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| **Danish organisation** | **Diálogos** |
| **Title of the intervention** | **Introducing mercury-free gold mining in Nicaragua** |
| **Partner name(s)** | **Fundación Crecemos Juntos** |
| **Amount applied for** | **498.029 DKK** |
| **Country(ies)** | **Nicaragua** |
| **Period (# of months)** | **November 2022- October 2023** |

**Introducing Mercury-free Gold Mining in Nicaragua**

**1. Relevance of the intervention**

Tens of thousands of Nicaraguan Artisanal Small-scale Gold Miners (ASGMs) use mercury to extract gold from gold ore. Mercury is recognized worldwide as a toxic element with harmful effects on human health and the environment. The gold miners in the suggested project area, as well as local authorities are strongly motivated for change. Diálogos has competence in implementing mercury-free mining in small-scale gold mining communities worldwide, and the present project proposal builds on these experiences (1-3, 9-11). With the experience we have in Diálogos, we believe that this is an optimal time for an intervention where we can probably create a change for relatively few funds.

## Objective

The present project aims to introduce a ***mercury-free gold mining method***, and thus phase out mercury use in ASGMs in the mining community La Libertad in Nicaragua. In turn, a reduction in the mercury pollution will prevent diseases among the miners and non-miners in the community and contribute to bringing down the global mercury emissions to the environment.

Intervention The central intervention focuses on introduction of a mercury-free gold extraction method in La Libertad. Furthermore, the interventions take the first steps towards *improving local community organisation* by the dissemination of this method at the local level.

The interventions in this project will be directed towards *2 objectives,* namely*:*

**Objective 1.** A group of small-scale gold miners have **been trained to perform mercury-free extraction of gold** and **disseminate this knowledge to** fellow miners.

**Objective 2**. Members of the local community like families, health professionals, teachers, and politicians

have **increased knowledge of mercury pollution** and its prevention. They have **taken steps towards promotin**g conversion to mercury-free mining.

**The general problem of mercury use in ASGM**

Mercury is a potent neurotoxin which is persistent in the environment. Exposure to high levels of mercury causes *brain and kidney damage*. *Even tiny doses of mercury negatively affect the intellectual and physical performance of children, when mothers are exposed during pregnancy.*

All over the world, ASGMs mix mercury with a mineral concentrate from gold ore to form an amalgam. The amalgam is then burned, resulting in highly toxic mercury vapours which are inhaled by miners, their families and people in the community. Whole-ore-amalgamation is a method that is used by ASGMs in many countries, including Nicaragua. Beside the mercury vapours from burning amalgam, whole-ore-amalgamation results in a major loss of mercury and gold to the tailings, the fine sand that is the waste product from ASGM. The spread of this method is the main explanation *that ASGM contributes at least 37% to* the global outlet of mercury annually (4). The result is the release of *phenomenal amounts* of mercury, which is a major health hazard for Nicaragua and provides a significant contribution to the global mercury pollution.

Thus, eventually some of the mercury from ASGM ends up in the air we breathe, and in the fish, we eat all over the world. However, the local mining communities remain subject to the most immediate consequences of mercury pollution.

It should be noted that mercury is only one among many health hazards in the mining communities.

ASGMs are exposed to a variety of diseases and occupational hazards, including silicosis and rheumatism as a result of exposure to gases, dust and extreme temperatures inside the mines, along with bad practices and postures in extractive work. There is generally no use of safety equipment, in addition to insufficient labour guarantees and/or access to health services and insurance.

Diálogos regards the introduction of mercury-free gold extraction methods as a wall breaker to also address other hazards and advocate for better general working conditions, working towards a vision of **responsible mining.**

**The Minamata Convention** is an international [treaty](https://en.wikipedia.org/wiki/Treaty) protecting human health and the environment from [mercury](https://en.wikipedia.org/wiki/Mercury_(element)) pollution. It is named after the Japanese city where the population went through a [devastating](https://en.wikipedia.org/wiki/Minamata_disease) mercury poisoning in the 1950-70’s. The Convention was approved by 140 countries including Nicaragua in 2013 and international trade with mercury is illegal. To comply with the convention, Nicaragua must define and execute a National Mercury Elimination Plan. This work is still underway. The project aims to contribute to this plan and thus the reduction of the environmental impact of ASGMs using mercury at local and subsequently at national and international level.

