



Terms of Reference

Air Quality Assessment in Relation to Mercury Emissions in Paramaribo from Gold Refining Operations in the ASGM Sector

1. Background

Suriname is a sovereign state on the Northeastern coast of South America with a land area of approximately 163,000 km². It has extremely high levels of tropical rainforest cover, forming part of the Amazon river basin. It is estimated that more than 90% is still forested, corresponding to approximately 14.8 million hectares (Report to CBD 2012), and it is considered a 'High Forest Cover- Low Deforestation Rate' country. While 13% of the country's land area has been set aside in protected areas, a substantial amount of forest and associated biodiversity is found within productive landscapes.

Mining is a vital sector of Suriname's economy and has grown significantly over the last decade, particularly gold mining, contributing an estimated 1.62 billion USD in 2012 versus 34 million USD in 2000. In 2011, small-scale gold mining was believed to provide 20,000 direct jobs as well as a significant number of jobs in subsidiary services. The majority of mining is taking place in Suriname's Greenstone Belt, in which the majority of gold deposits are believed to be found. Unfortunately, due to its largely unregulated and uncontrolled nature, mining, and in particular small and medium-scale gold mining (SMGM), is causing significant negative environmental impacts on forests, freshwater, fish and other groups of species.

The government of Suriname through the Office of the President has requested UNDP to provide support in:

- Access and utilization of GEF funding for Initial Assessment of the use of Mercury, this within the context of the Minamata convention, commonly known as the MIA project;
- Access and utilize GEF funding in the preparation of a National Action Plan for Artisanal and Small-Scale Goldmining, commonly known as the NAP project;
- the design, preparation and elaboration of one Suriname Full Size project from Suriname STAR allocation under GEF-6 funding as well as other pertinent GEF resources available to support this Multi focal area solution.

The implementation of the MIA project started in December 2016 and was finalized in December 2018, while the NAP project will continue till December 2020, parallel implemented with the Full-Size project.

The environmental impacts from the small and medium-scale gold mining sector are not limited to the mining locations in the interior of Suriname. As the extraction process involves the use of mercury, the produced gold still contains mercury residues and is brought to Paramaribo to be sold. The gold buyers (gold buying companies and goldsmiths) in the city further purify the gold, causing emissions of mercury vapour. This results in elevated levels of mercury in the atmosphere, as confirmed by previous studies.

Globally there are different approaches for ambient air quality monitoring, based on measurements, emission inventory, dispersion modelling, or receptor modelling. As each of these separate approaches has its limitations, NIMOS prefers an integrated approach involving a combination of various air quality management approaches and tools that are essential for planning strategies to improve air quality.

With this research project we aim to get a full understanding of the correlation between the gold purifying activities and air quality in Paramaribo. This requires developing a scientific methodology suitable for Paramaribo that can be used as a standard for future studies.

Furthermore, the option to include other pollutants, such as sulphur dioxide, nitrogen oxides, particulate matter, carbon monoxide, lead, tropospheric ozone and Volatile Organic Compounds, should be evaluated and implemented if feasible. Doing a thorough inventory and mapping of the pollution sources in combination with air quality measurements will allow several analyses to be conducted in support of air quality management policies and strategies.

2. Scope of work

In accordance with NIMOS, as implementing agency for the MIA and NAP project and aligned with the UNDP procedures, NIMOS is assigning the Anton de Kom University of Suriname (AdeKUS) to provide services for the *Air Quality Assessment in relation to Mercury Emissions in Paramaribo*.

The AdeKUS will facilitate students as well as partners within their network to carry out the commitments from this consultancy. The assignment will be completed within twelve (12) months and consists of desk study and fieldwork. Detailed activities are:

- i. Selection of the most suitable methodology for the study area, which can be used as a standard procedure for future studies. Options for integration of other air pollutants should also be considered.
- ii. Identification and mapping of sources in Paramaribo. This inventory should consist of sources depending on their location, at what elevation they emit, their frequency and duration of emission, etc.
- iii. To provide an overview of available scientific data from previous studies in the study area.
- iv. To foster partnerships with other institutes to enable a successful implementation of the research.
- v. Air quality monitoring, making use of students, AdeKUS infrastructure as well as well-recognized institutes.
- vi. Air quality modelling and report writing.
- vii. Recommendations for further studies and actions, including requirements for the establishment of a permanent air quality monitoring network.

3. Specific duties of the assignment related to the overall assignment

- Formulate a research plan, including detailed activities, timetable and an estimated budget for execution of all activities;
- Formation of a team to execute this assignment;
- Arrange field preparations and all necessary preparatory activities to ensure successful field missions;
- Ensure financial and administrative filing;
- Ensure a successful learning process to develop local capacity building, involving NIMOS;
- Engage with the local as well as international network to integrate best practices regarding this topic.

4. Implementation Arrangements

The National Institute for Environment and Development in Suriname (NIMOS), whom the government of Suriname has entrusted with the coordination will contract while the UNDP will make payments upon certification of deliverables and completion of assignment by AdeKUS.

Payment No.	Description of Deliverable	Target delivery date	Percentage
1	Detailed research plan and approval by NIMOS	One month after signing of grant agreement	35% lump sum fee
2	Inventory of mercury emission sources with corresponding map.	One month after approval of research plan	20% lump sum fee
4	Draft report with air quality monitoring and modelling results and analysis.	Three months after Inventory	30% lump sum fee
5	Final report	One month after draft report	15% lump sum fee

5. NIMOS trusts AdeKUS will be able to deliver qualified services and give the assurance that the assignment can be completed within the allocated time, making use of sufficient and qualified expertise within AdeKUS and enabling partnerships and collaboration between AdeKUS and its partners/network. This assignment will be a grant agreement between NIMOS and AdeKUS after receiving a formal letter from the institute stating the terms and conditions for accepting this assignment.