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UNIVERSIDAD AUTÓNOMA DE SAN LUIS POTOSÍ
FACULTADES DE CIENCIAS QUÍMICAS, INGENIERÍA, MEDICINA
Y CIENCIAS SOCIALES Y HUMANIDADES
PROGRAMA MULTIDISCIPLINARIO DE POSGRADO EN CIENCIAS AMBIENTALES
AND
TH KÖLN - UNIVERSITY OF APPLIED SCIENCES
INSTITUTE FOR TECHNOLOGY AND RESOURCES MANAGEMENT IN THE TROPICS AND SUBTROPICS

ENVIRONMENTAL PEACEBUILDING AND TRADITIONAL GOLD MINING COMMUNITIES: CHALLENGES AND OPPORTUNITIES IN A POST-CONFLICT SETTING IN COLOMBIA

THESIS TO OBTAIN THE DEGREE OF
MAESTRÍA EN CIENCIAS AMBIENTALES
DEGREE AWARDED BY UNIVERSIDAD AUTÓNOMA DE SAN LUIS POTOSÍ
AND
MASTER OF SCIENCE
NATURAL RESOURCES MANAGEMENT AND DEVELOPMENT
DEGREE AWARDED BY TH KÖLN – UNIVERSITY OF APPLIED SCIENCES

PRESENTS:

JOHANN SEBASTIAN REYES BEJARANO

CO-DIRECTOR OF THESIS PMPCA
Dr. FERNANDO DIAZ BARRIGA MARTINEZ
CO-DIRECTOR OF THESIS ITT
Dr. UDO NEHREN
ASSESSOR:
Dr. MIGUEL ALGUILAR ROBLEDO

COLOGNE, GERMANY 18.08.2019

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(CO-DIRECTOR, ITT)

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(ASSESSOR, PMPCA

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Erklärung / *Declaración*

Name / *Nombre*: JOHANN SEBASTIAN REYES BEJARANO

Matrikel-Nr. / *N° de matrícula*: 11124624 **(TH Köln),** 0286429 **(UASLP)**

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Abstract

The post-conflict setting in Colombia resulted after the signing of the peace agreement between the Revolutionary Armed Forces of Colombia (FARC) and the national Government at the end of 2016, faces two main problems. On one hand, the environmental degradation and the pressure over the ecosystems now exposed to the economic and socio-demographic dynamics of the country; and on the other hand, the increase of violence in rural areas characterized by the abundance of natural resources. These two problems can be linked through the complex dynamics of natural resources appropriation. Among the natural resources affecting the course of the post-conflict in Colombia, gold appears as one of the most relevant sources of violence and environmental degradation. This condition makes it crucial to understand the complex local dynamics of mining regions in order to propose alternatives for consolidating a sustaining peace. The armed groups, the state, the private companies, and traditional gold mining communities are all stakeholders involved in gold mining and the conflicts around this activity. Nevertheless, communities have been denied as a formal actor.

This work aims to give voice to those communities, understanding them as a key actor for peacebuilding. This research seeks to understand the relationship between gold mining and the social-armed conflict in Colombia, to identify which are the drivers for the increasing of this activity during the post-conflict, as well as which strategies developed by traditional gold mining communities can contribute to peacebuilding. Thus, an integrative analytical framework is developed. This theoretical framework integrates 1) environmental peacebuilding to evaluate the possibilities of natural resources to becoming tools for cooperation, and 2) political ecology to clarify, from a multi-scalar approach, the socio-political context in which the conflict takes place. Hence, from a qualitative approach that involves several ethnographic methods is found that artisanal-ancestral miners and traditional miners organized to remain in their territories in a context of dispossession, have developed socio-ecological systems and natural resources management strategies relevant to implement initiatives of environmental peacebuilding that can be sustained over time and aimed to overcome the structural causes of violence and environmental degradation.

Keywords: Environmental peacebuilding, political ecology, gold mining, post-conflict.

Resumen

El escenario del postconflicto en Colombia, resultado del acuerdo de paz entre las Fuerzas Armadas Revolucionarias de Colombia (FARC) y el Gobierno nacional a finales del 2016, enfrenta dos grandes problemas. Por un lado, la degradación ambiental y la presión sobre ecosistemas ahora expuestos a las dinámicas económicas y sociodemográficas del país; y, por otro lado, el aumento de la violencia en las zonas rurales caracterizadas por la abundancia de recursos naturales. Estos dos problemas se relacionan a través de las dinámicas de apropiación de los recursos naturales. Entre los recursos que afectan el curso del posconflicto en Colombia, el oro aparece como una de las fuentes de violencia y degradación ambiental más relevantes. Esta condición hace que sea crucial comprender las dinámicas locales de las regiones mineras para proponer alternativas que permitan consolidar una paz sostenible. Los grupos armados, el Estado, la empresa privada y las comunidades que desarrollan minería de oro tradicional son actores involucrados en la minería de oro y los conflictos generados alrededor de esta actividad. Sin embargo, las comunidades han sido negadas como un actor valido.

Este trabajo pretende dar voz a esas comunidades, entendiendo a las mismas como un actor clave para la construcción de paz. La investigación busca comprender la relación entre la minería de oro y el conflicto social y armado en Colombia, evaluar las razones del incremento de esta actividad en el postconflicto, e identificar cuales estrategias implementadas por las comunidades que desarrollan minería de oro tradicional pueden contribuir a la consolidación de la paz. Por lo tanto, se desarrolla un marco analítico integrador. Este marco teórico integra 1) el enfoque de la consolidación de paz ambiental para evaluar las posibilidades que tienen los recursos naturales de convertirse en herramientas para la cooperación, y 2) la ecología política para esclarecer, mediante un enfoque multiescalar, el contexto sociopolítico en que tienen lugar los conflictos. Por lo tanto, desde un enfoque cualitativo que involucra métodos etnográficos, se encuentra que los mineros artesanales - ancestrales y los mineros tradicionales organizados para permanecer en sus territorios en un contexto de despojo, han desarrollado sistemas socio ecológicos y estrategias de gestión de recursos naturales relevantes para la implementación de iniciativas de consolidación de paz ambiental que puedan mantenerse a lo largo del tiempo y que apunten a superar las causas estructurales de la violencia y la degradación ambiental.

Palabras Clave: Consolidación de paz ambiental, ecología política, minería de oro, postconflicto.

Introduction

At the end of 2016, was signed in Colombia the peace agreement between the national government and the Revolutionary Armed Forces of Colombia (FARC-EP), known as "*Acuerdo Final para la terminación del Conlficto y la construcción de una paz estable y duradera*" (Gobierno de Colombia y FARC-EP, 2016). The signing of this agreement has been a crucial step towards the end of an armed conflict that has extended over more than six decades. But at the same time, the period of implementation of the agreements has revealed and even intensified, other manifestations of violent conflicts in some regions and territories of the country, something that demonstrates the complexity of peacebuilding in Colombia.

Among the problems that appear as a challenge for the post-conflict and peacebuilding, two could be highlighted. In the first place, there are social problems related to the continuity of violence in the territories. After the retreat of the FARC from the areas they historically controlled, a sort of power vacuum was created in the territory, which had an impact on the increase of crime. In addition, illegal armed groups have started disputes over the appropriation of strategic corridors, which have resulted in combats and mass displacements of populations (Semana, 2017). Added to this, there has been an increase in the assassination of social leaders (El Tiempo, 2018), mainly in rural areas, facts that weaken community organizations and undermine the community empowerment.

In the second place, there are problems associated with the deterioration of the environment. After the suspension of hostilities between the government and the FARC, as well as the mobilization of the guerrillas towards the transitory sites for the beginning of the process of reincorporation into civil society, the environmental problems related to deforestation and the intensification of mining activities have increased substantially, principally in those areas abandoned by the FARC (Tarabochia López, 2017).

Informal gold mining is one of the most alarming mineral extraction activities as it has not environmental management programs in place for its operations and, in many cases, uses mercury in the extraction processes, endangering the health of both ecosystems and human populations (Olivero, 2018). In addition, mining activities turn out to be a factor in the

generation of social conflicts and disruptions. This happens due to the existence of mineral deposits under informal and artisanal exploitation are an important incentive for the appearance of illegal armed groups (Coronado & Barrera, 2016). This situation intensifies the manifestations of violence and conflicts.

Considering these issues, it becomes evident that in the post-conflict setting of Colombia, environment deterioration and violence are highly related. Therefore, the commitment to building territorial peace, which means building peace based on the needs, particularities and, realities of each territory, requires the recognition for addressing the environmental problems those territories are facing, understanding them as part of the manifestation of violence. At the same time, it is crucial to understand the relationships between violence and natural resource appropriation, and doing so, to identify the opportunities for building peace by looking for inclusive strategies of natural resources management.

Research problem

The peace agreement between the FARC and the government of Colombia signed in 2016, brought the country into the setting of post-conflict. The post-conflict means that the country has entered in a process in which is expected to reach the goals that will allow overcoming the violence. In a post-conflict scenario, those goals normally include cessation of hostilities and armed violence; signing of agreements between encounter parts; demobilization, disarmament, and reincorporation of ex-combatants; refugee return; establishing a functioning state; achieving reconciliation and societal integration and economic recovery (Suarez, Árias-Arévalo, & Martínez-Mera, 2017). In Colombia, the central document for guiding these reforms and programs for achieving the goals is the document both parts, government, and FARC, signed as agreement. Nevertheless, as some literature states, the priorities in post-conflict have been focused on socioeconomic recovery, peacekeeping, and poverty reduction, while natural resource management and environmental issues are relegated aspects (Suarez et al., 2017).

Therefore, besides the issues and the slow development the implementation of the agreement has had, two central problems call the attention: the continuity of violence and the

deterioration of the environment. The continuity of violence is expressed through the appearance of new armed groups and FARC dissidents, the confrontation between those groups for controlling opened territories after FARC demobilization, and the violence against social leaders of grass-roots organizations in rural communities (Vanegas, E. Á., Vélez, A. C., & Astroz, 2017). On the other hand, the environmental deterioration is noticed through the increase of deforestation and biodiversity loss (Tarabochia López, 2017), as well as the environmental degradation due to activities such as mining, which cause water pollution and might affect the ecological resilience of the forested areas (Baptiste et al., 2017).

Overcoming both problems is, therefore, one of the main challenges of post-conflict in Colombia. Consequently, it is crucial to ask how these problems are linked. The assumption of this research is that the connection between these problems is established by the dynamics of natural resources appropriation. Thus, to understand the dynamics of certain types of natural resource appropriation as a link between violence and environmental degradation would be a crucial point for developing strategies oriented to improve the natural resources management in those areas affected by violence. This attention is motivated by the narratives of environmental peacebuilding approach, which "attempts to integrate socially just forms of natural resource management into conflict prevention and post-conflict peacebuilding" (Le Billon & Duffy, 2018, p. 245).

Hence, the idea is to find out opportunities for making peace in those territories characterized by the abundance of natural resources, which are the most affected areas by the internal conflict. This idea is supported by the approach of environmental peacebuilding, which states that there are certain key qualities of environmental concerns that would lead discordant parties to consider them as a means of cooperation (Ali, 2007). In this way, the research aims to identify what aspects should be considered to develop natural resources management strategies recognized as "socially just", which can become a tool for achieving peace in Colombia.

Nevertheless, each resource is associated with different dynamics of appropriation and conflicts (Le Billon, 2009; Rettberg, Leiteritz, & Nasi, 2014). For this reason, trying to explain the dynamics of all those natural resources involved in Colombian conflict would be

an unachievable goal for the master´s research. In consequence, this research focused on informal and traditional gold mining.

There are three reasons for this: first, the importance of this activity for the extractive economy of Colombia, since 87% of gold mines do not have legal permission and only 3% have an environmental license (Güiza & Aristizábal, 2013). Moreover, traditional mining is present in 44% of municipalities and represents 30% of total mining operations (Quiroga, 2016). Secondly, the relation gold has had with violence, being recognized as an economical source of armed groups (Le Billon & Massé, 2017; Ortiz-Riomalo & Rettberg, 2018), a fact that might explain why 40% of the 489 municipalities where illegal mining takes place have a presence of armed groups like the FARC, The National Liberation Army (ELN) or Criminal Gangs (BACRIM) (Le Billon & Massé, 2017). Furthermore, 80% of human rights violations in the first decade of this century occurred in mining-energy regions, and 87% of the displaced people in the country come from these places (Le Billon & Massé, 2017). Finally, the environmental problems gold mining generates are highly relevant. Particularly, because most of the informal gold mining use mercury for the extraction of gold without any kind of regulation. Indeed, 130 Tons of mercury were imported in 2011, and 75% of them were used in artisanal and small-scale mining (Güiza & Aristizábal, 2013).

To understand the problem, it is important to clarify three stages that will shape the storyline through which this research will advance:

1) The first stage takes place during the "war against FARC". This stage is characterized by the strong presence of FARC over the territories, a presence that influenced during years the natural resources appropriation in the territories controlled by this guerrilla, even generating sorts of management strategies together with communities under their influence. At this point, it would be important to identify how gold mining became a source for armed groups, the actors involved in gold extraction and the role of communities.

2) The second scenario is the "post-conflict settling", which is the current stage. This moment appears after the vacuum of power generated by FARC demobilization. This period is characterized by the increase of informal gold mining and its associated

environmental and social problems. Here, it would be important to understand the drivers for the increase of the activity, the changes in natural resources management, the perception of FARC ex-combatants about the problem and the meanings communities have about it, as well as the strategies grass-roots organizations have developed to face the problem.

3) The third stage would be a possible scenario formed during post-conflict, in which improved strategies for natural resources management developed by communities, are recognized as strategies to consolidate peace in those territories. The base for those management strategies would be the initiatives and meanings of resource appropriation that communities have developed during the last two scenarios. Strategies that have been carried out to achieve the goal to remain in their territories despite the violence against them.

The analysis of the first two stages aims to better understand the context in which gold appropriation takes place. The idea is to identify the main actors, their meanings and perceptions about this natural resource appropriation; the conflicts behind, and their social and environmental consequences. Moreover, it is also important to figure out the strategies of natural resource management generated during the mobilization processes, in which communities claim for the right to remain on their territories in better social and environmental conditions. This is crucial because it would be the baseline for making natural resources management strategies that can be considered paths for achieving peace.

Research Questions

- How is the relationship between informal gold mining and the social-armed conflict in Colombia?
- What are the causes of the increase of informal gold mining during post-conflict with the FARC?

- Which grass-roots organization strategies developed by traditional gold mining communities should be considered for developing sustainable natural resource management strategies as a tool for achieving peace in gold mining regions of Colombia and which social and economic aspects are relevant?

Justification

First, this research aims to better understand the post-conflict challenges in Colombia, particularly the problems of violence and environmental degradation generated through informal gold mining. This understanding is the baseline for developing proposals oriented to peacebuilding in those regions affected by the increase of extractive activities during post-conflict. The proposal developed through this research would be centered on natural resource management and environmental conservation as the core idea for peacebuilding. This idea is supported by the approach of environmental peacebuilding, which suggests that natural resources can be considered as a source of cooperation, conflict reduction and creation of peace (Le Billon & Duffy, 2018). This would be particularly important in regions characterized by natural resources abundance, in which the history of violence linked to them, might allow thinking in theories related to the "resource curse".

Secondly, the environmental relevance of understanding the issues related to informal mining is related to the fact that the main method for gold extraction is amalgamation. Through this method, the small miners use mercury to separate the gold from the material without economic value. This separation creates a mixture of gold and mercury called amalgam, which is burned to recover the gold while the mercury goes to the atmosphere through evaporation (Güiza & Aristizábal, 2013). It is estimated that globally, the implementation of such techniques, leads to the discharge of around one thousand tons of mercury in the environment, 40% in the atmosphere and 60% in soils and water (Güiza & Aristizábal, 2013).

The mercury used for gold extraction is highly toxic and polluting, persists in the environment, is accumulated in the trophic chain and has negative effects on human health (Güiza & Aristizábal, 2013). Therefore, in order to overcome these kinds of polluting practices that have increased during post-conflict, it is crucial to understand the economic,

politic and social factors that influence the realty of gold mining extractivism in the territories. This is urgent considering that Colombia is one of the largest mercury importers worldwide (Güiza & Aristizábal, 2013).

This research aims to be part of the efforts that exist to protect human health and the environment from the anthropogenic emissions of mercury, as is established in the Minamata Convention of Mercury (Programa de las Naciones Unidas para el Medio Ambiente, 2013). At the same time, it is linked to the national efforts such as the law 1658 of 2013, which regulates the commercialization and promotes the reduction and elimination of mercury. Hence, the proposals for natural resource management that emerged from this research might include what the Minamata Convention has called "the best available techniques and best environmental practices" for artisanal and small-scale mining.

Finally, the research is an effort to integrated two different academic approaches that have focused on environmental conflicts and natural resource conflicts: Political ecology and peace and conflict studies. On one side, political ecology has been focused on conflict analysis avoiding environmental determinism by attending socio-historical factors behind such conflicts more than environmental ones. Thus, political ecology has centered on understanding the impacts of uneven power relations and conflict on resource access. The methods of research implemented in these approaches are mainly ethnography with multi-scalar analysis (Le Billon & Duffy, 2018). On the other side, though a positivist methodological approach, peace and conflict studies have centered the attention on the causal effects of environmental change, and how these changes can drive conflicts (Le Billon & Duffy, 2018). The efforts of peace and conflict approaches are oriented to demonstrate the factors and mechanisms behind the conflicts and their mode of resolution. Moreover, with a more systematically understanding through quantitative research, it mostly analyses higher scales of conflicts, including international and civil wars (Le Billon & Duffy, 2018).

This research attempts to integrate both disciplines and approaches to understand a specific problem. This integration has been recognized as a gap in the analysis of environmental conflicts (Le Billon & Duffy, 2018). Furthermore, the research can contribute to the environmental peacebuilding approach, which has been mainly focused on international conflict resolution. Political ecology could give support for analyzing the possibilities of

natural resource management and conservation to become a tool for cooperation as the environmental peacebuilding literature suggest.

Research Objectives

General objective: To identify the opportunities and social, political and economic criteria that should be considered in order to sustainable and fair natural resource management strategies can become tools for cooperation in traditional gold mining territories during post-conflict in Colombia.

Specific objectives:

- To describe the relationships between informal gold mining and social-armed conflict in Colombia;
- To discuss the causes for the increase of informal gold mining in the post-conflict setting, and its effects on environmental and social degradation in traditional mining territories;
- To identify the natural resources management strategies and the meanings traditional gold mining communities have developed around gold and discuss whether those strategies and meanings might be integrated into environmental peacebuilding initiatives in post-conflict Colombia.

1. Theoretical framework: Environmental peacebuilding and political ecology- An integrative analysis to evaluate the role of natural resources management for peacebuilding in gold mining communities of Colombia.

1.1 Environmental peacebuilding, achieving peace through environmental cooperation.

The post-conflict setting that the peace agreement between FARC-EP and the national government generated in Colombia must face several political, economic, and environmental challenges in order to achieve a lasting peace. It is not possible to address those challenges through centralist perspectives and policies oriented to solve the structural causes of armed conflict from a national level. The initiatives and proposes should consider the specific conditions and shapes that armed conflict took at subnational levels. For these reasons, the peace agreement adopts the concept of "territorial peace", which allows thinking in peacebuilding processes as localized efforts to contribute to solving the root causes of violence with the community participation in each territory. Hence, territorial peace would be a process of peacebuilding from a territorial perspective that implies participative planning to identify the characteristics and necessities of each territory. Territorial peace processes should be done in order to build plans oriented to transform those territories by addressing the structural causes of violence such as poverty, marginalization, lack of infrastructure, sanitation and education (Chamie, 2018; Rodriguez, Rodriguez, & Durán, 2017)

One of the fields in which territorial peace must focus on in order to understand the dynamics of violence is the relationship between natural resources and violence. This is particularly important in mining regions due to those areas have concentrated the highest rates of violence during armed conflict (Le Billon & Massé, 2017; Mcneish, 2016). Gold has become an important resource for fuelling armed conflict in Colombia, and the dynamics of this resource exploitation and appropriation have shaped not just the conflicts but also the socio-territorial dynamics of traditional gold mining regions. Therefore, addressing the relationships of

natural resources appropriation and proposing participatory plans for improving sustainable natural resources management is crucial to consolidate peace in traditional gold mining communities. Hence, gold might be categorized as a "Conflict resource", which means a natural resource whose "systematic exploitation and trade in a context of conflict contribute to, benefit from, or result in the commission of serious violations of human rights, violations of international humanitarian law or violations amounting to crimes under international law" (UNEP, 2009, p. 7).

Environmental peacebuilding appears as a relevant approach to understanding the relationships between informal gold mining and violence in the context of post-conflict in Colombia due to this approach have not just concentrated in analysing how natural resources are involved in conflict, but also because it suggests that natural resources can be a trigger for cooperation in conflict scenarios (Carius, 2006; Dresse, Fischhendler, Nielsen, & Zikos, 2019; Krampe, 2017; Le Billon & Duffy, 2018; Ogden, 2018) Therefore, environmental peacebuilding is a useful framework to identify the challenges and opportunities of improving natural resources management and environmental governance for peacebuilding in traditional gold mining regions of Colombia.

Environmental peacebuilding emerges as a branch of peace and conflict studies focusing on the role natural resources and environment might play in building cooperation and trust, instead of provoking conflicts due to resource scarcity or due to abundance as presented in the resource curse theory. The fact that in recent decades 80% of armed conflicts have occurred in biodiversity hotspots, especially in regions with extensive tropical forests (Salazar et al., 2018) which affects key ecosystems and contributes to extent conflicts have brought the attention over the role of natural resources management in violence generation as well as in conflict resolution strategies. In this way, since the early 2000s, an important amount of researchers and practitioners have "focused on the ecological foundations for a socially, economically, and politically resilient peace" (Krampe, 2017, p. 1).

Initially, environmental peacebuilding has been focused mainly on inter-state or international conflict resolution (Dresse et al., 2019; Le Billon & Duffy, 2018). Therefore, literature interested in the environment-conflict nexus started focusing on interdependence and

sustainable development, viewing environmental challenges as an incentive for transboundary cooperation rather than a cause for violent conflict between states. Nevertheless, "this approach focusing on shared natural resources as a conflict resolution tool has since developed into a transformative framework that encompasses conflict prevention and post-conflict peacebuilding" (Dresse et al., 2019, p. 2) allowing this approach to be applied on internal conflicts and post-conflict scenarios.

> "Environmental peacebuilding is based on the hypothesis that the mutual benefits of cooperation outgrow the self-interested rationale of conflicts and can contribute to the pacification of coupled human-natural systems in a durable and multifaceted way (...) This hypothesis is supported by most non-orthodox economic approaches, nuancing rational choice as a primary motivation for human action, viewing conflict as not purely determined by competition but resulting from many factors" (Dresse et al., 2019, p. 2)

Technical literature that analyzes the relationship between natural resources and armed conflicts from an environmental peacebuilding approach such as the report "From Conflict to Peacebuilding The Role of Natural Resources and the Environment" By (UNEP, 2009), points out that there are three main pathways that this relationship might take. Thus, natural resources might: **1, Contribute to the outbreak of conflict** due to inequitable wealth sharing of resources benefits as well as environmental degradation. This would be more likely in countries that depend on primary commodities exportations like is the case of Colombia**; 2. Finance and sustain conflict**, as might be the case of gold mining in Colombia where this "high-value" resource has been exploited to finance illegal armed groups, and have become strategic to gain territory advance and consolidation.