**The political context affecting ASGM in Nicaragua** A key part of the Nicaraguan government's mining policy is to support entrepreneurs as well as small and medium-sized enterprises, in order to create new jobs and improve the living conditions for the population. It is the Ministry of Family, Local Communities, Cooperative and Association Economy which administers the government's initiatives, which includes continued education, counselling as well as financial and material support opportunities depending on the industry. ASGMs in the project area have received help from the ministry in the form of counselling and continued education about working environment and health. The supervision on the use of mercury lies with the National Commission for the Registration and Control of Toxic Substances. The Commission had the use of mercury on the agenda a few years ago where it was decided to draw up an action plan. This work is not yet completed.

**Minerals and mining in Nicaragua** Gold mining in Nicaragua dates back to pre-Columbian times. In recent times, gold mining has taken place in various regions – among these the municipality of *La Libertad* in the Chontales department – our intended project area. Nationally, gold is today the second most important export commodity after textile exports. Banco Central de Nicaragua states that the total value of gold exports in 2020 was 665,9 million USD and it accounted for 9.5% of total export. The value of gold exports has risen sharply in recent years. This is partly due to the fact that the government has worked for further investments in the sector and partly because gold prices have risen significantly. Gold exporters pay a 3 % tax to the Nicaraguan state when the gold is exported (7). The largest part of mining is conducted by large industrialised gold mines, most are foreign-owned and operate on the basis of a concession from the Ministry for Energy and Mines (CAMINIC), which organises the industrial gold mines. There are more than 5,000 direct employees in the mines and more than 9,000 indirect employees. This is relatively few in relation to the sector's significance for the trade balance. The concessions state that the companies must grant concessions to the local population so the people can extract gold in a non-industrial way. Therefore, the ASGMs are concentrated in the same geographical areas as the large mines. There are **no figures** on what they produce and the value of this. It is estimated that more than **30,000** people work in small-scale gold mining throughout the country and that **20%** of them are women. It is estimated that they are organised in about 2,000 groups or cooperatives. Nicaragua decided to ban the import and the use of mercury in the mining industry from 2020, promoting a Five-Year Plan for Mining Development. Unfortunately, the results have not, so far, been as expected. It is illegal to deal with mercury in Nicaragua, yet it is still available in the market – and still widely used.

**Minerals and mining in La Libertad** The large mines process the extracted gold abroad and *without* mercury, whereas the miners who are employed in the companies, work their own production in their spare time, without regulation and *with* the use of mercury for extraction. The municipality has estimated that in La Libertad 3,000- 3,200 people work in ASGMs. Many of the miners are organised in cooperatives which work in the interests of the members in relation to necessary concessions.

**Health, mining safety and working conditions** Representatives of the Ministry of Health (MINSA) have stated that there is a huge mercury pollution in ASMG mining sites and that the pollution have resulted in urinary tract damages and many more premature babies and children with malformations. (Ref: MINSA’s local representative). The ore is mined from the surface in open pits, and from the underground through shafts and tunnels. Most tunnels have primitive hoists and no types of bracing. Furthermore, there is no shielding or protection from the rod mills grinding of the ore. This presents a huge safety hazard. Members of the cooperatives cannot register with the State Health and Pension fund INSS, which means they have no health insurance or pension.

**Mercury use in ASGM in Nicaragua** There are no official figures of the national consumption of mercury in ASGM. In La Libertad, it is estimated that there is a consumption **of 10 kilos/day.** This corresponds to an annual consumption of 3 tons. If consumption is proportional to the number of employees, then the annual consumption in Nicaragua will be around **29 tons!** *The ASGM-production is the only contributor to the mercury pollution in the area – and these miners are the main target group for this project.*

The mercury-free gold extraction method

This project aims to *introduce a* ***mercury-free gold extraction method***in the project area.

In a Diálogos fact-finding mission financed by the World Bank in 2007, it was discovered that a group of ASGMs from Benguet in the Philippines were using a mercury-free method for extracting gold. This mercury-free method is superior in environmental terms and also **yields 20-50 % more gold** (5,9,11).

