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Global Mercury Project

Project EG/GLO/01/G34:
Removal of Barriers to Introduction of Cleaner Artisanal Gold Mining and Extraction Technologies

GEF

UNDP

UNIDO

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

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

GMP IN SUDAN

FINAL SUMMARY REPORT

BLUE NILE STATE – SUDAN
October 2007

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BRGM and Universite Bordeaux
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Project EG/GLO/01/G34

Removal of Barriers to Introduction of Cleaner Artisanal Gold Mining and Extraction Technologies

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Introduction

Artisanal and small-scale gold mining (ASM) is a poverty-driven activity that provides an important source of livelihood for perhaps 10 – 15 million people, but is also one of the major global sources of mercury contamination. It is estimated that artisanal gold miners produce up to 800 tonnes of gold annually, but releasing as much as 800-1000 tonnes of mercury to the environment in the process. These activities are frequently accompanied by extensive environmental degradation and deplorable socio-economic conditions.

The use of mercury to recover gold, a process known as amalgamation, is a common and simple gold extraction process that has been used for centuries. However, it is only relatively recently that the hazards of mercury have been understood and how ASM activities can contaminate air, soil, rivers, lakes and their fish communities with mercury, both locally, and ultimately, on a global scale. The health of the miners and other people living within the area is adversely affected primarily through inhalation of mercury vapour, and the consumption of mercury contaminated fish. Environmental and health impacts of amalgamation by the artisanal gold miners and their effects on international water bodies are similar in nature in most developing countries and solutions to these problems require concerted and coordinated global responses. The Global Mercury Project (GMP) was initiated to begin this global response to address environmental impacts resulting from mercury released by the artisanal mining sector.
This report addresses the GMP's efforts to introduce technology, educate miners and reduce mercury use and loss to the environment in The Sudan.

Objectives of the Global Mercury Project

The ultimate goals of the GMP are (1) to reduce mercury pollution caused by artisanal miners, thereby protecting human health and local water bodies; (2) to introduce cleaner technologies for gold extraction and develop mechanisms to allow this technology to be supplied locally; and (3) to train local miners and develop community awareness about all environmental impacts derived from artisanal mining. Besides the environmental issues, this program also aims to train miners in procedures related to the formalization / legalization of their activities and good practices to both improve their health and quality of life.

Background – Gold Mining in Sudan

Gold mining and processing in the Red Sea Hills and Nubian Desert has been in process for at least 3,000 years. At that time providing gold to the Pharoanic Dynasties. Post-pharoanic gold production was continued by Arabs, Beja tribes and Turks in the desert of north and north-east Sudan. In what is now Southeastern Sudan, gold was discovered by the Turkish during the time of the Ottoman Empire in the mid 19th Century. Gold

processing did not include amalgamation with mercury until the last couple of decades with the arrival of foreigners.

Artisanal and small scale mining has been a traditional sub-sector. Its contribution to the national economy is underestimated, partly because the banking system does not have a mechanism to include gold. Despite the large number of the population being involved in artisanal gold production for centuries, few efforts have been made to improve technical abilities. At present, Ariab gold Mining Co. is the only gold producer on

industrial scale. Annual production is in the 3-5 mT range.