> "Indeed, the existence of easily captured and exploited natural resources not only makes insurgency economically feasible (and, therefore, war more likely); it may also alter the dynamics of conflict itself by encouraging combatants to direct their activities towards securing the assets that enable them to continue to fight. Thus, revenues and riches can alter the mindset of belligerents, transforming war and

> insurgency into an economic rather than purely political activity, with violence resulting less from grievance than from greed". (UNEP, 2009, p. 11)

And finally, natural resource might contribute to **3, undermine the peacemaking** resulted from a peace agreement due to individuals or specific groups might lose access to the revenues generated by resource exploitation if peace is achieved. This situation might provoke the sabotage of peacebuilding as is the case already with the dissident groups of FARC in the post-conflict Colombia (Torrado, 2018). Therefore, it is important to understand these pathways in the context of traditional gold mining communities because conflicts associated with natural resources are twice as likely to relapse into conflict in the first five years (UNEP, 2009)**.** The report UNEP (2009) suggests:

> "The common trait in these three situations is the inability of weak states to resolve resource-based tensions peacefully and equitably. Indeed, conflict over natural resources and the environment is largely the reflection of a failure of governance, or a lack of capacity. As demands for resources continue to grow, this conclusion highlights the need for more effective investment in environmental and natural resource governance" (UNEP, 2009, p. 11)**.**

Nevertheless, as mentioned above, environmental peacebuilding approaches are also focused on the role that natural resources might play in the peacebuilding processes, not only on the relation these resources have to the rise of violent conflicts. Therefore, the UNEP (2009) report proposes three compelling reasons for how the environment and natural resources can contribute to peacebuilding. First, they might contribute by **supporting economic recovery** through a "properly governed and carefully managed high-value resources" (UNEP, 2009, p. 19)**.** Second, by **developing sustainable livelihoods,** which might be achieved through the minimization of vulnerability to different hazards and climate change through the management of key natural resources and the introduction of appropriate technologies as well as technical support. Finally, natural resources and the environment might **contribute to dialogue, cooperation, and confidence-building**. Thus, with a well-managed strategy environmental issues could be an encounter point for solving the collapse of social cohesion and public trust in state institutions (UNEP, 2009), which are a legacy of an armed conflict that took place during more than 50 years in Colombia.

Environmental peacebuilding has been criticized as some authors consider that development interventions from a top-dawn perspective have been promoted through this approach. Moreover, it has been suggested that most of the initiatives adopt a neoliberal conception of peacebuilding in which instrumental rationality over resources and the environment leads individuals to choose cooperation in a cost-benefit calculation without considering other factors or motivations (Dresse et al., 2019). As a result, a large number of environmental peacebuilding initiatives focus on the market value of natural resources to offer cooperative alternatives that benefit the parties economically. This has turned into initiatives that are not sustainable in the long term because they do not correspond to the capacities or priorities that stakeholders in a territory may have (Dresse et al., 2019). Therefore, "They might also fail to account for the multifaceted, long-term nature of environmental problems and the social, cultural and political identities that are vested in the immaterial values of natural resources" (Dresse et al., 2019, p. 5)

This criticism is fundamental to understand the opportunities and challenges environmental peacebuilding may have in traditional gold mining regions of Colombia. This is because many of the communities have developed meanings over natural resources that go beyond economic utility, since they are part of collective identities and the conceptions of the territory that those communities inhabit (López Granada, 2016; Machado, Botero, & Escobar, 2015; Restrepo & Restrepo, 2017; Valencia & Silva, 2018). These meanings over natural resources and the environment may come into conflict with market rationality approaches that see them as a mere source of economic income to improve living conditions or livelihoods.

> "Considering the diverse biophysical, political and social settings of environmental cooperation, the variety of interests and values underlying human-environment interactions should be taken into account to fully grasp what motivates environmental cooperation and to what extent it effectively contributes to peacebuilding (Ide, 2016; Waisová, 2015; Wessels, 2009). Conflicting interests may emerge at different governance levels regarding the use or protection of natural resources, and local interest groups may have concurring perceptions of a conflict situation and the potential pathways to peace (Mac Ginty and Richmond, 2013; Wessels, 2015). In this

> frame, contending interests may preclude deliberation and reason-giving, vital social processes to avoid conflicts (Hiedanpää and Bromley, 2016). From this perspective, environmental governance comes forward as a framework for creating, validating or changing institutions in order to resolve conflicts over natural resources" (Dresse et al., 2019, p. 5)

Dresse et al. (2019) states that environmental peacebuilding initiatives have three main components that have been considered as building blocks. These are **the initial conditions** in which the environmental peacebuilding initiative unfold, the **mechanisms** will be used for achieving cooperation and the **outcomes** expected (Dresse et al., 2019). The initial conditions should consider both the environmental challenges and the socio-political atmosphere in the intervention context. This is related to the perception of abundance or scarcity a community may have about a natural resource or the lack of sustainability, as well as the interest of the actors involved in a conflict and the power symmetry between them (Dresse et al., 2019).

The mechanisms are divided into two elements: the type of activities and the implementation modalities. The activities might be categorized as technical cooperation which "falls under the authority of trans-boundary epistemic communities under the pretext of neutrality and efficiency" (Dresse et al., 2019, p. 9); the creation of neutral spaces of interaction where contenders can exchange freely; and the building of a common-pool resource management in which resource users start moving from competition towards cooperation (Dresse et al., 2019).

The implementation modalities refer to the pathways through which these activities are executed, and can be categorized as a coordinated action, dialogue and negotiation, and collective action. Coordinated action might be more suitable to apply in a context in which the levels of violence are high and little interaction is required, so coordination for technical issues might be the starting point for cooperation. Dialogue and cooperation could contribute to foster mutual understanding and recognition between conflict parties when conditions enable direct contact between them. Finally, collective action may be the way for achieving common-pool resource management by shifting the emphasis on political borders or differences to socio-ecological systems (Dresse et al., 2019). Thus, through collective action

might be possible to negotiate innovative types of environmental governance that allow the creation of new institutions that can guaranty lasting peace.

> "The tailored environmental governance structures which often exist in the case of common-pool resources present certain advantages over more inclusive and generalized approaches ("one-size-fits-all" solutions), as they seek to account for the complexity of social-ecological systems and can enable the creation, validation or change of institutions to peacefully resolve conflicts over natural resources" (Dresse et al., 2019, p. 9)

Finally, the possible outcomes of environmental peacebuilding might be 1, the reduction of shared environmental problems related to environmental degradation or resource scarcity; 2, the edification of cooperation and trust between encounter parts; and 3, the reduction of perceived inequalities related to natural resource access and distribution, which focus on the roots of sustainable peace (Dresse et al., 2019)

Considering these three building blocks, Dresse et al. (2019) have suggested three possible trajectories environmental peacebuilding might take. The first one is the **technical environmental peacebuilding**, which promotes environmental cooperation across conflict borders and is a high politics approach. The second is **the restorative dimension of environmental peacebuilding**. This trajectory aims to provide share spaces to "acknowledge past injustices and recognize the other as a legitimate interlocutor" (Dresse et al., 2019, p. 12). And the third one is **sustainable environmental peacebuilding** which aims to ensure collective action with the involvement of high-level leadership and communities. Sustainable environmental peacebuilding can be the result of initiatives with a top-down approach as part of international or national peace agendas, how is the case of Colombia after the peace agreement with the FARC, or can be the result of "pre-existing informal types of cooperation at the local level in a bottom-up process" (Dresse et al., 2019, p. 15). For Dresse et al. (2019), the third trajectory of environmental peacebuilding:

> "addresses the root causes of potential conflicts by focusing on equitable resource distribution as a pre-requisite for sustainable development and peace (Carius, 2006). Based on symmetrical power relations, joint management systems can be established when parties accept the transfer of a part of their influence on the collective in view of achieving public good". (Dresse et al., 2019, p. 12).

Thus, environmental peacebuilding and natural resources cooperation should be addressed as a dynamic, mutually constituting process "which is shaped by the biophysical environment and social identities but also redefines the social and biophysical environment" (Dresse et al., 2019, p. 15)

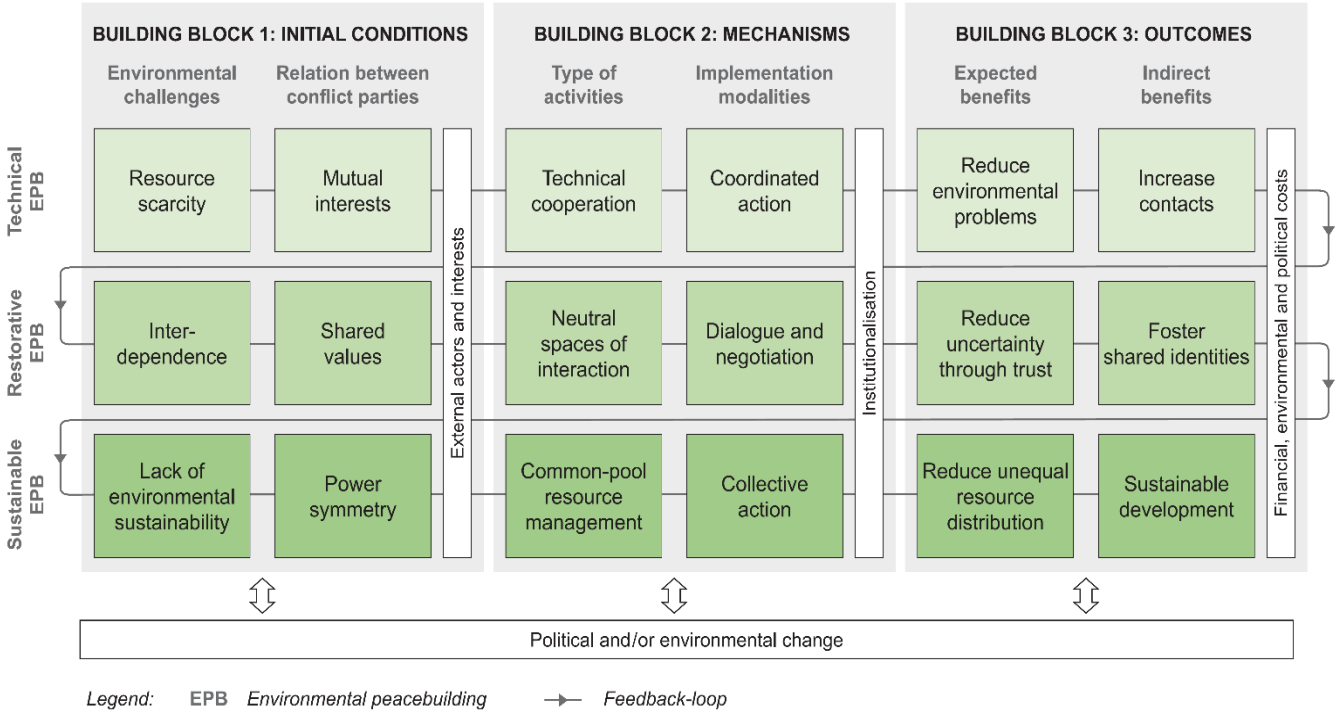

Figure 1. Environmental peacebuilding trajectories

Source: (Dresse et al., 2019, p. 8)

As mentioned above, gold in Colombia can be considered as a "conflict resource" that has had a close relationship with the armed conflict as it has become an economic resource that contributes to finance and sustain the armed conflict. This situation hinders peacebuilding during the post-conflict settings and makes gold to be considered a resource that might undermine the peacemaking. However, from an environmental peacebuilding perspective,

this resource could be assessed in terms of the contributions it might offer to support the economic recovery of communities affected by violence through the improvement of their quality of life, or the role it could play as a meeting point for dialogue, cooperation and trust in the post-conflict context.

The analytical framework established by Dresse et al. (2019) is useful to identify and understand the challenges and opportunities environmental peacebuilding might have in the context of traditional gold mining communities after the peace agreement between the FARC-EP and the Colombian government. Nevertheless, in order to make it possible that gold becomes a resource for cooperation, it is important to understand that Gold cannot be considered only as a conflict resource that generates violence, but also as a resource that has supported livelihoods for thousands of rural families facing high vulnerability conditions, which develop subsistence mining that becomes an essential part of their collective and territorial identities.

Consequently, an analysis of the initial conditions in which environmental peacebuilding would develop should consider the biophysical characteristics of the environment in which mining is developed, the natural resources involved, and the problems that mining processes generate, such as environmental degradation and the damage to human health caused by mercury pollution. At the same time, the natural resources management strategies these communities have developed must be taken into account in order to find possible elements that contribute to fair environmental governance. In addition, the actors involved in the process, the social characteristics of the communities and the power relations existing in the territory must be identified.

A preliminary conception of the study problem suggests that the mechanisms that should be implemented in this case could be mainly **dialogue and cooperation as well as a collective action**. The first one is key in a context in which informal miners are not recognized as formal actors by the authorities, on the contrary they are criminalized and persecuted while favoring large-scale mining projects (Eslava, Silva, Tobón, & Vélez, 2014; Quiroga, 2014, 2016; Restrepo Parra & Martínez Márquez, 2018; Urán, 2013). This denial of informal miners as a valid actor contradicts one of the objectives of territorial peace, which is the participation of communities in the identification and overcoming of the problems affecting their territories.

Thus, the generation of neutral dialogue spaces based on mutual recognition should contribute to the construction of trust and understanding.

The second mechanism, the construction of a common pool resource management in which the resources involved become axes for cooperation through collective action, would allow traditional mining activity to stop being treated as an economic, political and legal problem so that it becomes recognized as part of socio-ecological systems in permanent change. This perspective would lead to cooperation scenarios to progress on the formalization processes of small-scale miners, which would allow gold extraction and exploitation practices to be improved. This situation might contribute to the building of environmental governance initiatives based on the proposals and initiatives of grass-root organizations in dialogues with governmental authorities.

As Dresse et al (2019) points out, these mechanisms could achieve outcomes such as the reduction of problems caused by environmental degradation related to some mining practices, the building of a trust degraded by years of persecution against informal miners and decades of armed conflict, as well as the reduction of inequalities related to natural resource access and distribution. Thus, the trajectory that environmental peacebuilding should take to achieve peace in areas inhabited by traditional gold mining communities, would be found between the **restorative dimension** and **the sustainable environmental peacebuilding**.

As it was mentioned, it is important to identify and understand the political, social, and economic aspects that surround conflicts related to natural resources in order to implement actions oriented to change the structural factors that generate violence. In fact, the literature on environmental peacebuilding has been criticized for focusing narrowly on natural resources, which contributes to ignore the dynamics and challenges that "stem from interactions of natural resource management with the unique social and political processes in post-conflict countries" (Krampe, 2017, p. 5).

1.2 Political ecology. Understanding the resource complex in a politicized environment

In order to clarify those aspects surrounding conflicts related to natural resources, the approach of political ecology is included in this work to understand the meanings existing about gold and the environment, the territorial dynamics generated around it, the perception of conflict and the power relations behind those conflicts and meanings. This is possible considering that political ecology examines the political dynamics surrounding the material and discursive struggles over the environment and "the role of unequal power relations in constituting a politicized environment" (Bryant, 1998, p. 79). Moreover, the political ecology approach can be used to achieve a more complex understanding of the relationship between gold and violence based on analyses that take into account actors and processes that are historically and geographically constructed, something that has been cataloged as "the resource complex" by Watts in (Le Billon, 2015).

Political ecology has its roots in the context of academic debates around environmental change that took place during the decades of the 1960s and 70s. This approach comes from disciplines such as radical geography, cultural ecology, and agrarian studies. The first analyzes from a political ecology approach emerged as a neo-Marxist critique of neo-Malthusian analyzes about the ecological crisis perception and overpopulation (Bryant, 1998; Khan, 2013; Le Billon, 2015). This criticism contained heterogeneous approaches supported on theories and perspectives such as dependency theory, world-system theory, and modes of production theory (Bryant, 1998). Therefore, "neo-Marxism offered a means to links local social oppression and environmental degradation to wider political and economic concerns relating to production questions" (Bryant, 1998, p. 81). With this approach, political ecology appears as a criticism against the apoliticism of work promoted by neo-Malthusian researchers. By doing so, political ecology proposes a notion in which "politics should be `put first' in the attempt to understand how human-environment interaction may be linked to the spread of environmental degradation" (Bryant, 1998, p. 80)

Nowadays, the development of political ecology has led to a more eclectic discipline after certain neo-Marxism determinism. The research in this field has incorporated political sociology approaches, social movements theory, ecofeminism, poststructuralism and

discourse theory (Bryant, 1998). Nevertheless, this approach is still focusing on relating political-economic and ecological processes, so the main assumption is that "politics and environment are everywhere thoroughly interconnected" (Bryant, 1998, p. 82).

Political ecology focuses on two components that define the socio-environmental conditions of a region in conflict. On the one hand, the unequal power relations over natural resources and environment appropriation. This means that "power is reflected in the ability of one actor to control the environment of another" (Bryant, 1998, p. 86). Such control may be reflected in the environment through landscape alterations. In the case of gold in Colombia, it could be thought that such control is exercised through the granting of mining titles for large-scale gold extraction that favors mining companies that meet the high operational requirements that these titles require. At the same time, the particularities of informal gold mining may be an expression of resistance to such control, which also has specific expressions over the space. Hence, the unequal power relations can be reflected in the physical environment. In relation to this, Bryant (1998) points out that:

> "The intervention of the European and American colonial powers in the `third-world' is especially crucial to understanding contemporary patterns of human-environmental interaction and associated power relations. Such intervention encompassed the incorporation of third-world peoples and environments into a first world-dominated global system of capitalist production is a process in which millions of livelihoods were transformed often for the worse" (Bryant, 1998, p. 85).

On the other hand, the second component of socio-environmental conditions of a region in conflict is addressed by focusing on unveiling the ways in which these power relations are expressed through the perception of environmental conflicts, analyzing the discourses generated around the appropriation and use of natural resources, the definitions of the correct know-how and the knowledge claims (Bryant, 1998). In the case of gold mining in Colombia, these unequal power relations could be expressed through the discourses promoted by the government against traditional miners, where this activity is criminalized by associating it with violence, contamination, and backwardness, while large-scale mining carried out by private companies is promoted as environmental friendly and as crucial for achieving development (Quiroga, 2016; Urán, 2013). In consequence, "political-ecological conflicts

are thus as much as struggles over meaning as they are battles over material practices" (Bryant, 1998, p. 87).

The hegemonic model of gold extraction that is imposed over traditional or subsistence mining in Colombia is the extractivist model. This model is promoted as the only extraction modality that contributes to the common good and the economic development of the country. Extractivism is characterized by the exploitation of large volumes of natural resources that are exported as commodities with no added value and depend on enclave economies (Gudynas, 2012). Extractvism is highly associated with a resource dependence economy which is considered from this perspective as "a historical product associated with a pattern of relationships with the global economy, through colonial powers, private transborder commercial interests, and domestic elites." (Le Billon, 2001, p. 566)

Political ecology is interested in studying how political factors and conflicts shape the environmental conditions of a region, and at the same time, how these environmental conditions contribute to the production of conflicting relationships. Thus, the analysis of the conflict around natural resources and the environment might be understood through the category of resource complex, which recognizes the hybrid "socio-natural" character of natural resources, the importance of situated perspectives, and the historicity and contingency of conflicts (Le Billon, 2015). Hence, following an inductive and multi-scalar approach, political ecology understands conflicts and the several forms of violence associated with them "as a site-specific phenomenon rooted in local histories and social relations yet connected to larger processes of material transformation and power relations" (Peluso and Watts 2001) in (Le Billon, 2015, p. 604).

It is important to mention that political ecology does not necessarily see conflicts as a nefarious process with only negative effects, but it recognizes the creative character the conflict might have in terms of "their emancipatory role in challenging structural and cultural forms of violence" (Le Billon, 2015, p. 599). This can be important when analyzing the proposes that some Colombian gold mining communities have built as outcomes of resistance and mobilization processes to claim for the right to remain in their territories as well as being recognizes as valid actors and subjects. Those proposals should be considered in

environmental peacebuilding initiatives that aim to change the structural conditions that provoke violence.

To analyze the specific conditions in which environmental peacebuilding should be developed in traditional gold mining communities, acknowledging the political character of the environment and understanding gold from a perspective of resource complex, is an important and supportive exercise. In order to represent this, the design of a "chain of explanation" surrounding gold extraction might be a useful tool for understanding the dynamics and properties of these politicized environments (Bryant, 1998). Such a chain of explanation aims to emphasize "on the connection between physical changes and their economic symptoms on the one hand, and specific land-use practices at that place on the other hand" (Bryant, 1998, pp. 83–84). This is a way to understand the use and exploitation of a natural resource from a multi-scalar perspective that contributes to understanding how the relationships between different actors at the regional, national and international levels have direct consequences in local spaces and conflicts. In this way, a more complex view of the value chain of golf produced in traditional gold mining communities of Colombia might be developed.

This perspective is close to what Le Billon (2001) has presented as an economy of networks. For this author, who proposes a political ecology of war (Le Billon, 2001), "armed conflict economies, including commercial activities, tend to shift from an economy of proximity to an economy of networks" (Le Billon, 2001, p. 569). Those networks are formed by several dynamic actors such as private groups, transnational corporations, the diaspora population, the leadership of foreign countries and the consumers in importing countries (Le Billon, 2001).

Le Billon (2001) proposes an approach called "political ecology of war" to analyze the relationship between natural resources and violent conflict. This approach criticizes the deterministic perspectives on the scarcity or abundance of natural resources in the production of conflicts, since it indicates that such perspectives fail to consider the socially constructed nature of resources, and in so doing, "fail to explain why an abundance or scarcity of valuable resources is not a necessary or sufficient factor of conflict" (Le Billon, 2001, p. 565).

Therefore, this author states that within the historical processes shaping resource extraction political economies, the following factors participate in the reproduction and transformation of resource-linked conflicts: 1,the distortionary effects of dependence upon valuable resources; 2, the conflictuality of natural resources political economies; 3, the spatial distribution of resources; and 4, the lootability of resources (Le Billon, 2001).

> "The political economy, materiality, and geography of resources can thus significantly influence the likelihood and course of armed conflicts. In turn, the needs and practices of war have influenced the pattern of resource exploitation and the state of the environment. It is in this way that we can speak of a political ecology of war." (Le Billon, 2001, p. 566)

The distortionary effects of dependence upon valuable resources are related to the colonialist character of such dependence as mentioned above. This effect is expressed in economic phenomena such as the "Dutch disease", in where the economic growth of one sector motivates the depletion of other economic sectors increasing the levels of vulnerability of macroeconomic stability. At the same time, such countries present high exposure to external shocks provoked by the volatility of commodity prices. Moreover, the availability of the resource rent often results in corruption of state institutions and the likelihood of the structuration of systems of patronage.

The conflictuality of natural resources political economies refers to the fact that the appreciation of the environment and natural resources as tradable commodities responds to historical-political processes, which involves "the definition of property rights, the organization of labor, and the allocation of profit" (Le Billon, 2001, p. 568). Furthermore, the nature of violence may change whether we talk about extracted resources, such as gold, or produced resources like crops. Thus, with extracted products violence is expected to take a physical form to achieve territorial or state control, and with produced commodities violence is most likely to take more structural forms, such as coercive forms of labor or controls over trade (Le Billon, 2001).

The lootability of a resource is related to the fact that "primary commodities are often highly amenable to taxing and looting" (Le Billon, 2001, p. 569) by different social groups participating in a conflict. For UNEP (2009), a *lootable resource* has a high value and is associated with low economic barriers to entry into the sector. This means a valuable resource that can be exploited by artisanal technics, such as gold, and does not require high investment and machinery. Some components of lootability are: "the materiality of the resources, its mode of exploration and production, its spatial spread and accessibility to its revenues, and (il)legal and (il)licit character along its value/commodity chain" (Le Billon, 2009, p. 17).

Finally, the spatial distribution is related to the geographical dimensions of natural resources involved in conflicts. The first geographical dimension is the location of the resources, which have relevance in the case of extractive resources like gold because they cannot be placed by human decisions. Thus, the greater the distance or difficulty of access from the center of control, the higher the risk of losing the resource to the opponent (Le Billon, 2001). This means that the resources located closer to the capital centers are less likely to be used by illegal armed groups than those located close to borders. In consequence, resources can be classified as proximate or distance. The second geographical dimension is the concentration, which classifies resources in point resources referring to those concentrated in an area and diffuse resources which are more widely spread over large areas (Le Billon, 2001). Moreover, the dimensions of fragmentation and peripheralization should be considered in the structuration of international economic networks that influence armed conflict dynamics.

Based on the geographical dimensions presented above, Le Billon (2001) proposes a typology of resource-linked armed conflict. Thus, the author suggests that a point resource, which is more easily monopolized than a diffuse resource might be related to state control disputes or *coup d´ etat* when it is closer to the center of power and might be associated with secession disputes when is located far of the center. On the other hand, diffuse resources can be linked to rebellion or rioting when they have a relation of proximity to the center and they could be associated to dynamics of Warlordism when they are located far of the center and are easily accessible and marketable, as well as sufficiently valuable (Le Billon, 2001).

