governments to enable them develop policies and legislation that are practical and enforceable. These efforts will in turn lead artisanal mining activities that are efficient and environmentally acceptable.

23. Within the above basins being focused by the project, GEF is already supporting a project within the Lake Victoria basin that is shared between the countries of Kenya, Tanzania and Uganda, and another project within the Nile River Basin is in advanced stages. The two projects address environmental impacts to these International Waterbodies resulting from industrial pollution. This project will benefit from experiences gained from the two projects by establishing close cooperation through exchange of information, meetings, conferences and workshops. It is envisaged that such close cooperation will bring regional and global environmental benefits by extending the gained experiences to other regions of Asia and Latin America and even beyond.

Specific Project Objectives

24**.** There is general agreement on the need for a globally consistent approach to address the removal of barriers to the introduction of cleaner artisanal gold mining and extraction technologies. Since the issue cannot be addressed at the same time in dozens of countries suffering from the same problem, typical cases for mercury pollution of international waters have been selected.
The following specific project objectives and related activities will be implemented within the participating countries.

Objective 1A: To ensure effective project coordination and support (providing information, communications, professional assistance, programme implementation and evaluation and assessment) through establishment of a UNIDO based Programme Coordination Unit (PCU) and a Global Project Task Force.

Objective 1B: Identification of, and provision of resources for the establishment of the programme management structures in each of the six participating countries and the creation and operation of the basin and country specific project task forces.

Objective 2: Identify project demonstration sites and organize training aimed at increasing knowledge and raising awareness of miners, Governments, NGOs and the general public on the environmental and health impacts associated with the current artisanal mining practices and the environmental, health and economic benefits of employing appropriate technology.

Objective 3: Identify hotspots in project demonstration sites, conduct geochemical and toxicological studies and other field investigations in order to assess the extent of environmental (mercury) pollution in surrounding water bodies and devise intervention measures.

Objective 4: Establish a databank comprising of technological requirements relevant to artisanal gold mining and extraction activities through field investigations, interviews with miners, miners' associations and other relevant institutions.

Objective 5: Acquire and demonstrate, within the project demonstration sites, the application of affordable high-efficiency clean technology with improved gold processing methods while avoiding environmental degradation from mercury contamination.

Objective 6: Based on the acquired experience, develop sustainable extraction indicators and hence assist Governments to develop generic and to the extent possible, country specific policies and legislation that will lead to implementable standards on the application of mercury with special attention to minimization of environmental impacts.

Objective 7: Promote the dissemination of the produced project results and identify opportunities that will allow the project to continue beyond the three-year time frame through self-financing and to initiate and conduct a Donor Conference to solicit financing.

Rationale for GEF Intervention

25. One of the priority areas identified by GEF under the “international waters focal area” is the “degradation of the quality of the transboundary water resources, primarily due to pollution from land-based activities". The negative impacts resulting from artisanal mining, which are land-based activities, lead to degradation of the selected International Waterbodies resulting to far reaching consequences. This project is also consistent with the GEF Operational Programme #10, which targets projects that “help to demonstrate ways of overcoming barriers to the adoption of best practices, waste minimization strategies and pollution prevention measures that limit contamination of the international waters environment”. The proposed activities aim at removing barriers that inhibit artisanal miners from applying cleaner and efficient technology. Apart from removing the barriers the project will demonstrate the application of cleaner technology and conduct training to the miners in order to enhance the application of cleaner technology and thus reduce pollution and minimize waste resulting from the currently applied poor technology. Supplementing ongoing activities of the respective countries in developing the artisanal activities to the level of an organized small-scale gold mining sector, the project will contribute to a substantial incremental progress regarding the reduction of mercury pollution.

26. In all the six countries, artisanal miners use mercury as a major component in gold recovery. The focus of Operation Programme #10 is stated as being on poorly addressed global contaminants such as mercury. Apart from introducing alternative techniques that will minimize the application of mercury, methods for recirculating mercury during distillation and thus avoid its direct release to the environment, will be introduced. As such, the proposed project represents an important step towards realizing the GEF operational programme objectives. The amount of co-financing made available from the participating countries (US$12.3 million) for the implementation of this GEF/UNDP/UNIDO project reflects the commitment of the Governments of Brazil, Sudan, Tanzania, Zimbabwe, Lao and Indonesia. Looking at the reduction of mercury globally, the GEF/UNDP/UNIDO projects is benefiting also from financial resources given to UNIDO by certain member states for addressing the mercury problem in some selected Asian and African countries, which do not participate in the GEF/UNDP/UNIDO project.

A.3 Project Activities / Components and Expected Results

GEF Project Objectives and Activities

Objective 1A: To ensure effective project coordination and support (providing information, communications, professional assistance, programme implementation and evaluation and assessment) through establishment of a UNIDO based Programme Coordination Unit (PCU) and a Global Project Task Force.

Rationale:

27. It is now widely accepted that problems associated with artisanal mining practiced in different developing countries are similar in nature. As such, solutions to these problems need a globally consistent approach that is effectively coordinated in order to deal with the interrelationships of the individual problems. Past approaches which have been implemented in individual countries with a focus on isolated problems have had limited impact. UNIDO's experience in dealing with problems of a similar nature and its international network, will be an added value in this project. In addition, UNIDO will commit on full time basis a senior professional staff who will work as the Chief Technical Advisor as part of assistance in co-financing of the project. This objective focuses on the establishment of a Project Coordination Unit (PCU) based at the UNIDO Headquarters in Vienna under the leadership of the Chief Technical Advisor (CTA) and with the assistance of a Small-Scale Mining Expert (SSME) and supporting staff from UNIDO itself. It is envisaged that the work of the PCU will be supported by GEF over the three years of the GEF sponsored project. It is expected that after three years, mechanisms will have been established within the participating countries and UNIDO that will enable the project to continue beyond this period. This will enable UNIDO to remain with the monitoring role, in collaboration with respective Governments, and use the experience to extend the project to other countries. At a global level, a Global Project Task Force (GPTF) comprising of members from various task forces, Country Focal Points, PCU, UNDP and UNIDO will be set-up to assess the achievements and failures and recommend strategies for future directions.

Activity 1A.1 Recruit and hire the Chief Technical Advisor (CTA), a Small-scale Mining Expert (SSME) and supporting staff.

Activity 1A.2 Establish the Project Coordinating Unit (PCU) responsible for overall coordination and facilitation of the project and establish communication channels between participating countries.

Activity 1A.3 Create and manage a Global Project Task Force (GPTF) with representatives from the (CPTFs), Country Focal Points, PCU, UNIDO and UNDP.

Activity 1A.4 Establish a project Website and set-up a global resource information centre where reviews of past and existing studies on the application of mercury in artisanal gold processing both in individual countries, regional and globally can be stored and shared accordingly; establish and maintain internet links with all participating countries.

Activity 1A.5 Make arrangements for evaluation and assessment of project results.

Objective 1B: Identification of, and provision of resources for the establishment of the programme management structures in each of the six participating countries and the creation of the basin and country specific project task forces.

Rationale:

28. In addition to effective project coordination globally, it is imperative to ensure smooth implementation of the project activities at the country level. This will be achieved through identification of a senior Government official within the institution responsible for mining affairs as the Country Focal Point to oversee the implementation of the project activities. It is imperative that the project is placed under the leadership of a senior Government official in order to ensure the long-term sustainability, Government's commitment and assistance in co-financing. In order to enhance effectiveness, an assistant to the country focal point will also be recruited. The assistant, who will be a person with extensive experience in the areas of mining and environment, will be responsible for the day to day running of the project activities. The country focal point and his assistant and in collaboration with the PCU will be responsible for convening an inter-ministerial project awareness workshop prior to project commencement that will select members of the Country Project Task Force (CPTF) that will review from time to time and provide guidance towards effective implementation of the project objectives.

29. The selected study areas are within basins the interests of which are shared by countries other than those participating in the project. Although some of these countries have no active artisanal gold mining activities, they are bound to be victims of the resulting negative environmental impacts. In order to ensure that the project raises awareness of wider audiences, Basin Project Task Forces, (BPTF), will be created to comprise members from countries sharing a particular basin. BPTF meetings will therefore be convened annually to discuss the project implementation, results and problems at the regional level and hence recommend future strategies. This will facilitate sharing of information and development of strategies that will bring wider regional and hence global benefits. Over the long-term, i.e., looking beyond the three-year project term, cooperation through BPTFs will facilitate extension of the project and replication of its results.

Activity 1B.1 In consultation with the Government institution responsible for mining, identify a senior official to act as the country focal point and thus assume leadership of the

project activities, recruit an assistant for the day-to-day running of activities and provide working facilities.

Activity 1B.2 In collaboration with the PCU, recruit and hire project consultants, preferably local consultants, in the areas that are specific to the project activities and time schedules.

Activity 1B.3 Review past, existing and prepare new case studies focusing on the applied methodologies and lessons learnt and identifying impacts associated with the application of mercury in artisanal gold processing; Exchange the results with other participating countries in order to share experiences.

Activity 1B.4 With the assistance of the PCU, plan and hold country-based project awareness workshops, one in each participating country, that will raise awareness of the addressed problems, educate participants and improve communication capacities. With participants being multi-sectoral, create the Country Project Task Force (CPTF) that will be responsible for reviewing and giving advice on the project directions at the country level.

Activity 1B.5 Create a Basin Project Task Force (BPTF) and provide resources to enable both CPTF and the BPTF to carry out their roles.

Objective 2:	Identify project demonstration sites and organize training aimed at increasing knowledge and raising awareness of miners, Governments, NGOs and the general public on the environmental and health impacts associated with the current artisanal mining practices and the environmental, health and economic benefits of employing appropriate technology.

Rationale:

30. During the PDF-B phase it was established that the majority of artisanal miners were not aware of the negative environmental and health implications associated with mercury use. The lack of awareness, technical knowledge, support programmes and information on different aspects of artisanal mining make the situation more precarious. It was also revealed that the institutional weaknesses limit the capacity of Governments to carry out their regulatory functions effectively. Besides, although environmental issues are multi-sectoral, there is lack of coordination and cooperation among various relevant Government institutions. Bureaucratic procedures within the relevant institutions force most miners to opt for illegal mining and trading activities. As such, training and awareness campaigns would go a long way to change the miner's attitudes towards adopting cleaner working techniques and enable Government institutions to institute mechanisms for efficient regulation of these activities. In addition, it is envisaged that training and awareness campaigns will enhance direct participation of women to mine production activities whose involvement are currently limited by a number of socio-cultural factors. UNIDO has an agreement for cooperation with the United Nations Environmental Programme, (UNEP), which it intends to utilize in order to enable participating countries access more professionally developed training programmes. In addition, the project will make use of the UN Train-X network which is coordinated by UNDP and its training development methodology so as to enable participating countries to create course modules that are targeted and that can be easily adapted by other members of the project. By using the TRAIN-X methodology the project will engage a consultant to assess potential course development units and/or delivery units in the six participating

countries and run two-weeks course development workshops that will enable the adaptation of training packages using TRAIN-X methodology. It will be taken into full account that training must be provided in national and local languages. The different levels of education of various groups will be taken into consideration during preparation of the programmes and since this will be done through consultants and sub-contracts, it will form part of the terms of reference.

31. In order for the project to be focused and thus deal directly with the environmental and health problems resulting from the application of mercury in artisanal gold extraction, it is of the essence that the project be implemented in selected demonstration sites in each participating country. By concentrating the efforts to individual demonstration sites, the project will be able to demonstrate the effectiveness of the proposed interventions and thus produce measurable results that can be easily corrected and replicated accordingly. According to the suggestions of the STAP reviewer, the selected demonstration site in each country will be opened to small-scale miners/cooperatives from other geographically distant places of the respective country, in order that these regions benefit from the introduction of cleaner technologies, too. Furthermore, selection of a project demonstration site will take into consideration, location in relation to the waterbody, intensity of gold extraction activities, extent of the application of mercury, extensiveness of the areas and willingness of miners to participate in the project.

Activity 2.1 Conduct survey and identify appropriate project implementation sites for the demonstration of efficient and cleaner technology and conduct consultations with stakeholders regarding the project objectives.

Activity 2.2 Collect and compile information through detailed analysis of the legal and regulatory framework and its application to artisanal mining.

Activity 2.3 Conduct artisanal miners' training needs assessment through consultations with miners, miners' associations, local Governments, NGOs, mineral dealers and relevant Government institutions.

Activity 2.4 Organize and conduct stakeholders' awareness campaigns with target groups being the miners and their associations, NGOs, members of public, relevant Government institutions, local governments, etc., covering different aspects of artisanal mining.

Activity 2.5 Prepare and conduct awareness programmes through different media, e.g., Televisions, Radio and Newspapers, in national and local languages aimed at raising awareness of the public at large on the environmental and health effects of mercury.

Activity 2.6 Based on the results of Activities 2.1 and 2.2 and those from the awareness campaign programmes, create generic and adaptable versions of course packages which will form a targeted educational and training programme for artisanal gold miners, relevant NGOs and Government institutions. The training programme should make participants aware of the negative impacts of the current operations and the advantages of adopting efficient and cleaner technologies. By using the TRAIN-X methodology, engage a consultant to assess potential course development units and/or delivery units in the six participating countries and run two-week course development workshops which will enable the adaptation of training packages using TRAIN-X methodology.