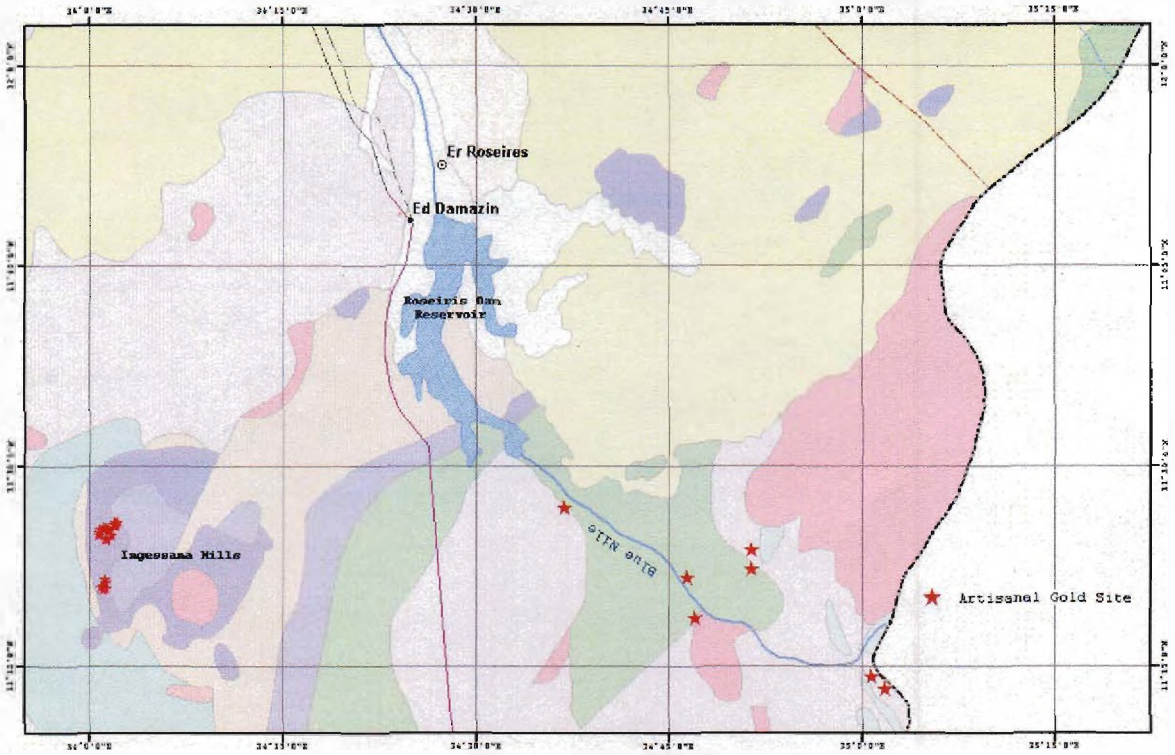

Republic of the Sudan
Artisanal/Small-scale Gold Mining Sites
EGYPT
LIBYA
RED SEA
CHAD
CHAD
ERITREA
ETHIOPIA
ETHIOPIA
C. AFRICAN REPUBLIC
D.R. CONGO
UGANDA
KENYA
Key
Southern Blue Nile
Artisanal Gold Mining Site
asphalt
completed design
gravel
suggest
under construction
Railway
River
Oasis
Towns
1:10,500,000
100 50 0 100 200 300 400 500 km

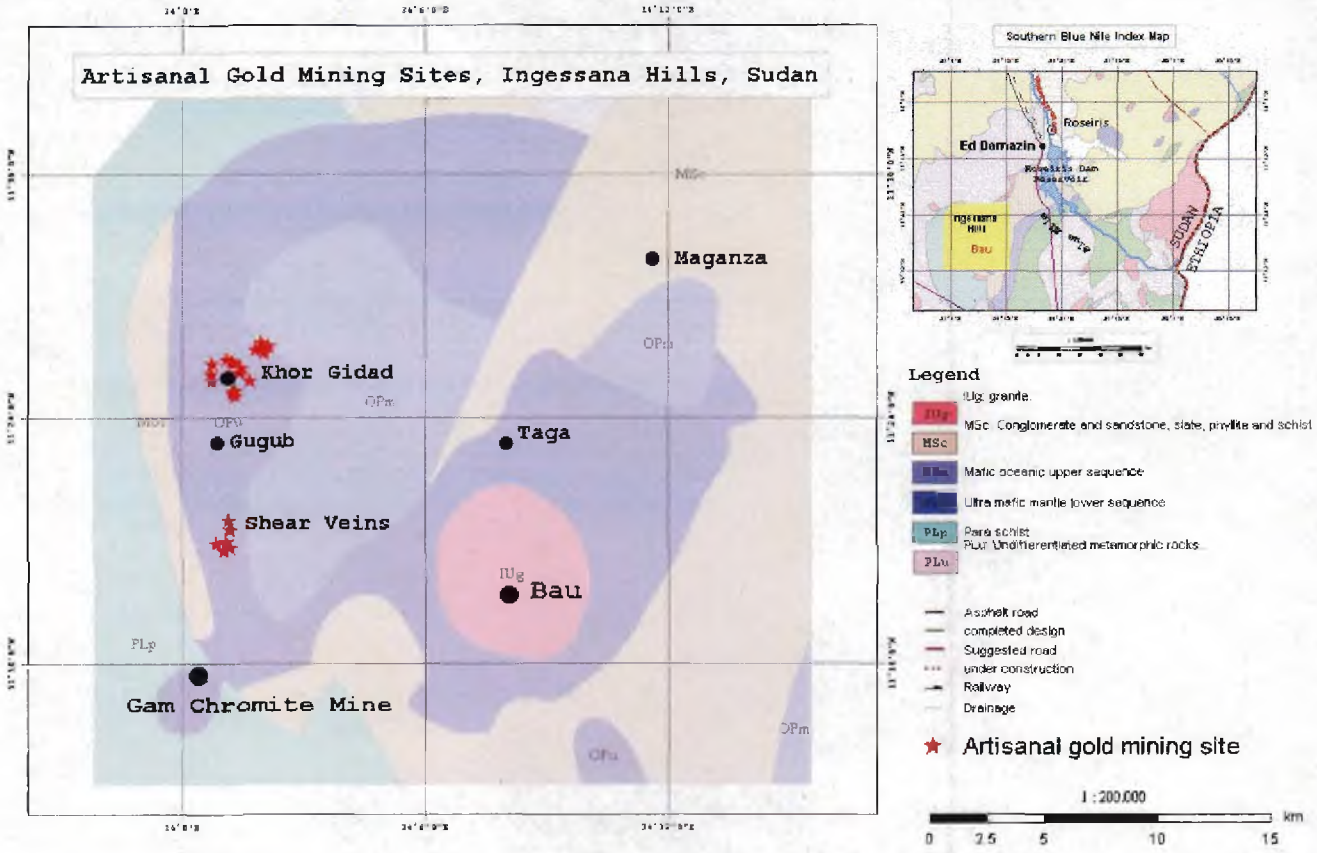
Project Area – Blue Nile State, south-eastern Sudan

The area selected for the Global Mercury Project implementation site lies in the Ingessana Hills, Bau Locality (province) ~80 km to the southwest of Edamazin town, the capital of Blue Nile state. This area is characterized by a range of hills expanding in a semi-circular form from north to south with a diameter ~40 kilometers (figure). Chromite, asbestos and magnesite (in 1960s) and later gold (in late 1990s) were discovered in commercial quantities in these hills.