Table 1. Typology of resource-linked armed conflicts

Geographical dimension	**Point**	**Diffuse**
Proximate	State Control struggles / Coup d´ etatt	Rebellion / Rioting
Distant	secession	Warlordism

Source: adapted from (Le Billon, 2001)

In conclusion, environmental peacebuilding offers an analytical framework oriented towards the development of initiatives based on environmental cooperation to overcome conflicts. This analytical framework could be applied to find the opportunities and challenges facing the design of natural resource management mechanisms in territories where traditional gold mining is practiced in the post-conflict context of Colombia. However, to advance in the search for cooperation scenarios it is important to understand that gold has not only been a conflict resource related to the generation of violence, forced displacement and the violation of human rights, but it has also been an essential part of the construction of territorialities and collective identities of marginalized rural communities. These communities have made use of gold through artisanal and traditional mining as a subsistence activity that shapes the socio-ecological systems of these territories.

In this way, gold should also be understood as a resource in dispute. Thus, the struggle for the appropriation of gold puts into confrontation contradictory uses, meanings and interests that must be considered by analysis from the perspective of environmental peacebuilding. In this case, such a perspective should aim to transform the structural conditions that cause violence in the territories through the structuration of institutions by integrating the different meanings around gold. This, with the objective of moving towards cooperation around the management of natural resources between the parties involved in the conflict and reduce the inequalities related to natural resource access and distribution, which focus on the roots of sustainable peace (Dresse et al., 2019).

The approach of political ecology allows for a more complex analysis of the conditions under which environmental peacebuilding initiatives could be developed. The political ecology integrates the meanings associated with the different mining practices and the inequitable relations of power over the space. Thus, the biophysical conditions are understood as part of a politicized environment product of social-historical processes integrated by local, regional, national and international scales. Moreover, the political ecology of war posed by Le Billon (2001) allows integrating into this analysis the geographical conditions of the resources and their influence on the development of conflicts. Such multi-scalar analysis could contribute to the approach of environmental peacebuilding not become a tool that deepens or legitimizes the inequitable relationships that provoke violence, or in an analytical framework for interventions that propose alternatives for the solution of conflicts that are unsustainable in the long-term.

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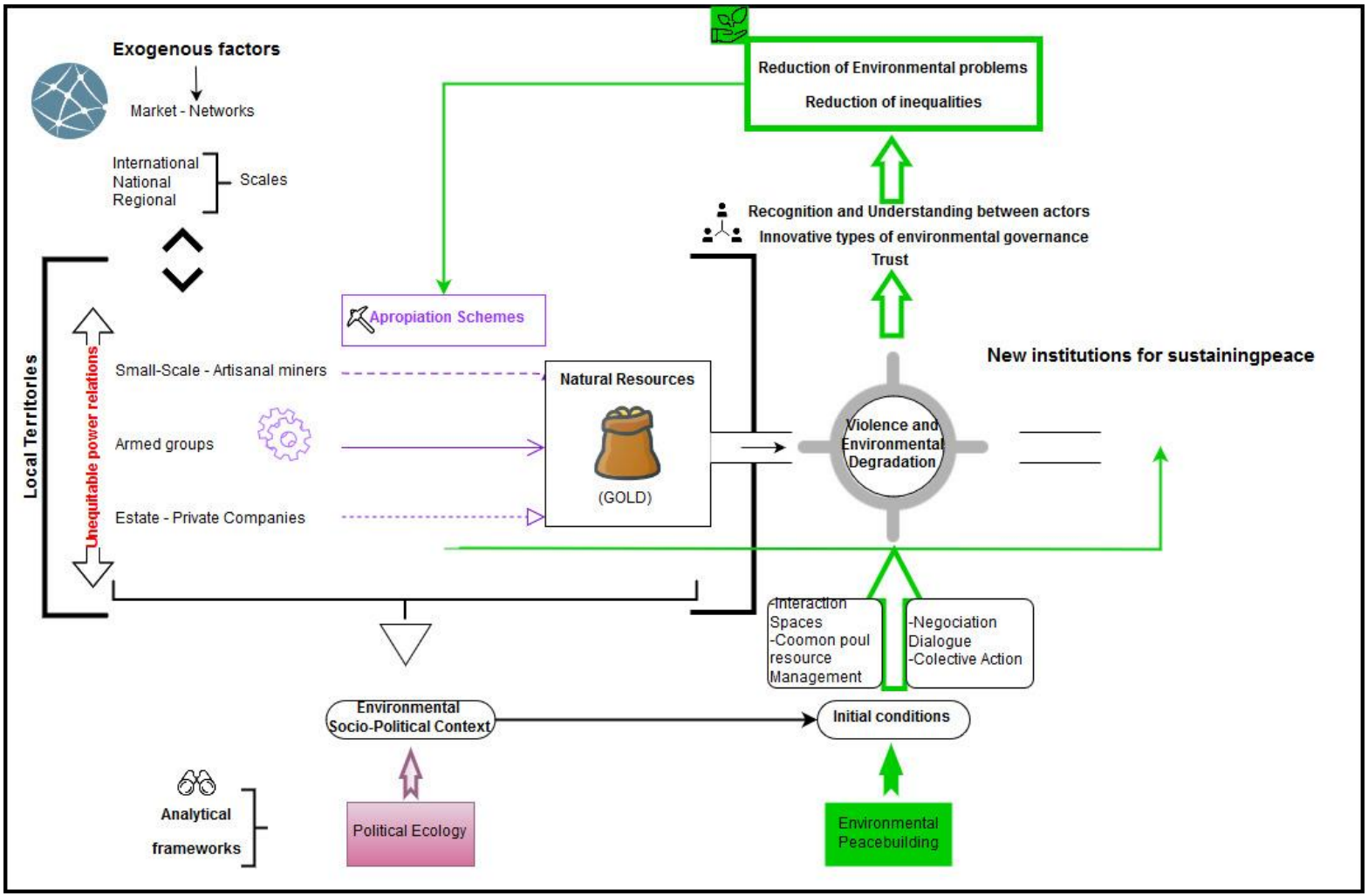

Figure 2. Integrative theoretical framework.

Source: own elaboration

2. State of the art: Informal gold mining and violent conflict in Colombia - Contextualizing a problem around natural resources appropriation

This section presents the literature review that was carried out in order to identify the main lines of analysis and the most highlighted issues of the research problem. Besides a literature review, this section aims to clarify the context in which this research is carried out by identifying the main problems and debates around informal gold mining and conflict. The literature about criminal economies in Colombia, which refers to those economic activities boosted by criminal groups, focuses mainly on drug trafficking and coca production. Nevertheless, after the rise of gold prices during the first decade of this century, which has incentivized gold and extractive sector in general to gain a leading role in the Colombian economy, the literature has been focusing on gold mining as part of the criminal resource portfolio of armed groups (Rettberg & Ortiz-Riomalo, 2016).

Therefore, most of the literature reviewed was produced at the end of this decade and was organized in several clusters ordered by topics, approaches and research interests. This was done following the idea of making an integrative review, which attempts to find common ideas and concepts across the authors (Pautasso, 2013). At the same time, this allows having an overview of the main problems surrounding peacebuilding in traditional mining communities. Furthermore, the clusters aim to encompass the different issues related to informal gold mining, and its relation to socio-environmental conflicts and armed conflict in Colombia, as well as the challenges this sector faces in the post-conflict scenario.

Consequently, the literature is divided into four clusters. The first cluster is oriented to have an overview of the literature on the informal gold mining sector and its challenges. It includes a sub-cluster that presents some research on the environmental issues caused by mercury pollution and offers recommendations for solving this problem. The second cluster gathers the literature on the conflicts related to informal gold mining from a political ecology approach. The third cluster arranges the literature on the relationship between informal gold mining and armed conflict. This cluster addresses two different stages in this relationship, which are the rise of gold prices and the involvement of armed groups in informal gold mining activities; and the challenges of gold mining and armed groups relationship in a post-

conflict scenario. Finally, the last cluster addresses the literature on the role of environment and natural resources in peacebuilding during the Colombian post-conflict.

2.1 Informal gold mining in Colombia: Environmental degradation, violence and stigmatization

The scientific literature and even the official reports that address the problem of informal gold mining are huge. This is related to the fact that the extractive sector has shifted towards the center of the economic development boosted by the government (Rettberg, Cárdenas, & Ortiz-Riomalo, 2017; Rochlin, 2018). This situation takes the Colombian government to focus efforts on the formalization of small-scale mining, and the prosecution of illegal mining in order to guarantee control over the mineral resources and incomes produced by extractive projects. This effort is explained because most of the mining production in the country is informal.

72% of all mining operations in Colombia are classed as 'artisanal and small-scale mining', and 63% are 'informal', lacking a legal mining concession or title, while Large-scale mining comprises only 1% of operations (Echavarria, 2014; Pantoja & Pantoja, 2016). In the case of gold mining, 87% of the mines was lacking legal titles in 2012 (Camargo & Massé, 2012; García et al., 2015; Rochlin, 2018). According to estimates by the Colombian Mining Association, over 340,000 Colombians depend directly on artisanal-small mining and medium-scale mining for their income (Echavarria, 2014). The informal gold mining sector in Colombia includes two main categories of gold production. The first consists of artisanal mining (*barequeo*), an ancestral subsistence mining that is carried out using hand-panning and some rudimentary mechanical tools (Le Billon & Massé, 2017). The second consists of small-to-medium scale mechanized operations using backhoes and dredgers (Le Billon & Massé, 2017). Authors such as Rochlin (2018) consider that:

> "informal mining is a broader term that refers to the general conditions of production. It includes the lack of legal title, but also involves the absence or low level of mechanization, the reliance on family members or a small number of workers,

> relatively small quantities of minerals produced, and involves small, hand-dug tunnels rather than open-pit mines or major excavation projects. Small, medium and large-scale mining involves increasing degrees of both mechanization and mineral product." (Rochlin, 2018, p. 331)

The scientific literature reviewed addresses the issues of informal gold mining as a complex problematic associated to the political, social and economic contexts that surrounds the territories in which informal gold mining takes place (Echavarria, 2014; Eslava et al., 2014; Pantoja & Pantoja, 2016; Rochlin, 2018; Urán, 2013). For these authors, when it is not associated with a tradition of ancestral artisanal gold mining in a territory, informal gold mining is the result of years of marginalization, poverty, and violence, which puts communities to take the risks associated with informal gold mining in order to obtain basic incomes. Thus, informal mining has developed from the emergence of human settlements that appear spontaneously without a prior planning design. This has not only led to the absence of a territorial and urban order but also perpetuates the precarious living conditions of this population in terms of inadequate sanitary services, health care, education and housing (Pantoja & Pantoja, 2016). Therefore it is not surprising that in the vast majority of mining municipalities the average poverty is 74%, which is higher than the rest of the rural regions of Colombia (Pantoja & Pantoja, 2016). Therefore, informal gold mining is represented as a subsistence activity that takes place in territories with high vulnerability levels, contrary to the idea of small miners as criminals that obtain high incomes by exploiting this mineral and the environment.

The literature reviewed considers the stigmatization of informal gold miners as a mistake committed by the government. For these researches, stigmatization against small gold miners is not just part of a wrong treatment to the problem of informal mining but is also part of a governmental general strategy that favors the large-scale mining projects developed by transnational mining companies. (Echavarria, 2014; Eslava et al., 2014; Pantoja & Pantoja, 2016; Rochlin, 2018; Urán, 2013). According to Echavarria (2014)

> "the 2001 Mining Code created an asymmetric scenario for granting mining concessions, prioritizing large-scale mining companies while leaving the different needs of artisanal, small-scale and medium-scale miners unrecognized by the law.

> Exploration and mining concessions have been granted to large-scale mining and investors in traditional artisanal and small mining areas through simplified, online requests over the past 15 years, attracting foreign direct investment to Colombia, but undermining the rights of traditional informal miners. This has fueled conflict between artisanal small mining and large-scale mining" (Echavarria, 2014, p. 8)

For the specific analysis of formalization policies and laws, Echavarría (2014) develops a very detailed analysis of the attempts to formalization carried out by the Colombian government across history. The research analyses the main drivers of those policies, the different levels of participation traditional mining communities have had and identifies the barriers and challenges of formalization. What is common for the literature in this cluster, is the importance given for recognizing the informal miners as legitimate actors whose proposals and needs should be considered in the processes of formalization.

Beyond the importance of giving recognition to traditional and informal miners, the literature points out that the dynamics of organization and production generated by the communities during decades of collective coexistence in the territory, contribute to the generation of social capital that is extremely valuable in the consolidation of the formalization processes. Furthermore, formalization is seen as part of what should be an integral policy of a rural development model that guarantees the improvement of the life quality and wellbeing of these communities. Thus, the study of social capital would allow assessing grassroots social relations that are not considered by the inhabitants of communities, private sector, social organizations, politicians and scholars (Eslava et al., 2014).

Formalization processes should then consider the potentialities of mining communities and grassroots organizations. Thus, formalizing artisanal and small miners should not be based on a policy oriented to finish the artisanal and small mining in order to establish large-scale mining as the only possible model of extraction. On the contrary, the formalization should support the improvement of the mining practices, the legalization of the miners and their access to the legal gold market as a path for sustainable development. Thus, "an intervention in the public sector is necessary to create simple, clear, understandable, and sensible legal frameworks that have the capacity to strengthen AGM[1] with legality, promoting a route to

[1] Artisanal Gold Mining

formalization that considers technical investment along with the betterment of labour and environmental conditions related to artisanal mining operations" (Rochlin, 2018, p. 421).

Some authors such as (Eslava et al., 2014; Rochlin, 2018; Urán, 2013) suggest that thinking about gold mining formalization should be linked to debates related to the development model proposed by the Colombian governments and the ideas about development that communities might have. Hence, both perspectives should coexist in order that the extractivist model does not be imposed by force over traditional gold mining communities. Following this line, the concept of "segmented legalization" (Urán, 2013) proposes a formalization that recognizes the particularities of artisanal and small mining in order to avoid homogenized models of mining certification that do not recognize the production diversity in mining territories. Such homogenized models have complicated the legalization of small miners who do not have access to a minimum of guarantees.

> "Once again, an inclusive and widespread State-led formalization process for the hundreds of thousands of artisanal and small-scale miners is the best medium-to-long-term option for Colombia. Ideally, it would mean higher environmental standards, safer labor conditions, and better social programs for miners. It would provide the State with a more substantial tax base, and it would create a better-trained and politically content labor force. But Colombia does not have the surplus jobs available for those displaced by a sweeping formalization process that focuses only on the creation of large-scale enterprises. This stands in contrast to the Chinese case whereby it formalizes by amalgamating smaller units into super-efficient mega-mines, but displaced miners can find employment elsewhere in its relatively booming economy. Colombia needs to keep its artisanal miners working." (Rochlin, 2018, p. 336).

The literature about informal gold mining also covers approaches focused on identifying the environmental consequences that inadequate mining practices generate (Casas, Gómez, Rodríguez, Girón, & Mateus, 2015; García et al., 2015; Güiza & Aristizábal, 2013; Vélez-Torres, Vanegas, McLamore, & Hurtado, 2018). Particularly, this literature refers to the fact that most of the small and medium scale mining uses mercury to produce gold through the method of amalgamation.

This literature commonly starts also by defining and characterizing the problem of informal mining and the barriers for formalization. For authors such as (García et al., 2015; Güiza & Aristizábal, 2013; Vélez-Torres et al., 2018) those barriers are related to the fact that public policies use to be oriented to favor large-scale mining, which is considered more valuable and profitable compared to small-scale mining. In this sense, similar to the literature mentioned above, the research presents the contextual situations of artisanal and small-scale mining communities and their conditions of vulnerability, which are increased due to the stigmatization and persecution, as well as the violence of armed groups.

In Garcia et al. (2015), after making a characterization of the informal mining sector in Colombia, the operation processes of small-scale mining in the municipalities of Remedios and Segovia in Antioquia are presented in detail. This contribution is essential because it clarifies step by step the process of extraction, separation, and use of the mineral, which allows identifying which are the most polluting practices in this type of gold mining. In addition to this, the paper presents a proposal for reducing the use of mercury in small-scale mining based on a case study in the Antioquia region, the most contaminated with mercury in the country (García et al., 2015).

Güiza and Aristizábal (2013), carried out research with the objective to figure out why artisanal miners use mercury in the mining process. By doing this, they identified that mercury is widely used because the gold separation process is faster, easier and cheaper (Güiza & Aristizábal, 2013). These three elements that intervene in the decision to use mercury by small-scale miners are associated with the levels of marginalization, stigmatization, and persecution that informal miners face in Colombia. Therefore, it is proposed that the reduction in the use of mercury should occur within formalization processes that consider the economic and social conditions of each region, and that recognize small-scale miners as a valid stakeholder.

Velez et al (2018) present the legal initiatives that the government of Colombia has developed to achieve compliance with the Minamata agreement for the elimination of mercury and the challenges that these initiatives have had to solve the problem. Through a case study in the North Cauca region, the authors analyze the risk perception that communities have about the use of mercury in mining. This paper focuses on analyzing the sexual division of labor in

mining communities, identifying that women play a more prominent role in the identification of health problems and the risks associated to mining, and they are who mainly denounce the effects of this metal due to the direct contact to children and pregnant women. From there, the text presents a participatory methodology for the community to monitor the levels of mercury in the environment and associated risks. The methodology presented is called "Closed-loop Integration of Social Action and Analytical Chemistry Research (CLISAR)". (Vélez-Torres et al., 2018).

In conclusion, the literature reviewed in this cluster allows us to characterize the informal gold mining sector in Colombia, as well as the challenges and opportunities that it presents. Most of the papers highlight the social and economic contexts that characterize the mining regions. At the same time, the idea that the stigmatization against small-scale mining is part of a model that favors large extractive projects, aggravating the exclusion suffered by mining communities is frequent. Moreover, it is highlighted that the use of mercury as the main material for the separation of gold is also associated with the levels of marginalization in which these communities find themselves, which ignore the risks associated with these practices in order to obtain subsistence economic benefits in the easiest way possible. Consequently, it is highlighted by most of the authors that formalization processes must consider the needs of mining communities, as well as the proposals and potentialities developed by them so that access to legality contributes to generating better practices in mining while guarantying the improvement of wellbeing.

Table 2. Literature related to the Characterization of the informal gold mining sector and its challenges

Conflicts and challenges of formalization	Environmental consequences and mitigation
(Pantoja & Pantoja, 2016)	(Casas et al., 2015)
(Echavarria, 2014)	(García et al., 2015)
(Eslava et al., 2014)	(García et al., 2015)
(Rochlin, 2018)	(Vélez-Torres et al., 2018)

(Urán, 2013)	

2.2. Socio-environmental conflicts: Disputes over territories and natural resources access and meanings. Addressing the problem from a political ecology approach

The literature that addresses the problem of armed conflict and small-scale gold mining from a political ecology perspective is quite broad. The literature reviewed focuses on the study of local cases, making use of qualitative methods and ethnographic studies to account for the meanings that communities build around gold, on how notions of territory are constructed, and how these particular notions conflict with the rationality of the state that promotes an extractivist model based on large-scale mining. Thus, the common line of political ecology approaches is that these studies address the problem as part of socio-environmental conflicts generated in a context of struggles for resource access and territories appropriation.

This literature tends to controvert the idea that the regions where the traditional mining communities are located are regions that suffer from the absence of the State, which generates a lack of governability, violence, and exclusion. On the contrary, for some authors, the state is present in these regions, but in particular ways. The presence of the state is done by the concession of mining titles to transnational companies (Restrepo Parra & Martínez Márquez, 2018) and the promotion of discourses against the traditional mining communities that occupy these territories in order to favor private concessions over community interests (Bernal Guzmán, 2018; Quiroga, 2014, 2016; Restrepo & Restrepo, 2017; Valencia & Silva, 2018). Thus, for Quiroga (2016) the official discourses suggest that any kind of mining activity should be carried out as the norms and principles of a "rational way" of exploiting the resource, which is adopted by private companies, due to this would be the only way to achieve sustainable development and economic growth in the country. Hence, with this idea traditional mining becomes an obstacle to the capitalist project, given the occupation of

"winning" territories, in productive terms, by communities that subsist on the exploitation of gold (Quiroga, 2016).

Through this approach, the socio-environmental conflicts that take place in traditional mining territories might be an expression of a struggle for the consolidation of a "neoliberal state" that sustains its economy in extractivism, against communities that see their traditions, territories and subsistence forms threatened. In this way, the violence exerted by the illegal armed groups is part of a general dispossession strategy that seeks to empty the territories to the accumulation of capital. Hence, even though the researches are focused on local communities, the analysis uses to have a multi-scalar perspective that considers how international market dynamics contribute to those conflicts.

The approach of political ecology often criticizes theories as the resource curse. This theory points out that regions with natural resources abundance seem doomed to suffer from the absence of governability, corruption, and violence. Thus, by focusing on the dispute over the appropriation and exploitation of resources, the approaches of political ecology point to the historical conditions and the power relations that led to the generation of conflicts, debating the idea of a “natural” resource curse. Furthermore, they highlight the agency of communities in these conflicts, and how this agency capacity becomes a potential for natural resource management and peacebuilding (McNeish, 2018). In consequence, this literature focuses on organizational processes carried out by grass-roots organizations, which seem to be the strategies that communities develop to face the process of accumulation by dispossession. Therefore, considering the strong links this processes and social movements have with territories, some authors have developed and used categories such as socio-territorial movements (Quiroga, 2014) or “socio-territorial theory in movement” (Machado et al., 2015) to explain the process of mobilization developed by traditional gold mining communities.

The literature usually points out formal mining projects granted to transnational corporations as the central form in which the neoliberal state is consolidated over the territories. However, part of the literature focuses also on the conflicts generated by the increase in illegal medium-scale mining activities in territories characterized by artisanal mining (López Granada, 2016; Machado et al., 2015; Restrepo & Restrepo, 2017; Valencia & Silva, 2018).

This type of research is usually carried out in communities where artisanal mining has developed ancestrally. For these authors, the arrival of heavy machinery promoted by illegal miners and armed groups that seek to extract gold in artisanal mining communities is a phenomenon produced by the rise of gold prices in international markets. Thus, illegal miners appear to transform the territorialities and meanings that these communities have over gold. The massive influx of foreign miners transforms social relations by bringing dynamics that did not exist before, such as drugs and alcohol abuse, prostitution, and violence. In this way, the rationality of extraction, which is considered one violent rationality, is imposed on the territory (Restrepo & Restrepo, 2017) over ancestral rationalities in which gold is part of complex territorial structures. In consequence, mechanized illegal mining becomes a "technology of dispossession" (Restrepo & Restrepo, 2017) that follows capitalist rationality, even though it is pursued by the State, which in turn contributes to the stigmatization of communities.

In conclusion, the literature that addresses the relationship between violence and informal gold mining from a political ecology approach recognizes that such violence takes place within a context of socio-environmental conflicts around the appropriation of natural resources. In general, these conflicts confront different rationalities and meanings about gold and territory. These meanings are studied through qualitative research complemented by multi-scalar analysis. The imposition of a neoliberal model of extraction that seeks to generate the greatest profit fight against communities that for years have had access to the resource but find themselves forced to be displaced. The forms of organization that these communities create allow the development of agency capacity, generating alternatives to the extractivist model.

Table 3. literature that address conflicts related to informal gold mining from a political ecology approach

(Bernal Guzmán, 2018)	(Quiroga, 2014)
(Cardona, Pinilla, & Aída, 2016)	(Quiroga, 2016)
(López Granada, 2016)	(Restrepo Parra & Martínez Márquez, 2018)

(Machado et al., 2015)	(Restrepo & Restrepo, 2017)
(McNeish, 2018)	(Valencia & Silva, 2018)

2.3 Informal gold mining and armed conflict

The relationship between illegal armed groups and gold mining in Colombia has become a central issue for academic research focused on the links between armed conflict and natural resources. The relevance of this issue is related to the mining boom that Colombia experienced during the 2000s. The rise of gold prices in the international market led to an exponential growth in investment in this economic sector. This attracted the attention of armed groups that saw the opportunity to finance their activity through gold mining (Massé & Camargo, 2012; Nicolás, Daniel, & María, 2014; Ortiz-Riomalo & Rettberg, 2018; Rettberg & Ortiz-Riomalo, 2016). Between 2002 and 2011, the price of gold rose from 300 USD to 1850 USD per ounce; in 2012 it fell again, but kept the price above 1,500 USD (Camargo & Massé, 2012). Consequently, not just large-scale mining projects and private concessions increased their number around the country, but also the informal mining sector.