Diálogos implemented this method in mining communities, which previously were using mercury: in the Philippines 2011-2017 in a CISU funded project and managed to stop the use of mercury in one project area and reduce the mercury usage in others. The recent external evaluation of the Philippine project concluded that the mining community Gaang has now been mercury-free for 7 years. In Mozambique in 2018, during a Diálogos miner-to-miner training session with scientific monitoring, the mercury-free method yielded up to 78 % more gold than the old method. The community is now mining without the use of mercury.

Similar projects are undertaken in Bolivia and Uganda. Thus, we know that the *mercury-free method works* and that it is possible to implement it in mining communities which have previously been using mercury.However, it does require *new skills,* and therefore*training and practice will be required before the miners are confident with the new method.*

**2: The partnership/collaborators**

Fundación Crecemos Juntos (FCJ) is a non-profit foundation and is implementing projects supported by international funding, i.e., from DOS Doetinchem, an NGO from Groningen in the Netherlands. They have been conducting several projects together during the last 30 years. FCJ was approved by the Parliament in 1996. There are currently 16 members and the board consists of six members. It has its own office house, and a permanent staff of 3, one being the accountant. The chairman is a medical doctor and a member of the city council. The volunteers include members who are economists, Vice Director of a local school, and others who work in the health clinic – thus enhancing the successful outcome of the information objectives in this project, as they represent and can impact some of the intended target groups.

FCJs original target groups were teachers, health workers and police officers: it started by building affordable housing for the target groups. FCJ has contributed to in-service training of teachers, extra tuition for students, introduction of technical equipment for the local health centre, improvement of ambulances, beds and laboratory for the health clinic.

FCJ is expanding its project portfolio to work with miners, health and safety. As working with ASGM is new to the partner, the project will contract with a project leader, and a local geology expert.

The local mining cooperatives along with FCJ have contacted Diálogos for help to introduce and implement the mercury-free method. The project proposal has been developed ***jointly*** *between us*. It is anticipated that a successful outcome of this project will result in a second, and larger proposal.

[**Diálogos**](https://dialogos.dk/)

Diálogos is a Danish NGO with about 200 members, founded in 1994 mainly by health professionals with broad work experience from developing countries. The NGO has considerable experience in projects within the fields of health and environment, mainly through projects funded by Danida and CISU in Bolivia, Nepal, the Philippines and Uganda. Projects are framed within the core competencies of occupational and environmental health, and intercultural health organisations. The core values are *empowerment, local anchoring of projects in the south, voluntary work in the north, interdisciplinary work and scientific documentation.* Diálogos has a proven track record of collaboration with organisations ranging from local NGOs to government authorities, universities and international organisations such as WHO.

For each Diálogos project, a voluntary workgroup is established. Members of the gold project groups have professional backgrounds in areas such as toxicology, geology, Occupational Health, Public Health and Healthcare Planning, Environmental Planning, Medical Anthropology, Social Anthropology, Philosophy and medical teaching and research. Several of the group members are affiliated with the University of Copenhagen and the University of Southern Denmark and have published a variety of scientific articles on ASGM and mercury contamination. The group members have work experience in health and ASGM projects in developing countries on five continents.

The suggested partnership is new, and the project is structured in the same way as Diálogos previous and ongoing projects in Africa, Asia, and Latin America. These projects have combined implementation and exchange of experience with mercury-free gold mining for more than 15 years. This has producedextensive knowledge and experience, and this, combined with insight into the Nicaraguan context, the target groups and the problems necessitating the intervention, creates the basis for successfully reaching the objectives of out-phasing the use of mercury.

## Division of roles in project implementation

*Fundación Crecemos Juntos* as the executing agency, has the responsibility, in coordination with Diálogos, of the management and practical implementation of the project. To fulfil this function, it shall:

i) Ensure technical and administrative management of the project. ii) Ensure overall coordination in the execution between partner and collaborating institutions. iii) Participate in internal and external evaluation processes. iv) Prepare quarterly progress reports. v) Prepare educational materials.

*Fundación Crecemos Juntos* will conduct in-house capacity building of the organisation (i.e., by Diálogos experts on mercury toxicology and in communication and fundraising). Its role as a *catalyst* is essential, in order to: i) Promote inter-institutional relationship. ii) Facilitate the acceptance of the project with the beneficiary groups and collaborating cooperatives. iii) Generate new links and opportunities to start similar interventions in other cooperatives, and with independent miners - not organised in cooperatives, in the project area.

La Fundación Crecemos Juntos is financially responsible towards Diálogos.