Bau, the central town in Ingessana Hills district lies ~80 kilometers southwest of El Damazin, the capital of the Blue Nile State. Other smaller towns and villages scattered around the hills are Soda, Gabanit, Gam, Dairang, Taga, Kumrik, Fadamia, Salbal, and Gugub. The Ingessana Hills are home to more than 20 artisanal gold mining sites. The gold production activities started in the late 1990s. In the neighboring localities of Queissan, Kurmuk and Belguwa gold mining practices have taken place for centuries. All these sites lie within the Blue Nile river system. Seasonal streams flow into the Blue Nile River above the Roseries Dam. The Blue Nile contributes 80% of the Nile water budget.

Southern Blue Nile Artisanal Gold Mining Sites




Artisanal Gold Mining Sites, Ingessana Hills, Sudan
Maganza
Khor Gidad
Gugub
Taga
Shear Veins
Bau
Gam Chromite Mine
MSc
OPm
OPv
OPu
PLp
IUg
Southern Blue Nile Index Map
Roseiris
Ed Damazin
SUDAN
ETHIOPIA
Legend
IUg: granite
MSc: Conglomerate and sandstone, slate, phyllite and schist
Mafic oceanic upper sequence
Ultra mafic mantle lower sequence
Para schist
PLu: Undifferentiated metamorphic rocks
Asphalt road
completed design
Suggested road
under construction
Railway
Drainage
Artisanal gold mining site
1 : 200,000
km
0
2.5
5
10
15