> "By 2011, large-scale gold mining operations (gran mineria) complying with the complex legal requirements accounted for less than 12% of total production. In short, the boom mostly resulted from the growth of the informal sector, with only 13.3% of the 4,133 gold mining production units identified by the 2011 Mining Census having a mining title" (Le Billon & Massé, 2017, p. 4).

The research on this topic shows how the regions with the highest activity and mining concessions present high rates of violence(Ortiz-Riomalo & Rettberg, 2018). Hence, 40% of 489 municipalities where informal mining takes place have a presence of armed groups like the FARC, Ejercito de Liberación Nacional (ELN) or Bandas criminales (BACRIM) (Le Billon & Massé, 2017). Moreover, 80% of human rights violations in the first decade of this century occurred in mining-energy regions, and 87% of the displaced population in the country come from these areas (Le Billon & Massé, 2017).

Violence is expressed differently in relation to the type of mining that takes place. The relationship that armed groups have with large-scale mining and transnational corporations is different from the relationship they have with informal mining. Some of the literature reviewed indicates that the presence of armed groups such as paramilitaries usually precedes the arrival of large extractive projects. The presence of armed groups could have the function of facilitating the arrival of companies so that they find territories "cleared" of communities that might represent problems for investment. In this way, it has been denounced by some NGOs that the official army might protect the private investment while paramilitaries attack social protest and press the displacement over those regions (Camargo & Massé, 2012). This idea is controverted by another paper, which suggests that there is not a significant causal effect of illegal gold mining on forced displacement (Idobro, Mejía, & Tribin, 2014). This might be explained in territories when most of the mining activity is characterized by informality and illegality because, as the author's state, illegal mining is a labor-intensive activity, and this may have counteracted the incentives of illegal armed groups to displace local populations from their land (Idobro et al., 2014).

The literature review identified that the *modus operandi* of armed groups in gold mining has several types: 1. Direct participation by providing the machinery for gold mining, 2. Creation of companies controlled by armed groups, 3 indirect participation through mediation on land access and revenues distribution, security services, and illegal taxing or extortion (Camargo & Massé, 2012; Ortiz-Riomalo & Rettberg, 2018)

Nevertheless, some authors suggest that during the last years the way how armed groups exercise violence over the territories has been changing, a situation that reflects a shift in these groups' strategies. Thus, it has been noticed that in several mining regions the illegal armed groups are trying to evade the confrontation with the stakeholders of the mining sector in order avoid calling the attention of public authorities (Le Billon & Massé, 2017; Massé, 2016). This strategy of "convivence" can be seen across several levels of the mining sector: with mining communities, national private companies, transnational companies, other armed groups and local authorities (Massé, 2016). Hence, even the extortion to mining companies has stopped in some regions because the armed groups who control the territories go for contacting those companies in order to make "silent agreements" for guarantying both types

of mining formal and informal in the same territory. Moreover, they also contract the local workforce for illegal mining in the periphery of private exploitation, instead of provoking their displacement (Massé, 2016).

Rettberg and Ortiz-Riomalo (2018), carried out research that aims to identify the mechanisms through which gold contributes to originate, intensify and prolong the armed conflict. In this paper, the authors point out the importance of clarifying the participation of armed actors in the different links of the gold value chain, because this determines the way in which violence and pressure over territories are shaped. It is also important to consider each stage of the gold mining process, which is exploration, extraction, refining, and beneficiation because this contributes to determining whether the participation of armed groups is direct or indirect and allows them to identify the levels of participation in each stage. Hence, Rettberg and Ortis-Riomalo (2017) found that most of the criminal activities are concentrated in the stages of extraction and beneficiation. In addition, another factor indicated by the literature is the relevance that a subnational analysis of the phenomenon should have. This is the case, because although it is the same resource, and sometimes the same armed group, the mechanisms, and dynamics of violence are presented differently across the regions of the country (Rettberg et al., 2017).

Coronado and Barrera (2016), establish a typology to classify the territorial scenarios generated by the interaction of mining and armed groups considering the following factors: whether in the territory takes place large-scale or small-scale mining, and whether the armed groups are present before or after the mining activity. Through this typology, the authors establish four scenarios and their associated practices of violence, shown in Table 4.

Table 4. Territorial scenarios of interaction between mining extraction and armed conflict

Extraction scale / Territorial background	**Armed conflict before mining activities**	**Territories with consolidated mining extraction**

Large-scale mining	Scenario 1: extraction during the war. - Extortion payments and security services to illegal armed actors -Population displacement	Scenario 3: War in the middle of the extraction. -The capture of royalties from extraction through the cooptation of local and regional institutions
Medium and small-scale mining	Scenario 3: New extractive frontiers -financing the war: the illegal armed actors control the extraction fronts developed by private agents -Illegal armed actors directly promote the extraction	Scenario 4: Extraction in dispute -Illegal armed groups try to capture the income of the extraction developed by different actors through different channels. There is an unusual increase in the extraction -Illegal armed actors directly promote the extraction

Source: (Coronado & Barrera, 2016)

Particularly speaking about informal mining, the literature points out that gold mining cannot be considered the cause of the armed conflict in Colombia, but it has contributed to the financing of the military and political campaigns of armed groups, prolonging and fueling the conflict (Ortiz-Riomalo & Rettberg, 2018). In that sense, all the armed, legal and illegal actors have received economic benefits from mining extraction in the armed conflict context.

Rettberg and Ortiz-Riomalo (2016) consider that gold should be understood as part of a criminal resource portfolio, which refers to the simultaneous participation in the extraction of multiple resources as funding sources of illegal armed groups. Guerrillas and paramilitary groups have been involved in several types of “illegal economies”, combining in several

ways the source for financing their military and political agendas. Nevertheless, during the last decades, gold mining and drug trafficking have been the most relevant source of income for these groups, being gold even the most important in some periods and regions. For this reason, some literature has focused on the interaction of gold mining, drug trafficking and armed conflict (Ortiz-Riomalo & Rettberg, 2018; Pantoja & Pantoja, 2016; Rettberg et al., 2017; Rettberg & Ortiz-Riomalo, 2016).

The relevance gained of gold mining for fueling armed groups is related to the efforts and persecution against drug trafficking and the declared illicit crops such as coca. Thus, gold mining would be replacing, in some cases, and complementing, in others, the role that drug trafficking has traditionally played within the financial structure of the illegal armed groups (Ortiz-Riomalo & Rettberg, 2018). Hence, given the growing difficulty of participating in drug trafficking due to the policies of eradication and aspersion of crops, armed groups would have expanded their participation in gold mining as a substitute source of income to finance their activities (Ortiz-Riomalo & Rettberg, 2018).

Therefore, it has been partially found that in regions in which anti-drug efforts have been most successful, gold mining appears to have emerged as a substitute for illicit crops, while it serves only as a complement for revenue in other regions (Rettberg & Ortiz-Riomalo, 2016). The links between gold mining and drug trafficking are numerous and diverse: On the one hand, gold mining has absorbed redundant labor from abandoned illicit crops as a result of state pressure. In addition, many of the illegal groups involved in gold mining maintain parallel operations related to illicit crops (Rettberg et al., 2017), a fact that makes it crucial to talk about gold as part of a resource portfolio.

In consequence, Ortis-Riomalo & Rettberg (2016) have pointed out that research and policies might have failed in contributing to overcome the problem of natural resources extraction and armed conflict for three main reasons: First, both areas have been focused on analyzing one resource at a time without understanding the complexities generated around portfolios composed by different illegal economies. Second, the local or subnational characteristics that the problem has around the country have been ignored. And third, they have focused on the economic motivations that armed groups could have for choosing one or another resource, without recognizing the political reasons those groups might have, such as the social

condemnation of kidnapping and trafficking of wildlife (Rettberg & Ortiz-Riomalo, 2016). Thus, resource portfolios should be understood as dynamic and respond not only to market logic and international prices but also to political reasons (Rettberg & Ortiz-Riomalo, 2016).

The literature reviewed points out several reasons for gold to become a central part of the armed groups' resource portfolios during the last decades. The following points constitute a summary of them: 1. different from cocaine and drug trafficking in general, gold is a legal resource regulated by domestic and international institutions. Thus, it is a resource with lower levels of risk for extraction and commercialization; 2. gold is highly tradable in international markets; 3. the law 1382 and the new mining code presented by Colombian government causes a liberalization of the internal market of gold that makes its commercialization easier and at the same time complicates the establishment of a differentiation between informal and formal gold mining; 4. gold is a highly lootable resource that combines high values in small volume, which facilitates its transportation, and is commonly located in areas isolated of urban centers; 5. production of gold provides municipalities with access to public royalties, which acts as an incentive for illegal actors to loot state resources; 6 gold is a commodity that allows illegal organizations to do money laundering of incomes that comes from other criminal activities; 7. gold price experienced a steep increase for over a decade. (Camargo & Massé, 2012; Le Billon & Massé, 2017; Ortiz-Riomalo & Rettberg, 2018; Rettberg & Ortiz-Riomalo, 2016)

A part of the literature that studies the relationship between armed conflict and gold mining in Colombia has focused on analyzing the challenges of this relationship for peacebuilding in the context of the post-conflict with the FARC (Garzón, LLorente, Vanegas, & Preciado, 2016; Le Billon & Massé, 2017; López-Vega, 2016; Massé, 2016; Mcneish, 2016; Ortiz-Riomalo & Rettberg, 2018). Some of this literature indicates that the Colombian government intends to continue promoting the large-scale extraction model with the objective of financing peacebuilding. For some authors, this would only be an excuse to continue promoting a model that has generated conflicts over the appropriation of resources and that favors large companies over small miners. In this way, social conflicts might increase in the post-conflict setting and influence the intensification of murdering of social leaders in the regions of interest (Mcneish, 2016), as is currently happening in the country.

In this scenario, the stigmatization against small-scale miners would continue, and the government would focus on strategies of repression against the weakest actors in the gold chain, instead of identifying and attacking the strongest. This kind of policy would be wrong because it might reinforce the links between communities and illegal economies and undermine the legitimacy of the state in the territories (Garzón et al., 2016). This negative reaction of communities to the actions of the state might be explained through the concept of criminal governance and the maturation of criminal economies. This means that due to the absence of the state, the armed groups have generated forms of governance legitimized by the communities, which makes the criminal economies consolidate in those territories (Garzón et al., 2016).

Consequently, the actions of the state in these regions should focus on developing public policies that allow the formalization and access of informal miners to legal gold markets, while identifying and executing actions against the strongest actors of illegality in the different links of the value chain. However, it is emphasized that neither the formalization nor the peace agreement with the FARC is sufficient to stop criminal activities around gold mining, because the problem is not only illegal mining but also illegality in mining, which means that once formalized, illegality can still take place within the formal companies as it is currently the case (Massé, 2016). Furthermore, FARC is not the only armed group active in gold mining, so it is important to advance in negotiation processes also with other groups.

Massé and Le Billon (2017) propose three possible scenarios that could arise in traditional mining regions during post-conflict: 1. **Golden peace**, the peace agreement and the departure of the FARC generate greater security and reduce the criminalization of miners because they are no longer associated with insurgency, which allows progress towards formalization; 2. **mining wars**, with high levels of violence because the FARC does not monopolize the sector and there are other interested actors who arrive in the territories to dispute the empty spaces left by the FARC. The conflicts that might appear in this scenario might confront the government against criminals groups; criminals groups fighting between them; and large-scale extractive projects against local communities; 3. **Pax mafiosa**, illegal mining remains but with a relative reduction in violence due to illegal armed groups build convivence

agreements that benefit all of them and allows the illegal economy to achieve high levels of maturation (Le Billon & Massé, 2017)

In conclusion, the literature reviewed points out that the increase in gold prices provoked a boom not only in large-scale mining but also in informal gold mining around the whole country. In consequence, mining regions became centers of violence and conflicts due to the dispute over the appropriation and economic benefit that the mining boom brought with it. Violence and the ways in which armed groups interact with gold in the territories occur differently between the different types of mining and the different stages of production, as well as in different regions of the country. In turn, the *modus operandi* of the armed groups is differentiated. This *modus operandi* goes from direct participation, the creation of companies, the administration of mines and security, to extortion. At the same time, the way in which armed groups interact with different mining actors has been changing in recent years with the aim of guaranteeing their presence in the territories of gold mining activity.

Gold mining should be understood as part of a portfolio of economic resources for financing the armed and political agendas of illegal groups. The relationship between gold and drug trafficking generates different scenarios of violence over the territories, so these dynamics must be studied thoroughly.

The literature points out that the extractivist model should not become an engine for the peacebuilding because it generates greater conflict. Peacebuilding in mining regions must be based on the recognition and formalization of small miners while fighting the strongest criminal actors. At the same time, advancing in negotiations with other armed groups is essential. Finally, it is pointed out that during the post-conflict in Colombia three scenarios could emerge: one where peace is consolidated and progress is made towards mining formalization, second where the power vacuum generated by the absence of the FARC leads to violence scenarios between different groups and a third where illegal armed groups are consolidated in the territories through a *pax mafiosa* which provokes the reduction of violence.

Table 5. Literature that addresses the relationship between informal gold mining and armed conflict

(Coronado & Barrera, 2016)	(Idobro et al., 2014)
(Garzón et al., 2016)	(Mcneish, 2016)
(Giraldo & Muñoz, 2012)	(Ortiz-Riomalo & Rettberg, 2018)
(López-Vega, 2016)	(Ortiz-Riomalo & Rettberg, 2018)
(Massé, 2016)	(Rettberg & Ortiz-Riomalo, 2016)
(Camargo & Massé, 2012)	(Rettberg et al., 2017)
(Le Billon & Massé, 2017)	

2.4 Environment and natural resources during the Colombian post-conflict

The peace agreement between the FARC and the Colombian government stimulated various sectors of academia and science to focus their efforts on identifying the challenges and opportunities for peacebuilding during the post-conflict context. One of the research areas that is beginning to gain importance is the role of the environment in peacebuilding, as well as the possible effects that the post-conflict could have on ecosystems. In the literature reviewed approaches that range from a more ecologist perspective, focused on analyzing the effects of post-conflict on the environment, and the opportunity for developing policies oriented to climate change adaptation were identified (Baptiste et al., 2017; Garcia & Slunge, 2015; Negret, Allan, Braczkowski, Maron, & Watson, 2017; Salazar et al., 2018), as well as approaches that emphasize on discussing the importance and opportunities that the environment has for peacebuilding (Lederach, 2017; Morales, 2017; Rodriguez et al., 2017; Suarez et al., 2017)

The literature points out that the Colombian armed conflict had positive and negative effects on the environment. This is important considering that most of the regions in which conflicts took place have been recognized as areas with high levels of biodiversity (Morales, 2017). Those effects have been both positives and negatives according to specific regional dynamics

(Garcia & Slunge, 2015; Rodriguez et al., 2017; Suarez et al., 2017) When the literature mentions that armed conflict could affect in a positive way the environment and some ecosystems, it refers to the fact that the presence of armed groups in some territories led to the conservation of huge areas of forest. This can be attributed to various causes, one of them is that forest cover might offer protection for combatants and their military infrastructure (Suarez et al., 2017), a circumstance that has relation to the fact that there is a positive relationship between forest cover and the intensity of armed conflict across Colombia (Negret et al., 2017). At the same time, those areas were blocked from state intervention and industry activity, infrastructure development, and human settlements (Morales, 2017). Another reason is that in order to consolidate legitimacy, armed groups regularized social life and economic cycles. This made that in some areas armed groups-imposed restrictions on hunting, fishing, logging, water pollution, and trading in wildlife, generating a kind of environmental regulation (Morales, 2017; Suarez et al., 2017).

Related to the negative effects that armed conflicts have had on the environment, the literature suggests that this was caused by the presence of natural resources, which became an essential source of funding for the military and political objectives of illegal armed groups. The central illicit economies fueling conflict and generating environmental degradation has been coca production and gold mining:

> "One of the main environmental consequences of the conflict has been deforestation, the first link in a chain of negative effects that includes loss of biodiversity, soil degradation, and an increase in greenhouse gas emissions. Various factors contribute to deforestation, including displacement, coca cultivation, and criminal mining; the latter two have also served as a source of financing for insurgent groups. These illicit economies, in turn, have caused toxic spills that have contaminated soil and water sources. Turning coca leaves into cocaine requires the intensive use of chemicals, while gold miners use mercury and cyanide. Moreover, attacks on oil infrastructure, especially pipelines, caused the spillage of thousands of barrels of crude oil. The National Planning Department has calculated that under an optimistic scenario, the country will save 7.1 trillion pesos (US$2.4 billion) in conflict-related environmental degradation costs for every year of peace" (Morales, 2017, p. 9).

In relation to the economic, political and social dynamics that will be observed in the context of post-conflict, the literature reviewed indicates that the environment must be a key factor to consider in peacebuilding. In the first place, most of the literature points out that the withdrawal of the FARC from some territories will generate pressures on ecosystems that were protected during the existence of this group. Thus, many rural areas would be available for capital investment in mining, agriculture, and infrastructure provoking the creation of new settlements. This would cause the expansion of the agricultural and mining frontier, generating environmental problems in areas where they did not exist before (Baptiste et al., 2017; Morales, 2017; Negret et al., 2017; Salazar et al., 2018).

For Suarez et al (2017) who studied different cases of post-conflict countries to contrast with the situation of Colombia, the main drivers for environmental change during post-conflict might be the ineffective land use planning, the return of displaced population, the demand for land for agricultural production and the dependence on the primary sector. Thus, identifying and understanding the main environmental risks in post-conflict is crucial considering that "41 of the 47 municipalities classified as a high priority for attention because of the conflict's impact are home to national parks or forest reserves" (Morales, 2017, p. 5). This represents a huge challenge because those conservation areas host the territories of communities that are expecting the development policies and programs that the peace agreement would bring and because some of those forest reserves were demarked after communities, and even gold mining communities were living there. In consequence, understanding the drivers for environmental change during post-conflict is crucial to face the conflicts that would appear.

> "The environment often provides an important source of livelihood and well-being for the population and its degradation could threaten social and economic stability. For example, soil degradation caused by logging could undermine food security, while water pollution from mercury and other toxins used in illegal mining could spur social conflicts and new migrant flows. At the same time, economic development and the revenues derived from expanding economic activity are essential to sustaining social programs and meeting the spending needs that arise in the post-conflict context" (Morales, 2017, p. 7).

In addition to the risks, environment and natural resources could be drivers for overcoming violence if effective policies to sustainable development are proposed. To achieve sustainable development, it is important to think about land use plans that contemplate conditions of each territory and that guarantees the participation of the communities to improve the governance and legitimacy of the state. Therefore, it is important to guarantee environmental democracy so that communities have the right to participate in decisions about the use and management of natural resources in their territories (Rodriguez et al., 2017). Morales (2017) offers some recommendations: Improve access to information and include climate change mitigation proposals in long-term planning, which can attract investment and donors; delineate protected areas and limit agricultural expansion; strengthen and empower local authorities, even local and informal environmental institutions.

In the context of gold mining, some literature highlights the importance of overcoming the extractivist model and the need to recognize the formalization of informal and small-scale mining. This would be the most realistic way to achieve better practices in small and artisanal mining. Moreover, it is important to achieve formalization policies and rural development because ex-combatants in those areas who find no real prospect of economic reintegration would be more likely to participate in illicit economies such as illegal mining, contributing to amplifying the problem (Morales, 2017).

In conclusion, the peace agreement between the government and the FARC has stimulated scientific and academic research to focus on the consequences that the post-conflict scenario can bring to the environment, and how this environmental change can prolong conflicts. Thus, it was highlighted that the departure of the FARC from some territories will allow the arrival of new social and economic actors that can generate pressures on ecosystems that were protected during the armed conflict. For this reason, the policies and programs for the consolidation of peace and development in the territories affected by the armed conflict must consider the environmental problems that such development policies may generate. This literature also points out the importance of small-scale gold mining formalization processes, and how this process should count with the active participation of local communities. This participation should be extended to the design of local development plans as has been proposed by the concept of territorial peace.

Table 6. Literature focusing on the role of environment and natural resources in peacebuilding

(Baptiste et al., 2017)	(Negret et al., 2017)
(Garcia & Slunge, 2015)	(Rodriguez et al., 2017)
(Lederach, 2017)	(Salazar et al., 2018)
(Morales, 2017)	(Suarez et al., 2017)

3. Methodology

As mentioned in the theoretical framework, the main objective of the restorative dimension of environmental peacebuilding is to generate dialogue scenarios that facilitate the recognition of the actors involved in the conflict. This is a necessary step to advance in the collective creation of natural resource management strategies that promote cooperation and peacebuilding. In consequence, the data collection methods used in this stage of the research aims to reveal the perspective of the actors that have been made invisible and criminalized, which are the traditional and informal miners.

This work is developed through a qualitative approach based on ethnographic methods that seek to reconstruct the reality from the observations of the individuals involved in the social system defined for the analysis (Hernández-Sampieri, 2014), *i.e.* the traditional gold mining communities as the target population. As mentioned in the section about political ecology in chapter 1, the methodological approach of this work recognizes the creative nature of conflicts as a tool for transformation of structural conditions of violence, in which actions and proposals from social sectors that directly suffer the consequences of unequal power relations play a fundamental role.

The data collection tools used during this research were: a review of literature, press and official documents, semi-structured and open interviews, and participant observation through a field visit. These methods, allowed to establish the environmental socio-political context in which the conflict around the informal gold mining takes place, the perception of the local stakeholders about it, the mining processes and some of the natural resource management strategies developed by traditional gold mining communities.

Table 7. A qualitative approach through ethnographic methods

Methods	Analysis	Main Outputs

Literature, press, official documents review	. Problem contextualization. The relationship between informal and small-scale mining and violent conflict in Colombia . Main drivers, actors, and challenges	. Literature review and state of the art.
Open and semi-structured interviews. 12 interviews in Bogotá, Medellín, and Peque	. Perception of local stakeholders and grass-root organizations about the problem. . Mining processes and meanings about natural resources usages	. Interviews transcription . Record Notes . Notes
Field visit and Participant observation. municipality of Peque and Humanitarian refuge in Bogota	. Natural resources management strategies developed by traditional gold mining communities	Photos Videos Fieldnotes
Data analysis	. Content analysis of the interview's transcription using the software Atlas Ti. . Triangulation of data collected	

3.1. Literature and documents review

The literature review covered the different topics contained in the research questions, as well as the objectives of this research. This review allowed achieving a contextualization of the problem and the main academic debates around it. In order to do this, a search was made in the academic databases Scopus, Science Direct, Springer Link and Research Gate, as well as Google Scholar. The topics defined for the search of scientific literature were the relationship between armed conflict and informal gold mining in Colombia, the socio-environmental conflicts surrounding gold mining, the problems of informal gold mining and the importance of natural resources for peacebuilding in the post-conflict setting of Colombia. The way in

which this review was structured, as well as the topics addressed, can be reviewed in chapter 2.

In addition to the academic literature review, a press and official document review was carried out in order to complement the existing information, as well as identifying the discourses and perspectives on informal gold mining that are generated from official institutions and government. To this end, online pages of the most important media in Colombia, as well as of public institutions were reviewed.

3.2. Interviews

The review of literature, press and official documents was complemented by semi-structured and open interviews. The importance of the interview as a research tool for this work is that this is not just a way for collecting "individual opinions" but is a way to show the coherence of social attitudes and behaviors, inscribing them in history, personal or collective trajectory (Beaud, 2018). In this way, the interviews contrast the findings obtained through the literature review with what currently occurs in some Colombian territories where traditional gold mining is carried out. This made it possible to obtain a localized contextualization of the problem through a triangulation exercise. As mentioned above, the criterion for the selection of the actors interviewed was specified by the importance of giving recognition to artisanal and traditional miners and their claims in the context of territorial peacebuilding during the post-conflict.