Activity 2.7 Through the CPTF, assist the Government to prepare programmes that will lead to improved institutional cooperation for the institutions dealing with environmental issues in the country.

Objective 3:	Identify hotspots in project demonstration sites, conduct geochemical and toxicological studies and other field investigations in order to assess the extent of environmental pollution in surrounding waterbodies and devise intervention measures.

Rationale:

32. Most gold miners use mercury for amalgamation as a cheap and fast method for recovering gold. It has been established that even those working on ores with large particles of gold that can be recovered by gravity separation, look into mercury as the most efficient way of gold recovery. The major concerns due to application of mercury in gold recovery is its direct release into the waterbodies, its accumulation and subsequent methylation to organo-mercury and hence transfer into the food chain through the aquatic ecosystem. Since most artisanal gold mining in the six countries is carried out around International Waterbodies, the pollution does affect also the environment and innocent populations downstream. From a few existing studies and some preliminary investigations conducted during PDF-B phase of this project, it is clear that the levels of mercury poisoning amongst miners who handle mercury regularly and mercury pollution levels in different media with mining areas and within the waterbodies, are already too high. Apart from being the major sources of water for the miners and the neighbouring communities, the international waterbodies surrounded by the mining activities are the major sources of fish through which methylated mercury is known to be bio-magnified and thus spread to even further areas through the food chain. As shown in Annex IV the GEF/UNDP Project Brief, the level of mercury poisoning amongst miners and those living downstream of the polluted waterbodies, are already high. It should be noted however, that, apart from Brazil where detailed studies have been carried out to assess mercury contamination resulting from artisanal gold mining in the Amazon Basin, there have been limited studies in the other five countries. Some studies that have been carried out in Tanzania and Zimbabwe have been limited in their scope and study boundaries. In Brazil where a large amount of data has been established regarding the extent of mercury pollution, limited resources have made implementation of intervention measures almost impossible.

Activity 3.1 Conduct interviews and develop a questionnaire in order to establish the general health conditions of the members of communities living in the mining areas.

Activity 3.2 Conduct geochemical sampling and analysis of the mining area (water, soils and river sediments) and use the results to identify "hot spots" areas with the project implementation sites.

Activity 3.3 Collect human specimens and other biological samples and assess the impact and extent of mercury pollution along waterbodies.

Activity 3.4 Conduct surveys and establish the extent of mercury migration from the selected mining area to surrounding waterbodies and the vertical migration within the identified hot spots.

Activity 3.5 Organize permanent visits of medical doctors who are experienced in dealing with mercury intoxication problems to carry out specific medical checkups.

Activity 3.6 In collaboration with the Government identify a local laboratory and enhance its resources capacity to enable it to conduct continuous monitoring of mercury pollution

in waters surrounding artisanal gold mining areas; Assist in the introduction and set-up of a continuous monitoring programme.

Activity 3.7 Formulate and carry out measures for remediation of the "hot spots" through identification and isolation of mercury containing tailings followed by recovery and/or immobilization of mercury.

Objective 4:	Establish a databank comprising of technological requirements relevant to artisanal gold mining and extraction activities through field investigations, interviews with miners, miners' associations and other relevant institutions.

Rationale:

33. Technological problems feature out strongly in artisanal mining because of their direct relationship to productivity and the environmental scars left behind. Apart from the visible physical damages caused on the environment, different studies have shown that use of poor technology results in pollution that affects even those living far from mining areas. The impacts of mercury on the aquatic ecosystem are a good example. Consequently, any programme attempting to transform artisanal mining activities into sustainable operations cannot ignore the influence of technology. Because of its direct influence on productivity and the overall working environment, technology has been shown to influence all approaches towards poverty alleviation. The choice for the efficient and cleaner technology should however, be carried out with full participation of the target groups. Imposition of technology through solutions developed behind closed doors has in most cases proved unworkable. This project will avoid such traps by working hand-in-hand with the miners, their associations, NGOs and the Government in the choice of the appropriate technology. The advice of the STAP reviewer will be taken into account in view to involve as much as possible the miners in the technology selection process. Apart from demonstrating the disadvantages of the existing technology, this project plans to demonstrate the cost effectiveness of the new technology and thus enable miners to appreciate increased earnings associated with the new approach. The applied combination of training, awareness campaigns and involvement in the selection, installation and running of the new technology will enable miners to closely associate themselves with project. The campaigns and training will employ real case studies based on videos that UNIDO has accumulated from other projects, e.g., in the Philippines. The main target of this objective however, is to establish a database of the current technology and its deficiencies. The collected data will be used to categorize the existing tools into those that can be modified in order to improve their efficiency, those that need to be replaced and production of a manual for such technologies. Such data will be used to demonstrate to miners the advantages of the new technologies.

Activity 4.1 Through field investigations compile a database on the existing artisanal mining and processing technology and establish technological requirements.

Activity 4.2 Establish InfoBase for local and foreign suppliers and supply routes of equipment and tools with the view of establishing suppliers of environmentally acceptable equipment and tools.

Activity 4.3 Identify existing facilities and their capacities within mining areas and neighbouring towns that can be used for fabrication of simple working tools.

Activity 4.4 Establish, through interviews with relevant Government institutions, the tax regime and restrictions on importation of mining equipment and supplies.

Activity 4.5 Conduct investigations and test the establishment of micro-credit schemes that will enable artisanal miners to shift to more benign technologies indicating clearly the conditions for accessibility, likely participants in the programme, modes of financing and other considerations.

Objective 5:	Acquire and demonstrate, within the project demonstration sites, the application of affordable high-efficiency clean technology with improved gold processing methods while avoiding environmental degradation from mercury contamination.

Rationale:

34. The alternative of not introducing efficient and cleaner technology is to allow the negative environmental and other impacts resulting from current artisanal mining activities to continue. Continued negative impacts from artisanal mining, especially the pollution from mercury on International Waterbodies and the populations at large, will have far reaching consequences. Over the long-term, the negative impacts are bound to override the economic short-term benefits. To most miners, the quest to break from the chains of poverty is usually the driving force for their entry in artisanal mining. This objective aims at introducing technology that will minimize the release of mercury into the environment including the recovery and/or immobilization of mercury left in tailings that is usually a source of environmental mercury contamination. The immobilization technology that has already been tried in Brazil allows mercury to remain in controlled tailings without being released to the environment. Application of gravity concentration techniques and utilization of mercury amalgamation retorts will not only eliminate the loss of mercury to the environment, but save miners money through recirculation and hence reuse of mercury. The overall approach to introduction of clean technology must target the application of "closed circuit processing", i.e., processing flow-sheets that do not allow the release of mercury outside the control boundaries. Further to these approaches, it is imperative to demonstrate simple techniques for concentrating and recovering gold without the use of mercury. The fact that miners of alluvial gold ore that is known to have coarse gold particles use mercury indicates the problem associated with the lack of technical know-how. Training on different mining and processing techniques that are not only efficient, but also environmentally acceptable, will enhance the minimization of negative environmental impacts. It is also appreciated that any technology introduced must be easily accessible and affordable by the stakeholders. In order to ensure this, the project will identify local fabricators and manufacturers who will be trained in the production of the identified technology.

Activity 5.1 Organize on the job training in order to introduce miners to the new working methods and equipment.

Activity 5.2 Identify and conduct training to local fabricators and manufactures and work closely with the trainees to enable them to produce tools, e.g., sluice boxes, mercury retorts, gravity concentrators, shaking tables and others that conform to specified project requirements and that will be used during the project implementation and beyond.

Activity 5.3 Demonstrate competitive basic mechanical alternatives to mercury amalgamation and introduce "closed circuit processing" methods for activities still based on amalgamation and show the cost effectiveness of the introduced equipment.

Activity 5.4 Construct demonstration high-recovery gravity concentration equipment, install on selected sites, assess and evaluate their cost effectiveness.

Activity 5.5 Establish equipment supply channels through linking miners to the suppliers and through collaboration with the relevant Government institutions.

Activity 5.6 Conduct mercury immobilization through extraction in areas identified as being highly polluted.

Activity 5.7 Compile and as necessary produce documentary videos on the operations of the different introduced technology for use on future training purposes.

Objective 6:	Based on the acquired experience, develop sustainable extraction indicators and hence assist Governments to develop generic and to the extent possible, country specific policies and legislation that will lead to implementable standards on the application of mercury with special attention to minimization of environmental impacts.

Rationale:

35. Not all of the six participating countries have instituted environmental policy, legislation and regulations for artisanal mining activities. Even where the environmental legislation has been introduced, there is lack of capacity and systematic implementation programmes to ensure effective compliance. Also, the development processes of most artisanal legislative and regulatory frameworks do not take into consideration the need to promote sustainable operative procedures for the sector. As a result, the existing legislation try to regulate activities that are unsustainable and with intrinsic negative environmental impacts. Even with these legislation, the combination of the miners' lack of technical know-how and the lack of trained and experienced environmental experts within Government institutions, make their implementation difficult. In other countries, the existing legislation and regulations do not differentiate between the artisanal and the large-scale mining sectors and as such contain requirements that are not implementable within the artisanal mining sector, e.g., the requirements to conduct Environmental Impact Assessments. The worst cases of course are with those countries that do not have any legislation or regulatory framework for this sector. Consequently, these activities continue to operate unregulated and thus leading to significant negative environmental impacts. It is therefore important that Governments should be assisted to develop policies and legislation that are practical and geared towards the needs of the artisanal mining sectors. In order to achieve that, this objective will aim at developing "sustainable gold extraction indicators" or a set of rules developed to promote gold extraction activities within the following framework:

- processes that minimize mass-flows of overburden and/or gravel/sand;
- minimizes processes energy requirements and, if possible uses clean energy;
- minimizes environmental impacts (effluents to the environment, be it solid, liquid or gaseous);
- maximizes the social satisfaction of the living community and nearby villages.

36. A monitoring programme will also be developed and as shown under activity 3.5, capacity of local laboratories to carry out continuous monitoring of mercury pollution to the waters surrounding the mining activities, will be enhanced. As a result, the developed policies and legislation coupled with a continuous monitoring programme will lead to setting of achievable and enforceable standards within the artisanal mining sector.

Activity 6.1 Conduct literature review on artisanal gold extraction activities "sustainable indicator", policies and legislation on environmental aspects and associated standards paying attention to mercury pollution resulting from gold processing activities.

Activity 6.2 Carry out review of the identified indicators, legislation and regulations and compare them to those existing in the country.

Activity 6.3 Based on the results of Activity 6.2, prepare and give recommendations on new or revised indicators, policies and legislation.

Activity 6.4 Conduct consultations with various stakeholders on the recommendations and collect views regarding sustainable operative indicators, policies and legislation that will lead to achievable and enforceable standards.

Activity 6.5 Assist the Governments to develop guidelines on extraction indicators, and policies and legislation that will lead to achievable and enforceable standards within the artisanal mining sector.

Activity 6.6 Conduct a workshop with representatives from the stakeholders, relevant Government institutions, the private sector and general public to discuss the proposed guidelines, policies and legislation.

Activity 6.7 In collaboration with the Government, develop enforcement programmes.

Objective 7:	Promote the dissemination of the produced project results and identify opportunities that will allow the project to continue beyond the three year time frame through self-financing and to initiate and conduct a Donor Conference to solicit financing.

Rationale:

37. Mercury pollution resulting from artisanal gold mining and extraction activities conducted around or within the identified International Waterbodies, affects more countries than those participating in this project. Also, within the participating countries, mercury is applied by artisanal miners in many other areas than those selected for project demonstration. Some neighbouring countries also have artisanal mining activities although not to the same extent as those in the participating countries. Over the long-term, the interventions proposed should be expanded to cover wider areas within the same country and those sharing the target basin. It is envisaged that the project training programmes, awareness campaigns, capacity building and enhancement of the Governments capacity to develop practical policies and legislation will ensure sustainability of the project. In collaboration with the Government, the CPTF will be able to develop strategies for expansion of the project within the country. Similarly, the BPTF in consultations with basin member countries should be able to

recommend strategies for extension of the project in other areas of the basin. The implementation of such strategies will be realized by raising finance through demonstration of the current project achievements. The achievements should also be disseminated both locally and internationally in order to ensure that the project has a much wider contribution towards minimization of mercury pollution.

Activity 7.1 Organize country based annual workshops on sustainable artisanal gold extraction techniques with participants from the stakeholders, relevant institutions and the general public.

Activity 7.2 Organize and conduct three regional annual workshops, one in each of the three regions, on sustainable gold extraction procedures and techniques with participants from the stakeholders, relevant institutions and the general public.

Activity 7.3 Review the opportunities for self-financing of project components at the global, national and regional levels, pinpointing the potential economic sources and mechanisms.

Activity 7.4 Organize and sponsor a donor conference using the ongoing GEF project as leverage for the creation of necessary additional financiers.

A.4 Risks, Sustainability and Commitments

Possible Risks

38. *Political willingness*: The long-term success of the global attempt to minimize negative environmental impacts associated with artisanal gold extraction activities through the introduction of efficient and cleaner gold mining and extraction technologies depends on one hand on the political willingness of the participating countries. Political willingness of individual countries is important in ensuring that barriers resulting from existing policies, legislative and fiscal frameworks, infrastructural and other socio-economic related factors are removed. The removal of such barriers will create an environment for effective execution of the project objectives. The political willingness factor is however regarded as a moderate risk at this time as most participating countries have already initiated reforms for the promotion of this sub-sector. The countries have either enacted new policies and legislations that recognize artisanal mining as an important economic sector or are in the process of doing so. In addition, all the participating countries have made specific commitments towards support of this project.