*Diálogos*is financially responsible towards CISU, and has the responsibility of ensuring the proper execution of the project. To fulfil this function, it shall: i) Guarantee the resources committed. ii) Monitor and evaluate the progress and achievements of the intervention. iii) Introduce the guidelines for internal and external monitoring and evaluation of the project. iv) Participate in internal and external evaluation processes. v) Review and approve monitoring reports and evaluation, internal and external. vi) Discuss policies, principles and readjustments that are relevant to the execution of this project.

In addition, Diálogos must also secure and transfer its experience from similar projects thereby assuming a more active role in: 1) Support the validation and transfer of the mercury-free method. 2) Support in the development of capacities and knowledge strengthening of the target groups.

**3. Target groups**

## **Primary target group**

### Miners: Miners, men and women, who work in ASGM environments with high exposure to mercury, have long been fighting for the recognition and respect of their rights and well-being. The *project will support, strengthen knowledge and develop the skills necessary for the establishment of a social, environmental and economically sustainable production system.* To achieve this, miners’ cooperatives will be introduced to health information and be trained in the mercury-free method.

It should be noted that these selected groups have previously been informed in meetings and interviews, about the scope, objectives and benefits of the project, which has allowed us to motivate and ensure participation in order to benefit at least **200 miners of which 20% are women**, all directly related and involved in the ASGM.

Miner cooperatives: Most of the miners in the project area are organised in mining cooperatives. They are organised by a general assembly with administration and supervisory councils. Some of the cooperatives are collectives that work together on the entire production process. The project will work with 6 cooperatives in La Libertad.

Health care professionals and teachers: Through workshops on toxicology and mercury health hazards, by means of meetings, web, media, and pamphlets, the project aims to inform and educate at least **10** teachers and **10** health care professionals about the consequences that mercury has on health and the environment, in addition to preventive measures.

**Secondary target groups** Families and community: The project emphasise informing and empowering the mining community, thereby hoping to impact the ASGM community in general. The general population is exposed to organic mercury pollution, and in contact with inorganic mercury. From the local institutions and from the municipality **10** representatives will be trained in toxicology and health. The local Ministry of Health representative, the Health Clinic as well as the local representative of the Ministry of Energy and Mines in La Libertad, are well aware of the problems with mercury pollution, and have expressed willingness to participate in the project.

**The project area**

The project will take place approximately 150 km from the capital Managua, in the municipality of La Libertad, Department of Chontales. The municipality covers 775 Km2, and has a general population of 14,500. In La Libertad there are ten mining cooperatives. It is estimated that there are 3,000 to 3,200 ASGMs, among these approximately 20% are women. From this municipality 6 cooperatives will participate, and be trained at the demonstration facility established in La Libertad.

**4. Strategy to achieve objectives** Diálogos’ various previous projects have shown that introducing new mercury-free methods, is not just reduced to transfer of technical expertise and knowledge: the *solution* to the problem is not simple, because it must *be oriented to changing habits and production processes*.

Key contributions of the intervention: Besides introducing a new mercury-free method, the project emphasises empowering the community of miners by *generating local knowledge* about mercury and safe mining as well as *stimulating* *organisation* of interest groups to change the practices among ASGMs in the project area.

## **Strategic deliveries:**

Mercury-free facility: The installation of a real-size, but low cost, learning facility, which will be used to demonstrate the effectiveness of the mercury-free method and for the training of experts, is in use. Diálogos Master miners from Benguet in the Philippines will travel to Nicaragua and will be responsible for the miner-to-miner education. Thus, a south-south exchange of experience will take place.

Before their departure, building instructions for the demonstration facility are sent ahead. The building parts will be ready for assembly, and the construction will be done by the Diálogos’ experts after arrival.

The learning facility will be donated to the miners/cooperatives for further training and sustainability of project activities.

### Miner-to-miner training: To become local Expert miners, **20** enthusiastic miners are selected.

The experienced Diálogos Master miners from the Philippines conduct a series of Master classes lasting 3 days. Local miners who learn to master the mercury-free method and learn to teach it, will become Expert miners. The miner-to-miner training takes place at the learning facility.

Along with the technical training, the miners receive a course in mercury toxicology and practice teaching their fellow miners lasting 1 day.