Southern Blue Nile - Sudan

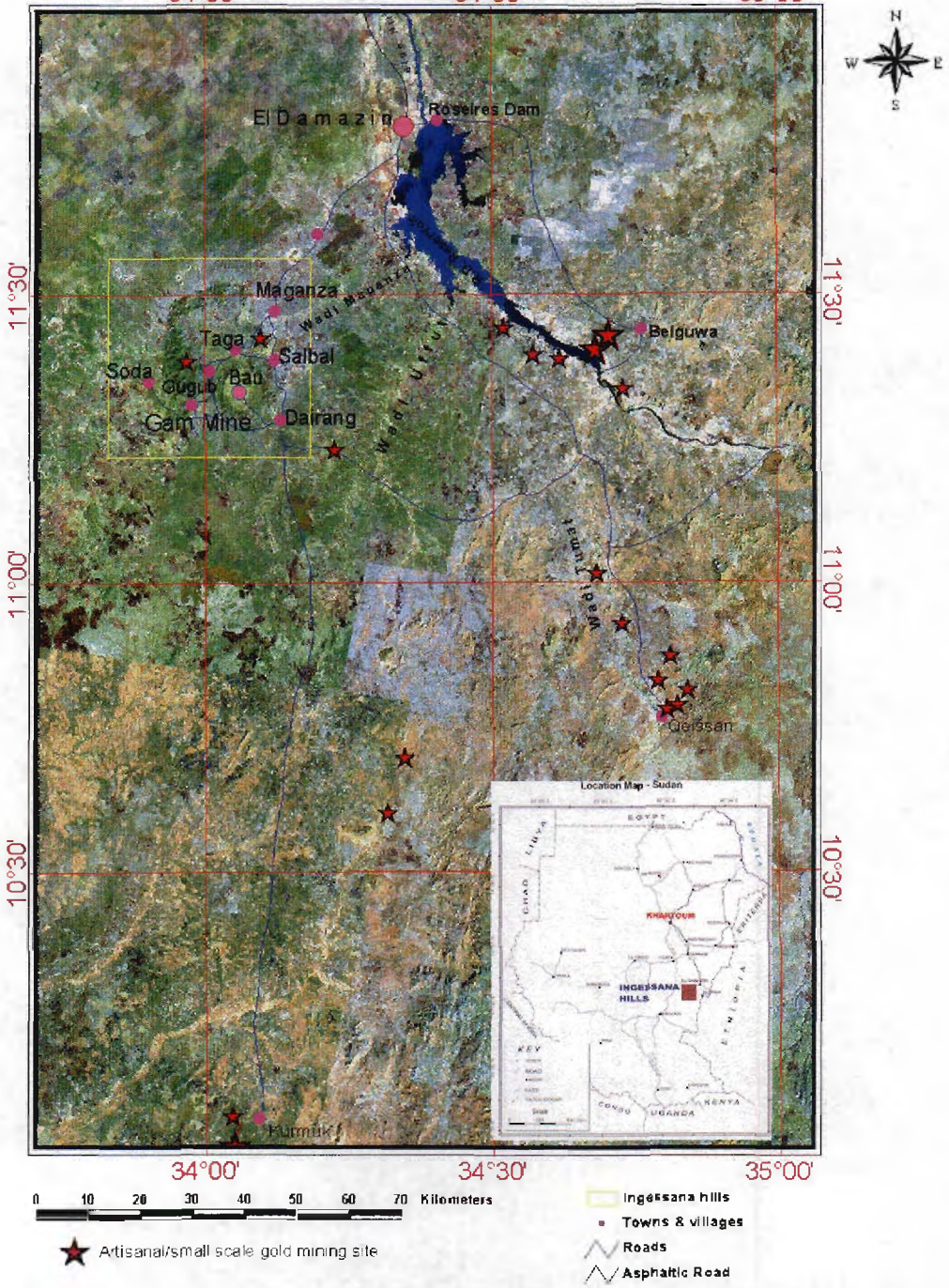
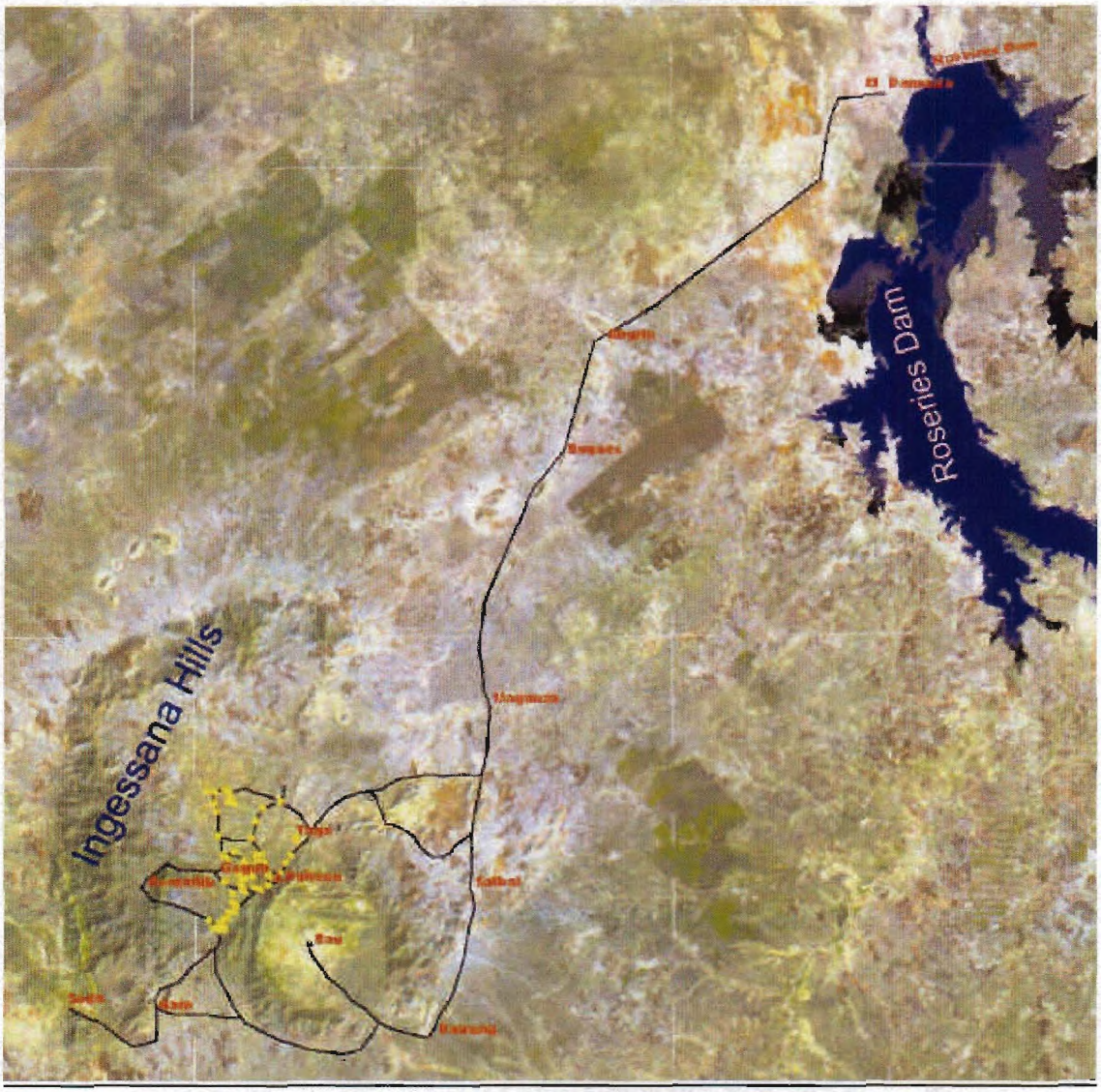


Fig. 3

Ingessana District

Southern Blue Nile Region, Sudan



Socio-economic assessment

The indigenous Ingessana community of >25,000 makes up the majority of Bau locality residents. However, during the 1990s the war displaced the Dawalla community from Kurmuk (100km south) to the Ingessana Hills. They introduced the mercury processing to the area, in addition to some Islamic values and primary school education for all children. Previously the Ingessana people had pursued a variety of livelihoods including cattle-

raising, sorghum cultivation, charcoal making and recently gold mining using traditional panning methods. With the arrival of the Dawalla and mercury, gold production increased to 200kg gold per annum from panning alluvium and primary ore extraction. Socio-economic study of Ingessana Hills' targeted ASM community revealed social patterns, economic relations, and general attributes of the area. During 2004, ~1000 artisanal gold miners practice panning in more than 20 sites in the Ingessan Hills. %80 of miners were from Dwalla ethnic group of Kurmuk. Ingessana ethnic miners made <%10 of the total. Women and children participation was amazingly high (up to 90%). Illiteracy rate is high in Ingessana Hills (~90%) and is highest among women (~95%). Miners tend to work in family groups rather than form cooperative bodies. Tools for work were acquired through self-financing and are rudimentary.