39. *Miners' willingness:* The miners' willingness to participate is crucial to the success of the project. Miners should be able to associate themselves to the overall approach that attempts to change the fabrics of their mining culture. Although inefficient, environmentally unacceptable, having poor and health standards and mostly illegal, most miners see artisanal mining activities as the only way of getting out of the poverty trap. Miners need to be assured of the economic gains associated with the envisaged changes in technology and the overall work organization structures. Cultural factors play major roles in the management of mining operations and living conditions within the mining camps. Compromises on the cultural and economic aspects of artisanal miners may wither the miners' willingness to participate in the project. This is not regarded as a major risk for this project as the proposed intervention programme will involve the miners from the planning, implementation, testing,

evaluation and monitoring to the conclusion of the project. Since many small-scale mining activities are carried out illegally, the Project's demonstration sites must be located within licensed areas will focus in order to enhance the Governments' efforts in legalizing the sector and thus encourage illegal miners to register. The project demonstration sites will be identified within the preparatory phase of the project; the same applies for checking the willingness of miners/cooperatives/small-scale mining associations. The project will not attempt to cover the entire country to solve artisanal mining problems. It is expected that at the end of three years, mechanisms will have been developed to allow miners and the Government to extend the project to other areas. As such these barriers are not regarded as a major risk.

40. *Volatility of the mineral commodity prices*: Low mineral commodity prices in world markets would normally make a mining venture uneconomic taking into consideration the costs of production. Poor gold prices would compromise the willingness of artisanal miners to participate in the project. Although gold prices in the world markets are still low, the downward trend has been reversed and prices are on the rise again. However, while this is a major risk to large-scale mining companies, it is regarded moderate for artisanal mining. The low production costs of artisanal mining activities normally allows them to exploit marginal reserves that are usually regarded as uneconomical by large-scale mining companies. The increase in knowledge and awareness of miners on different mining issues will help minimize this risk.

Sustainability

41. At the country level, the project components have been designed to impart knowledge and raise awareness among participants, build capacity amongst different Government institutions and NGOs and introduce technology that is efficient, environmentally acceptable and that adhere to health and safety standards. The training component of the project is to ensure that miners, equipment manufacturers and those in control of these activities become increasingly aware of the economic, environmental and human health risks that result from the current working practices. Sensitization of Government institutions and NGOs will enable them to develop strategies for ensuring that safer and sustainable activities are carried out. The combination of these approaches and the existence of pilot project results, will ensure that countries identify elements of sustainability for such activities.

42. The project is designed to exchange information and data and thus utilize the experience of one country for the benefit of others. A UNIDO maintained Website and a global resource information centre where reviews of past and existing studies on the application of mercury in gold processing can be stored and shared accordingly, will be set-up. This will also ensure that proceedings of meetings of the CPTFs, BPTFs and the GPTF can be exchanged between the participating countries. Information relevant to small-scale miners will be drafted in such a way that a translation from English into the local language spoken at the demonstration site is easily possible. This information will also contain informative sketches to illustrate the principle of the interventions. At the end of the project, a programme for self-financing will be worked out and a donors' conference organized in order to attract more financing into the project. Attraction of donor funds will be based on demonstration of the achievements over the three years and the ability to replicate these into other countries and regions and hence ensure global benefits.

Commitment of the Participating Governments and UNIDO

43. This proposal has been prepared with full long-term commitments of participating countries and UNIDO. Each country is committed to provide one senior government official to lead the project in additional to providing office space and facilities. On the other hand, UNIDO's commitment to the project is demonstrated by the continuous efforts to abate mercury pollution through projects in other countries, which are not participating in the Global Mercury Project.

A.5 Stakeholders Participation and Implementation Arrangements

Stakeholders Participation

44. During the PDF-B phase of this project, miners, local experts, the Government and local NGOs participated fully in identifying barriers limiting the introduction of cleaner technology to artisanal mining activities. Whereas local experts collected data and prepared country reports, the Governments provided information regarding sectoral development plans and the associated budgets. It is further appreciated that the success of the implementation phase will also depend on the commitment and participation of the stakeholders. In order to avoid mistakes of other projects that tend to ignore the significance of the stakeholders' participation and thus turn them into sources of data, this project intends to involve them at all implementation levels. After the project has been approved, six project awareness workshops will be organized, one in each country, in order to raise awareness of the miners and their leadership, the Government, NGOs and the general public on the issues to be addressed and exchange views. This will be followed by a field visit by the country focal point and his assistant in order to conduct close consultations with the miners and their associations and provide elaboration of the envisaged project implementation. This will enable adoption of the miners' views into the programme and thus move towards development of a close working partnership between management, consultants and stakeholders.

Project Implementation

45. UNIDO, which coordinated the work during the PDF-B Phase, will be the Executing Agency of the project. Through the PCU and in collaboration with Governments in participating countries, UNIDO is well situated to implement the project thanks to its project management experience in similar projects and its international network.

Institutional Framework

46. In each participating country the project will be under the leadership of a senior Government official and will be based within the institution responsible for mining affairs. In order to enhance effective implementation of the project activities, an assistant to the country focal point will be recruited to oversee the day-to-day running of the project. A Project Coordination Unit (PCU) based at UNIDO in Vienna will be responsible for the overall coordination and overseeing implementation of the project activities globally. The PCU will be comprised of a Chief Technical Advisor (CTA) (Level P5) who will be assisted by a Small-Scale Mining Expert (Level P3) and supporting staff provided from time to time by UNIDO. Specific activities will be carried out by both local and international consultants who shall be recruited by the PCU in collaboration with Country Focal Points.

47. Country Project Task Forces (CPTF) comprising members from relevant Government institutions will be established to review, give advice and comments on the project implementation from time to time. In addition there will be a Basin Project Task Force (BPTF), which will bring together representatives from countries sharing the basin upon which the project is being implemented. BPTF meetings will also be attended by representatives from the PCU, UNIDO and UNDP. The main task of the BPTF will be to review the project activities, their implementation and give recommendations that will ensure regional benefits. A Global Project Task Force (GPTF) comprising of members from the Country Focal Points, CPTF, PCU, UNDP and UNIDO will be set-up to assess the achievements and failures and recommend strategies for future directions.

A.6 Incremental Costs and Project Financing

48. The execution of the project objectives through pilot projects in selected demonstration sites will demonstrate the strategies that can be adopted by developing countries in order to minimize the negative environmental impacts resulting from artisanal gold extraction activities. Artisanal miners use mercury as an easy and cheap way for recovering gold, which in turn is released to the environment with far reaching negative impacts to human health and the environment at large. Mercury released in a vapour form can be transported further by wind and precipitate over water systems, where it accumulates in bottom sediments. Through oxidation it can finally be transformed into methyl mercury. As the bottom sediments are transported by water currents to distant locations so is methyl mercury, which is known to accumulate in biota, particularly in fish and hence entering the food chain. These processes make mercury a global contaminant with potential transboundary impacts due to atmospheric, riverine and biological transportation. Despite these transboundary negative impacts, artisanal mining activities are significant to the economies of most developing countries through their capacities to provide employment to the rural majority, generate foreign earnings to Governments, exploit marginal uneconomical reserves and assist large companies in the discovery of potential economic reserves. It is therefore of the essence that strategies aimed at transforming artisanal gold extraction activities to environmentally acceptable operations be introduced and demonstrated in relevant developing countries.

49. The cost of inaction is continued pollution, especially that resulting from the use of mercury, which is known to be biomagnified within the aquatic ecosystem and hence spread, further through the food chain. The incremental costs (IC) associated with the project, and which are the subject of the following table, are those, which are deemed necessary to bring transformation of artisanal gold extraction activities and thus bring global and regional benefits consistent with the GEF Operation Strategy and OP #10 of the Operational Programmes document.

Section B. INPUTS

B.1 Government Inputs

50. Detailed information on co-financing activities of participating countries is provided in the Annex V.

B.2 GEF/UNDP Financing of Incremental Costs/Project Budget

51. Detailed information on co-financing activities of participating countries is provided in the Annex to GEF/UNDP Project Brief.

Budget Line	GLO/01/G34	Activity No.	Totals		2002		2003		2004	
			m/ms	US $	m/ms	US $	m/ms	US $	m/ms	US $
	PERSONNEL									
11-00	**International Experts**									
11-01	Project Technical Adviser	1A.1	**36.00**	**300,000**	12.00	100,000	12.00	100,000	12.00	100,000
11-02	Small-scale Mining Expert	1A.1	**36.00**	**288,000**	12.00	96,000	12.00	96,000	12.00	96,000
11-50	**Short-term International Consultants**									
11-51	Expert in Setting up a Resources Information Centre (website)	1A.4	**3.00**	**25,000**	2.00	16,000	1.00	9000		
11-52	Expert in Project Evaluation and Assessment (lump sum)	1A.5	**12.00**	**100,000**	4.00	33,000	4.00	33000	4.00	34,000
11-53	Expert in TRAIN-X Methodology	2.6	**12.00**	**90,000**	4.00	30,000	4.00	30,000	4.00	30,000
13-00	**Administrative Support Personnel**									
13-01	Drivers (one per country, 10 months/year)	1B.1		**90,000**		30,000		30,000		30,000
15-00	**Monitoring and Evaluation**									
15-01	Travel annually to GPTF meetings	1A.3		**54,000**		18,000		18,000		18,000
15-02	Local staff project travel and DSA	1B.1		**216,000**		72,000		72,000		72,000
15-03	Review past, existing and prepare new case studies	1B.3		**18,000**		18,000				
15-04	Travel annually to BPTF meetings	1B.5		**84,600**		28,200		28,200		28,200
15-05	Travel Quarterly to CPTF meetings	1B.5		**50,400**		16,800		16,800		16,800
15-06	Travel for project monitoring	1B.5		**108,000**		36,000		36,000		36,000
15-07	Conduct survey for demonstration of new technology	2.1		**38,000**		38,000				
15-08	Travel for institutional cooperation	2.7		**18,000**		6,040		5,980		5,980
15-09	Database of artisanal mining technologies	4.1		**7,000**				7,000		
15-10	Identification of existing fabrication facilities	4.3		**3,000**				3,000		
15-11	Legislation review and recommendation	6.4		**22,000**				22,000		
15-12	Travel to country based workshops	7.1		**61,000**		20,330		20,330		20,340
15-13	Travel to regional workshops	7.2		**40,800**		13,600		13,600		13,600
15-14	Travel to Donors Conference	7.3		**26,000**						26,000
16-00	**Mission Costs**									
16-01	PCU travels and DSA	1A.1		**60,000**		20,000		20,000		20,000
16-02	Recruitment of local consultants	1B.2		**30,000**		30,000				
17-00	**National Experts**									
17-01-06	National Assistant to Country Focal Point	1B.1	**216.00**	**540,000**	72.00	180,000	72.00	180,000	72.00	180,000
17-07-12	National Legal Expert in Mining and Policy	2.2, 6.1, 6.2, 6.3, 6.5, 6.7	**101.50**	**203,000**	12.00	24,000	89.50	179,000		
17-13-18	National WID Expert / Sociological Expert	2.3	**9.00**	**18,000**	9.00	18,000				
17-19-24	National Mineral Processing/Small-Scale Mining Expert	1B.3, 2.3, 2.7, 4.1, 4.2, 4.3, 4.4, 5.5	**73.00**	**146,000**	42.00	83,800	15.50	31,100	15.50	31,100
17-25-30	National Nurse to Second Toxicologists/Neurologists	3.5	**15.00**	**30,000**	6.00	12,000	6.00	12,000	3.00	6,000
19-99	**SUB-TOTAL PERSONNEL COMPONENT**		**513.50**	**2,666,800**	**175.00**	**939,770**	**216.00**	**963,010**	**122.50**	**764,020**

