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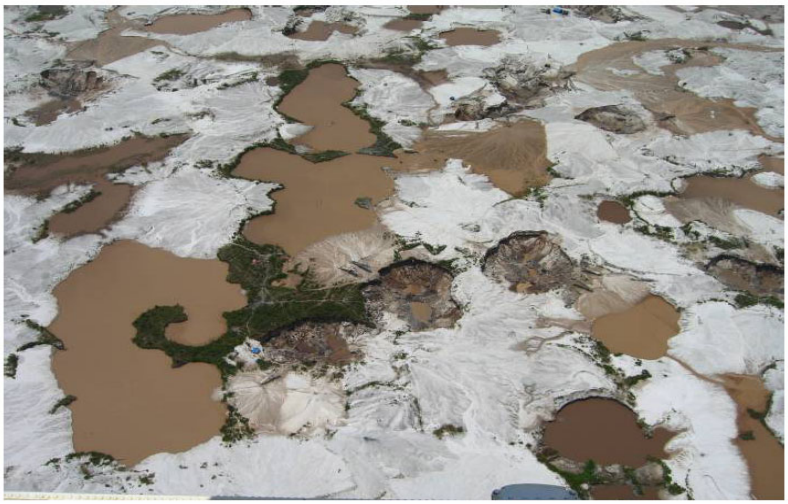
Education, Awareness and Technology to Prevent Mercury Pollution from Artisanal and Small-Scale Gold Mining



Abstract: The Global Mercury Project (GMP) was implemented in order to begin a global response to address environmental impacts resulting from mercury released by the Artisanal and Small-scale Mining (ASM) sector. The relatively poor knowledge or involvement of governments within the sector hampers sustainability initiatives. The awareness campaign provided education about the hazards of ASM activities, with a focus on mercury, to local and national citizens in pilot project countries. Key to this impact was also the diversity of community members included within the programs such as miners, millers, buyers, communal leaders, and food and beverage vendors. The combination of assessment and educational phases of the project allowed us to learn a great deal about the life cycle of mercury within artisanal mining. This project also highlighted the importance of locally appropriate technologies. Though not without failures, some of the key achievements in the GMP came about because of the ability to bring together health information, technological transfer and promotional activities. This project and the specific activities outlined in this experience note associated with education and awareness-raising through an integrated approach are significant in that they present methods with proven ability to help.

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Education, Awareness and Technology to Prevent Mercury Pollution from Artisanal and Small-Scale Gold Mining

Experience of the GEF - sponsored

GEF-UNDP-UNIDO: Removal of Barriers to the Introduction of Cleaner Artisanal Gold Mining and Extraction Technologies (Global Mercury Project)

GEFID: 1223

PROJECT DESCRIPTION

The Global Mercury Project (GMP) was implemented in order to begin a global response to address environmental impacts resulting from mercury released by the Artisanal and Small-scale Mining (ASM) sector. Six key transboundary river/lake basins in developing countries were selected: Brazil, Indonesia, the Lao People Democratic Republic (PDR), Sudan, Tanzania, and Zimbabwe. It is estimated that in these areas artisanal gold mining directly involves nearly 2 million people and supports more than 10 million others.

This project was implemented by the United Nations Development Programme (UNDP), with the United Nations Industrial Development Organisation (UNIDO) acting as the executive agency. The project was extended from its original timeline to run for a total of five years, ending in 2007. The project included seven objectives summarised as follows: a) assessing pollution from ASM; b) introducing cleaner technologies; c) regulatory development; d) environmental and health monitoring programmes; e) capacity building of local assessment laboratories; f) development of country policies for ASM; g) results dissemination and future funding.

This note does not address all activities within the project, but instead focuses on those that helped increase awareness of mercury pollution and health issues, especially within miner populations. For information on some other activities, please see the experience note on "Policy and Governance Measures to Prevent Mercury Pollution from Artisanal and Small-Scale Gold Mining".

The project activities in question aimed to increase knowledge and awareness of the environmental and health impacts associated with use of mercury among miners, government institutions, and the public at large. This was bolstered by the introduction and demonstration of cleaner and more efficient technologies that minimise negative environmental impacts while improving earnings, health, and safety. The training included a train-the-trainers initiative, multiplication of training, and education programs. Awareness campaigns were utilised to improve local and international awareness of mercury and more general ASM issues.

THE EXPERIENCE

Issue

Artisanal and small-scale gold mining is largely driven by poverty and provides an important source of livelihood for between 10-15 million people. Yet it is also one of the major global sources of mercury contamination. Mercury is used to recover gold from ores in a process known as amalgamation. As well as losses to air and soils, ASM activities can contaminate rivers, lakes and their fish communities with mercury, both locally and on a global scale. The health of the miners and other people living within mining areas is adversely affected through inhalation of mercury vapour, direct contact with mercury, and the consumption of mercury contaminated fish. Critically, when mercury enters water streams, it is subject to oxidation and methylation, leading to its transformation to the highly poisonous methyl-mercury form. With the combined effects of water transport and bioaccumulation, mercury affects not only miners, but distant communities.

Several features of ASM presented challenges for any potential intervention. First among these is the transient nature of miners, who often migrate to sites during particular seasons, and move to others because of various reasons. Geographical and terrain considerations make access by project workers difficult. The relatively poor knowledge or involvement of

governments within the sector hampers sustainability initiatives. Emerging threats complicates these ever-present challenges. Entry into the industry by new artisanal miners has, and is likely to continue to increase due to increases in the gold price.