A total of 12 interviews were conducted between February and June 2019 with four different actors: members of organizations or social movements related to grass-roots organizations in traditional gold mining communities (three interviews), artisanal or traditional gold miners (six interviews), former FARC members (one interview), and researchers on this topic (one interview). The interviews were carried out in different contexts and cities. Respondents were responsible for selecting the interview locations related to the security conditions of each individual. Thus, the places of the interviews were the cities of Bogotá and Medellín and the rural area of the municipality of Peque in the department of Antioquia. It is relevant to point out the importance of the security conditions at the time of conducting the interviews since

both the subjects to interview and the field visits changed during the research due to the continuity of violence in the territories. These contingencies added to the time allocated for the work contributed to define that this research has an exploratory scope that should be developed in future work. Information about the participants, their role and their relevance for the research can be found in the annex documents.

Table 8. Interviews location and interviewees

Bogotá	Medellín	Peque
❖ 2 interviews with members of social organizations ❖ 1 interview with an artisanal miner ❖ 1 interview with a researcher. ❖ 1 interview with an ex-member of the FARC	❖ 2 interviews with artisanal gold miners ❖ 1 interview with a member of a social organization from the northeast region of Antioquia (Remedios)	❖ 3 interviews with artisanal gold miners

The interviews allowed to clarify the following units of analysis through the perception of the subjects interviewed: First, the meanings associated with traditional mining practices, as well as the perception about the environment, conflict, and peacebuilding. Second, the natural resource management strategies developed by traditional gold mining communities and the importance of these strategies for remaining in the territory. Third, the proposals and demands of the communities in the context of post-conflict and territorial peacebuilding.

The qualitative data analysis software ‘Atlas to’ was used to analyze the content of the interviews. Also known as a computer-assisted qualitative data analysis software (CAQDAS) (Hwang, 2008), ‘Atlas ti’ was used as a tool for analyzing the content of the interview through a coding process that allows segmentation and grouping of data into units of meaning (Hernández-Sampieri, 2014). The coding in ‘Atlas ti’ was carried out through open coding (Niedbalski & Ślęzak, 2017) segmenting the content of the interviews to group it within the units of analysis described above, thus facilitating the analysis of the collected information. The codes used and the number of quotations associated with each code can be found in the annex documents.

3.3. Field visit and the importance of the context

The interviews acquire meaning within a "context", depending on the place and time of the interview (Beaud, 2018). For this reason, it is important to highlight that the interviews took place in a general scenario of social mobilization in Colombia. The organizations and social movements that promoted protests in different parts of the country, pointed out that they had to do with the failure of agreements to peasant and indigenous organizations by the government (Rodríguez, 2019) and the murder of social leaders and human rights defenders in the rural territories of the country. It can be said that the claim for the right to life and remain in the territories is one of the main drivers of demonstrations connected to rural areas in Colombia, in which some traditional gold mining communities are involved.

The first contact with artisanal miners took place in the city of Bogotá during a political initiative named *“Refugio Humanitario”* or humanitarian refuge. In this humanitarian camp, persecuted social leaders from different parts of the country met in order to claim for guaranties for their lives. Participation in the humanitarian camp is based on a participant observation exercise because as mentioned in the literature review, mining regions face high levels of violence. For these reasons, social leaders from artisanal gold mining communities came to the humanitarian camp because they are persecuted, threatened or displaced due to their role as the environment and land defenders. In addition, it was through the participation in the humanitarian camp that contacts were established to facilitate a field visit.

Fieldwork in which the participant observation method is used is key to the success of ethnographic analyzes (Beaud, 2018). This allows higher levels of interaction with the research subjects and the environment in which they operate (Beaud, 2018). In this way, the data obtained through the interviews are enriched with the possibility of participating in the daily life of the researched medium. Due to the time allocated for the fieldwork in this research, and the security contingencies that were presented, it was necessary to propose a field visit instead of ethnographic fieldwork that would take a long time.

3.3.1 Security issues and place selection

During the research, it was necessary to establish a protocol to reduce the risk levels in the visits that were initially planned. This decision was made due to several events: First, the visit that was scheduled several months in advance to Cauca Department by invitation of contacts in the Regional Indigenous Council of Cauca had to be canceled days before due to the outbreak of a strike known as *"Minga Indigena"* (Rodríguez, 2019). During this protest, the access roads to the region were blocked and confrontations and violent acts took place in which several people were injured and died (PACIFISTA, 2019). The second scheduled visit to this same region through the invitation by a contact in the Process of Black Communities, also had to be canceled because the contact in this community, who was also interviewed for this work, along with social leaders of the region, was victim of an attack with firearms and grenades during a meeting, a few days before the scheduled visit. These events led to the establishment of some security measures to reduce the risks.

The difficulty of carrying out field visits in the Cauca region led to the prioritization of two visits in the department of Antioquia, establishing this department as the study region. The first visit aimed to carry out participant observation in a community of artisanal miners or *"barequeros"* in the municipality of Peque, and the second visit to a community of traditional miners with medium-scale mining presence, in the municipality of Remedios. The second visit was canceled due to security conditions and high risks at the moment of developing it, so it was decided to interview a member of a social organization from this community that was in the city of Medellín, the capital of the Antioquia department at that time.

Finally, the field visit to the municipality of Peque took four days, in which the participant observation method was carried out with a family of artisanal miners or *"barequeros"* located in the rural area of this municipality, specifically in a community called "la Nueva Llanada". It is important to point out that artisanal gold mining, which has been a fundamental part of this community, cannot be developed any more in this territory due to the construction of a dam known as the "Hidroituango Project". The construction of this hydroelectric plant cut the flow of the river and restricted the access of the *"barequeros"* to it. Thus, over the past year, the communities that inhabit this area had to face the loss of part of their territory, as well as economic incomes. Although in the past year they could not do artisanal mining (*barequear*), during the participant observation, the gold extraction process, the strategies for the management of natural resources and the meanings over these resources were established. In addition to this, it was possible to realize the coping strategies of this family for facing the "loss of the river", and the importance of being recognized as *"barequeros"* by the state and the company that runs the hydroelectric project.

The information during this field visit was collected through field notes, voice recordings, open interviews, photographs, and videos.

4. Results

4.1. Characterization of the gold mining sector in Colombia

The gold mining sector in Colombia is characterized by a great number of stakeholders, including policymakers, governmental institutions, mining corporations, local communities, armed groups (both legal and illegal), and different types of small-scale miners (Vélez-Torres et al., 2018). Gold is Colombia's biggest mineral export (Echavarria, 2014) and the fourth major export product, after oil, coal, and coffee, accounting for about 0.8% of GDP (Le Billon & Massé, 2017). Gold exports have experienced enormous growth over the decade of the 2000s, reaching a total volume of 70 tonnes in 2012 (Echavarria, 2014; Güiza & Aristizábal, 2013). In 2016, the country produced about 61 tons of gold becoming the sixth-largest Latin American gold producer, and twentieth in the world (Le Billon & Massé, 2017; Massé, 2016). Gold is found in 44% of Colombia's departments; the most important producers are the departments of Antioquia and Chocó, followed by Bolivar, Caldas, Cauca, Córdoba, Tolima, Valle del Cauca, Nariño, Santander, Huila, and Putumayo (Echavarria, 2014). About 60% of gold production is alluvial and 40 % underground (McDermott & Massé, 2017).

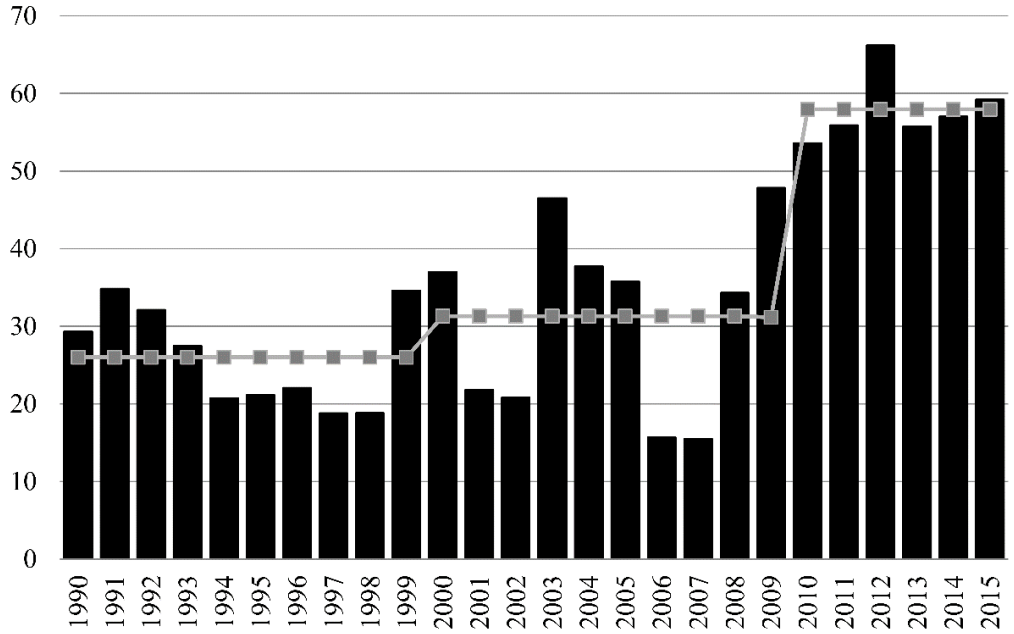

Figure 3. Colombian Gold production in tons between 1999 and 2015

Source: Retrieved from (Rettberg et al., 2017, p. 12)

Most of the gold produced and exported in Colombia is extracted by informal and illegal mining projects. About 87% of gold mining operations lack a legal title (Rochlin, 2018), which makes them to be considered as illegal. Nevertheless, this amount also includes informal subsistence and artisanal mining that is widely considered to be legitimate (Le Billon & Massé, 2017). Over the last five years, 2781 illegal mines have been detected, representing over US$2.5 billion of the estimated revenues of the sector (Mcneish, 2016). This situation calls the attention of Colombian official authorities since 95% of all the gold mines have no environmental permit (Rochlin, 2018), which provokes serious environmental risks besides the participation of illegal armed groups in this sector.

4.1.1 Types of gold mining and the problems of classification

From a strictly normative point of view, only mining projects that operate with a title and an environmental license are producing gold legally. Thus, "the 2001 Mining Code notes that the right to explore and exploit mines that are state property can only be granted through a concession title registered in the National Mining Registry" (McDermott & Massé, 2017, p. 6). According to their size and proportion the mining projects that operate legally or that count with the authorities' legal recognition, have been classified by the Ministry of Mining in: subsistence mining (up to 20g of gold produced monthly), small-scale mining (15,000 tonnes per year for underground operations and 250,000 cubic meters for open-pit operations), medium-scale mining (up to 300,000 tonnes per year for underground operations or 1.3 million cubic meters for open-pit operations) and large-scale mining which produce beyond 300,000 tonnes (MinMinas, 2016).

Besides this classification and as part of the range of illegal mining, the category of criminal mining has been defined by the Inspector General's Office (Produraduría General) as mineral extraction with the objective of obtaining resources to finance criminal activities. Those mining activities are generally carried out by illegal armed organizations, guerrilla groups, and criminal gangs - BACRIM - that, directly or through third parties, with their own

equipment, stolen or confiscated, carry out mining activities to generate income (Serrano Pérez, 2016).

One of the most common problems of this lack of clarity in defining illegal, informal and criminal mining, is that this classification in many cases links the mining activity developed by traditional gold mining communities or informal miners with criminal mining since they share the situation of not having exploitation permits for the subsoil, which makes them all illegal for the sate (Quiroga, 2016). Thus, such a classification has contributed to stigmatizing some communities that practice traditional mining due to this practice, in many cases ancestral, is associated with invasive activities aimed at supporting illegal armed groups. (Quiroga Manrique, 2016)

This perception is shared by one of the grassroots organizations representatives who states that

"This issue must be analyzed carefully because historically the government's argument is that all traditional miners, or informal mining - because for us it is not illegal mining - is that this is a criminal mining that finances terrorism, and relates almost all the miners to criminal gangs, with organized armed groups or with guerrillas, there is always that excuse for attacking us" (Social organization representative, personal interview, May 20, 2019)

This is one of the modalities for stigmatizing informal gold miners, which suggests that informal gold mining is necessarily financing armed groups. This does not take into account that informal gold mining is developed in areas far from the urban and economic centers, with a lack of infrastructure, high rates of poverty and the presence of armed groups that arrive in the territories aiming to control the economic and political activities developed there, and even influencing the dynamics of resource extraction in traditional gold mining communities, as indicated by the "disputed extraction" category (Coronado & Barrera, 2016), but also forcing formal and large-scale mining by taxing and extortion. Therefore, all economic activities, both formal and informal, are forced to be related to the armed groups controlling the territory. However, stigmatization and persecution fall to informal miners.

"We reject the claims of the State that suggest we are doing criminal mining that finances terrorism, that the miner is the one who finances the violence as if the illegal armed groups were the owners of the mines. That is completely false. Unfortunately, to be able to work in the territory when an actor is controlling the area, everyone must submit to what the paramilitary says or even the official army itself because they are all armed actors." (Social organization representative, personal interview, May 20, 2019)

The discourses against informal miners as criminals and polluters deny complex local realities in which those actors are involved. They also make invisible that traditional gold mining communities are also farmers that survive through several activities different to mining and that they are actors who generate strategies for natural resources management and claim for common administration schemes that allow them to remain on their territories. Nevertheless, in order to avoid "essentialization" perspectives, it is important to mention that both polluting practices and unequal power relationships inside communities also exist, but this should be analyzed as part of a complex reality in which informal and artisanal miners are more than illegals or criminals.

"I said these mines here are polluting so much with all that mercury used in entables[2]*. But I tell you that they are people who have done mining all their lives, who mix it with other forms, who make crops, organize water, who have their things there, their defense. Also, in terms of the Peasant Reserve Zone defense, they have a lot of initiatives, but for the State, they do not have mining title, so they all are illegal"* (Researcher, personal interview, May 20, 2019)

Another kind of stigmatization found is done through the homogenization of mining extraction that establishes a certain amount of production for informal mining to being

[2] *Entables* are small-scale processing facilities that offers basic processing services for gold separation.

considered subsistence or artisanal mining. In this case, informal and traditional miners must face requirements that they cannot always accomplish to be considered formal or legal miners. These requirements are related to the amount of gold produced by them and their taxation and technical requirements. This is particularly important for the formalization processes, as already explained in the literature review because it is important to develop differentiated processes of formalization that avoid asking the same requirements for all kinds of mining without considering local contexts of extraction. This is sawed by the interviewees as a way of supporting private mining companies over traditional gold production, which undermines trust as well as the wish of formalization.

Referring to the Northeast region of Antioquia, the researcher interviewed states:

"People have done mining all their lives, but they have done underground mining, and for Colombian legality, that mining is not legal. It is illegal and criminal because it is not for subsistence. So you can see how the gold market dynamics break everything, how subsistence implies very different things for the state, subsistence is that you extract gold only to eat, but if you have profit from that you should be declared as illegal because subsoil is state´s property. So, the state tends to homogenize so it is easy to criminalize miners who are extracting a little more gold." (Researcher, personal interview, May 20, 2019)

And related to the states and private interest also points out that:

*"The state has built very peculiar discourses. The miner who cannot be formalized is an illegal miner, he is an environmentally unsustainable miner, he is a person who lacks technique, that's why private companies say: 'we can make alliances', we have the technique, the sustainability of the whole process. So, you who do not know how to mine, come here that we can develop you. And the state, as informal mining got out of its hands, becomes into a monitor that also needs formalization to receive royalties" (*Researcher, personal interview, May 20, 2019)

Referring to initiatives oriented to label artisanal and traditional gold for supporting formalization, the interviewee of a grassroots organization from the Cauca region shows her perception about it as follows:

"This is a way in which the Colombian state has regulated the sale of gold. This multi-actor initiative was in charge of showing that if it has a label is good and if it does not have a label it is informal and if it is informal it is illegal. Then, under the new mining code, the people who are not formalized and do not have a constant gold production are illegal miners. So, what happened after the mining code was issued is that many traditional mines had to formalize so that the miners were not taken to jail because they were illegal despite they did not handle dredgers or backhoes (...) What seems terrible to me is the way this constraint. It is the institution saying if you do not sell to me you are criminal because you have to sell to me under these criteria and caps. If you do not sell to me, you are a criminal and if you want to sell to me, then you must dedicate yourself only to gold extraction, and that is a huge problem for us because in this way people become mining workers, abandoning other activities." (Social organization representative, personal interview, March 28, 2019)

Finally, it is important to mention that in some cases the state has recognized *barequeo* as the only recognized way for traditional and artisanal mining. For the researcher interviewed, the state makes this public recognition with the interest of promoting the stigmatization of informal mining on a small and medium scale, using *barequeros* as a vehicle to gain legitimacy within some communities and public opinion. This recognition is given without developing policies aimed to improve the life quality of these communities, and without guaranteeing their participation in territorial planning. During the fieldwork, some *barequeros* mentioned that finally the regional government was talking about them very well, publicly pointing out that their practices are "environmentally friendly", and that it is important to preserve this tradition while combating criminal mining. Nevertheless, the *barequeros* also highlight that this recognition comes after hundreds of *barequeros* were

displaced from the Cauca river basin thanks to the construction of a dam that did not consider their participation. Related to this matter, the researcher states:

"I have read many things about barequeros that say they are perfect and that barequeros do know how to do mining in opposition other miners that include infrastructure in their projects. And the State says it, the State says "but why not all are barequeros" because barequeo is softer, is another way of understanding the river, a different way of understanding water. I believe that this must be seen in more detail because it is also ignoring other more complex forms of mining (...) Because obviously, it is more functional for the state, to think about essentialized subjects, ecologically beautiful subjects that survive of interesting things. This to be able to make a radical division between a good mining that is the giant large-scale mining, and these little ones, While all the rest that is found among the extremes is a disaster because it is not formalized, or it is formalized badly or it begins to mix with some illegal or environmentally unsustainable issues." (Researcher, personal interview, May 20, 2019)

This perception might be also used by artisanal miners to be recognized by the state and to gain the support of NGOs and social movements in their claiming for guarantees to remain in their territories in a context in which the state promotes large scales projects that provoke people´s displacement, as is the case of Antioquia in Cauca River Canyon. Related to this, the statement of a displaced *barequero*, who is now promoting a social organization to claiming for recognition and reparation from the state is an example. This statement was the answer to a question about the appearance of medium-scale mining in the territory:

"That could be related to armed groups because there was a lot of money there. We know that a backhoe is worth 400 or 500 million pesos, a barequero cannot afford that. Then, we are going to be measured as the same as those people, 'these barequeros work for them.' Not any single armed group would like us because we only get one gram of gold or less in a day. Barequeo is for subsistence, but these other things may be related to something else. But they

cannot throw us into the same sack with all who extract gold because we extract it on a small-scale (Artisanal miner, personal interview, May 10, 2019)

The main problem of lacking a contextual classification that includes all of this particularities traditional gold mining communities must face, is that lots of informal gold miners that have been extracting gold for years as part of a traditional activity carried out in their territories for centuries, become victims of stigmatization and criminalization when they are linked with illegal and criminal mining associated to armed groups. The stigmatization denies the potentialities for transformation these communities might have and undermine the trust and interest of informal gold miners for taking part in formalization processes.

In order to overcome this situation, a classification oriented to clarify the differences between gold mining in relation to their legal status has been proposed by the "Mining Dialogue Group", which classifies the operations according to the level of compliance with the rules. This classification has five categories: (1) the formal one, when the activity complies with all regulations; (2) the ancestral and artisanal, when it is carried out by indigenous miners, afro-descendants and peasants; (3) the informal one, when it fails to comply with any environmental, labor, mining or health requirement, but there is an intention to formalize; (4) the illegal, when it is not intended to be legalized; and finally (5) the criminal, when it comes to mining activities that finance criminal or illegal companies (López-Vega, 2016).

This work focuses on collecting information from actors located at the top of the sphere presented in figure 4 because it is in this field where organized traditional mining communities that fight for recognition of their activity and permanence in their territories can be located. Interviews and fieldwork were focused on artisanal miners (*barequeros*) and informal miners from the department of Antioquia. The actors are involved in local organization processes that aim to overcome the stigmatization and claim for their recognition as valid actors in a socio-environmental conflict around gold mining.

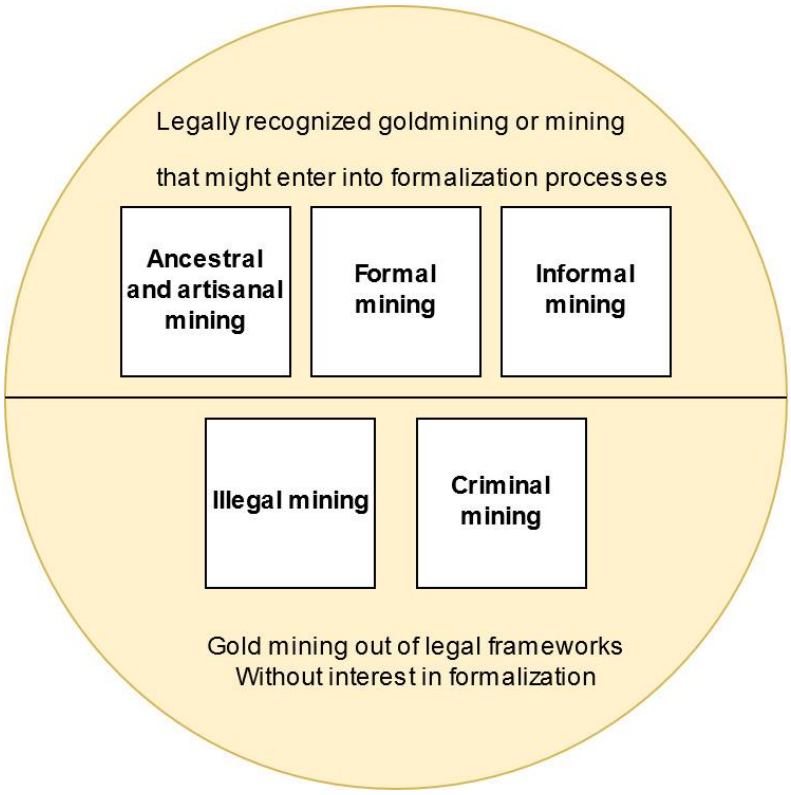

Figure 4. Classification of gold mining by the level of compliance with the rules

Source: own elaboration based on (López-Vega, 2016)

4.1.2. Informal and artisanal gold mining

As mentioned above, informal gold mining refers to extractive projects that fail to comply with any environmental, labor, mining or health requirements and do not have a legal title for operating. However, there is an intention to be recognized or formalized. Although *barequeros* are authorized to perform artisanal mining without a mining title, they must be registered in their municipality's major's office in order to carry out this extractive activity (McDermott & Massé, 2017). However, due to most of the artisanal mining takes place in areas of difficult access away from populated centers, many *barequeros* carry out their activity without being registered, which also makes them informal. Nevertheless, this work refers to informal mining as small-to-medium scale mechanized mining operations (Le Billon & Massé, 2017), separating it from artisanal mining (*barequeo*).

Informal mining in the northeast of Antioquia, particularly in the rural area of the municipality of Remedios, is a small and medium-scale activity, mostly underground mining. The peculiarity of this type of mining is that the labor force is composed of peasant-miners; this means that, although of great importance, mining is part of the economic and subsistence activities carried out by the peasants. To understand this, the concept of peasant-miner is a key, since it refers to the fact that the people who extract gold are not only miners but also peasants, farmers who combine their economic activities between harvest times and the extraction of gold, which configures its territorial and community identity.