Health and environmental assessments

These assessments were valuable in revealing the situation of the ASM communities. Because mercury has only been recently introduced to the area, it is an excellent baseline study for exposure for 5 – 10 years. The hazards of indoor burning of mercury and of mercury in tailings were evident. Evident also is the direct relationship between individual behavior and mercury contamination. Amalgamation and burning is often done in the privacy of the single room home in the only pan. Considered 'women's work' young girls are frequently the burners. Mercury vapor is the most toxic form as it enters into human body via inhalation. Mercury is a neurotoxin that concentrates in the body, it especially affects growing fetus, and therefore it is extremely important that women and girls of child bearing age keep away from or less avoid it. Because of increasing poverty and adverse situation in the rural areas, more desperate women go into ASM activities. In the Ingessana Hills during 2004-5, it was noticed that women and children make 90% of work force at gold pits. All recommendations made emphasize the necessity of keeping women and children away from amalgamation and amalgam burning. Acute health problems include malaria, diarrheal diseases, malnutrition and lack of obstetrical care. UNICEF provides an immunization program for children; otherwise there is little health care. (see Casalas C., Fenet H., Lamot M-O., ElBashier H., Medani K. BRGM report, 2005).

Gugub and Khor Gidad are among the heavily mercury contaminated sites. In a similar manner to the River Nile in the north (see figure 1), artisanal gold production has created many mercury hot spots. Gold amalgamation and burning are performed haphazardly; inside houses, in yards and around the shops. Liquid mercury is frequently found in the village soil. Evidence of burning in the kitchen using cooking pots is seen on the walls and ceilings of homes. Due to the high annual rain fall and proximity of ASM activities to river banks along with increasing use of mercury makes the Nile contamination eminent. The fish were so far not affected by mercury and considering the size of the watershed and the amount of ASM therein, it becomes urgent to prevent future methylation and bioaccumulation. Acute environmental concerns are headed by lack of clean water and sanitation methods as well as rapid deforestation (see G. Récoché, JP. Ghestem, I. M. Suleiman, R. Maury-Brachet, V. Roques-Duflo and A. Boudo, BRGM report 2005).

Micro-credit assessment

Micro-credit study made on ASM community reveals many opportunities for the miners/small investors to access financing institutions. The approach to micro-financing small gold production necessitates first organization the miners into associations, cooperatives or any community based organizations (CBOs). The experience of micro-crediting has been successful in a number of projects led by non-governmental agencies especially in the field of micro-agriculture. Among those NGOs, Practical Action (PA) Group (formerly Intermediate Technology Group, UK) has a good in country experience in the areas of community organization and promotion of micro-credit opportunities. With their new office in Edamazin, the chances are bigger for ASM community in southern Blue Nile to pursue acquiring small scale gold mining and processing equipment through the different micro-crediting options (see B. Elnaeim Microfinance options report, 2006). PA has already expressed interest in going into collaboration with GMP activities in Blue Nile State.

Another option to organize ASM activities in the country is to adopt the gold milling centres, which is widely performing successfully in Zimbabwe and elsewhere. The setting there is the community deals directly with custom milling and processing point for a small fee or a share on gold produced. In either case, the mill owner keeps the tailing for a further treatment to extract the remaining gold in ore. Usually that is where the owner makes the profit. By this undertaking, the artisanal gold miners get organized because their activities are mostly tied with the mill. In this way the environment is also protected because all processing activities are contained in a small area, which minimizes mercury and tailings/waste contamination.

The Savings Bank and Industrial Development Bank in Edmazin and other State capitals offer opportunities for micro-crediting small scale enterprises, which likely suits the needs of ASM community to acquire equipment.

History of Gold Mining Processing Methods and Mercury in Ingessana Hills

Up until the present time, traditional gold panning has been the main method of gold separation in the different ASM sites in Sudan. Estimated panning efficiency in extracting gold from ore is 50% at best. During the last decade, artisanal gold production became increasingly dependant on amalgamation as cheap method of gold extraction from ore. Mercury as a medium for gold separation was introduced in the 1990s by the Dwalla people displaced by fighting. Prior to that time, amalgamation was mainly confined to goldsmith shops. Goldsmiths also act as mercury suppliers, which are in contact with importers. No official record of Hg imports is available, and it is believed that mercury is smuggled in from the neighboring countries. Artisanal gold miners use mercury in a largely uncontrolled manner for amalgamating gold. Mercury is often mixed excessively with gold concentrate where spillage often takes place. Miners often mistakenly think that more mercury will mean more gold and are unaware of the toxicity of inhaled mercury. The most dangerous part of the process is the amalgam heating to evaporate mercury leaving behind gold dore' with partly not evaporated mercury (~%20). Up to %20 of this gold associating Hg ends up in goldsmith shops in

town. 80% of mercury inhaled can not be excreted by the body and thus causes a gradual increase in concentration. The amount of mercury emitted by burning into the air in Khor Gidad area has been estimated at around 0.3 – 0.4 tonnes/annum. Estimates at the ratio of Hg lost: Au produced varies from 1:1.5 to 1:4.