Budget Line		Activity No.	Totals		2002		2003		2004	
			m/ms	US $	m/ms	US $	m/ms	US $	m/ms	US $
21-00	**SUB-CONTRACTS**									
21-01	Conduct stakeholders awareness campaigns	2.4		**94,000**		47,000		47,000		
21-02	Develop & implement awareness programmes through media	2.5		**160,500**		53,500		53,500		53,500
21-03	Establish the extent and impact of Hg on environment	3.1, 3.3		**254,000**		84000		86000		84000
21-04	Establish the extent and impact of Hg on health	3.2, 3.4		**460,000**		155,000		155,000		150,000
21-05	Formulate measures for remediation and rehabilitation	3.7		**90,000**				90,000		
21-06	Investigate and develop micro-financing programmes	4.5		**500,000**		168,000		332,000		
21-07	Execution of on-the-job training	5.1		**218,000**		72,000		146,000		
21-08	Execution of training for manufacturers	5.2		**40,500**				40,500		
21-09	Set-up alternatives and high recovery methods	5.3, 5.4		**130,000**		32500		65,000		32500
21-10	Mercury immobilization programme	5.6		**110,000**				110,000		
21-11	Compile and produce documentary videos	5.7		**45,000**						45,000
21-99	**SUB-TOTAL SUB-CONTRACTS COMPONENT**			**2,102,000**		**612,000**		**1,125,000**		**365,000**
32-00	**OTHER TRAINING**									
32-01	GPTF meetings	1A.3		**32,000**		10,700		10,700		10,600
32-02	Project awareness workshop	1B.4		**45,200**		45,200				
32-03	BPTF meetings	1B.5		**58,680**		19,560		19,560		19,560
32-04	CPTF meetings	1B.5		**60,320**		20,040		20,040		20,240
32-05	Workshop on new indicator guidelines and legislation	6.6		**50,000**						50,000
32-06	Country based workshops on sustainable artisanal mining	7.1		**28,000**		9,300		9,300		9,400
32-07	Regional based workshops on sustainable artisanal mining	7.2		**19,200**		6,390		6,390		6,420
32-08	Donor Conference	7.4		**42,000**						42,000
32-09	Travel to Awareness Workshop by Government Officials	1B.4		**18,800**		18,800				
32-99	**SUB-TOTAL MEETINGS COMPONENT**			**354,200**		**129,990**		**65,990**		**158,220**
45-00	**EQUIPMENT**									
45-01	Expendable equipment for PCU	1A.2		**20,000**		20,000				
45-02	Transport and administrative equipment for countries	1B.1		**270,000**		270,000				
45-03	Monitoring equipment for selected local laboratories	3.6		**300,000**		100,000		200,000		
45-04	Alternative equipment to mercury amalgamation	5.3		**365,000**		91,250		182,500		91250
45-05	High recovery gravity concentration equipment	5.4		**350,000**		87,500		175,000		87500
45-06	Vehicles operating costs	1B.1		**60,000**		20,000		20,000		20,000
45-99	**SUB-TOTAL EQUIPMENT COMPONENT**			**1,365,000**		**588,750**		**577,500**		**198,750**
	TOTAL (Excluding 5% Support Costs)		**513.50**	**6,488,000**	**175.00**	**2,270,510**	**216.00**	**2,731,500**	**122.50**	**1,485,990**
	AOS			**318,800**						
99-99	**GRAND TOTAL**		**513.50**	**6,806,800**						

B.3 UNDP Inputs

52. Detailed information on co-financing activities of UNDP is provided in the Annex to GEF/UNDP Project Brief.

B.4 UNIDO Inputs

53. Since almost a decade, UNIDO has been assisting a number of developing countries in introducing cleaner technologies in small-scale gold mining. These activities have started with very modest funding from UNIDO's own regular budget. Within the last years, donor Governments, such as Austria, France and Japan, have generously supported these activities aiming at reducing mercury emissions from small-scale gold mining. For calculating the co-financing of the GEF Global Mercury Project through UNIDO, the same method has been applied as for calculating the parallel co-financing of participating Governments; i.e. only those mercury-related project activities have been taken into account, which had started in the year 2000 and will continue during the implementation of the GEF Global Mercury Project until 2005. These parallely disbursed funds for planned and ongoing UNIDO activities pertaining to environmental management of artisanal gold mining amount to US$642,000. Moreover, UNIDO will provide as in-kind contribution office, fax, telephone, Internet connection to the Project Coordination Unit at UNIDO Headquarters during the entire period of implementation. These costs are estimated at US$28,000. Total UNIDO co-financing amounts, therefore, to US$670,000.

B.5 Monitoring, Evaluation and Dissemination

Monitoring and Evaluation

54. The CPTF is expected to have regular quarterly meetings in order to review the implementation of the project and thus be able to give advice from time to time on the course of action. In addition, the CPTF will have resources to visit the project implementation sites, review implementation of the project objectives and advise accordingly. The BPTF will also meet once a year through which the emerging issues that are affecting countries within the basin will be reviewed in order to ensure regional and global benefits from the project. The project will also be subjected to various evaluation and review mechanisms of UNDP, including the Annual Project Review (APR), an independent final evaluation and an annual Tri-Partite Review (TPR). There will also be a Final Report prior to the termination of the project. At the country level, the project will also be subject to the GEF review process including PIR and will aim to establish process (e.g., changes in practices, laws, etc.), stress reduction (e.g., reduced mercury emissions) and environmental status indicators (e.g., indication of the reduction of mercury in the environment) and the review of the project implementation processes.

Dissemination of Results

55. Dissemination of the project results will be carried out through meetings, workshops and seminars with stakeholders and other relevant institutions. At the local level, there will be an annual workshop organized in each country and attended by stakeholders and representatives from relevant institutions. Three international workshops, one in each region, are planned and will be attended by representatives from stakeholders, Government institutions and members of the international community interested in the subject. Meetings of task forces will serve to disseminate the project results both at national, regional and international levels. The established global resource information

centre that will have a project specific Website will be used to disseminate the project results to a much wider audience.

56. As regards the project implementation period of 3 years, UNIDO will take care that the lessons learnt from other mercury-related projects in Tanzania, Ghana and Philippines will be applied and the timeframe will be kept as in these previous projects. It must also be mentioned that the implementation of most of the project activities in one or two project sites allows the concentration of efforts and improves time efficiency. Advantage will be taken of the technological achievements in the individual countries and the availability of data related to health and environment.

ANNEX I Job Descriptions

11-01	*Project Manager/Chief Technical Advisor*
11-02	*Small-Scale Mining Expert*
11-51	*Expert in establishing Web Sites*
11-52	*Expert in Monitoring and Evaluation of mining-related projects*
11-53	*Expert in Train-X Methodology*
17-01 – 17-06	*Assistant to the Country Focal Point / Environmental Management Expert*
17-06 – 17-12	*Legal Expert in Mining Law and Policy*
17-13 – 17-18	*National WID Expert*
17-19 – 17-24	*National Mineral Processing/Small-Scale Mining Expert*
17-25 – 17-30	*Nurse to second Medical Group of Toxicologists/Neurologists*

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
11-01

Post title	Project Manager/Chief Technical Advisor
Duration	36 m/m
Date required	as soon as possible
Duty station	UNIDO Headquarters and implementation sites in participating countries
Counterpart	UNDD/GEF, Country Ministries/Institutions responsible for mining, environment and health

Duties

The CTA shall be responsible for the overall coordination of all aspects of the Global Mercury Programme in general and in particular. He/she shall head the Project PCU and liaise directly with UNDP/GEF, CPTF, BPTF, GPTF, the Country Focal Points, Ministries of Mines, Environment and Health, in order to coordinate the annual work plan for the programme. He/she shall be responsible for delivery of all substantive, managerial and financial reports from the Project. He/she will provide overall supervision for staff in the Programme Coordination Unit as well as guiding and supervising all external policy relations. He/she shall consult with, and coordinate closely with senior representatives of partner agencies as well as the respective UNDP officers in all participating countries. In particular, the CTA will have the following specific duties:

- to manage the GEF Components of the PCU, its staff and budget;
- to prepare the annual work plan of the programme on the basis of the Project Document, in close consultation and coordination with the CPTF, BPTF GPTF, Country Focal Points and GEF Partners;
- to coordinate and monitor the activities described in the work plan;
- to ensure consistency between the various programme elements and related activities co-financed by other bodies;
- to prepare and oversee the development of Terms of Reference for consultants and contractors;
- to coordinate and oversee the preparation of the substantive and operational reports from the Project;
- to foster and establish links with other related GEF programmes and, where appropriate, with other relevant regional International Water programmes and;
- to submit quarterly reports to UNDP/GEF.

Language	English
Qualifications	Senior Mining/Mineral processing engineer with post-graduate degree and extensive experience in small-scale mining, beneficiation techniques, environmental assessments and technology transfer

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
11-02

Post title	Small-Scale Mining Expert
Duration	36 m/m
Date required	as soon as possible
Duty station	UNIDO Headquarters and implementation sites in participating countries
Counterpart	Country Ministries/Institutions responsible for mining, environment and health

Duties

Under the direction of the Project Manager/Chief Technical Adviser and in co-operation with Country Focal Points, the expert will be responsible for the following duties:

- Meet Country Focal Points, Government officials and other relevant institutions and agree on project implementation strategies;
- In association with Country Focal Points, their assistants and other project personnel, visit the mining sites, collect information on the existing activities, conduct discussions with miners on the proposed project and seek their views;
- Attend project awareness meetings and make presentations on project objectives and outputs. Attend country, regional and global task force meetings;
- By using the established Website at UNIDO Headquarters, prepare information and data relevant to the project and put it on the Website and establish linkage to the participating countries;
- Review requirements for equipment for each participating country, make recommendations on both the appropriate equipment and suppliers;
- Conduct regular visits to project implementation sites, review and give advices to the project team, and;
- Prepare reports according to the requirements of the project.

Language	English
Qualifications	Senior Mining/Mineral processing engineer with experience in small-scale mining techniques

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
11-51

Post title	Expert in establishing Web Sites
Duration	3 m/m
Date required	as soon as possible.
Duty station	Home based
Counterpart	PCU

Duties

Under the direction of the Project Coordination Unit, the expert will be responsible for building up a website established on the principal of simplicity in order that users obtain directly the information they seek. The job comprises the following duties:

- Establish a website containing only valid HTML. All web pages must be accessible by all standard browsers, including text-based browsers, older & newer versions of graphical browsers;
- Prepare a questionnaire for UNIDO to determine the best promotional stance to take and based on the questionnaire propose the best possible way to achieve Internet exposure for the Global Mercury Programme;
- Prepare the primary web page according to graphic lay-out of UNIDO homepage and establish links to it;
- Prepare initial web pages in such a way that they begin with indices that are broad and cover all lower level documents; subsequent pages should have more precise indices referring to greater detail;
- Maintain and update the site every six months, and;
- Submit it to twenty or more of the Internet's most popular search engines.

Language	English
Qualifications	Senior IT specialist with experience in setting up web sites

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
11-52

Post title	Expert in Monitoring and Evaluation of mining-related projects
Duration	12 m/m
Date required	as soon as possible
Duty station	Home based and implementation sites in participating countries
Counterpart	PCU, Country Focal Point and Ministries/Institutions responsible for mining, environment and health

Duties

Under the direction of the Project Manager/Chief Technical Adviser and in co-operation with Country Focal Points, the expert will be responsible for the following duties:

- To inspect project sites and to evaluate the achieved results with the planned project objectives and project outputs.
- To hold hearings with the Country Focal Points for assessing public opinion on project implementation.
- To check compliance of ongoing project activities regarding the removal of barriers to the introduction of clean technology.
- To comment on the effectiveness of installations and the quality of training.
- To outline any gaps, deficiencies and concerns in intervals of 12 months regarding project implementation.
- To advise on further opportunities regarding the removal of barriers and devise plans of action, if necessary, to manage the identified issues and problems.
- To propose corrective measures regarding execution of project activities and dissemination of results.
- To submit detailed reports on above issues to PCU.

Language	English
Qualifications	Senior Mining/Mineral processing engineer with experience in small-scale mining techniques

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved

with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
11-53

Post title	Expert in Train-X Methodology
Duration	12 m/m
Date required	as soon as possible
Duty station	Implementation sites in participating countries
Counterpart	PCU, Country Focal Point and Ministries/Institutions responsible for mining, environment and health

Duties

Under the direction of the Project Manager/Chief Technical Adviser and in co-operation with Country Focal Points, the expert will be responsible for the following duties:

- Create generic and adaptable versions of course packages which will form a targeted education and training programme for Governmental officers, representatives of small-scale mining organizations and small-scale mining entrepreneurs;
- Using the TRAIN-X methodology, the Training expert will cooperate with the Ministries of Mines, Environment and Health in the preparation of adaptable training packages for in the six participating;
- Conduct training programmes in each country separately for Governmental officers, members of small-scale mining associations and small-scale mining entrepreneurs in coordination with the WID and Small-scale Mining Expert Conduct training paying attention to:

    - Principles of mercury-free ore-dressing and mineral processing;
    - Equipment for mercury re-cycling;
    - Reagents and chemicals;
    - Mineral processing flowsheets;
    - Mineral processing equipment selection, operations and maintenance;
    - Occupational Exposure to mercury and;
    - Health hazards.

Language	English
Qualifications	Senior Mining/Mineral processing engineer with experience in small-scale mining techniques

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often

resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
17-01, 17-02, 17-03, 17-04, 17-05 17-06

Post title	Assistant to the Country Focal Point / Environmental Management Expert
Duration	216 m/m (total for a maximum number of 6 experts)
Date required	as soon as possible
Duty station	Capital of participating country and implementation site in participating country
Counterpart	Country Ministries/Institutions responsible for mining, environment and health

Duties

Under the direction of the Project Manager/Chief Technical Adviser and in co-operation with Country Focal Points, the expert will be responsible for the following duties:

- Brief Country Focal Point on all project related activities, keep Government officials and other relevant institutions posted and assist UNIDO in all questions regarding project implementation.
- In association with PCU, Country Focal point and technical counterparts, prepare missions of International and National Experts and project personnel (sub-contractors) to the field.
- In cooperation with PCU and Country Focal Point assist in organizing country task force meetings, project awareness meetings.
- Facilitate the coordination of stakeholders work in the field and establish linkages between Government, mining associations and private sector.
- Conduct regular visits to project implementation sites, review and give advices to the project team.
- Supervision and quality control of all project activities, design pilot testing, development of alternative high-efficiency artisanal mining and processing equipment and transfer of new mining/beneficiation methods to targeted population.
- Coordinate and supervise training activities.
- Prepare reports for PCU and Country Focal Point according to the requirements of the project.