Upon finishing the Master Classes, the local *Expert miners will teach their fellow miners* the mercury-free gold extraction method. Each Expert miner will *ensure that 5 fellow* miners are subsequently trained by him/her, and *they in turn teach others.*

The project will supply a ‘start kit’ for the 20 Expert miners, with the necessary remedies for conversion to mercury-free mining. As mentioned, miners from other cooperatives in the area will have to transport themselves over to the training facility for the training in the mercury-free method, including the final process of the burning of gold ore with borax. The 20 start kits are intended as an aid to carry out the full process including the burning of gold ore with borax locally*,* in their own cooperative in their own villages*.* Hereby, they avoid the transportation to another place to carry out the purification, and to ‘book’ time for the process. At the end of the project each of the six trained cooperatives have three starter kits. The cooperatives’ members will be able to conduct the purification process together locally, in a ‘corporate’ fashion - or the members can join forces to buy more, if necessary. The tools for startkits are easily available locally. The start kit provided by the project contains sufficient borax to supply all 200 participants enabling them to start using the mercury-free method on their own.

We thus expect the training to have a multiplier effect as knowledge is expected to be passed on to fellow ASGMs in their cooperative and villages as they realise the economic, environmental, and health benefits of mercury-free gold extraction.

Experience and lessons learned will also be shared between cooperatives, with the help of the local geologist.

*Occupational health:* In the information, education and communication processes, aspects related to environmental safety, occupational health, safe working conditions will be addressed during the miner training. *Feasible* safety measures will be identified and promoted. All of this in order to achieve more awareness and introduce preventive measures.

Formation and training of Interest groups: Training sessions in communication of the toxicity of mercury and the mercury-free method to extract gold will be conducted for a mixed group of ASGM’s, local government representatives, teachers and health care workers.

Evaluation and gathering of experiences: Baseline and follow-up studies will be conducted and will document the change in knowledge, attitudes and practice regarding the use of mercury in the mining community during the project duration.

Questionnaires for interviews of the target groups knowledge of mercury toxicology (before and after training) have already been developed by Diálogos, and are ready for use.

Contact will be established with Diálogos’ project partner, Plagbol in Bolivia, for inter-regional exchange of experience, best practice and educational materials.

In the project we will transfer technical knowledge as well as inform and teach on toxicology and health. This project’s strategy is thus based on the vision of generating a process of both a *productive and, at a later stage, also an institutional transformation within local, and hopefully also regional and national stakeholders and institutions.*

**The plans for systematising and disseminating the experience**

* Discussions over Zoom and monitoring visit, reports from partner and evaluation.
* Data collections, experiences gained and best practices established will be incorporated into project management and monitoring processes.
* Project results will be made public and accessible through publications and information.
* Contact has been established with the local radio station about making news spots about the project activities.
* Video about the introduction of the mercury-free method will be produced.
* In a future project, local and regional seminars will be conducted, further contributing to making project activities and objectives sustainable.

**Future initiatives**

Based upon the experiences and lessons learnt in this initial project, a following project will be developed. Further interventions in that project *could* include but not be limited to:

* Expanding the project areas, cooperatives and communities.
* Increase the number of participants.
* Include independent miners and other stakeholders.