Artisanal gold miners in the Ingessana Hills are spread over approximately 100 gold mining sites in Belguwa, Qeissan, Kurmuk and Bau districts. Gugub and Khor Gidad villages (~7 km apart) along with Taga (~5km away) are major centers as the main mining site. This was chosen as the project site. Both alluvial and primary ores are excavated and processed in 23 pit sites. Rudimentary ore comminution, concentration and amalgamation are thought to recover up to 50% of the gold. Work is mostly conducted by women in the rainy season (up to 90%) as most of the men attend to agriculture at that time. Primary ore is mined with hammers and picks up to 20 meters deep. These quartz veins have high grade of up to 30g Au/tonne, and an average miner can extract 0.3 g Au/day. Alluvial workings are more productive and it is estimated that each miner produces 0.5 – 1.0 g Au/day. This gives about 150-300 kg Au/annum production.

Since the 1980s efforts to develop and regulate ASM gold mining have been attempted by Geological Research Authority of the Sudan (GRAS), Ministry of Energy and Mining and local governments in different parts of the country. Most notably efforts in regulating activities in Belguwa, Qeissan, and Ingessana Hills, Blue Nile State were made in collaboration with Intermediate Technology Development Group, now Practical Action, NGO. During the 1990's there were surveys made to assess the ASM situation in the Blue Nile State. The undertaking culminated in the creation of approximately 30, 1-2Km sq, permitted gold mining concessions (see S. Khaleel Legal report,2004). At that time dry hammer mills were unsuccessfully introduced. Due to adverse conditions and deteriorating security in the district efforts were postponed. Now after the Comprehensive Peace Agreement signed in 2005 between central Government and Sudanese People Liberation Army (SPLA), few permit holders returned back to the region and resumed semi-rudimentary gold extraction.

The recent demobilization of armed men from the southern states has initiated a government effort to train and employ thousands of ex-combatants. News of large nuggets of gold being found in the Blue Nile State recently has attracted prospectors to the area. The arrival of outsiders once again threatens the social peace of indigenous Ingessana people. Until late 2006, inter-ethnic relations between indigenous Ingessana and war-displaced Dwalla were good. Over time conflicts between the two groups over gold-rich pits and cultural differences increased to the point that in January of 2007 the Dawalla returned to Kurmuk.

The Blue Nile State is not considered part of South Sudan, nor does it function as part of North Sudan. According to the Comprehensive Peace Agreement CPA signed at the formal end of the twenty year civil war (2005) it is one of three "States with special status". It remains marginalized and underdeveloped and therefore its people are

vulnerable to external influences unless real development programmes are urgently introduced.

Ingessana Hills targeted ASM community

Up tro 2007, the number of active artisanal gold miners in the Ingessana Hills is around 1000 (~200 families). Most miners were based in Gugub, Khor Gidad and Taga villages ~10 km away from Bau centre. As mentioned, %80 is from war-displaced Dwalla ethnics of Kurmuk ~100 km to the south. Traditionally, Ingessana indigenous community is less involved with artisanal gold production. They are rather small-scale farmers, cattle raisers, and wood cutters. Ingessana men picked up artisanal gold production skills from the Dwalla who introduced the activity to the hills in 1996. Baseline studies conducted in the Ingessana Hills prior to TDU training were mainly targeting the most active groups at pit sites who were mostly Dwalla along with scores of Ingessana and other ethnics. Among those, Dwalla were the most enthusiastic to participate in TDU training. But two months before mobilization of TDU to the sites, Ingessana-Dwalla inter-relations had deteriorated due to conflicts over gold-rich pits and eventually tension reigned. As a consequence, local authorities and UN peace keeping forces in Blue Nile facilitated return of all Dwalla families back to Kurmuk and elsewhere.

At the arrival of TDU to Khor Gidad major ASM site in mid March, 2007, there were only less than 200 artisanal gold miners practicing in the area. %50 of them are men from outside Ingessan Hills. Unlike Dwalla, Inessana and other ethnics were less organized, and most work on individual basis. The outsiders, however, manage a weak informal association mainly for the purpose of speaking with Ingessana chiefs and local authorities when necessary. Most miners around used to work in abandoned Dwalla pits. During training period, no new pits were dug.

TDU Trainers:
GRAS has selected 5 trainers to implement TDU training in the Ingessana Hills. Global Mercury experts Gillian Davis, GMP coordinator for Sudan, University of British Columbia, Canada, Professor Hermain Wotruba, University of Aachen, Germany, and Patience Singo, mining consultant form Bulawyo, Zimbabwe shouldered the training of trainers (ToT) before heading to the site. The trainers received a short but thorough training of trainers (ToT) course on the different elements of gold mining and processing along with classes on environmental, health, legalization and micro-credit issues pertaining to ASM activities. They went through the training manuals supplied by GMP. As part of ToT, all the team along with ACFP visited GRAS pilot gold production site in Bayuda Desert, River Nile State in the north. Practical demonstrations on gold extraction and technologies use were performed. Trainers had chances to hands-on training on ore handling, sluicing (wet and dry), ore concentration, amalgamation and retorting. Nurse trainers also found a good chance to get acquainted with gold mining and processing settings, and the inherent environmental and health risks entailed.