Language	English
Qualifications	Senior Environmental Management Expert with experience in small-scale mining techniques

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved

with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
17-07, 17-08, 17-09, 17-10, 17-11, 17-12

Post title	Legal Expert in Mining Law and Policy
Duration	101.5 m/m total for a maximum number of 6 experts
Date required	as soon as possible
Duty station	Capitals of participating countries
Counterpart	PCU, country's Ministry of Mines, Chamber of Mines, small-scale mining associations

Duties

Under the direction of the Project Manager/Chief Technical Adviser and in co-operation with Country Focal Points, the expert will be responsible for the following duties:

- Meet officials of Government and mining related institutions and discuss present mining and environmental legislation.
- Visit the sites and use experience from other countries to give recommendations on possible legal and administrative framework to address the various environmental challenges of small-scale gold mining.
- In collaboration with the project management, conduct a workshop to discuss the proposed recommendations regarding the possible legal and administrative framework to address the various environmental challenges of small-scale gold mining.
- Review relevant legislation, policies and literature.
- Prepare a report giving recommendations for updating mining and environmental policies and legislation with respect to artisanal and small-scale mining.
- Prepare a report giving recommendations on development of an enforcement programme.

Language	English
Qualifications	Senior Mining Expert with experience in environmental and mining law

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
17-13, 17-14, 17-15, 17-16, 17-17, 17-18

Post Title	National WID Expert
Duration	9 m/m total for a maximum number of 6 experts
Date required	as soon as possible
Duty station	Country Project Headquarters and implementation sites
Counterpart	Country Ministry/Institution responsible for mining

Duties

Under the direction of the Country Focal Point and in co-operation with other project personnel, the expert will be responsible for the following duties:

- Analyze sociological structure of mining community such as number of households, names, sex, number of family members, age, pregnancies, education, percentage of illiteracy…
- Check habitat, proximity to extraction activities, and find out possible ways of exposure.
- Check occupational hygiene and dietary habits.
- Check readiness of questioned people to participate in medical check-up.
- Meet representatives of women's associations to discuss the status and situation of women engaged in gold mining, share of women and their contribution to the incomes of the households, type of work they are carrying out in the mining process and their working conditions.
- Meet concerned women in small-scale and artisanal mining project implementation areas to investigate their actual living and working conditions and the need to let children take part in the income generation.
- Prepare recommendations to the project management on how the project can better address women's problems and can better integrate them into the mining activities they are involved in.
- Select a group of women participating in the project and follow-up their progress. Based on their experience recommend further improvements in project activities.
- Assist in the preparation of monthly and progress reports as required.

Language	English and the local languages
Qualification	Women with a Diploma or university degree in Social Sciences, experience in training of local women and knowledge on the operation of small-scale and artisanal mining

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children.

For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
17-19, 17-20, 17-21, 17-22, 17-23, 17-24

Post title	National Mineral Processing/Small-Scale Mining Expert
Duration	73 m/m total for a maximum number of 6 experts
Date required	as soon as possible
Duty station	UNIDO Headquarters and implementation sites in participating countries
Counterpart	Country Ministry/Institution responsible for mining

Duties

Under the direction of the Chief Technical Adviser and in co-operation with Country Focal Points, the expert will be responsible for the following duties:

- Meet Country Focal Points, Government officials and other relevant institutions and agree on project implementation strategies.
- Review past case studies on small-scale mining issues in respect to lessons learned.
- In collaboration with other members of the project team, conduct meetings with Government, local and provincial officials and establish the status of artisanal gold mining and extraction at selected Project site.
- In association with Country Focal Points, their assistants and other project personnel, inspect the mining/extraction sites, collect information on the existing activities, conduct discussions with miners on the proposed project and seek their views and undertake a thorough training needs assessment.
- Based on the collected field data, identify problems associated with the current mineral processing techniques and prepare an outline for the training programme.
- Condense findings in a database.
- Identify new equipment and manufacturers as well as local and foreign supply routes. Identify import restriction and duties.
- Establish linkages between equipment suppliers and small-scale miners.
- Assist the International Expert on TrainX and conduct training paying attention to:

    - Mineral processing equipment selection, operations and maintenance;
    - Principles of mercury-free ore-dressing and mineral processing;
    - Equipment for mercury re-cycling;
    - Reagents and chemicals;
    - Mineral processing flowsheets.

- Attend project awareness meetings and make presentations on project objectives and outputs.
- Attend country task force meetings.
- In collaboration with the PCU and Country Focal Point introduce cleaner technologies at Project sites.
- Assist in internal project monitoring and evaluation programmes.

Language	English
Qualifications	Senior Mining/Mineral processing engineer with experience in small-scale mining techniques

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

JOB DESCRIPTION
17-25, 17-26, 17-27, 17-28, 17-29, 17-30

Post title	Nurse to second Medical Group of Toxicologists/Neurologists
Duration	15 m/m total for a maximum number of 6 experts
Date required	as soon as possible.
Duty station	Implementation site in participating country
Counterpart	Country Ministries/Institutions responsible for health

Duties

Under the direction of the Project Manager/Chief Technical Adviser and in co-operation with Country Focal Points, the expert will be responsible for the following duties:

- Participate in clinical/toxicological/neurological check-ups and maintain accurate medical records to assure compliance with examinations.
- Provide health services and counseling before and after clinical/laboratory check-ups in an effective and positive manner to enhance the health of the small-scale mining community.
- Compile data for statistical purposes and maintain confidentiality regarding all health-related issues.
- Provide clinical assistance under the direction of the medical group of Toxicologists/Neurologists, such as assisting with blood, urine and hair sampling, vision and hearing screening and other screening as directed, i.e. height/weight, blood pressure, etc…
- Encourages communicable disease prevention practices.

Language	English
Qualifications	Registered nurse with experience in public health issues

Background information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

ANNEX II Subcontracts

TOR of subcontract 21-01: Stakeholders Awareness Campaign
TOR of subcontract 21-02: Awareness Campaign through Media
TOR of subcontract 21-03: Environmental Assessment
TOR of subcontract 21-04: Assessment of Health
TOR of subcontract 21-05: Site Remediation
TOR of subcontract 21-06: Micro-Financing System
TOR of subcontract 21-07: On-the-Job Training
TOR of subcontract 21-08: Execution of Training Programme for Local Fabricators and Manufacturers
TOR of subcontract 21-09: Introduction of Alternatives to Amalgamation and Mobile High Recovery Concentrators
TOR of subcontract 21-10: Mercury Immobilization Programme
TOR of subcontract 21-11: Execution of Documentary Video

TERMS OF REFERENCE OF SUBCONTRACT 21-01
STAKEHOLDERS AWARENESS CAMPAIGN

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

The project aims to raise awareness of the major stakeholders, i.e., miners and their associations, NGOs, members of public, relevant Government institutions, local Governments and others, on the negative impacts associated with the uncontrolled use of mercury, poor technology, lack of appropriate knowledge and adequate policies.

The services of the subcontractor must encompass the following activities:

- Identification of the key stakeholders within the Government and non-Government institutions, NGOs, miners and their associations and members of the public;
- Visit the selected project demonstration sites and relevant areas, conduct consultations with the identified stakeholders and establish requirements and methodologies for conducting the awareness campaigns;

- Through consultations with the project management prepare recommendations on the requirements and methodologies for the awareness campaigns;
- Select centers upon which the awareness campaigns will be conducted;
- Prepare awareness campaign materials based on the identified requirements and methodologies;
- Carry out discussions on the planned methodologies and requirements with selected stakeholders;
- Carry out the awareness campaigns in the selected centers through the identified methodologies, and;
- Prepare a report summarizing the campaigns achievements, facts and conclusions.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after end of the contract period.

(b) A Final Report in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-02
AWARENESS CAMPAIGN THROUGH MEDIA

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

The project aims to raise awareness of the stakeholders by using the media that is easily accessible by the target groups on the negative impacts associated with the uncontrolled use of mercury, poor technology, lack of appropriate knowledge and adequate policies.

The services of the subcontractor must encompass the following activities:

- Visit mining areas and conduct consultations with miners and their associations in order to identify areas in which there is lack of awareness amongst miners;
- Within the project demonstration areas, identify the popular local media (Television, radio, newspapers) that are easily accessible by the stakeholders;
- Conduct discussions with owners of the media and establish the costs involved in presenting educational programmes;

- In collaboration with the project management, select the appropriate media to be used for awareness campaigns;
- Based on the identified areas where there is lack of awareness, select different topics and prepare materials for presentation in the media;
- In collaboration with the selected media, work out the presentation methodologies (i.e., as documentaries, panel discussions, feature articles, cartoons, etc...);
- Prepare a schedule identifying topics, presentation dates, duration and other considerations and discuss the schedule with the relevant media;
- Carry out the awareness campaigns according to the planned and agreed schedule;
- Conduct monitoring of the awareness campaign and establish its effectiveness by visiting and conducting discussions with the stakeholders, and;
- Prepare a concise report on all findings on the effectiveness of awareness campaigns through the media.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after the end of the contract period.

(b) A Final Report in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-03
ENVIRONMENTAL ASSESSMENT

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

The project requires substantial input, mainly in form of inorganic mercury analyses of water, sediments, soil, biochemical analyses for determining mercury concentrations in fish and food.

The services of the subcontractor must encompass the following activities:

- Meet officials of Government and mining related institutions and discuss present situation of the environment in gold the mining and processing area and evaluate existing data of analyses conducted in the past;
- Investigate the situation of the habitat/agricultural sites in the vicinity of small-scale mining activities and take samples;
- Analyse biological samples;
- Evaluate the nature and extent of the mercury pollution in produce, especially in those being part of the main diet;

- Introduce and set-up a monitoring system for continuous biological sampling and analyses;
- Advise on necessary interactions between government departments, mining industry and research institutions;
- Prepare a concise report on all findings and data on biological sampling including recommendations;
- Investigate the situation of the environment on the spot and take samples from waters, sediments and soils, where pollution can be assumed;
- Analyze inorganic samples. Expected number of samples is at least 500, but not exceeding most probably 750 per country. The exact number of samples within these limits will be determined during project implementation;
- Evaluate the nature and extent of the mercury pollution in a selected river system;
- Introduce and set-up a monitoring system for continuous water quality assessment;
- Formulate measures for the remediation and possible rehabilitation of hot spots in the river systems and vicinities;
- Advise on necessary interactions between government departments, mining industry and research institutions, and;
- Prepare a concise report on all findings and data on environmental sampling including recommendations.

3. <u>Reports</u>

(a) A Draft Final Report in English, to be submitted to UNIDO/Contract Section in three (3) copies, not later than 3 month after receipt of last samples.

(b) A Final Report in English, in seven (7) copies and a diskette, submission 3 weeks after discussion of draft report and its results with UNIDO project manager.

TERMS OF REFERENCE OF SUBCONTRACT 21-04
ASSESSMENT OF HEALTH

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e. introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

In addition to clinical/neurological/toxicological check-ups the project requires substantial input, mainly in form of mercury analyses of human specimens, such as blood, urine and hair.

The services of the subcontractor must encompass the following activities:

- Refine and develop a UNIDO questionnaire on general health condition of members of the mining community and on indications for symptoms of mercury poisoning;
- Advise on most suitable sampling techniques for the survey;
- Develop protocols and interact with local health institutions and the National Expert on Health, i.e. the nurse seconding the Sub-contractor;
- Advise on best preservation methods for urine and blood samples;

- Based on the sociological survey of the selected mining community undertaken by a National Expert, take and analyze biological samples from a pre-determined cohort of approx. 250 people per country;
- Based on analytical results, advise on the health risk of people living near mining operations and gold shops where gold is melted;
- Conduct anamnestic/clinical/neurological/toxicological test programme according to the state of the art. Start with this work in 2002;
- Check for neurological disturbances, behavioral disorders, motor neurological functions, cognitive capabilities, balance, gait, reflexes etc…
- Double check participants in the health survey, who exhibit signs of mercury intoxication. Undertake this follow-up once in 2003 and 2004;
- Deliberate with health authorities on their appropriate treatment;
- Maintain accurate medical records to assure compliance with examinations;
- Provide health services and counseling before and after clinical/laboratory check-ups in an effective manner to enhance the health of the small-scale mining community. Cooperate with the Sub-contractor on the environmental assessment in order to incorporate their conclusions in the health counseling;
- Compile data for statistical purposes and maintain confidentiality regarding all health-related issues;
- Encourage communicable disease prevention practices, and;
- Prepare a report summarizing facts and conclusions.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after receipt of last samples.

(b) A Final Report of 150 pages, in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-05
SITE REMEDIATION

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

In addition to identifying the “hot spots” within the mining areas the project will aim at carrying out remediation of the identified areas so as to minimize the impact of mercury pollution.

The services of the subcontractor must encompass the following activities:

- Visit the mining sites within the project demonstration areas, carry out discussions with miners on pollution of the mining areas, examine the mining and processing areas and compile information on possible levels of pollution;
- Meet official of the relevant Government institutions and environmental agencies and discuss the situation regarding the polluted artisanal mining areas and the possible remediation measures;
- Based on the field data identifying the “hot spot” areas identify and formulate measures for remediation of the polluted areas;

- Collect and compile information on similar site remediation programmes in other countries with similar operations;
- Conduct discussions with the miners on the envisaged remediation programme and identify significant issues for incorporation into the programme;
- Prepare the remediation programme identifying clearly the technology to be used, equipment and tools required and time schedule;
- Carry out the site remediation according to the prepared programme;
- Prepare and carry out monitoring programme of the rehabilitated sites and compile progressive data, and;
- Prepare a concise report on all the findings and data on site remediation and possible long term monitoring.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after the contract period.