**LOGICAL FRAMEWORK**

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| --- | --- | --- | --- |
| Objective | Output | Activity | Indicator / *Means of verification* |
| 1) A group of small-scale gold miners have **been trained to perform mercury-free recovery of gold** and **disseminate** this knowledge to fellow miners. | **1.1**  A mercury-free learning facility is in use in La Libertad. | **Construction of 1 mercury-free learning facility**  **(Budget lines 1.1.1-1.1.11 + 2.1.1)**   1. Build a demonstration site. 2. Disseminate information and experiences of the mercury-free method. 3. Introduce and operate a demonstration site. 4. Compile a technical manual. | - Demonstration site is built and running.  - Gold yield shown to be unchanged or increased when testing the mercury-free method against the old method.  *Source: Inspection reports, measurements, photos.* |
|  | **1.2**  20 miners (15 men and 5 women) are able to implement the mercury-free method and to *train other* miners in the use of the mercury-free method and safety in mining. | **Expert education in the mercury-free method**.  **(Budget lines 1.2.1-1.2.28 + 6.2.1-6.2.7)**  1.Meetings in 6 cooperatives in the community to identify the miners who will participate in the training process.  2. Develop/Adapt the training program and educational materials for the miners.  3. Implement the process of training and transfer of the method with Diálogos’ Master Miners. (3 theoretical and 3 practical courses events).  4. Workshop to assess quantitatively and qualitatively the degree of learning of the Expert Miners. | - 80 % of the trained miners master the new method.  - 80% of the trained miners use the new method for gold extraction.  *Source: Workshop, Follow-up study, evaluation/questionnaires.* |
|  | **1.3**  Larger group of 200 miners have *increased their knowledge* on the mercury-free method and mining work safety and are *motivated* to use it. | **Transferring knowledge from Expert miners to fellow miners**  **(Budget lines 2.1.2 + 1.3.1-1.3.9)**  1.Prepare/adapt the educational materials for the transfer of knowledge to fellow miners.  2.Support the adoption of the method at a regular level.  3. Exchange of experience and lessons learned between cooperatives. | - Knowledge of mercury-free gold mining has increased among fellow miners.  - In half of the cooperatives, mercury-free gold extraction is used.  - Expert miners have taught at least 5 fellow miners each. Total 100 miners.  - Examples of practical improvements in the working environment and safety conditions in the mines.  *Source: Questionnaires of knowledge and use of the mercury-free method.*  *Existence of manual describing the mercury-free method and safe mining practices.*  *Interviews, inspections, photos.* |
| 2.  The local community in the mining area has *increased knowledge* of mercury pollution, its prevention and has *begun to organise* promoting conversion to safer and mercury-free mining. | **2.1**  A baseline on local knowledge of mercury pollution in mining exists. | **Development of baseline study and materials**  **(Budget line 1.4.1)**  1.pre-and post-evaluations of knowledge of mercury poisoning and mercury-free gold mining among local community groups. | - Baseline study has been used for elaboration of strategy and informative materials.  *Source: Results of the baseline and follow-up studies using questionnaires and interviews.* |
| **2.2**  Communication strategy and materials exist for dissemination of knowledge. | **Development of communication strategy**  **(Budget lines 1.5.1-1.5.3 + 1.4.1)**  1.Develop a communication strategy.  2.Design/adapt educational materials.  3. Production of video & radio/TV programs.  4. Publication of article. | - Appropriate educational materials (posters, guides) are available for each target group.  - Video of the mercury-free method exists.  - Radio/TV spots in La Libertad.  - Article in peer-reviewed paper.  *Source: Inspection of information and materials, radio/video.* |
| **2.3**  Key stakeholders have *acquired knowledge* on mercury poisoning and mercury-free gold mining. | **Training and awareness raising**  **(Budget lines 1.6.1-1.6.4)**  1. Coordinate, plan and implement a training process (1 workshop) with 1/3 women and 2/3 men from municipal and union authorities, total 10 persons).  2. 1 workshop for 10 health professionals.  3. 1 workshop for 10 teachers. | - Knowledge of mercury's toxic effects and the alternatives of mercury-free mining has increased by 50% among trained stakeholders.  *Source: Inspection of materials and attendance documents, certificates, photos, and stakeholder interviews.* |
|  | **2.4**  ASGMs, union representatives, local government representatives, health care workers, and teachers *have acquired skills in communicating* mercury toxicity and the mercury free gold extraction method. | **Communication training**  **(Budget line 1.6.5)**  1. 1 workshop with ASGMs, union representatives, local government representatives, health care workers and teachers (30 people in all). | - 50% of the workshop attendees have acquired the skill to communicate their knowledge of mercury toxicity and the mercury free gold extraction method.  *Source: Video of communication from the attendees and stakeholder interviews* |

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## **Main project assumptions**

* New method can be verified for use with ASGMs in Nicaragua.
* Goodwill and interest from cooperative and miners to learn a new method.
* The miners trained as experts are able and willing to share knowledge.
* Conversion to the new method is possible without major investments.
* The suggested mining security measures are realistic and practical.
* The political situation is stable – including manoeuvrability for foreign NGOs.
* The Covid19 outbreak does not increase, and/or cause unforeseen delays for the project’s timeframe and in project activities.

**Risks** Miners and their communities are living in fragile conditions, particularly in regards to:

* Political fragility: a) Voice and accountability. b) Perception of corruption.
* Environmental fragility: c) Rule of law. d) Environmental health.
* Economic fragility: e) Regulatory quality.