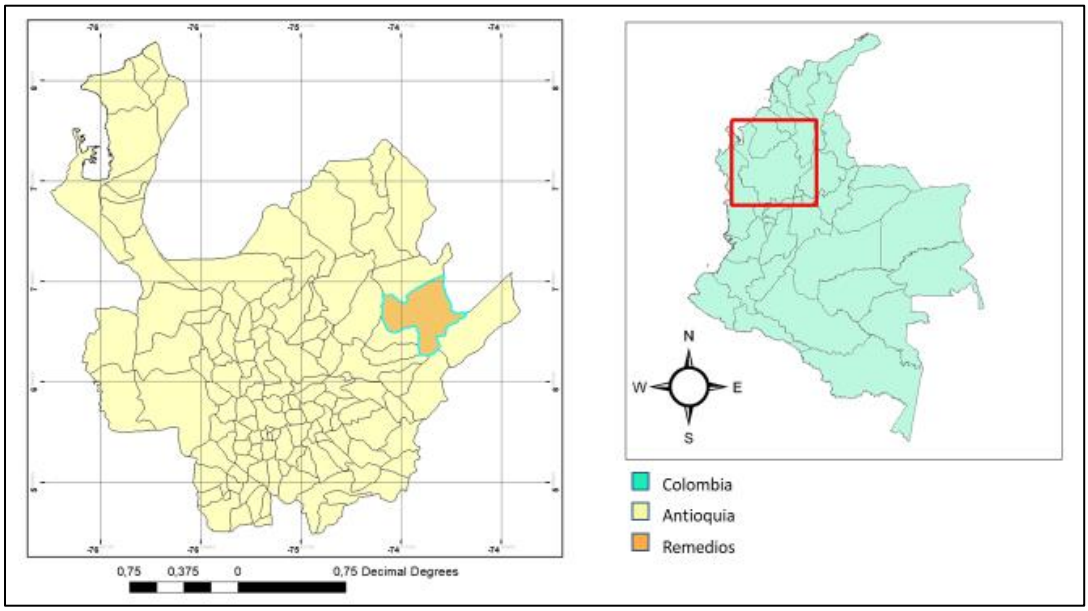

Figure 5. Localization Municipality of Remedios – Antioquia
Source: Own elaboration

The concept of peasant-miner is a fundamental component of the roots in the territory and the construction of a collective identity that allows the management of organizational projects for the administration of the territory, as well as the struggle for recognition, ownership over land and permanence in the space. This definition makes a distinction to the "miner" who is dedicated exclusively to this activity, because for the peasant-miners, a miner is a gold worker who only has interest in remaining in the territory while it houses the mineral of interest, without a strong territorial identity due to the transhumant nature of its activity. Thus,

the demand for access to land for agriculture and life, the diversification of productive activities, the struggle for collective recognition and autonomy, and the roots in the territory are key elements of the peasant-miner identity.

"When we refer to peasant-miners, it is because we believe that there are miners, miners, whose work is only related to the mines. They only arrive to work in the mine and when the mining is done, they go to another place because they are nomads, the miner is where the mine is. They extract here, finish and go to another region. They do not have such a strong root in the territory, but they are only mining workers who after finishing their work go to another municipality. And when we refer to a peasant-miner, it is because he belongs to the territory and due to different circumstances works on mining. Or they are people who come from other regions, but they arrive in the territory and generates a bond, they put down roots there and build their life project in the territory. They are peasants who have their farms and crops but work in mining sometimes, and when they are not working in mining, they work in their plot, so their work is changing. But what we emphasize a lot is that they are rotted on the territory." (Social organization representative, personal interview, May 20, 2019)

Informal mining is carried out in rural areas, inhabited by communities with high degrees of marginalization, exclusion, and poverty, so traditional mining is a subsistence activity that allows peasant-miners to acquire food and basic goods to survive. The incomes do not imply an improvement in their life quality. In fact, despite the increase in the international price of gold, the income that families obtain is barely sufficient to acquire basic goods in communities where the cost of living is very high. During the interviews and the fieldwork, it was found that the price of food is much higher in these communities than in other rural communities, as well as the price of transport where animal rent must be paid in many cases because populations do not have access roads. Thus, the cost of living, poverty levels and the isolation of those communities make necessary for them to participate in gold mining activities to gain the necessary incomes to survive.

"When people talk about gold or mining, they think there is a lot of money there, that they are millionaires and it's not true. Mining work is very unstable because it can happen that in one day you cannot get anything, or in one day you can take out the month, that is very relative. (...) with mining, people do not get rich. (...), you go there and they live in wooden houses (...) Because that is another problem, in mining areas the cost of living is very expensive, a pound of rice is worth double or triple, a beer can cost you up to 7 thousand pesos. As well as they work and generate income as well the cost of living is high. The transport is trails and sometimes there is no car and they must ride a mule, so the transport or whatever is very expensive. So, when one goes to a village only the transport cost 60 thousand pesos only one way." (Social organization representative, Personal interview, May 20, 2019)

There are different modalities in which the mining activity is carried out. One of them occurs through the construction of tunnels in the vicinity of formal mining projects. Under this modality, informal miners extract material clandestinely from formal projects or areas titled to private companies. Through the interviews was found that even this modality has a certain type of association between peasant-miners, which are responsible for defining who can work or not in the informal mine. Another modality constitutes the traditional underground mining model that occurs in the region. This model has been described by Quiroga (2014) as follows:

First, associated miners extract the basic material that contains the mineral of interest from underground mining. After selecting the material, a small quantity is sold to the Mine smelt houses (*Entables*). The less pure part of the extracted material is thrown away in order that women which are known as *"chatarreras"* can collect it and save it. During the whole day, these women collect the stones in buckets and after separating small pieces of gold they bring them to the *entables* to gain a small quantity of money. And finally, *barrenderos* are groups of families that live close to the mines or their roads. These people sweep their gardens and the roads to collect enough dust to sell it to the *entables* (Quiroga, 2014).

This traditional mining model allows us to see how different territorial relations are generated around a mine (Quiroga, 2014). There are three key components: the peasant farm where the household is located, the mine and the *entables*. The *entables* are key to the gold economy

dynamization in these communities. Besides buying the material, this small-scale processing facility offers basic processing services with grinders, basic sorting machinery and basic chemical procedures (Massé & McDermott, 2017). Moreover, *entables* are the primary entry points of mercury in those areas (García et al., 2015).

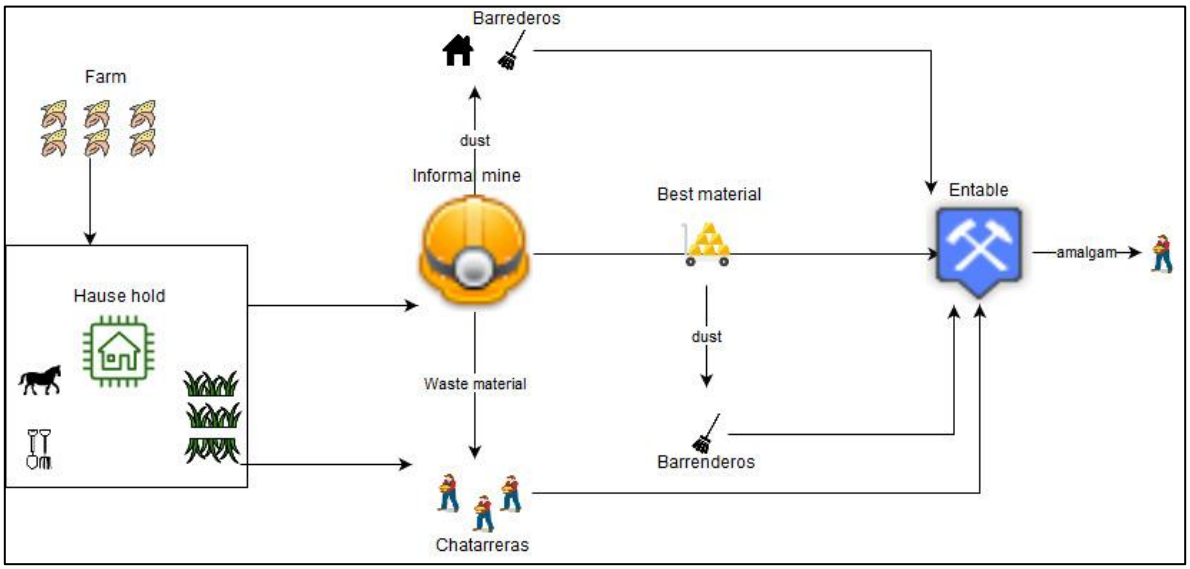

Figure 6. The traditional underground mining model

Source: Own elaboration based on description (Quiroga, 2014)

The material miners bring to the *entable* is amalgamated in small ball mills *("cocos")* using mercury. The process of separating gold from *entables* in 2010 is presented by Gracia et al. (2015) as follows:

The material collected by miners is added to the "*cocos*" using mercury. "The mill runs for 4 hours, after which the amalgam is separated from the rest of the minerals by panning, and the excess liquid mercury is squeezed out in a piece of cloth, resulting in a solid ball of amalgam containing 40-50% mercury and 50-60% gold and silver" (García et al., 2015, p. 246). The amalgam is given back to the miners, and they sell it to a gold shop. In these shops, "mercury from amalgam is evaporated with a propane torch without any condenser or filter" (García et al., 2015, p. 246) in order to obtain gold and silver. Later, The mercury-contaminated tailings from the "*cocos*" are collected and subjected to cyanidation by the owners of the *entables* (García et al., 2015).

It is important to consider that normally "only 10% of the material adheres to the amalgam in this process, indicating that if 10g of mercury is used to produce 1g of gold, 9g of mercury are released immediately into the environment and 1g remains in the amalgam" (Güiza & Aristizábal, 2013, p. 36). And finally, 100% of the mercury from the amalgam is released into the atmosphere.

Figure 7. "Cocos" are small ball mills to amalgamate the whole ore

Source: Retrieved from (García et al., 2015)

Artisanal mining (*barequeo*) takes place in more remote and hard-to-reach areas, where the heavy machinery necessary for informal and illegal mining cannot enter due to lack of access roads and topographic characteristics. For some interviewees, these features have allowed this ancestral activity to remain almost intact in areas such as the rural area of the municipality of Peque-Antioquia until 2018 when the *barequeros* had to put aside the extraction of gold due to the construction of a dam in the river where they extracted the mineral. In the case studied, similar to informal miners of the municipality of Remedios, although the extraction of gold on the banks of the rivers is a central activity for survival, identification with the

territory and collective identity, is also part of several economic activities that focus on rural life.

In the visited community this is more pronounced, since the activity of *barequeo* is carried out in relation to the seasons of rain and drought, so it is included in the sowing and harvesting cycles. The gold is extracted from the banks of the rivers once the rainy season ends, as the riverbed is reduced leaving the beaches exposed so that *barequeros* can carry out their economic activity along the Cauca River canyon. The relationship with agriculture is so marked that the peasants of this region refer to the season of gold extraction in the rivers as "the harvest of the river." Thus, they say that when the rainy season is long and the riverbed increases, "the harvest of gold" is much better, referring to gold as another resource offered by "the land and the river." Figure 9 reflects the planting and harvesting cycle that integrated the activities of this community until 2018.

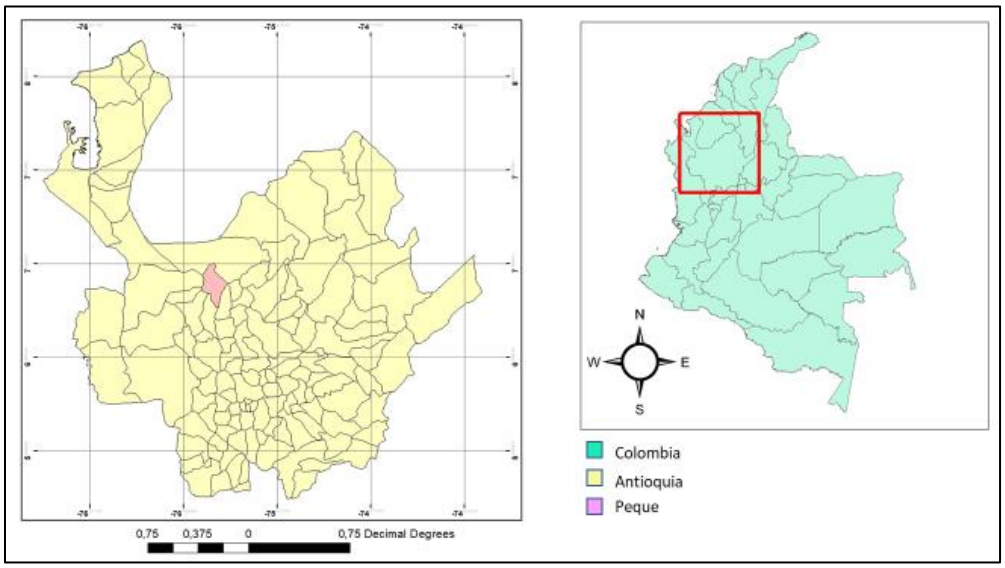

Figure 8 Localization Municipality of Peque – Antioquia
Source: own elaboration

"When the river grows, we expect it to bloom (...) We call him blooming because when he is growing, he is washing the ravines and throwing the gold with mud at the beaches. While he

grows the communities plant beans, plant corn, plant pineapple, and medicinal plants." (Artisanal miner, personal interview, April 20, 2019)

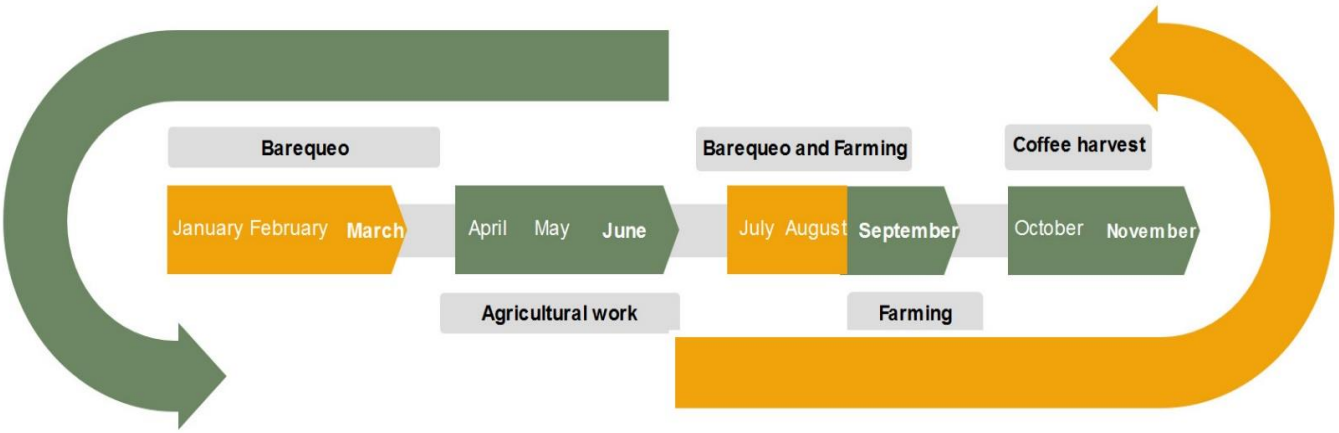

Figure 9. The work cycle of Barequeros in Peque-Antioquia until 2018
Source: own elaboration

Barequeo is a subsistence activity that allows peasant and fisher families to obtain income to buy food, medicines, seeds, and inputs for crops, among other family expenses.

"We were farmers, so in order to have the beans, the arepa, we had to harvest, and with gold, we bought the panela, the rice, the oil, and the little things. Because agriculture gave us nothing but to eat, it did not give us to sell. So, what we did, we harvested to have the corn and the beans, to be able to eat beans, to be able to eat arepa, to be able to take the mazamorra, for that. And with gold, we could buy rice, soap, panela, salt, oil." **(**Artisanal Miner, personal interview May 10, 2919)

As mentioned earlier, *barequeros* tend to be located in the most remote areas of mining regions. This makes access to these communities even more complicated than in other cases. Moreover, the lack of roads, infrastructure, and basic services makes agricultural activity insufficient to guarantee the subsistence of these communities, as the acquisition of

agricultural inputs is difficult, as well as the entering of products into market chains. Thus, most crops are for self-consumption. Due to its physical characteristics, coffee became the only crop for sale in this community, as it tolerates the harsh transport conditions. However, the profit for growers with this product is very low, so everyone points out that planting, harvesting, and transport efforts are not worth it. For this reason, gold, a resource of high value and easy transport becomes a suitable product in these conditions.

"I liked being close to the river, and every eight days I saw the money. Sometimes a few, sometimes a lot, but you had every eight days the possibility to go to the market. On the other hand, now one lives practically from coffee and agriculture and, as I was saying, right now the crops are being lost and coffee is annual, so it is very difficult to see the money (...). At that time, I went to the town and they could not see that I was carrying something because you take out a gold ball and put it in your pocket (...). And now to have something in December, when the coffee is ready, you must load many packages to the town. It is a lot of work that is worth nothing because coffee costs very little and is getting cheaper every day." (Artisanal miner, personal interview, May 15, 2019)

The livelihood of a family of *barequeros* in this area was made up of the following spaces that formed their territory until 2018 when they lost access to the river after the dam construction: The household with gardening, the farm-plot where they grew coffee and other self-consumption crops, and finally the river, where they "harvested" gold and fished. The gold collected from the banks of the river was sold or exchanged for food to small gold buyers located in municipalities closer to the river, and the coffee production is sold in the municipality of Peque.

Figure 11. Barequeros family´s house. Peque, May 15, 2019

This is a common type of house in a traditional gold mining community. The materials used by the building of the houses are normally found in the same territory

Figure 10. The Family´s Farm-Plot. Peque, May 15, 2019

Traditional coffee crops are well spread in Peque. The farm systems of traditional coffee production are polycrop systems.

Figure 12. Cauca river canyon after the dam. Peque, May 20, 2019

The river is a fundamental component of *barequeros* identities and livelihoods. The construction of the dam by Hidroituango project took out from them part of their territory and source of incomes.

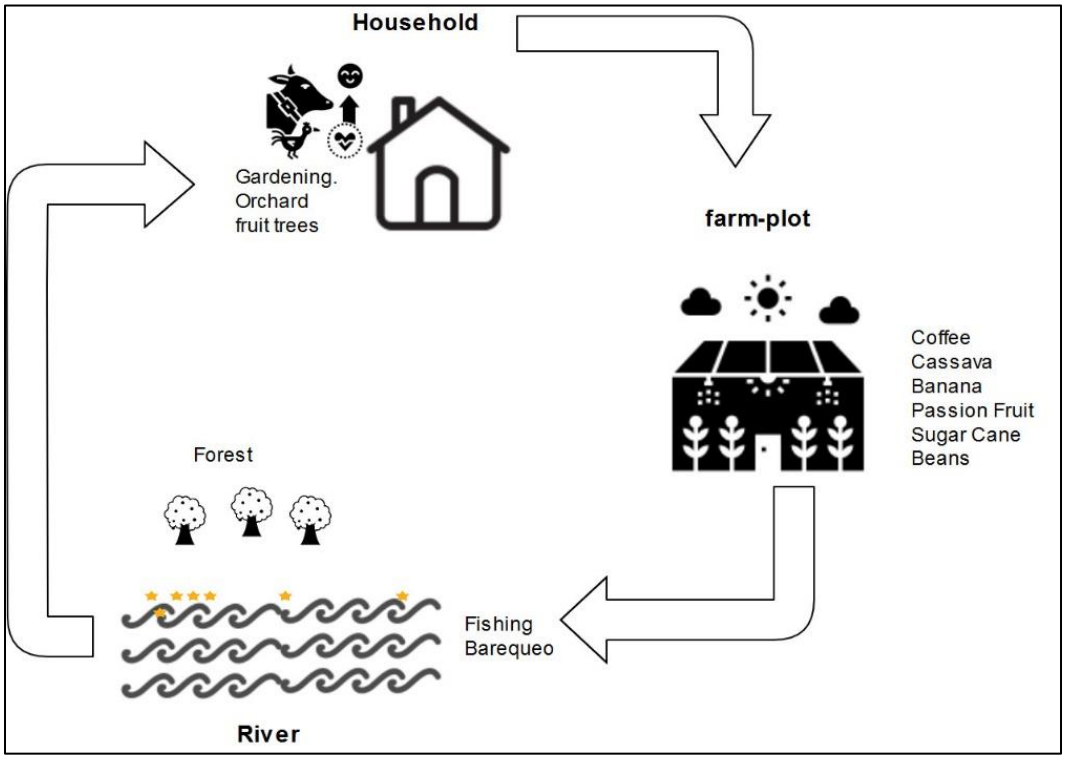

Figure 13. Three components in a family of *barequeros*

Source: Own elaboration

The process of extracting gold through *barequeo* is done by washing sand on the banks of a river using manual methods that are transmitted from one generation to another (gold panning). These learning processes are facilitated because families set up their camps in the forests near the rivers for weeks while they extracted gold and fished. One of the most important aspects of this community is that the method for gold separation from the material without economic interest (called *jagua* by *barequeros*) does not involve mercury. To make

Figure 14. Activity transmitted from one generation to another. Peque, May 17, 2019

this separation possible the *barequeros* use local macerated plants that replace this polluting element.

"In the process of barequeo, the river grows and leaves the gold under the stones and when the river falls again the water is removed from the beach, then one piece of beach is left to work. Then, there you go with an almocable, with that you take out the sand, with the shovel, with a pike, with that the sand is removed. Then you assemble a wood mill with a sack and put the sand there to washing it. The sand and gold get stuck in the sack. Then you shake it in the batea and then begin to wash it to remove the sand and get the gold with the jagua." (Artisanal miner, personal interview, May 10, 2019)

The extraction process identified has the following steps: First, the artisanal miner (*baraquero*) walks across the river beaches prospecting the placer deposits with a pan (*batea*), this gold panning as a prospection process is called *catear*. Once a good prospect is identified the *barequero* removes land and mud to put them into a homemade sluice box called *molino* in order to wash it using water from the river. The material, mainly mud, is collected from the sluice box in a sack. Then the sack is re-washed on the pan in order to be agitated until the gold sinks to the bottom of the pan. The small pieces of gold are collected in a recipient called "*jaguero*". Finally, all the gold collected in the *jaguero* is cut, which refers to the process of separation from the *jagua*. The process of separation uses the maceration of several local plants to produce a gelatinous emulsion that will be used to obtain the gold in its "purest version". This gold is wrapped in a piece of cloth forming a small ball known as *cavetan* that will be sold to local gold buyers.

Figure 15. *Barequeros* washing gold in the river. Proportioned by interviewee, April 2019

4.1.3 Spatial distribution of gold mining

As already stated before, traditional gold mining communities are normally located away from the principal urban centers, in border and colonization zones. Informal small and medium-scale mining using some machinery are located in rural areas closer to formal projects and medium and small size urban areas, while ancestral artisanal mining is developed in the most remote and hard-to-reach areas, relatively close to the banks of the rivers. Moreover, the interest of the armed group's control over the mining activities is focused on informal mining which might generate more revenues. The interviews allowed us to see that the extractive activities developed by *barequeros* are not attractive for armed groups and they are not interested in taxing those communities' activities. Those areas are considered as military withdrawal zones.

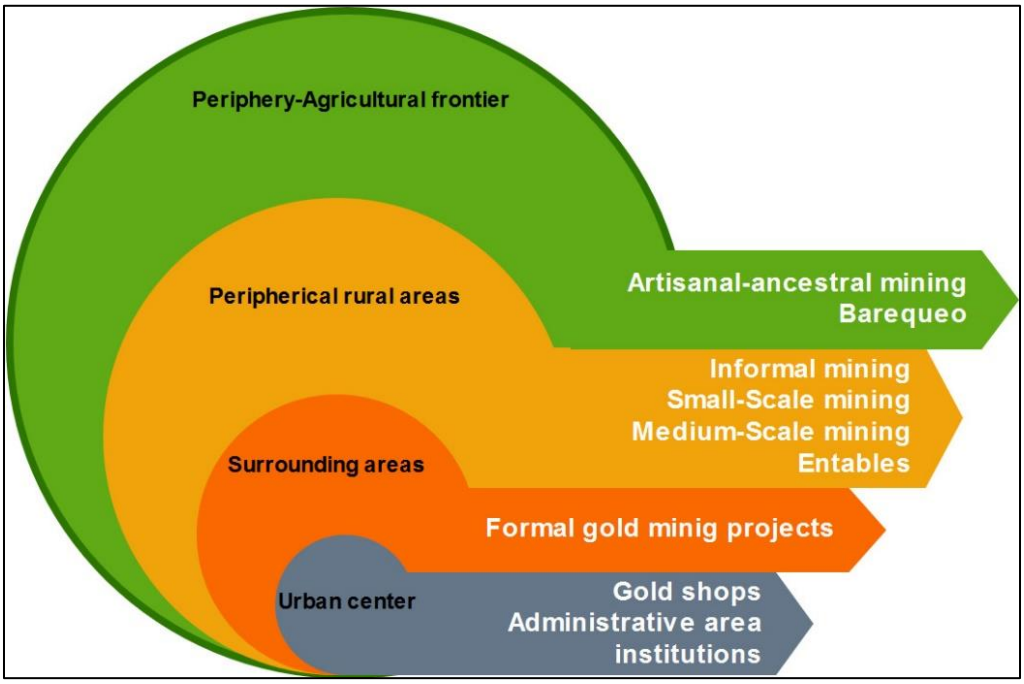

Figure 16. Spatial distribution of gold mining

Source: Own elaboration

4.2 Environmental hazards and risks

The most relevant environmental issue related to informal gold mining is the use of mercury for gold separation. Amalgamation with mercury has become the most used method for gold separation. The selection of this material by the miners might be also be considered a consequence of marginalization, criminalization, and isolation of these communities. Considering the particular conditions these communities must face, "the use of mercury allows each miner to accomplish almost the entire process independently without entering into a partnership with others" (Güiza & Aristizábal, 2013, p. 34) or without taking part in formalization processes. Moreover, mercury is very accessible, cheaper compared to other methods, is easy to use and very effective in gold separation (Güiza & Aristizábal, 2013).