(b) A Final Report of 150 pages, in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-06
MICRO-FINANCING SYSTEM

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

In addition to raising awareness and demonstration of simple and efficient technology, the project intends to provide a micro-financing programme in order to enhance the capacity of miners to acquire simple and efficient technology.

The services of the subcontractor must encompass the following activities:

- Identify micro-financing programmes that exist in the country and internationally;
- Conduct consultations with the management of the identified local micro-financing programmes and compile the individual operating procedures;
- Conduct consultations with artisanal miners, miners' associations, relevant NGO's, Government institutions and compile requirements for a mining micro-financing programme;
- Prepare a micro-financing programme for artisanal miners, identifying clearly the funding sources, modes of repayment, chargeable interests, sustainability of the programme, etc…

- Present and discuss with stakeholders the proposed micro-financing programme during Country Project Task Force Meeting (CPTF);
- Following the meeting with CPTF prepare findings report and identify key issues for incorporation into the programme;
- Incorporate the findings into the proposed programme before presentation to the Project Coordination Unit (PCU);
- In cooperation with the country project management prepare implementation procedure for the micro-financing programme;
- Identify a group of stakeholders and carry out tests of the prepared programme;
- Conduct monitoring of the group to which micro-financing has been availed and identify any shortfalls to the implementation procedures and carry out adjustments accordingly, and;
- Prepare a report to be presented to possible donors to the micro-financing programme indicating results of the field trials of the programmes and give recommendations for full-scale implementation.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after the end of contract period.

(b) A Final Report of 150 pages, in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-07
ON-THE-JOB TRAINING

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

In addition to provision and demonstration of cleaner and efficient technology, the project will train artisanal miners in order to impart them with knowledge of the efficient and environmentally acceptable mining and processing techniques.

The services of the subcontractor must encompass the following activities:

- Visit the mining areas, study and clearly identify the current mining and processing techniques used;
- Identify the deficiencies of the current techniques, categorize them into those that can be improved and those to be replaced;
- Prepare a proposal identifying working methods which have deficiencies that can be improved and methods for improvement;

- Conduct discussions with the miners on the proposed new working techniques and incorporate their views in the proposal;
- Identify educational backgrounds of miners and group them accordingly for training purposes;
- Identify training needs in accordance to working groups, e.g., miners, processing, mine services, etc…
- Conduct consultations with the project management in order to understand the proposed equipment and tools to be introduced;
- Finalize the on-the-job training proposal by incorporating into the training programme the equipment and tools to be introduced;
- Identify the miners' work schedules so that the training programme will have limited interference in their economic activities;
- Prepare an implementation programme identifying clearly the training methodology, number of trainees per site, training requirements and time schedule;
- Make presentation of the programme to the project management and incorporate any new views;
- Carry out training in accordance to the approved programme and schedules, and;
- Prepare a concise report on the implementation of the training programme showing clearly the trained individuals, their specializations, achievements and failures.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after the end of the contract.

(b) A Final Report of 150 pages, in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-08
EXECUTION OF TRAINING PROGRAMME FOR LOCAL FABRICATORS AND MANUFACTURERS

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

Although the project will introduce and demonstrate cleaner and efficient technologies, it also aims at building capacity in order to ensure that some of the introduced equipment and tools can be produced locally. This will ensure that the introduced technology is easily accessible and affordable.

The services of the subcontractor must encompass the following activities:

- Visit the mining areas within the project demonstration centers, identify and familiarize with the existing working equipment and tools;
- In consultation with the project management, identify new equipment and tools that are to be introduced;
- Conduct a survey, especially in towns surrounding the demonstration centers, and identify potential fabricators and manufacturers;

- Assess and compile a list of facilities available to each of the identified fabricator and manufacturer;
- Based on their identified capacity and capabilities, select a group regarded as suitable for training, hold discussions with them and prepare a list of participants;
- Prepare a training programme aimed at introducing special features of mining the identified mining equipment and tools, production costs effectiveness, marketing, material requirements, quality control and other engineering design features;
- In consultation with the project management, select a training site and agree on the schedule.
- Conduct training according to the programme and time schedule, and;
- Prepare a concise report showing the trained groups, achievements and any other relevant information.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after the end of the contract period.

(b) A Final Report of 150 pages, in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-09
INTRODUCTION OF ALTERNATIVES TO AMALGAMATION AND MOBILE HIGH RECOVERY CONCENTRATORS

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

As part of the introduction and demonstration of the cleaner and efficient technologies, the project intends to introduce alternatives to amalgamation so as to minimize the negative impacts resulting from the application of mercury. In addition, the project intends to improve miners' production efficiency through the introduction of mobile high recovery concentrators.

The services of the subcontractor must encompass the following activities:

- Visit the mining areas within the project demonstration sites, study and document the amalgamation techniques used;
- Compile data and information on technologies that have been used in other countries in artisanal gold mining and that can compete with amalgamation in terms of efficiency and cost effectiveness;

- Select suitable technologies that can be applied under the working conditions of the specific country;
- Identify and document requirements and availability of the selected technologies;
- Identify suppliers of mobile high recovery concentrators;
- Based on the suppliers documentation and own experience, recommend suitable concentrators based on their application in similar environment, costs, efficiency and other technical considerations;
- Prepare a programme for introduction showing time schedules, installation requirements, training needs, etc…
- Conduct consultation with miners and incorporate their view into the implementation programme;
- Acquire the alternative technologies to amalgamation and conduct test trials demonstrating clearly their efficiency and cost effectiveness;
- Identify any deficiencies in the introduced technology, rectify and carry out full-scale demonstration and on-the-job training;
- Acquire and install mobile high efficiency concentrators;
- Conduct trial runs, identify any deficiencies, rectify accordingly and conduct on-the-job training;
- Compile an easy to apply users and maintenance manuals possibly in the local languages, and;
- Prepare a concise report on the installation, trail runs and full application of the new technologies.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after the end of the contract period.

(b) A Final Report of 150 pages, in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-10
MERCURY IMMOBILIZATION PROGRAMME

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

In addition to identification of “hot spots” areas and site remediation, the project plans to carry out a mercury immobilization programme in respective areas within the project demonstration sites.

The services of the subcontractor must encompass the following activities:

- Visit the mining sites within the project demonstration centers and collect relevant data on the identified “hot spots” and areas for mercury immobilization;
- Compile available information on mercury immobilization technology demonstrating its application in other areas, success and failures;
- Prepare a programme for immobilization showing areas involved, materials on site, effect on the miners’ economic activities, possible environmental impacts and other considerations;
- Conduct consultations with local environmental agencies, present the proposed immobilization programme and solicit opinions;

- Conduct consultations with miners and their associations, discuss proposed programme and seek their views;
- Incorporate views of the environmental agencies and those of miners into the programme;
- Carry out the immobilization programme while keeping records of the step-by-step implementation of the immobilization procedure;
- Conduct adequate tests to demonstrate effectiveness of the programme, and;
- Prepare concise report giving data on the implementation of the programme and tests for its effectiveness.

3. Reports

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after the end of the contract period.

(b) A Final Report of 150 pages, in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

TERMS OF REFERENCE OF SUBCONTRACT 21-11
EXECUTION OF DOCUMENTARY VIDEO

REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL MINING AND EXTRACTION TECHNOLOGIES

1. Background Information

Mercury is one of the most toxic substances in the world causing significant damage to the environment and to the health of people who handle it. Mercury, which is used mostly by artisanal gold miners, is absorbed by the human organism through drinking water, food or breathed air. Artisanal mining activities provide income to the world's poorest populations and ethnic minorities; a great majority of the miners being women and children. For every gram of gold recovered, about two grams of mercury are released into the environment - often resulting in the death of men, women and children and in a permanently ruined habitat. The relevant simplicity and effectiveness of the technology, known as amalgamation, mask its dangers. This process can be improved with procedures using inexpensive and highly efficient devices that can be manufactured locally and at low cost.

The objective of the programme is to replace mercury amalgamation with new technology while improving the income of the miners through more efficient recovery, increasing knowledge and awareness and providing policy advice on the regulation of artisanal gold mining with due consideration for gender issues.

The primary target beneficiaries will be artisanal miners - men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by artisanal mining.

The activities will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury - i.e., introduction of new technology and its dissemination; training of miners in the application of new technology, training of local manufacturers; awareness creation on the protection of the environment as well as policy advice to governments and local institutions.

2. The Scope of Contracting Services

While implementing the project activities the project intends to compile documentary videos that can be used in future for training purposes.

The services of the subcontractor must encompass the following activities:

- Demonstrate to the project management team knowledge and experience of using digital recording devices and production of documentary videos;
- In collaboration with the project management study the schedule of project activities and identify clearly how the recordings of the videos can be matched to implementation of the activities;
- Prepare and present a schedule identifying each activity, time required for recording, editing and production of a documentary video;

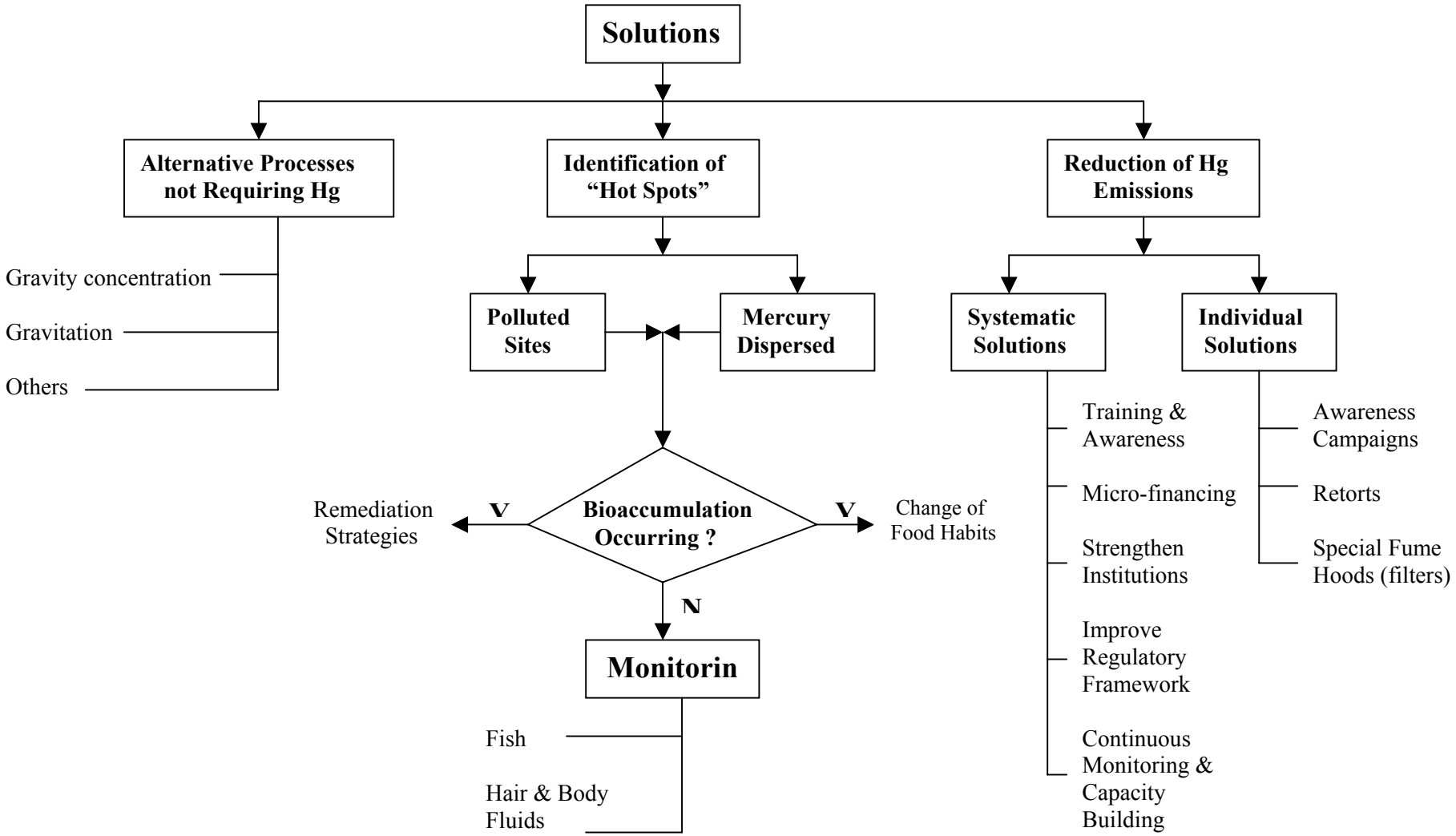
- Identify materials requirements and other facilities to enable the production of high quality videos;
- Carry out recordings and production of videos according to the agreed schedule, and;
- Prepare a short report giving video identification numbers, location, recorded activities and other relevant information.

3. <u>Reports</u>

(a) A Draft Final Report, to be submitted to UNIDO/Contract Section in 3 copies, not later than 1 month after the end of the contract period.