Addressing the Issue

After an initial diagnostic phase that studied environmental contamination of mercury and associated problems at field sites, the second phase centred on education and awareness was begun. This was highly focussed upon reducing or eliminated the use and release of mercury from ASM. The training program constituted the main activity and included segments on how to increase the recovery of gold, how to recycle mercury, how to use retorts, impacts of mercury on health and the environment, mercury in the gold shops, how to protect water bodies, how to diversify the miners' rural economy, how to legalize a mining site, tailings and waste management, refilling old pits, pools for mercury amalgamation, use of latrines and mosquito nets, how to filter water, garbage disposal, and reforestation of degraded areas. The awareness campaign provided education about the hazards of ASM activities, with a focus on mercury, to local and national citizens in pilot project countries. Awareness on preventative and corrective actions for healthy living were included. These encompassed aspects directly related to artisanal gold mining but also some topics affecting every communities in rural areas of developing countries: sexually and vector transmitted diseases (AIDS, malaria…), sanitation, children's education… The field implementation of the project was anchored on the Transportable Demonstration Unit (TDU) which existed to bring as one package the messages on new and clean technologies, health and environment.

RESULTS AND LEARNING

The greatest success of these project activities was the increase in miner and general community knowledge about the dangers of mercury use. This objective was achieved in all countries where the project was implemented. Though it was found often necessary to demonstrate the economic savings of introduced technologies and alternate practices, wider understanding of mercury's health and environmental issues provides an essential underpinning. Key to this impact was also the diversity of community members included within the programs such as miners, millers, buyers, communal leaders, and food and beverage vendors.

The combination of assessment and educational phases of the project allowed us to learn a great deal about the life cycle of mercury within artisanal mining. By studying and then working with miners to address mercury use, much was learned about environmental losses due to whole-ore amalgamation, open air burning without retorts, concentrate amalgamation and accidental losses. It is only by fully understanding these processes that technologies and other mechanisms to combat mercury loss can be designed.

This project has had some important impacts on indirect actors and the wider issues of ASM. More than sixty publications have arisen from the project including items such as a manual for training artisanal and small-scale miners. On the basis of the Environmental and Health Assessment, the project published a protocol that is now the benchmark for assessment worldwide (e.g. UNEP, WHO projects). The findings of these studies have also helped shape the development of the next phase of the GMP – one that places more emphasis on implementation strategies that reduce the use and release of mercury from ASM.

The GMP was very proactive and unique in integration of health, ecological, technical, economic and policy concerns in community development. The sustainability of such a broad and inclusive approach is itself very challenging and not without concern. For example, our experience showed that the presentation of health messages by non-health personnel is very dangerous. Yet our experience showed how some level of integration is necessary for such a complex issue that involves many actors from miners to traders to government.

This project also highlighted the importance of locally appropriate technologies. Methods used include the establishment of communal new technology centers (e.g. communal retort in LAO, processing centers in Tanzania). The GMP also identified and trained local manufacturers, to produce beneficial ASM equipment and pollution-prevention technologies (Tanzania, Indonesia and Sudan).

REPLICATION

In such a project where multiple issues of health, livelihoods, poverty, regulation, environment and economics intersect, it becomes challenging to deal with all of these in an integrated way. Yet this integration is an essential feature that will allow the success and importantly, the sustainability of any future projects. Though not without failures, some of the key achievements in the GMP came about because of the ability to bring together health information, technological transfer and promotional activities. It is recommended that to replicate such a project, an integrated human-centred, rural development approach is used.

As with many global projects, it is a challenge to reconcile differences in implementation and administration across different countries. But this is particularly the case with artisanal gold mining where technologies, techniques and societies create diverse sets of circumstances in which to operate. In any replication it is therefore important both to consider the need for alternative approaches, as well as the creation of clear and simple avenues to share learnings and disseminate good practice. Similarly, it is recommended that the new technologies are well investigated and tested under the differing local conditions of the project sites.

The nature of legislative processes dictates prolonged interaction with government. The kinds of regulatory changes needed to allow effective fieldwork sometimes do not occur until too late. Therefore it is recommended that these issues be dealt with right from the beginning of the project. What ended up becoming a major component of the project extension (Policy and Governance), the subject of the other Experience Note from this project, was based upon this realization.

The presence of the majority of artisanal gold mining sites in rural and poorly serviced areas created significant challenges for project implementation. This impacted many facets of the project, including education and awareness campaigns, and the use of common facilities. The GMP approach found some success using the TDUs and regional training centres. It is recommended that replication projects utilise similar measures to allow for geographical and distribution challenges, and on the basis of our experience, do so starting from early in the project cycle.

The introduction of new technologies, and changed practices of artisanal miners requires a difficult feat - long-lasting cultural change. Such change is premised upon sustainable learning programs, especially in this industry, which is characterized by highly transient miners and the continual entry of new miners. Rising gold prices attract more miners to the sector who were not aware of the best practices demonstrated by the project. Whilst one-off projects and miner training helps, integration of continuous engagement through ever-present institutions such as local government or mining department extensions should be considered.

SIGNIFICANCE

ASM is a major cause of environmental pollution, particularly with regards extraction chemicals such as mercury. Its application in proximity to significant transboundary water resources, right across the developing world, makes it a threat. The propensity for water transport of mercury, chemical transformation and bioaccumulation make it a threat not only to the physical and long-term environmental health of miners and their surroundings, but the health and environments of the global community. In short, the issue is significant because of its global reach and ability to affect future generations. Currently, ASM is one of the largest anthropogenic sources of mercury emission to the environment.

This project and the specific activities outlined in this experience note associated with education and awareness-raising through an integrated approach are significant in that they present methods with proven ability to help. Whilst this project was only a beginning of limited scale and reach, and not without failings in implementation and effectiveness, it highlights some important learning about how to proceed.

REFERENCES

Further information and a number of useful documents can be obtained from the project website (http://www.globalmercuryproject.org/).

Alternatively contact can be made with UNIDO programme manager:

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KEYWORDS

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