The following trainers have tackled the TDU training campaign last summer in the Ingessana ASM sites:
-Ibrahim M. Toum-GRAS geologist and team leader
-Salah Elnour-GRAS geologist
-Tajelsir Ateya-GRAS mineral processing technician
-Rabab Gubara-Private Nurse
-Asfa Elnour-Nurse and lecturer, University of Blue Nile, Edamazin

ACFP also participated in training during stay in the field. It was scheduled that Patience Singo join the TDU in the field but awkward circumstances in Khartoum delayed him from doing so. He returned home after 3 weeks stay in Khartoum.

TDU Trainees:
The period of training stated in the contract signed between GRAS and UNIDO is 3 instead of 6 months as suggested in earlier draft. The 3 months period would have been tight to offer training to the original targeted ASM community (~1000 individuals) especially when first and second payments delayed almost 6 months after the amended contract became effective. The said transfer delays and other difficulties encountered during equipment acquisition and mobilization had made it impossible to catch up Dwalla community in time before their return back to Kurmuk in January 2007.
More than 300 individuals were registered for training (%80 men). Those actually attended full TDU training amount to ~220 summarized below:

Tabel 1: TDU Training-Ingessana Hills, March-May 2007

Group/class	Theoretical	Practical	Women attend.	Total illiteracy%
1	18	14	7	60
2	25	25	3	96
3	17	14	2	82
4	20	16	7	40
5	21	18	0	10
6	16	16	1	80
7	8	8	1	85
8	10	10	0	13
9 (Chrome mine	7	7	0	0 (engineers)
10	10	6	0	100
11	12	11	0	90
12	10	10	0	50
13	3	2	0	0 (engineers)
14	30	30	0	0
Totol	**220**	**199**	**21**	

Although wound up around May 20, training was scheduled to continue for as long as more trainees were available. In fact, by mid May no more interested trainees were found in the area. A few registered miners, probably based on political agendas, expressed their later disinterest in joining TDU training. Some even talked awful about the project.
Apart from those participated, about 100 (mostly men) visited TDU during stay in Khor Gidad camp. Some of those were experts of the UN Nile Basin Initiative Project touring Blue Nile valley. We learned that one of their project objectives is to protect the Nile basin environment. The project's regional office is based in Khartoum. Others were small-scale gold investors/gold dealers and passer byes. It was initially aimed to also mobilize TDU to at least a couple of ASM sites in Qeissan and Bulang within southern Blue Nile region as soon as finish training in Ingessana Hills. Ibrahim Toum, training leader and ACFP made a reconnaissance visit to Qeissan in early May and met with local chiefs for coordinating training. Unfortunately, at that time no one was practicing artisanal gold mining due to

water shortage. Instead, all were involved with bamboo cutting for trade. In Bulang, the pits site was deserted with no one around to ask. Accordingly, we saw no point of mobilizing the TDU to those sites.

Technical Training Offered
During stay in the Ingessana Hills, all trainees received thorough TDU training on:
-Basics of gold ore geology, prospecting and testing
-Ore communition
-Ore concentration basics
-Different sluicing techniques
-Other gravity concentration techniques
-Size reduction, screening
-Amalgamation, mercury handling, hazards
-Retorting techniques
-Environmental protection
-Health and sanitation
-Organization and legalization of ASM activities
-Micro-financing options

Training included both theoretical and practical sessions. Different types of alluvial and primary gold ores were used for hands on training. All attendees expressed satisfaction with equipment performance and many showed real interest in acquiring them and follow procedures they learned. We believe this is a positive signal for behaviour change. A follow up programme to consolidate technology transfer to those marginal communities is strongly recommended.

Awareness Training:
Based on the previous socio-economic study and later survey during training, it is evident that over %80 of ASM miner trainees are illiterate. Those participants who can read are mainly 10-15 years old students from Taga and Bau schools. All were offered both theoretical and practical demonstrations on TDU equipment and hands on operation. In addition, sessions on health, environment, sanitation, legalization and economics matters were integral part of training. Visual teaching aid like posters, booklets and board drawing helped very much and proved effective in bridging illiteracy gabs.

During training, more than 30 sets of GMP theme Booklets (sets of 4) and 10 sets of posters (set of 10) depicting all aspects of artisanal/small-scale gold mining and processing along with health, sanitation and environmental issues were distributed to community chiefs, schools, Gam mine engineers, and others who can read. A set of posters glued to a board was made available to Taga elementary school to teach students further on proper ASM mining. Also during training, about 7 retorts were donated to community chiefs and most active artisanal miners in the area to share with others.