(b) A Final Report in English, in seven (7) copies and a diskette (MS Word), submission 3 weeks after the Contractor's receipt of UNIDO's comments on the Draft Final Report.

ANNEX III Solutions for Reducing Mercury Pollution



ANNEX IV Examples of Mercury Poisoning in Humans

1. Total mercury (T-Hg) and methylmercury (MeHg) concentrations in hair and urine from inhabitants of the Lake Victoria goldfields, Tanzania (*Source: Ikingura et al., 1995*).

Sample no.[b]	Sex (M/F)	Age (Years)	Duration mine/village (years)	Occupations[a]	Hair T-Hg (ppb)	Hair MeHg (%)	Urine T-Hg (ng/ml)
Mu-01	M	30	3	b	1115	28.4	318.5
Mu-02	M	34	6	m, a	1025	27.3	90.1
Mu-03	M	22	6	p,b	2988	9.7	201.6
Mu-04	M	53	6	m,p,b	715	ND	1.8
Mu-05	M	50	6	m,p,b	421	69.1	4.2
Mu-06	M	25	10	p,a,b	2209	17.2	145.4
Mu-07	M	22	5	p,a,b	1114	17.4	129.4
Mu-08	M	21	3	p,a,b	5433	7.3	411.4
Mu-09	F	28	2	a,c	214188	0.1	8.8
Mu-10	F	27	1	w	365	63.3	1.9
Mu-11	F	32	7	w	416	30.7	1.3
Mu-12	M	13	6	s	1500	21.0	4.5
Mu-13	M	23	5	m,a,b	505	34.2	102.6
Mu-14	M	20	5	m	ND	ND	3.1
Pr-15	F	6	6	-	ND	ND	2.0
Pr-16	F	13	13	s	ND	ND	21.7
Pr-17	F	35	11	t	34212	0.5	27.3
Nu-20	M	55	9	f,g	442	20.5	0.9
Nu-21	M	42	2	d	383	44.6	2.7
Nu-22	M	54	25	d,f	ND	ND	1.0
Nu-23	M	65	10	g	271	33.4	14.1
Nu-24	M	44	2	f,g	260	32.7	1.1
Nu-25	M	48	7	f,g	ND	ND	1.1
Nu-26	M	41	3	f,g	156	59.0	1.2
Nu-27	F	17	17	g	216	61.3	0.7
Nu-28	F	19	19	g	318	54.8	ND
Nu-29	F	17	17	g	197	ND	ND
Nu-30	F	15	15	g	375	82.1	ND
Nu-31	F	6	6	-	419	47.0	ND

[a]Occupation: a, amalgamation; b, amalgam burning; c, commerce; d, administration; f, fishing; g, agriculture; m, mining; p, panning; s, student; t, teacher; w, housewife.
[b]Sample locality: Mu, Mugusu gold mine; Pr, primary school; Nu, Nungwe Bay village; ND, Not Determined.

2. Symptoms of Mercury Poisoning Observed from Artisanal Gold Miners in Zimbabwe

A study conducted in Insiza District which is one of the most active artisanal gold mining areas in Zimbabwe by the Intermediate Technology Development Group revealed that almost 95% of all the miners in the area use mercury and the majority had the following symptoms which are related to mercury poisoning:

- 60% had body weaknesses;
- 55% were feeling nausea;
- 50% had lost teeth, 45% had history of respiratory distress;
- 40% had high salivation and tremours;
- 30% had a history of kidney disease and diarrhea.

Medical examinations conducted on a selected number of miners in the area indicated significant indicators of severe mercury poisoning as follows:

- 50% had evidence of blue colouring on the gingival and the gingivitis;
- 45% had problem with teeth;
- 25% had blue colouration of the oral mucosa;
- 20% had conjunctiva;
- 15% had poor eyesight;
- 10% lost hearing;
- 5% had lung disease and hyperreflex.

The most significant clinical results indicating severe mercury poisoning are blue gingiva and blue colouration of the oral mucosa. Lost teeth, poor eyesight and lost hearing although may be significant as indicators of mercury poisoning require matching with other factors including age, diet and sex. Tests carried out on samples of blood show that 40% and 30% had elevated levels of mercury in hair and blood respectively. Another study conducted in the Mashonaland Central Province (Harare Mining District) around Chiweshe and Tafuna Hills by the Small Scale Mining Association indicated levels of mercury in blood ranging from 0.001 to 0.74 mg/l (16.7% had levels above 0.05mg/l). Levels of mercury in urine ranged between 0.001 to 0.018mg/l.

ANNEX V Co-financing Activities, Budget and Sources

No.	Activities	Execution Period	Budget (US $)	Source of Finance
BRAZIL				
1.	Country Focal point Remuneration	Project Period	120,000	Central Government
2.	Office Space, furniture and facilities	Project Period	20,000	Central Government
3.	Study the health aspects related to the Pocone population as regards mercury poisoning due to fish eating.	2000 - 2001	135,000	PADCT
4.	Malaria versus mercury poisoning.	2000 - 2002	850,000	CNPq and Ministry of Health
5.	Certification of mercury analysis and testing laboratories	2000 - 2001	197,000	PADCT and Faperj
6.	Certification of mercury analysis and testing laboratories	2000 - 2002	94,000	Ministry of Science & Technology
7.	Equipping of the heavy metals testing laboratory at CETEM	2000 - 2001	376,000	Faperj and Ministry of Science and Technology
8.	Analysis of the environmental legal aspects versus the Brazilian Garimpo	2000 - 2002	127,000	Ministry of Science & Technology, IDRC-Canada, and CNPq
9.	Defining sustainability criteria for the extraction industries: the mercury case	2000 - 2002	33,000	Ministry of Science & Technology, CYTED (Iberoamerica), CNPq
10.	Defining heavy metal paths in the Vale do rio doce	2000 - 2002	387,000	Ministry of Science & Technology, CNPq
11.	Establishment of factors affecting mercury methylation	2000 - 2002	69,000	Ministry of Science & Technology, CNPq
12.	Survey of the extent of mercury pollution in the Amazon biota	2000 - 2002	520,000	PACDT
13.	Measurement of atmospheric mercury vapours via denuders	2000 - 2001	25,000	Ministry of Science & Technology, CNPq
	Sub-Total Co-financing for Brazil		**2,953,000**	
INDONESIA				
1.	Country Focal point Remuneration	Project Period	120,000	Central Government
2.	Office Space, furniture and facilities	Project Period	20,000	Provincial Authorities
3.	Training of miners in areas of West, Central and East Java on mining techniques and introduction of cleaner technology	2000 - 2002	504,000	Central Government - an ongoing program - this is a budget for 2000/02
4.	Extraction of mercury from tailings at Cineam small-scale mining site in West Java	2000 - 2001	5,000	ITB/Bapedal, Mineral Technology Research and Development Centre
5.	Conduct a study on the effectiveness of Water Lilies in the absorption of mercury from tailings	2001 - 2003	250,000	Mineral Technology Research and Development Centre
6.	Study the atmospheric mercury pollution at Lanud mining site	2001	2,000	Mineral Technology Research and Development Centre
7.	Mapping the distribution of mercury on sediment samples along Cikaniki River in Pongkor, West Java	2000 - 2001	34,000	Directorate of Mineral Resources - DMR
8.	Carry out policy and legislation reviews, training and capacity building in order to significantly reduce illegal mining activities in the country	2000 - 2001	1,000,000	President's Office
9.	Training and capacity building for government officials and local administrators in North Sulawesi on different issues related to artisanal mining and extraction.	2001	154,000	Deutsche Stiftung fuer Internationale Eutwicklung (DSE) of Germany and Provincial Government.
	Sub-Total Co-financing for Indonesia		**2,089,000**	
LAOS				
1.	Country Focal Point remuneration	Project Period	54,000	Central Government
2.	Office Space	Project Period	6,000	

	Sub-Total Co-financing for Laos		**60,000**	
SUDAN				
1.	Country Focal Point Remuneration	Project Period	180,000	Geological Research Authority
2.	Office space and facilities	Project Period	20,000	
	Sub-Total Co-financing for Sudan		**200,000**	
TANZANIA				
1.	Country Focal Point Remuneration	Project Period	60,000	Ministry of Energy & Minerals
2.	Office Space, furniture and facilities	Project Period	25,000	
3.	Training of small-scale miners on exploration, mining and business techniques	2000 - 2001	335,000	Ministry of Energy & Minerals and the World Bank
4.	Procure eight packages of mining and processing equipment and carry out technology demonstration.	2000 - 2001	850,000	Ministry of Energy & Minerals and the World Bank
5.	Raising awareness and training of miners on mercury pollution related threats	2000 - 2001	360,000	Government of Japan and UNIDO
	Sub-Total Co-financing for Tanzania		**1,630,000**	
ZIMBABWE				
1.	Country Focal Point Remuneration	Project Period	60,000	Government of Zimbabwe
2.	Office Space, furniture and facilities	Project Period	16,000	
3.	• Develop system for information exchange between Mining and Environmental Departments; • Draw new or modified statutes, policies and guidelines for EIA and mine site rehabilitation.	2000 - 2001	375,000	Canadian International Aid Agency & Government of Zimbabwe
4.	Provide extension and advisory services including free analytical laboratory facilities for small-scale miners.	Every Year - 3-year budget	400,000	Government of Zimbabwe
5.	Reduction of environmental degradation through introduction of efficient equipment.	2000 - 2001	40,000	
6.	Enforcement program of environmental regulations with small-scale mining areas.	Every Year - 3-year budget	24,000	
7.	To identify and introduce alternative methods to mercury amalgamation in gold recovery		10,000	Southern Africa Development Cooperation, (SADC)
8.	To integrate environmental regulations at all levels in the mining sector and institute organization and regulation of artisanal mining sector	2000 - 2003	4,500,000	European Union & Government of Zimbabwe
9.	To control alluvial gold panning and associated environmental damage by introducing basic and efficient gravity technology based on sluice boxes.	2000 - 2002	25,000	Germany Development Agency - GTZ
	Sub-Total Co-financing Zimbabwe		**5,450,000**	
	Total Co-financing from Participating Countries		**12,382,000**	
UNIDO ongoing and planned activities (Prodoc para 53), office space , telephone, fax , Internet for PCU			**670,000**	
	GRAND TOTAL		**13,052,000**	

ANNEX VI Activities Planned in the Participating Countries

Activity		Brazil	Indonesia	Laos	Sudan	Tanzania	Zimbabwe	Sub-Total	Total	Budget Line
1A	1A.1 CTA (8333.33*36)							300,000		11-01
	SSME (8000*36)							288,000		11-02
	Travel and DSA PCU							60,000		16-01
	Sub-Total							648,000	648,000	
	1A.2 Set up office + furniture							20,000	20,000	45-01
	1A.3 Travel to meetings of GPTF (Travel*Participant*Meeting)							54,000		15-01
	Meetings of GPTF (DSA*Participant*Days*Meeting)							21,600		35-01
	Organization of meetings							10,400		35-01
	Sub-Total							86,000	86,000	
	1A.4 Establish Web site							25,000	25,000	11-51
	1A.5 Project monitoring and evaluation							100,000	100,000	11-52
	Total							879,000	879,000	
1B	1B1 Assistant Salary (2,500*36)	90,000	90,000	90,000	90,000	90,000	90,000	540,000		17-01-06
	Set up office + furniture	10,000	10,000	10,000	10,000	10,000	10,000	60,000		45-02
	Travel and DSA CPTF	36,000	36,000	36,000	36,000	36,000	36,000	216,000		15-02
	Vehicle	35,000	35,000	35,000	35,000	35,000	35,000	210,000		45-02
	Driver (500*30)	15,000	15,000	15,000	15,000	15,000	15,000	90,000		13-01
	Fuel and Maintenance	10,000	10,000	10,000	10,000	10,000	10,000	60,000		51-01
	Sub-Total	196,000	196,000	196,000	196,000	196,000	196,000	1,176,000	1,176,000	
	1B.2 Recruitment of project consultants	5,000	5,000	5,000	5,000	5,000	5,000	30,000	30,000	16-02
	1B.3 Review past, existing and prepare new case studies (Travel+DSA*Day)	13,000	13,000	4,000	4,000	13,000	13,000	60,000	60,000	17-19-24 / 15-03
	1B.4 Workshop material	500	500	500	500	500	500	3,000		35-02
	Venue (DSA*Participants*Day) (miners)	6,400	6,400	1,800	1,800	6,400	6,400	29,200		35-02
	Venue (DSA*Participants*Day) (officials)	1,600	1,600	1,600	1,600	1,600	1,600	9,600		51-02
	Travel to the workshop (Travel*Miner+Travel*Official)	3,900	3,900	1,500	1,500	3,900	3,900	18,600		35-04, 51-02
	Organisation costs (Consultants*Day)	600	600	600	600	600	600	3,600		35-02
	Sub-Total	13,000	13,000	6,000	6,000	13,000	13,000	64,000	64,000	
	1B.5 BPTF Venue (DSA*Participant*Day*Meeting)	5,760	5,760	5,760	5,760	4,320	4,320	31,680		35-03
	BPTF Organisation costs (Cost*Meeting)	4,500	4,500	4,500	4,500	4,500	4,500	27,000		35-03
	BPTF Travel (Travel*Participant*Meetings)	18,000	18,000	10,800	10,800	13,500	13,500	84,600		15-04
	CPTF Venue (DSA*Participant*Day*Meeting)	6,720	6,720	6,720	6,720	6,720	6,720	40,320		35-04
	CPTF Organisation costs (Cost*Meeting)	3,500	3,500	3,000	3,000	3,500	3,500	20,000		35-04
	CPTF Travel (Travel*Participant*Meeting)	8,400	8,400	8,400	8,400	8,400	8,400	50,400		15-05
	Project Monitoring Travel (Travel*Participant*Number)	6,000	6,000	6,000	6,000	6,000	6,000	36,000		15-06
	Project Monitoring DSA (DSA*Participant*Day)	12,000	12,000	12,000	12,000	12,000	12,000	72,000		67-01
	Sub-Total	64,880	64,880	57,180	57,180	58,940	58,940	362,000	362,000	
	Total	291,880	291,880	268,180	268,180	285,940	285,940	1,692,000	1,692,000	
2	2.1 Maintenance (Cost*Consultant*Day*Area)	12,800	4,500	1,950	1,950	4,500	4,500	30,200		15-07
	Travel (Travel*Person*Area)	2,300	1,500	500	500	1,500	1,500	7,800		15-07
	Sub-Total	15,100	6,000	2,450	2,450	6,000	6,000	38,000	38,000	
	2.2 Legal regulatory framework (Cost*Day+Material)	3,000	5,000	3,000	3,000	5,000	5,000	24,000	24,000	17-07-12
	2.3 Training need assessment (Cost*Day)	6,000	4,500	1,950	1,950	4,500	4,500	23,400		17-13-24
	Field Transport + Material	1,100	1,000	500	500	1,000	1,000	5,100		17-13-24
	Sub-Total	7,100	5,500	2,450	2,450	5,500	5,500	28,500	28,500	
	2.4 Awareness Campaign (Consultant) (Cost*Consultant*Day*Site)	6,750	6,750	4,500	4,500	6,750	6,750	36,000		21-01
	Awareness Campaign (Travel) (Cost*Miners+Cost*(Consultant+assistant))	2,600	2,600	1,800	1,800	2,600	2,600	14,000		21-01
	Awareness Campaign (Training material*Site)	4,500	4,500	2,000	2,000	4,500	4,500	22,000		21-01