Annually, Colombia releases about 205 metric tons of the 590 metric tons of mercury that it imports, ranking third in the world for mercury pollution according to a report from the United Nations Industrial Development Organization (UNIDO), which reveals high levels of water, ground, and air pollution (Morales, 2017). The municipality of Segovia, also part of the Northeast region of Antioquia and other traditional gold mining municipality, was found as the most mercury polluted zone of the world in 2010. The mercury used in informal gold mining persists in the environment, it accumulates in food chains and it has damaging effects on human health.

> "In its inorganic form, mercury can cause kidney damage, increased blood pressure, digestive tract problems and impact embryonic development as well as cause a disorder called acrodynia (EPA 2007). However, it is methylmercury, an organic form of mercury, which is the most dangerous because of its neurotoxicity. It can cause permanent brain damage, blindness, blurred vision, deafness, ataxia, and death, and can cause mutations and malformations in the nervous system of foetuses" (Güiza & Aristizábal, 2013, p. 36)

Finally, the informal small and medium-scale mining might contribute to soil degradation and the expansion of mining and agricultural frontier, which has direct effects on deforestation and biodiversity loss.

In the case of the artisanal mining studied (*barequeo*), not chemical pollution hazards were identified. In fact, several interviewees, as well as part of the literature agree about the sustainability of artisanal mining in comparison to informal small and medium-scale mining. Nevertheless, in some cases, *barequeros* mentioned the use of pumps to remove bigger portions of the soil. This practice can contribute to sedimentation processes in the river as well as the presence of oils and fuels in the water. Moreover, the periods of violence and the implementation of large-scale projects such as the hydroelectric plant forced these communities to displace. Thus, as a coping strategy, some of the *barequeros* took part in informal gold mining in other municipalities before coming back to their territories.

4.3. Gold, a resource in dispute and a conflict resource. Perspectives, meanings, and uses of gold

4.3.1. Gold and armed groups

As mentioned in chapter 2, armed groups see gold mining as a resource to finance their military and political agendas which have contributed to prolong and fuel the armed conflict. In that sense, all the armed, legal and illegal actors have received economic benefits from mining extraction in the armed conflict context. Thus, gold is part of a "criminal resource portfolio" which refers to the simultaneous participation in the extraction of multiple resources such as cocaine and gold as funding sources of illegal armed groups (Rettberg & Ortiz-Riomalo, 2016). Hence, 40% of 489 municipalities where informal mining takes place have the presence of armed groups (Le Billon & Massé, 2017). The most important illegal armed actors have been FARC-EP, National Liberation Army (ELN) and post paramilitary demobilized groups knowns as criminal gangs (BACRIM).

The *modus operandi* of armed groups in gold mining has several types: 1. Direct participation by providing the machinery for gold mining, 2. Creation of companies controlled by armed groups, 3. in-direct participation through mediation in land tenure and revenues distribution,

security services, and illegal taxing or extortion (Camargo & Massé, 2012; Ortiz-Riomalo & Rettberg, 2018)

In the region studied, illegal armed groups participate mainly through the regulation of mining activities by taxation and distribution of exploitation areas where several mining projects converged. This is in order to avoid conflicts between community members and to gain economic resources for financing their military and political activities. In the case of the FARC, this guerrilla regulated the different economic activities in the territory, not just mining. Moreover, instead of participating directly in mines, they regulated them by taxing.

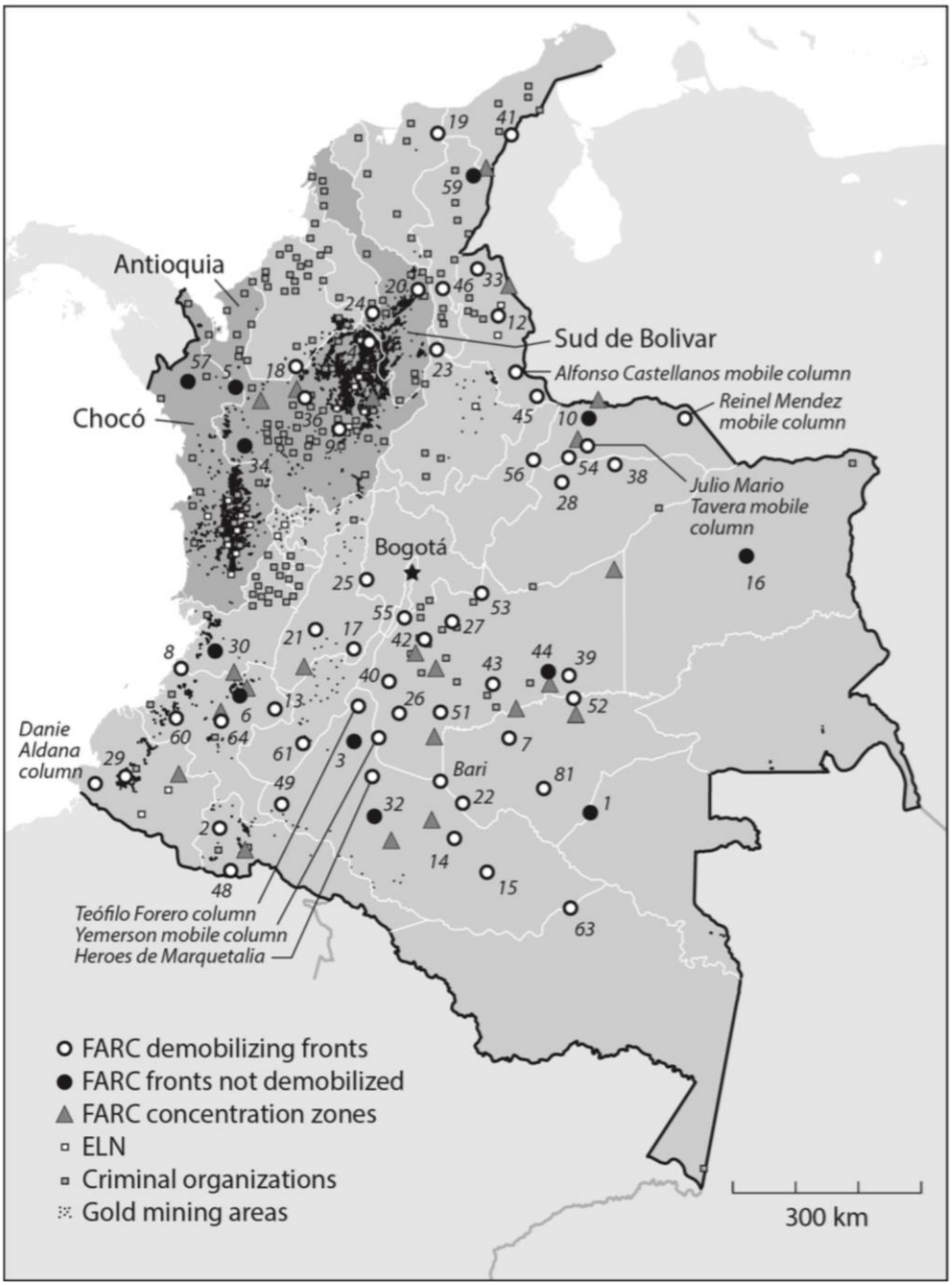

Figure 17. Gold mining areas, insurgent groups, and criminal organizations

Source: Retrieved from (Le Billon & Massé, 2017)

In some cases, the money armed groups obtained from mining came from the "collection of taxes" for mining activities. Thus, they might receive part of the profits in cash or claiming a percentage of the gold extracted directly. In other regions such as Cauca, it was found that paramilitary groups or their representatives bought machinery that was lent to local miners,

then claiming a percentage of the gold produced in the process. In regions such as northern Cauca, it was pointed out that on many occasions the different armed groups present in the territory had a greater interest in preserving and guaranteeing the illegal economies to sustain their activities than in fighting each other.

"What we are clear about is that it was a single chain in the participation of illegal economies. And I say this as a militant. One part is the protection of the exit of the resource, and that protection was offered by a group, another part is the transformation, and that was done by another group, and there were agreements between the groups to guarantee that there was a market for those products, gold or coca (...). One thinks they are fighting each other and no, they are there based on the movement of money, that simple. Because you need money to get guns, you need money to eat, to keep a camp, regardless of the group, they all need money. Then they divide the place in the chain and guard it." (Social organization representative, personal interview, Marc 28, 2019)

In addition to the control over economic activities to obtain money, all respondents mentioned that paramilitary groups had the function of suppressing protests against the implementation of large mining projects titled to private companies, or carried out actions that promoted displacement to facilitate the development of mining and energy projects. Thus, they point out that the violence caused by these groups allows the consolidation of the energy mining model promoted by the state and private companies

"Several trade unionists who have defended formal mining and traditional mining, when they have a critical position against foreign investment and against multinationals, pamphlets against them suddenly appear, they have been threatened, some have been killed. You could think why these leaders who have a critical position about the presence of multinationals are the leaders who have the most risks. In the rural area where we are present, there is still no presence of multinationals, but we believe that the state is looking for the forced displacement of the communities to leave the space to international investments. Because it is paradoxical

that all military actions or everything that the state does, such as criminalizing small mining, military actions against informal miners, seeks to strip them of the territory so that multinationals enter. And we believe that the conflict has taken place there because of the minerals, because of the abundance that exists - because it is a territory rich in gold and water." (Social organization representative, personal interview, May 20, 2019)

Related to the hydroelectric project of Hidroituango, which affected directly the *barequeros* from Peque and surrounding municipalities, it was mentioned that:

"When the project was sold, when actions related to the project were being taken, at that time there were massacres, there were selective murders, there were disappearances, and that certainly generates a forced displacement" (Social Organization Representative, personal interview, April 1, 2019)

Besides the participation in gold mining in the regions visited, FARC played a crucial role in environmental and natural resources management in general. As the lack of presence of official institutions and the state, FARC became a legitimated power institution responsible for justice administration as well as the regulation of land use and natural resources management. It was found that FARC promoted also the participation of community members in Community Action Councils (*Juntas de Acción Comunal*), a legally recognized grass-root level organization in Colombia, in order to have permanent contact with community leaders.

"The FARC controlled the cutting of wood, for example. They defined how many hectares could be cut. And yes, after the abandonment of weapons by the FARC, the cutting of wood in the territory has increased and it has been very difficult to raise awareness about natural resources. Unfortunately, the Colombians got used to the power exercised with weapons. Before, each farmer had to leave several hectares of forest because some farms were opened,

which means that they cut the entire forest for maintaining only small grass for cattle. Then each farm should have a few hectares of forest. And now what is being presented is that all the farms are opening and putting cattle and generating other things, and they are not leaving the forest. But when the FARC was there, there was control over that and now people are opening forest on the farms like crazy." (Social organization representative, personal interview, May 20, 2019)

4.3.2. Gold and traditional gold mining communities

For traditional gold mining communities, gold has been an important resource for guarantying their subsistence in a context of precarity, poverty, and violence, as is seen in agricultural frontier zones and colonization areas. In these regions, the communities have had to face the abandonment of the state, the lack of infrastructure, education, access roads and support for the development of agricultural activities so that gold has become a possibility to guarantee their subsistence. In this context it was stated by a community member:

"*Mining is an ancestral practice that has allowed us to live, which has allowed the territory to give us basically to eat"* (Social organization representative, personal interview, March 3, 2019)

Being a resource for subsistence associated with permanence in the territory, in many artisanal mining communities, the notion of sustainability in the extraction is crucial. For them, the gold extraction must occur without the natural environment in which they live got destroyed and guaranteeing access to the resource for the next generations.

"There is a plant that fulfills the function of mercury for gold separation. I've seen it, and it's the liquid from the plant that they use for the separation. Obviously, it is not the same as using mercury, but they do not care because the issue is not to profit from gold but to have some grams to buy the necessary. And because the idea is not to get everything out. What

has become very clear to me in all the places where I have seen artisanal mining is that it is necessary to leave some gold, that it is necessary to leave for the grandson. So, since people are thinking that they have to leave for the grandson they have no desire to take everything out." (Social organization representative, personal interview March 28, 2019)

For the *barequeros* of the Cauca River canyon in Antioquia, gold has a meaning that goes beyond its economic utility. It is common for artisanal miners to refer to gold and the river by assigning them characteristics of living beings as if they interact with sentient beings that inhabit the territory and are part of their communities. In addition to this, gold acquires a symbolic value. Moreover, even medicinal properties are attributed to gold. Thus, in addition to being used for some specific ailments, it is common for *barequeros* to always carry some gold in their pockets as a measure of protection and care.

"So, money is not everything. See, this is protection, I charge it as protection. I have had this gold almost 13 months ago. We have been in a need to feel it because it is the protection of the family. That is the cavetán[3]*: One without gold, to ask for strength, another with a little to ask for health, and another so that one is alive and has enough to live."* (Artisanal miner, personal interview, April 20, 2019)

Gold is then a fundamental component of these communities' identities. After *barequeros* from Cauca river canyon had to be displaced, many have felt the economic and psychological consequences of having left their territory and traditions behind.

"For my wife the loss of the river, the loss of barequeo has been very hard. Moreover, where we are in Medellín she keeps a pan, the cavetán, the Jaguero and tells me that we must continue going to the rivers to see if we find gold there. That is already part of life. We had a fellow, Remisio Moreno, who died of sadness. The situation is complicated" (Artisanal miner, personal interview, April 20, 2019)

[3] See figure 18

Figure 18. Gold carried by a *barequero* in the pocket. Bogotá, April 18, 2019

The small piece of clothes in which the gold is carried in this picture is called *Cavetan*

However, the perspective of mining that communities have is not exempt from contradictions and conflicts, as already seen in chapter 2. Despite being a fundamental part of the collective identity of peasant-miners and *barequeros*, the increase in this activity has been considered a risk to the health, the environment and the cohesion of the communities. In the context of precariousness in which these communities live, the increase in this activity attracts the arrival of new actors and reconfigures territorial dynamics threatening the peasant identity.

"Mining has been the livelihood of many families. We see it as a factor that greatly influences community dynamics. For example, we are concerned that there are villages that get empty because people go to areas where there are many mines. People go there to work because there are no access roads in good condition, there is no support from the state or the mayor's offices for the farmer to subsist from his land. It is very difficult for a farmer in the region to be able to live clearly from bananas, cassava or rice. How will they get it out? If the paths are five or six hours from the municipality and products arrive in very bad conditions. There

is nothing in our country for the rural economy. There is not a project to strengthen rurality. So many people abandon the work of their land, the farm because they must go find their livelihood by working in the mine." (Social organization representative, personal interview, May 20, 2019)

4.3.3. Gold and the State-Private companies

The state is one of the key actors that makes a presence in the territories influencing territorial dynamics, the appropriation of gold and the transformation of space. Although sometimes the absence of the state in these regions is mentioned due to the lack of infrastructure and public institutions, the presence of the state is manifested through the declaration of mining districts, forest reserve areas, and the concession of mining titles. Thus, in relation to mining, the state is present through the promotion of a neo-liberal economic development model based on extractivism, which takes place with the implementation of large-scale mining projects by private companies. The implementation of these projects is supported by increasing the presence of the armed forces to ensure security and developing operations against illegal and informal mining.

"In the territory, the transnationals Sandor Capital and Anglo Gold Ashanti are present in the municipal seat, and Colombian Gold also has its investments, because historically this territory has been for mining activities. Segovia, Remedios, and in limits with Bajo Cauca, the municipalities of Zaragoza, El Bagre, all that area between northeast and Bajo Cauca has been very mining. And it is always very striking that where there is a presence of these multinationals where gold is being exploited, it is militarized, and the state gives more security to foreign investment and not to communities that have always been on the sidelines." (Social organization representative, personal interview, May 20, 2019)

Since the increase in commodity prices in international markets, the extractive sector of the Colombian economy has become a central axis for macroeconomic growth according to the

government. Thus, the growth in investments in the energy mining sector was justified through the promotion of a developmental discourse from the first period of President Juan Manuel Santos (2010-2018) who signed the peace agreement with the FARC-EP. Thus, mining was presented as one of the five "locomotives for the development of the country" (DNP, 2010). In this way, mining was declared as a national interest activity for economic and social development and currently represents 8% of national land use. (Suarez et al., 2017). Thus, during the last years, mining has been marked by a high flow of foreign investment, by the competition for mining titles necessary for exploration and exploitation, as well as by high expectations of profit of the large companies dedicated to the business and the Colombian state in terms of royalty incomes (Rettberg et al., 2017).

1889 mining titles were issued in the country from 1990 to 2001, while between 2002 and 2009 the number increased to 7869 concessions corresponding to more than four million hectares and 20,000 applications pending (Valencia & Silva, 2018). The increase in mining concessions led the government to mobilize legal and military means to promote foreign mining investment under a low taxation regime, a model that has increased overlaps with informal mining areas (Le Billon & Massé, 2017).

The interest in reaching these regions to access the natural resources through mining concessions and other large-scale projects led the government to generate discourses that stigmatize these communities as previously mentioned. In addition to this, it has been denounced by communities that, although many informal miners intend to formalize, the mechanisms so far have been insufficient, being seen by the mining communities as mechanisms to favor the appropriation of natural resources by private companies.

"Many times, formalization has been impossible, because of the second law declaration, or because many years ago there were other titles in the area. And people want to make the mine, they want to do the procedure to legalize, but the government puts many obstacles, many, many. And one sees that for multinationals is very easy. And in the municipalities, there are mines secretaries and the mines secretaries have also tried the whole mechanism for legalization, but it has been very difficult" (Social organization representative, personal interview, May 20, 2019)

4.4. Multi-scalar causalities of local gold extraction schemes

The different gold appropriation and exploitation schemes configure particular relationships with the space that alter the landscape and the environment. Gold extraction schemes are mediated by different ways of conceiving the resource and interacting with the environment. This creates a context of overlapping territorialities that generate conflicts between different actors. Both the conflicts and the environmental effects generated locally have a relationship with political, social and economic dynamics configured at regional, national and global scales.

The increase of gold prices in international markets influences gold extraction schemes in traditional gold mining communities. Attracted for the high revenues, the illegal armed groups decide to participate directly and indirectly in the gold business by pressing for higher levels of extraction, the national government promotes a series of policies to motivate foreign investment by offering mining titles for large-scale extraction projects, while communities develop strategies to remain in space or to move into the agricultural frontier by increasing pressure on ecosystems.

In this way, the extractivist model that develops close to urban centers and the most populated municipalities begins to expand into unexplored areas where traditional peasant and mining communities live. The pressure on space makes communities move by increasing informal mining in the periphery. In addition to this, when they are subjected to higher degrees of pressure, informal miners make use of more polluting practices in order to extract gold in the easiest, fastest and cheapest way.

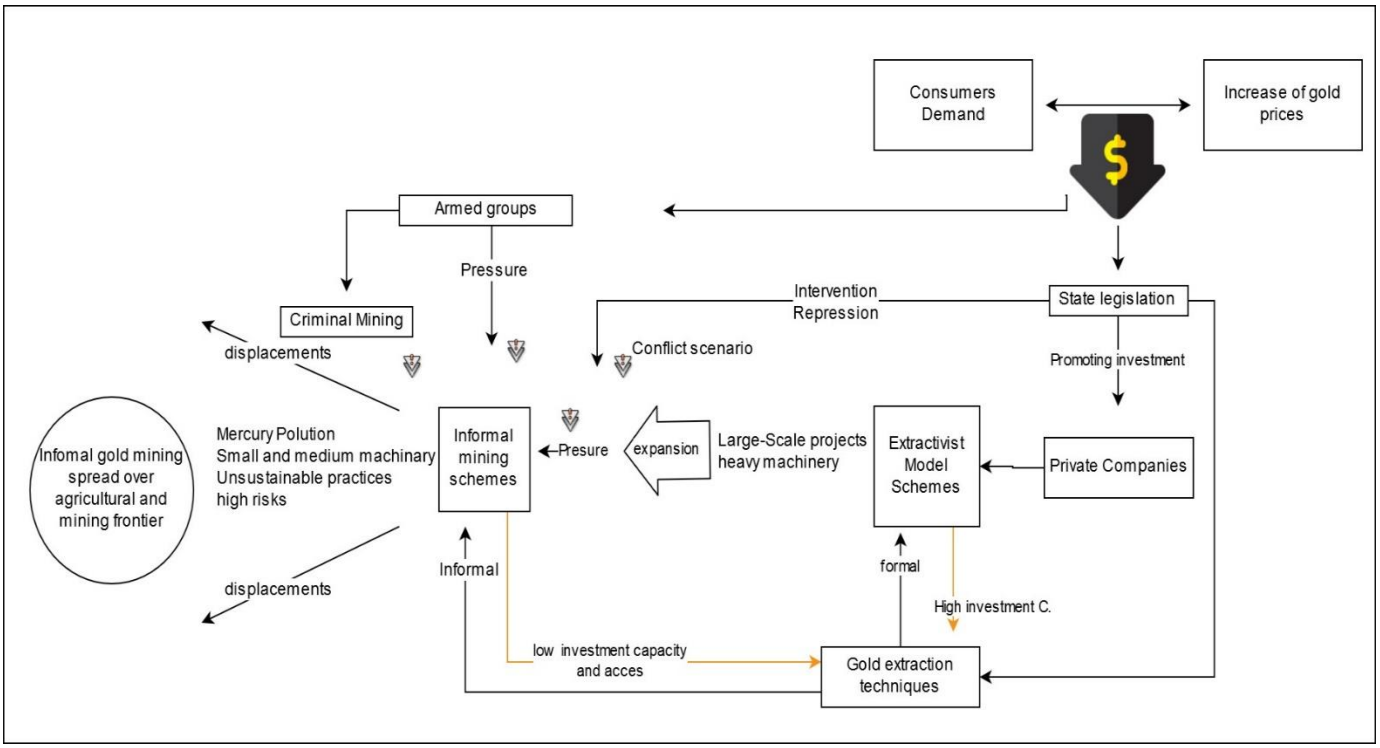

Figure 19. Multi-scalar causalities of local gold extraction schemes

Source: Own Elaboration

4.5. Community organization and natural resource management strategies

In a context of violence and conflicts over the appropriation of natural resources, traditional and artisanal mining communities have developed strategies to guarantee access and collective use of natural resources. At the same time, being aware of the local problem and the need to guarantee the ecosystems that shape their livelihoods and territories, they have developed strategies for natural resource management and environmental protection.

The baseline of these strategies is community organization. The context in which these communities are located, the risks that they must face due to the presence of armed actors, the lack of land titles, and the dynamics of dispossession they must face during a conflict around access to resources such as gold and water have led communities to generate organizational processes. Organizational processes reinforce collective identities, make stronger the agency's capacity of communities and allow them to think about strategies to remain in their territory, which is the most important claim in a dispossession scenario.

"The work in the river is over, very sad, very hard, but we say we are going to cultivate the land, we know how to cultivate the land, we continue to cultivate the land. And there is something very important: we don't want to get out of here. Our struggle is because we do not want to leave. We were displaced by the conflict, but we don't want to leave here, and we did fight to return here. We left when that conflict was there, but here we came back because we don't want to leave our land" (Artisanal miner, personal interview, May 16, 2019)

The processes of community organization and mobilization have made them more aware of the environmental problems in their territories, the health risks associated with mining activities and the need to make sustainable uses of natural resources. For this reason, communities have developed strategies such as reforestation programs, implementation of agroecological practices on farms, and initiatives such as the "yellow strip" in the northeast of Antioquia, which is a forest reserve and water protection zone determined autonomously by the peasant-mining communities of the region.