Media participation during training was less than aimed for partly due to difficulties encountered during mobilization, shortage of funds, and absence of ACFP in Khartoum handling Patience Singo's passport loss. Only two DVD shows were performed. TDU activities coverage, lightening strike event, and the BBC's Price of Gold shows were run at the camp and at Taga school yard. However, during training, 4 tapes covering day to day TDU training were shot. In the wrap up event, we managed to invite (for fees) Sudan News

agency SUNA, and Edamazin radio& TV to the TDU site for half day coverage. Radio, SUNA, and TV Interviews with ACFP, Ibrahim, Tajelsir, Nurse Asfa and Dr Buthaina Elnaeim, mcrocredit expert covered all aspects of the training conducted and GMP objectives as well. All interviews were aired on Edamazin radio& TV, which were well received by audience. Both Edamazin radio&TV manager and SUNA reporter promised to extend broadcasting to the national radio&TV in Umdurman. All are welcoming more GMP interviews and footages. At the end of wrap up, an invited singers band performed in front artisanal gold miners and chiefs for more than tow hours. At break times, ACFP and Dr Buthaina addressing the audience on ASM issues and how activities can be boosted by collaboration and commitment of all for the benefit of the community and for better life.

Better Practices of Small-scale Gold Extraction:
Efficient small-scale gold extraction must depend on suitable processing technologies like those introduced by Global Mercury Project. The ultimate goal is to transfer gold processing intermediate technology to those impoverished and marginal communities and teach them how to efficiently operate them for increasing productivity. The project also aims at empowering desperate artisanal gold miners through seeking avenues accessible to micro-finance institutions in order purchase the equipment.

Before GMP intervention last summer in the Ingessana Hills, Blue Nile state, the Geological Research Authority of the Sudan GRAS has set up a pilot gold processing centre in the Bayuda desert, River Nile State in the north with the aim of producing alluvial gold on small-scale. Equipment in use now include 2-4 long steel sluices, concentrators (a Falcon SB250 and a couple of water jet locally fabricated) fed by an elevated hopper with 10m long chute. Ore haulage is by a 15 tons dumper truck, a back hoe and a loader. Two technicians and 8 support personnel operate the equipment. The pilot project benefited from the ideas and technology made available by GMP during training of Trainers campaign last February. GMP experts Gillian Davis, Herman Wotruba, and Patience Singo along with ACFP helped also in training of the pilot project and a nearby gold concession technicians on the effective methods of gold extraction from ore (photos). The experts offered valuable advice on equipment adjustment and efficient gold processing techniques. Advice made has paid off as we learned later that gold production in the north is doubled. Nowadays, the pilot project produces up to 5 ounces/day from alluvium.

Although no similar set up is created in the southern Blue Nile state, the idea of introducing a gold ore milling and concentration centre seem viable as is the case with the successful custom milling centre set ups in Zimbabwe. The idea was discussed with experts who all agree that the centre can fulfill GMP objectives in introducing efficient technology, training and awareness along with organization and legalization instrument for regulating ASM activities in the different parts of the country. Despite the recent Mineral Resources Act (2007) has come into effect, current regulatory and monitoring capabilities are short than organization of ASM gold production activities. As mentioned, milling centres would serve to polarize all ASM activities around one or more sites where all activities can be monitored and controlled to betterment of all stakeholders.

Lessons Learned:
-Successful implementation of development programmes in poor/marginal communities requires multi-faceted cultural, socio-economic, political, and regulatory approaches.

-Commitment of local and central authorities beside all institutional set ups is of prime importance to a sustainable development achievement in rural areas.
-Adoption of targeted communities to new skills/experience provided is a slow process and the sought behaviour change is not strait forward as we anticipated first time. Although enthusiasm was high among TDU trainees, none has already changed his traditional gold extraction practices after learning new skills offered and equipment efficiency demonstrated.
-Transience nature of many ASM communities must be put into consideration when implementing similar projects in rural areas. As happened in the Ingessana Hills early this year when Dwalla families moved back to Kurmuk, a targeted community, for whatever reason, could abandon the sites and others could step in with little or no background on what the project is aiming for. The movement of Dwalla has affected GMP arrangements drastically.
-Involvement of an NGO body familiar with field implementation of development project facilitates more interaction with community and local politics.
-Organization of ASM miners into community-based organizations (CBOs) could serve far better in getting targeted groups benefit from training offered and options suggested for them to access decision makers, legalization, and micro-credit avenues for equipment/operation financing.
-In rural communities like the Ingessana, it seems better to adopt bottom-up approach in order to furnish fruitful implementation of a development project. In current circumstances in Blue Nile state, the voice of those marginal groups is often unheard. Authorities are more involved with or occupied by national/regional politics rather than with rural interests.
- Mercury utilization in ASM gold extraction seems inevitable and thus, elimination of it is impractical. The trend among ASM miners is to activities to mine primary ore since news of notable discoveries in the area spreads every now and then. In fact, >50 kgs Au discoveries took place a couple of times in the Ingessana Hills within the period 2005-07.
-Based on the above, any training core should more emphasize methods of extraction that lead to extreme minimization of mercury contamination/pollution and less human exposure to the substance as well.
-Women and children are increasingly involved with ASM activities for the last decade in Sudan as a result of political instability and increasing poverty. As men in rural areas e.g. in southern Blue Nile, are involved in conflicts, migrated to other parts of the country or participating in other low-income activities, women find themselves in positions of major family supporters in addition to the traditional roles they are playing in those marginal communities. Based on the low women turn out (%9) during late TDU training in the Ingessana Hills, specific training programme targeting ASM women is necessary in those areas. Our explanation to the low turn out of women is that they thought the training programme was targeting men mainly. Also traditional norms may have played a role in not encouraging women to attend TDU training.