	Awareness Campaign (Rental cost*Day*Site)	4,200	4,200	2,600	2,600	4,200	4,200	**22,000**		21-01
	Sub-Total	**18,050**	**18,050**	**10,900**	**10,900**	**18,050**	**18,050**	**94,000**	**94,000**	
	2.5 Media campaign (Preparation of training material: Cost*Day)		4,500	2,100	2,100	4,500	4,500	**17,700**		21-02
	Newspapers (Cost*Advert)		20,000	4,050	4,050	20,000	20,000	**68,100**		21-02
	Radio programme (Cost*Week)		16,000	6,000	6,000	16,000	16,000	**60,000**		21-02
	Media campaign (Cost*Month*Year)	14,700						**14,700**		21-02
	Sub-Total	**14,700**	**40,500**	**12,150**	**12,150**	**40,500**	**40,500**	**160,500**	**160,500**	
	2.6 Develop Train-X methodology	15,000	15,000	15,000	15,000	15,000	15,000	**90,000**	**90,000**	11-53
	2.7 Consultant for institution coordination (Cost*Day)		3,000	3,000	3,000	3,000	3,000	**15,000**		17-19-24 / 15-08
	DSA Assistant (DSA*Day*Number of travel)	2,400						**2,400**		17-19-24 / 15-08
	Travel Assistant (Cost*Number)	6,000						**6,000**		17-19-24 / 15-08
	Meeting with CPTF (Travel+Maintenance)	6,600						**6,600**		17-19-24 / 15-08
	Sub-Total	**15,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**	**30,000**	**30,000**	
	Total	**87,950**	**93,050**	**48,950**	**48,950**	**93,050**	**93,050**	**465,000**	**465,000**	
3	3.1 Interview on miners' health (Cost*Day)	4,500	4,500	2,250	2,250	4,500	4,500	**22,500**		21-03
	Material	2,000	2,000	1,750	1,750	2,000	2,000	**11,500**		21-03
	Sub-Total	**6,500**	**6,500**	**4,000**	**4,000**	**6,500**	**6,500**	**34,000**	**34,000**	
	3.2 Geochemical samples and analysis	80,000	70,000	30,000	30,000	70,000	70,000	**350,000**	**350,000**	21-04
	3.3 Biological samples and analysis	40,000	40,000	30,000	30,000	40,000	40,000	**220,000**	**220,000**	21-03
	3.4 Extent of mercury migration	70,000	10,000	5,000	5,000	10,000	10,000	**110,000**	**110,000**	21-04
	3.5 Medical examination	5,000	5,000	5,000	5,000	5,000	5,000	**30,000**	**30,000**	17-25-30
	3.6 Laboratory identification and enhancement (Expert+Equipment+Installation)	60,000	60,000	30,000	30,000	60,000	60,000	**300,000**	**300,000**	45-03
	3.7 Formulate measures for remediation and rehabilitation	20,000	20,000	5,000	5,000	20,000	20,000	**90,000**	**90,000**	21-05
	Total	**281,500**	**211,500**	**109,000**	**109,000**	**211,500**	**211,500**	**1,134,000**	**1,134,000**	
4	4.1 Database on artisanal mining and processing technologies	4,500	4,500	3,000	3,000	4,500	4,500	**24,000**		17-19-24
	Travel	1,800	1,400	500	500	1,400	1,400	**7,000**		15-09
	Sub-Total	**6,300**	**5,900**	**3,500**	**3,500**	**5,900**	**5,900**	**31,000**	**31,000**	
	4.2 Establish local and foreign supply routes for equipment and tools		2,150	1,900	1,900	2,150	2,150	**10,250**	**10,250**	17-19-24
	4.3 Identify capacity for existing fabrication facilities in relevant areas	1,500	3,000	3,000	3,000	3,000	3,000	**16,500**		17-19-24
	Travel	700	500	400	400	500	500	**3,000**		15-10
	Sub-Total	**2,200**	**3,500**	**3,400**	**3,400**	**3,500**	**3,500**	**19,500**	**19,500**	
	4.4 Establish tax regime and import restriction		2,250	2,250	2,250	2,250	2,250	**11,250**	**11,250**	17-19-24
	4.5 Develop Microfinancing programmes	90,000	90,000	80,000	80,000	80,000	80,000	**500,000**	**500,000**	21-06
	Total	**98,500**	**103,800**	**91,050**	**91,050**	**93,800**	**93,800**	**572,000**	**572,000**	
5	5.1 Trainees costs (Cost*Trainee*Site*Day)	30,000	30,000	12,000	12,000	30,000	30,000	**144,000**		21-07
	Trainers costs (Cost*Trainer*Site*Day)	9,000	9,000	4,500	4,500	9,000	9,000	**45,000**		21-07
	Transport of trainers and trainees	3,000	3,000	1,000	1,000	3,000	3,000	**14,000**		21-07
	Training material	3,000	3,000	1,500	1,500	3,000	3,000	**15,000**		21-07
	Sub-Total	**45,000**	**45,000**	**19,000**	**19,000**	**45,000**	**45,000**	**218,000**	**218,000**	
	5.2 Trainees costs (Cost*Trainee*Site*Day)		5,000	2,500	2,500	5,000	5,000	**20,000**		21-08
	Trainers costs (Cost*Trainer*Site*Day)		1,500	1,500	1,500	1,500	1,500	**7,500**		21-08
	Transport of trainers and trainees		2,000	1,000	1,000	2,000	2,000	**8,000**		21-08
	Training material		1,000	1,000	1,000	1,000	1,000	**5,000**		21-08
	Sub-Total	**0**	**9,500**	**6,000**	**6,000**	**9,500**	**9,500**	**40,500**	**40,500**	
	5.3 Alternatives to amalgamation (Equipment)	140,000						**140,000**		45-04
	Retorts (Cost*Number)		15,000	7,500	7,500	15,000	15,000	**60,000**		45-04
	Gravity separation equipment		45,000	15,000	15,000	45,000	45,000	**165,000**		45-04
	Alternatives to amalgamation (Testing and Set up))	40,000	5,000	2,500	2,500	5,000	5,000	**60,000**		21-09
	Sub-Total	**180,000**	**65,000**	**25,000**	**25,000**	**65,000**	**65,000**	**425,000**	**425,000**	
	5.4 Mobile high recovery gold concentrators (Design and Development)	40,000	90,000	20,000	20,000	90,000	90,000	**350,000**		45-05
	Mobile high recovery gold concentrators (Testing and Setup)	15,000	15,000	5,000	5,000	15,000	15,000	**70,000**		21-09

	Sub-Total	**55,000**	**105,000**	**25,000**	**25,000**	**105,000**	**105,000**	**420,000**	**420,000**	
	5.5 Develop programme for linking miners to equipment suppliers (Cost*Consultant)		4,500	3,000	3,000	4,500	4,500	**19,500**	**19,500**	17-19-24
	5.6 Mercury immobilization programme (Cost*Day*Site)	9,000						**9,000**		21-10
	Mercury immobilization programme ((reagant+material)*Site)	20,000						**20,000**		21-10
	Mercury immobilization programme (Analysis*Site)	33,600						**33,600**		21-10
	Mercury immobilization programme (Maintenance*Site)	42,000						**42,000**		21-10
	Mercury immobilization programme (DSA*Day*Site)	5,400						**5,400**		21-10
	Sub-Total	**110,000**			**0**	**0**	**0**	**110,000**	**110,000**	
	5.7 Compile documentary video	14,000	7,000	5,000	5,000	7,000	7,000	**45,000**	**45,000**	21-11
	Total	**404,000**	**236,000**	**83,000**	**83,000**	**236,000**	**236,000**	**1,278,000**	**1,278,000**	
6	6.1 Literature review (Cost*Day)	2,550	2,250	2,100	2,100	2,250	2,250	**13,500**	**13,500**	17-07-12
	6.2 Policies review (Cost*Day)	3,300	4,500	2,100	2,100	4,500	4,500	**21,000**	**21,000**	17-07-12
	6.3 Recommendations on policies (Cost*Day)	3,000	3,000	2,100	2,100	2,900	2,900	**16,000**	**16,000**	17-07-12
	6.4 Consultation with stakeholders (Cost*Day)	6,000	3,000	2,100	2,100	3,000	3,000	**19,200**		15-11
	Consultation with stakeholders (Travel)	2,800						**2,800**		15-11
	Sub-Total	**8,800**	**3,000**	**2,100**	**2,100**	**3,000**	**3,000**	**22,000**	**22,000**	
	6.5 Develop policies (Cost*Day)	4,500	12,000	9,000	9,000	12,000	12,000	**58,500**		17-07-12
	Develop policies (Travel/Material)		1,000			1,000	1,000	**3,000**		17-07-12
	Sub-Total	**4,500**	**13,000**	**9,000**	**9,000**	**13,000**	**13,000**	**61,500**	**61,500**	
	6.6 Workshop on legislation	10,000	10,000	5,000	5,000	10,000	10,000	**50,000**	**50,000**	35-05
	6.7 Enforcement programme (Cost*Day)	18,000	12,000	4,500	4,500	12,000	12,000	**63,000**		17-07-12
	Enforcement programme (Travel/Material)		1,000	500	500	1,000	1,000	**4,000**		17-07-12
	Sub-Total	**18,000**	**13,000**	**5,000**	**5,000**	**13,000**	**13,000**	**67,000**	**67,000**	
	Total	**50,150**	**48,750**	**27,400**	**27,400**	**48,650**	**48,650**	**251,000**	**251,000**	
7	7.1 Country based workshops on sustainable artisanal mining (Cost*Day*Number)	4,000	4,800	4,800	4,800	4,800	4,800	**28,000**		35-06
	Country based workshops on sustainable artisanal mining (Travel*Number)	15,000	9,300	9,050	9,050	9,300	9,300	**61,000**		15-12
	Sub-Total	**19,000**	**14,100**	**13,850**	**13,850**	**14,100**	**14,100**	**89,000**	**89,000**	
	7.2 Regional workshops on sustainable artisanal mining (Cost*Day*Number)	3,200	3,200	3,200	3,200	3,200	3,200	**19,200**		35-07
	Regional workshops on sustainable artisanal mining (Transport)	10,800	6,000	6,000	6,000	6,000	6,000	**40,800**		15-13
	Sub-Total	**14,000**	**9,200**	**9,200**	**9,200**	**9,200**	**9,200**	**60,000**	**60,000**	
	7.3 Long term requirements and financial opportunities (Travel)	5,000	5,000	3,000	3,000	5,000	5,000	**26,000**	**26,000**	15-14
	7.4 Organize donor conference	8,000	8,000	5,000	5,000	8,000	8,000	**42,000**	**42,000**	35-08
	Total	**46,000**	**36,300**	**31,050**	**31,050**	**36,300**	**36,300**	**217,000**	**217,000**	
	TOTAL	1,259,980	1,021,280	658,630	658,630	1,005,240	1,005,240	6,488,000	**5,609,000**	
0.05	Support Cost (5%)	61,911	50,183	32,363	32,363	49,394	49,394	318,800		
	GRAND TOTAL	**1,321,891**	**1,071,463**	**690,993**	**690,993**	**1,054,634**	**1,054,634**	**6,806,800**	**6,806,800**	