*The project’s activities are directly related to contributing to diminishing and remedying these structural risks. Already existing ties with local and national policy makers and political parties, and with the cooperatives will hopefully enable the project staff to conduct activities in the fragile and sometimes uncertain conditions.*

***5. Intervention-related information work in Denmark***

### Scientific articles: Diálogos has a long tradition for documenting the effect of the projects with scientific methods, as many of the members in the Diálogos gold group are researchers. Diálogos will further contribute to the project by writing articles and drawing upon their contacts i.e., ICOH scientific committees and colleagues from universities all over the World; all on a voluntary basis.

***6. Supplementary financing***

The project has managed to attract supplementary funding in regards to covering salary for two Danish experts (Budget line: 6.1).

The supplementary financing is a prerequisite for implementing the activities.

* Peter Appel, geologist and expert in mercury-free gold mining, will be financed through his own company, AppelGlobal.
* Chris Kuylenstierna, social anthropologist, will participate as his first trip with Diálogos and therefore will be paid travel, hotel and per diem only.

The combined value of these experts’ salary is estimated at 60.088 DKK. Peter Appels salary of 30,044 DKK provided by AppelGlobal is mentioned in the budget now.

**7. References:**

1. Perez E, Appel PWU, Koester-Rasmussen R. 2007 Training of Small-Scale Miners and their Families in Safe Handling of Mercury During Extraction of Gold in the Philippines. Report for the World Bank from the Geological Survey of Denmark and Greenland (GEUS).
2. Dialogos’ film on youtube.com <https://www.youtube.com/watch?v=X6Sawj0HyF0>
3. Appel PWU and Na-Oy L. The Borax method of gold extraction for small-scale miners. Blacksmith Institute J Health Pollut 2012; 2: 5–10.
4. Arctic Monitoring and Assessment Programme (AMAP)/The United Nations Environment Programme (UNEP). Technical background report for the global mercury assessment 2013. Oslo, Norway/Geneva, Switzerland: AMAP/UNEP, 2013, p.263
5. Appel, Peter & Høegh, Simon. Fact finding mission in Bolivia, 2019.
6. *Global Mercury Assessment 2013. Sources*, *Emissions*, *Releases and Environmental Transport*, United Nations Environment Programme, Chemicals Branch, Geneva, Switzerland, 2013.
7. 7. Envio digital: *Mining brings us neither growth nor development* <https://www.envio.org.ni/articulo/5370>
8. Envio digital: *In six years the gold will all be gone* [*h*ttps://www.envio.org.ni/articulo/4678](https://www.envio.org.ni/articulo/4678)
9. Stoffersen B, Køster-Rasmussen R, Cardeño JIC, Appel PWU, Smidth M, Na-Oy LD, Lardizabal DL, Onos RW. Comparison of Gold Yield with Traditional Amalgamation and Direct Smelting in Artisanal Small-Scale Gold Mining in Uganda. J Health Pollut. 2019 Nov 27;9(24):191205. doi: 10.5696/2156-9614-9.24.191205. PMID: 31893166; PMCID: PMC6905143.
10. Stoffersen, PWU Appel, Leoncio D Na-Oy, AS Sekamane, IZ Ruiz, R Køster-Rasmussen. Introduction of Mercury-Free Gold Extraction to Small-Scale Miners in the Cabo Delgado Province in Mozambique. Journal of Health & Pollution Vol. 8, No. 19 — September 2018.
11. Rasmus Køster-Rasmussen, Maria Lurenda Westergaard, Marie Brasholt, Richard Gutierrez, Erik Jørs, Jane Frølund Thomsen. Mercury pollution from small-scale gold mining can be stopped by implementing the gravity-borax method - a two-year follow-up study from two mining communities in the Philippines. NEW SOLUTIONS: A Journal of Environmental and Occupational Health Policy. [New Solut.](https://www.ncbi.nlm.nih.gov/pubmed/26463257) 2016 Feb;25(4):567-87. doi: 10.1177/1048291115607929. Epub 2015 Oct 13.
12. <https://journals.lww.com/epidem/FullText/2011/01001/Mercury_Pollution_in_La_Libertad,_a_Gold_Mining.904.aspx>
13. /Users/margrethesmidth/Downloads/Barefoot\_sampling\_in\_San\_Juan\_de\_Limay\_Nicaragua\_r.pdf