The main objectives, strategies, and achievements of organizational processes that traditional gold mining communities have carried out, which have been identified during the research are summarized in table 9.

Table 9. Organization strategies developed by communities

Main targets of the organization process	**Strategies**	**Outputs**
Face the violence provoked by the presence of armed groups	-Humanitarian refuges and camps -Communication channels with armed groups	-Community is recognized as a valid actor for armed groups -Reduction of violence levels

	-Identification of armed groups presented in the territory -Denounce of human rights violations	-Reduction of victimization
Access to Natural Resources	-Miner committees -*Barequeros* Associations	-Access and collective uses of Natural resources -Visibility and Recognition of mining activities
Collective administration of Natural resources	-Miner committees -Producers associations -Distribution of revenues from mining	-Improvement of living conditions -The building of infrastructures such as access roads, houses, and schools -Social networks and Resilience
Local territorial planning	Creation and promotion of administration and management figures such as Peasant Reserves Zones (ZRC); Agricultural-mining territories and life plans	-Local participatory planning -Collective initiatives
Return to the territories or common reparation strategies	-Displaced people associations	Visibility and Public recognition of the problem
To recognize communities	Different types of association	Local censuses of community members. Systematization of

		economic activities and initiatives
Socio-Territorial Movements	-Social Mobilization, -Protest and demonstrations -Communication strategies	-Visibility of communities and their claims - The building of networks with other sectors such as NGOs, social movements and communities in similar conditions.
Sustainable management of natural resources	-initiatives for forest conservation such as “The Yellow stripe” -Reforestation programs -Agroecological initiatives	-Environmental protection -Environmental awareness -Sustainable livelihoods
General Outputs	Permanence in the territories, access to natural resources, social recognition, and improvement of agency capacities. Transformation of structural conditions of poverty and violence	

Source: own elaboration

5. Discussion

5.1. Gold mining and social-armed conflict

The relationship between informal gold mining and social-armed conflict in Colombia has had different nuances. In terms of the armed conflict and the participation of illegal armed groups in the gold economy, it is important to point out the lootable nature of gold. The lootability of gold, in this case, is shaped by the fact that it is a high-value mineral, easy transport, with a legal market that has few barriers to entry, and often located in isolated, difficult access rural areas, and away from the most important urban and economic centers. Thus, gold becomes a lootable resource for armed actors who find in this an economic source to finance their military and political agendas (Massé & McDermott, 2017; Ortiz-Riomalo & Rettberg, 2018; Rettberg et al., 2017; Rettberg & Ortiz-Riomalo, 2016).

In terms of the geographical dimensions raised by Le Billon (2001), which refers to the location and concentration of the resource, it can be said that gold is a distance resource, located far from the economic and political centers of the country, which facilitates its control by armed groups. In addition to this, it is a diffuse resource spread over large areas across traditional gold mining regions. These geographical dimensions of gold in the context of the armed conflict have contributed to the appearance of dynamics of Warlordism. These dynamics are expressed in the consolidation of illegal armed groups in these regions through territorial control, the administration of justice and the management of natural resources. This, coupled with the low presence of state institutions, has led to high levels of maturation of illegal economies in regions such as Antioquia (Vanegas, E. Á., Vélez, A. C., & Astroz, 2017), which represents a major challenge for peacebuilding because in many cases armed actors have reached certain degrees of legitimacy within the population.

The violent conflict is not only manifested in relation to the presence of armed actors. Their presence is part of a complex conflict around the appropriation and uses of gold. Traditional mining communities, armed actors, private companies and the state are involved in this conflict, each with dissimilar meanings, perspectives and interests around gold. Thus, artisanal mining communities that have lived from artisanal gold mining, as well as small

and medium-scale mining, must face a structural process of dispossession caused by the expansion of the extractivist model over territories with high degrees of marginalization, where informality in mining is a general feature. Violence against these communities manifests itself directly through mechanisms such as forced displacement or military operations against informal mining, and directly or structurally through stigmatization, illegalization and the lack of an integrated rural development policy, which generates poverty and contributes to increasing the degrees of dependence on gold extraction.

It is important to point out that although the extractivist model promoted by the state encourages large-scale mining projects over traditional and artisanal mining, there are also conflicts among different schemes of small-medium scale mining. This conflicts are mediated by the pressure generated by the arrival of illegal mining in territories characterized by artisanal mining, as it occurs in some areas of Cauca department, where illegal miners appear to transform the territorialities and meanings over gold that these communities have, imposing a violent rationality of extraction, as suggested by (Restrepo & Restrepo, 2017). Hence, the massive presence of illegal mining in those areas becomes small-medium mechanized mining into a "technology of dispossession" (Restrepo & Restrepo, 2017)

5.2. Informal and illegal mining during post-conflict with FARC-EP

The increase in mining activity in the post-conflict context with the FARC is related to several variables. First, the departure of the FARC from historically controlled territories altered the dynamics of natural resource management. As it was seen, beyond the fear that could generate the presence of an armed group, the areas where natural resources were conserved in these regions were defined through strategies for resource management that this guerrilla developed. In order to administrate justice and avoid conflicts within the communities, the FARC intervened in the delimitation of the exploitation zones, the economic activities, and the ecological conservation areas. The perspective of FARC as an actor involved in environmental regulation is shared by authors such as (Morales, 2017; Suarez et al., 2017). This circumstance might confirm the positive relationship between forest

cover and the intensity of armed conflict across Colombia pointed out by (Negret et al., 2017).

Therefore, the absence of the FARC in these territories has generated an authority vacuum that breaks the dynamics of natural resource extraction. Without the presence of an authority that delimits and controls the extraction areas, some communities have expanded the mining and agricultural frontier, thereby increasing the pressure on ecosystems that remained moderately protected. In addition to the environmental problems that this might cause, it is possible that the reconfiguration of the extraction patterns can generate levels of conflict inside the communities. Thus, the analysis of the environment and natural resources management strategies developed in these regions under the control of the FARC, and the new appropriation dynamics generated after their departure, should be a subject to research in future works.

Secondly, the signing of the peace agreement between the FARC and the government favored the development of extractive projects in territories that private companies could not access during the armed conflict. In addition to the environmental risks generated by the opening of new spaces for the development of large-scale projects, this has become a strong pressure on traditional mining communities and informal miners, who start moving to more remote territories. These new areas of interest for investment, motivated by the high prices of commodities, deepen the dependence model on gold extraction, undermining the agricultural economy and the practices associated with a peasant culture in these regions.

The literature has suggested that the withdrawal of the FARC provokes that many rural areas become available for capital investment in mining, agriculture, and infrastructure, which promotes the creation of new settlements. This could cause the expansion of the agricultural and mining frontier, generating environmental problems in areas where they did not exist before (Baptiste et al., 2017; Morales, 2017; Negret et al., 2017; Salazar et al., 2018).

In fact, as showed before, for Suarez et al (2017), who studied different cases of post-conflict countries to contrast with the situation of Colombia, the main drivers for environmental

change during post-conflict might be the ineffective land use planning, the return of displaced population, the demand for land for agricultural production and the dependence on the primary sector.

Finally, there is not enough evidence in this work to determine whether the arrival of new armed actors in the territories of Remedios and Peque in Antioquia, contributes to the growth of illegal and informal mining. What the analysis suggests is that the arrival of armed groups such as the ELN and the BACRIM to several municipalities of Antioquia, although it increases the risks of violence, has pointed to a scenario of "*Pax Mafiosa*" as indicated by Le Billon and Massé (2017). Under this scenario, new armed groups arrive in the territory avoiding high levels of conflict to guarantee control over illegal and informal economies.

The violence generated by armed groups such as the BACRIM and the paramilitaries that arrive in these territories has been more selective, aimed at attacking specific leaderships while avoiding mass displacements, or transforming community dynamics through micro-trafficking and the promotion of drug use among young people. These new armed actors' strategies, as well as the economic dynamics linked to natural resources, turn out to be another important subject of research in future works.

5.3. Opportunities for environmental peacebuilding

Conflicts around gold mining involve actors with different meanings, perspectives, and interests around the resource. Future research should include the perspectives of all actors to have a clear picture and find elements in common that can facilitate an environmental peacebuilding process. As mentioned in the methodology, this research focused on traditional gold mining communities struggling to remain in their territories. Therefore, this turns out to be a work with an exploratory scope that focused on making visible an actor who has been denied throughout the conflict, who has been seen only as a victim, an environmental criminal or as an inhabitant of inhospitable territories where the state and development have not yet arrived.

The recognition of traditional gold mining communities as key actors in the conflict, but also as fundamental players in environmental peacebuilding strategies is supported on the following facts:

First, these communities have developed meanings about gold that makes this resource to be considered beyond economic interests. Therefore, it is crucial to think about initiatives for cooperation that go beyond instrumental rationality about natural resources. The roots in the territory, the struggle to remain in it makes it possible to think about the mining as part of several economic activities and interactions with the environment, and not as an extractive activity which once is finished forces the displacement of people involved in it. The idea of the existence of different interpretations over gold mining, and the importance of recognizing them, is share by authors such as (Eslava et al., 2014; Rochlin, 2018; Urán, 2013) which suggest that the several perspectives about mining, environment, and development should coexist in order that the extractivist model does not be imposed by force over traditional gold mining communities.

The intention to remain in the space is the baseline for thinking about strategies for sustainable natural resource usage and searching for better mining practices. The wish to remain in their territories constitutes a great potentiality for incorporating appropriate technologies as well as receiving technical support for gold mining. It is in this way that natural resources in traditional gold mining communities might contribute to developing sustainable livelihoods.

Secondly, the different schemes of gold extraction developed by traditional gold mining communities must be seen as part of complex socio-ecological systems that must be studied and understood, in order that the proposed changes can have positive effects, which would favor the transformation to more sustainable systems.

Third, the demands for the recognition and formalization of traditional miners must be a central part of the spaces for dialogue, negotiation, and collective action. Thus, common pool resource management programs oriented to create innovative and fair types of environmental governance in these regions should consider the proposals developed in the processes of

organization and mobilization of these communities. Therefore, community life plans developed by indigenous and black communities, territorial figures such as the Peasant Reserve Zones or the agricultural-mining territories, should be a starting point in the construction of initiatives from the environmental peacebuilding approach in these regions. This understanding is relevant due to these figures respond to the economic, social and cultural realities of the communities that inhabit the environment, which gives them legitimacy to being part of collective strategies for peacebuilding.

Moreover, the strategies of formalization should consider also differentiated schemes of formalization that reflect the particularities of local contexts as suggested by (Urán, 2013) when proposing segmented legalization processes. Furthermore, such formalization processes must aim to achieve a sustainable development model that counts with community participation to improve the governance and legitimacy of the state, which makes important to guarantee environmental democracy so that communities have the right to participate in decisions about the use and management of natural resources in their territories (Rodriguez et al., 2017).

Gold has been seen as a conflict resource related to environmental degradation, violence, criminality, and human rights violations. In consequence, most of the policies to overcome this problem have been focused on repressive and legal initiatives that do not consider the complexity of the local realities. In those regions in which traditional and artisanal gold mining has been part of the livelihoods of peasant communities, gold must be seen as a resource in dispute. Therefore, traditional gold mining communities and the organization processes developed by them must be considered as actors involved in the conflict. Even though is a civil actor that faces the violence of several armed groups and the state, the government and the official institutions must recognize them as part of a social-armed conflict related to natural resource appropriation. This recognition might contribute to preventing focusing the efforts on negotiation only with armed groups. This would be the first step to identifying the creative role of this conflict.

Communities want to remain in their territories; thus, they are interested in looking for better practices to guarantee a safe environment for them and their next generations. On the other hand, the government is interested in royalties and political control over those areas. Moreover, as stated by Rochlin (2018), Colombia does not have the surplus jobs available for those peasant-miners displaced by sweeping formalization processes that focus only on the creation of large-scale enterprises, which makes see the importance of maintaining traditional and artisanal miners working. Hence, this would be a common starting point for both parts to start dialogues. At the same time, this represents an opportunity for cooperation around gold mining, environmental protection, and natural resource management that contributes to peacebuilding.

Finally, in terms of the mechanisms for environmental peacebuilding proposed by Dresse et al. (2019), dialogue and cooperation would be an implementation modality to foster mutual understanding and recognition between traditional gold mining communities and the state, since there are conditions that enable direct contact between them. Thus, the government and civil society represented by traditional gold mining communities must negotiate in neutral spaces of interaction in order to find common interests. And finally, collective action may be the way for achieving common-pool resource management by shifting the emphasis on areas in dispute to socio-ecological systems. Thus, through collective action might be possible to negotiate innovative types of environmental governance that allow the creation of new institutions that can guaranty lasting peace in those regions.

As mentioned in chapter 1, these mechanisms might have outcomes such as 1, the reduction of problems caused by environmental degradation related to polluting mining practices and the coping strategies of displaced communities; 2, the building of a trust degraded by years of persecution and stigmatization against informal miners; and 3, the reduction of inequalities related to natural resource access and distribution. Thus, related to the trajectories of environmental peacebuilding presented by Dresse et al. (2019), the initiatives oriented to achieving peace through environmental cooperation in areas inhabited by traditional gold mining communities, would be the restorative dimension of environmental peacebuilding that aims to provide shared spaces to "acknowledge past injustices and recognize the other

as a legitimate interlocutor" (Dresse et al., 2019), and the sustainable environmental peacebuilding, which aims to ensure collective action with involvement of high-level leadership and communities, involving pre-existing informal types of cooperation at the local level, which are already well developed in some traditional mining territories as it was shown across this research.

5.4. Recommendations

The diagnosis of the initial conditions for environmental peacebuilding must include not only the political, economic and social situation but also the environmental conditions, the effects on ecosystems and health caused by mining practices. In addition, the environmental diagnosis must consider the opportunities that these ecosystems offer for the promotion of sustainable economic alternatives for the communities that inhabit them.

Considering the need to build dialogue and trust scenarios, it is important to think about a third party that can intervene in negotiations and also can promote the implementation processes. However, this third party does not necessarily have to be international organizations, but also the university research centers that have been in charge for years of assessing the situation in these communities and looking for alternatives to polluting mining practices.

If the environmental peacebuilding initiatives incorporate artisanal and traditional gold mining as part of the strategies for cooperation and natural resources management, it would be positive to assess the possibilities for FARC ex-combatants to get involved in such initiatives. This because the ex-guerrillas know the region, its economic and political dynamics, and in some cases, they managed to have important levels of legitimacy by coming from the same peasant communities. This participation could be part of programs for the social and economic reintegration of ex-combatants during post-conflict.

Finally, it is essential to move forward in dialogues and negotiation processes with other armed groups that continue operating in the country. The peacemaking with the rest of the

armed groups is a fundamental step to consolidate peace in the territories. Furthermore, and even more important, these negotiations must include programs to overcome the marginalization and poverty of rural populations in the country, which are part of the conflict structural causes.

Conclusion

The integration of political ecology into an environmental peacebuilding approach can help in identifying the structural conditions shaping the conflicts around natural resources. Understand the power relations mediating the appropriation of natural resources, as well as the different meanings and perspectives that mediate those appropriation schemes, is crucial to avoid superficial analysis that leads into initiatives for conflict resolution that do not persist on time, because they do not address the root-causes of the conflict or offer alternatives and cooperation schemes that do not consider the social, economic and cultural relations that take place in local contexts.

The analysis allows seeing how the relationship between social-armed conflict and gold mining in Colombia is the result of structural problems characterized by unequal power relationships in several scales. The structural problems identified in this research are i) the lack of integral rural development policies and ii) the promotion of an extractivist model in mining-energy policies. The lack of a rural development is expressed in the absence of infrastructure, basic services, and social rights in frontier communities; the segregation, marginalization and the poor levels of participation in rural areas; the lack of incentives and support for agricultural activities; the uneven development across regions and the lack of property rights by peasant families across the country and particularly in frontier areas. These conditions make traditional gold mining communities more dependent on gold extraction, motivates communities to still implementing polluting practices, increase their level of vulnerability to take part in criminal economies such as criminal mining and coca crops and undermine the trust in the state and formalization processes.

The promotion of an extractivist model based on large-scale projects that do not recognize other kinds of relationships with natural resources and the environment beyond instrumental rationalities is expressed through: the reinforcement of laws and policies oriented to call the attention of high investments in extractive activities; the creation of laws and policies to favor titulation of mining projects to private companies making difficult for traditional miners to take part in formalization processes; the discourses that stigmatize informal and traditional mining while promoting large-scale mining as sustainable and supportive to economic

development; and the promotion of military campaigns and police interventions against informal mining focused on attacking the weakest links of the gold market chain, which are the artisanal, traditional and small-scale miners. This undermines the trust of traditional gold mining communities and provokes high levels of primary economy dependence, which weaken economic diversification favoring corruption, patronage systems and reinforcing the uneven rural development of Colombia.

In consequence, the uneven rural development and the imposition of an extractivist model, shape a dispossession model that generates conflicts across several regions and sectors, being access, control, and uses of natural resources such as gold a central point of disputes.

Nevertheless, in this context of dispossession, rural communities such as traditional gold mining communities have developed strategies to remain in their territories protecting their land, traditions, and livelihoods, as well as transforming them into more sustainable ones. Those strategies have been developed through collective actions and grass-root organization processes which reinforce their identities as peasant-miners and *barequeros*. These struggles and organization initiatives have triggered the reinforce of the awareness about environmental problems generated by mining activities, the need for better natural resource management strategies and the conservation of the environment for improving their living conditions while guarantying resources access for next generations. This certainly constitutes a baseline for sustainable environmental peacebuilding processes.

Moreover, these strategies are inscribed in particular ways to interact with the environment and natural resources. These types of relationships with nature, society, and market configure socio-ecological systems characterized by rural economies and diversified activities of subsistence. The understanding of those systems is a fundamental objective of any kind of environmental peacebuilding initiative to be successful and sustainable in the long term.

Thus, as a conclusion at this point, the organization strategies and experiences, the proposals generated to collectively manage natural resources and the environment, the initiatives for remaining in their territories, and the socio-ecological systems configured in traditional gold mining communities represent the greatest opportunities for developing initiatives based on environmental peacebuilding.

In this way, the government and other actors can perceive communities and their grass-roots organizations as valid actors for negotiation to achieve cooperation, and for collective actions oriented to develop common-pool resource management aiming to improve environmental governance. Hence, the recognition of the community's initiatives and meanings might be a starting point of negotiations that can bring together governmental support, as well as the involvement of third parties such as universities and NGOs that contribute to transforming polluting mining practices by giving economical and technical support for achieving sustainable livelihoods.

The negotiation processes must be oriented to support the permanence of these communities in their territories while giving importance to the state presence for integral rural development policies. In this way, gold could be considered as a resource around which acrimonious parties might work together for improving living conditions and governance. Considering this, the development of common gold management strategies, the protection of the environment through community participation and the creation of collective types of environmental governance might be an achievable target for environmental peacebuilding in traditional gold mining communities in a post-conflict setting in Colombia.

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Annexes

Annex 1. List of Interviews, participants and relevance

Interviewee	Role	Interview´s Location	Date	Relevance
Sofia Garzón Valencia	Social Organization Representative. “Proceso de Comunidades Negras” (PCN)	Bogotá	28.03.2019	Member of a Social Organization with work in several traditional gold mining communities. The organization called "Black Communities Process" (PCN) is considered a social movement that has worked with traditional mining communities affected by armed conflict and the increase of illegal gold mining.
Ernesto pinzón	Social Organization Representative. “Corporación Acción Humanitaria por la Convivencia y la Paz del Nordeste	Medellín	20.05.2019	CAUCOPANA has worked as a human rights defender in the northeast region of Antioquia. A region affected by armed conflict and one of the most important gold producers of Colombia

	Antioqueño” (CAUCOPANA)			
Diana Giraldo	Social Organization Representative. “Movimiento Rios Vivos Antioquia”	Bogotá	01.04.2019	Rios Vivos is a social movement that has worked with artisanal miners affected by hydroelectric projects in several regions of Colombia
Diego (Changed Name)	Former Member of the FARC militias	Bogotá	10.04.2019	FARC was an armed actor involved in gold mining
Catalina Quiroga	Researcher	Bogotá	05.05.2019	Researcher Focused on socio-environmental conflicts from a political ecology approach. She worked for 5 years in the northeast region of Antioquia with several community organization processes
Guillermo Willes	Artisanal Miner and Social leader from Sabanalarga - Antioquia	Humanitarian Refuge - Bogotá	20.04.2019	"Comunidades sembradoras de Territorio Agua y Autonomia" has grouped artisanal miners affected by Hidroítuango, a

				Hydroelectric project that took place in Cauca River Canyon. He has been a social leader displaced by armed groups
Blanca Oliva Agudelo	Artisanal Miner displaced from Orobajo - Antioquia	Medellín	10.05.2019	The life history of artisanal miners affected by armed conflict is relevant. She is currently involved in an organization process of displaced artisanal miners in Medellín City
José Antonio García	Artisanal Miner and Social leader from Sabanalarga - Antioquia	Medellín	10.05.2019	He has worked in the municipality of Sabana Larga in an organization process claiming for the recognition of Barequeros affected by armed conflict and the Hidroituango project.
Bernardo Tamayo	Artisanal Miner	Peque	15.05.2019	Artinasal miner that has worked in informal mining as a coping strategy after a process of forced displacement

Acened Higuita	Artisanal Miner and social leader from "Comunidades Sembradoras de Territorio, Agua y Autonomía"	Peque	16.05.2019	Besides being an artisanal miner is a social leader in a grass-root organization that has worked for the recognition of barequeros and for the implementation of agroecological initiatives and reforestation programs
Yurleny Tamayo	Artisanal Miner	Peque	15.05.2019	A young artisanal miner who learn from their parents how to farm and extract gold from the river

Annex 2. list of codes and quotations of each participant in Atlas ti

	Participants										
Codes	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P10	TOTAL
Territorial administration by Armed groups.	3	0	0	1	0	2	0	0	0	0	6
Analysis about conflict	0	0	0	1	0	0	0	0	0	0	1
Artisanal mining (barequeo) characterization	3	1	5	0	1	0	3	0	2	0	15
Traditional miners' characterization	0	1	0	1	0	2	0	0	0	1	5
Peacebuilding and post-conflict.	0	0	0	4	0	2	0	0	0	0	6
State-Private mining	1	1	0	2	0	3	1	2	2	0	12
Natural resource management strategies	1	3	0	2	2	2	0	0	5	4	19
Stigmatization against informal mining	1	0	0	5	0	2	0	1	0	1	10
participation in territorial planning	3	0	0	0	0	2	0	0	0	0	5
Recognition and formalization	1	0	0	0	0	2	0	0	1	0	4
Violence during post-conflict setting	3	0	2	0	0	3	1	0	2	1	12
Participation of the FARC in gold mining	0	0	0	0	0	1	0	0	0	0	1
Perception about mining	0	3	1	0	2	2	1	0	1	2	12
Perceptions about the conflict by communities	3	0	2	0	3	2	0	1	1	0	12
Problems of formalization	1	0	0	1	0	1	0	1	0	4	8

Extraction processes	1	8	4	0	0	0	1	0	4	0	18
Community organization processes	3	0	0	1	3	2	2	3	0	4	18
Proposals from gold mining communities	1	0	0	1	3	4	0	1	2	5	17
Relationship armed groups and gold mining	1	0	0	1	0	1	0	0	0	3	6
Accounts about violence	2	0	2	0	0	0	2	1	1	0	8
Meanings about gold	0	1	0	0	0	0	0	0	2	0	3
Meanings about peace	0	0	0	0	1	0	0	0	0	0	1
TOTAL	28	18	16	20	15	33	11	10	23	25	**199**

Annex 3. Photos Collected during the field Work in Colombia

Public Event of the Humanitarian Refuge. Bogotá, April 20, 2019

Barequero with his Pan (*Batea*). Peque, May 15, 2019

Central square of Peque. Peque, May 13, 2019

Agroecological Initiatives of barequeros in Peque. Peque, May 16, 2019

Mule is common transportation in rural areas of traditional gold mining communities.

Peque, May 15, 2019

Vereda La Nueva LLanada. Peque, May 15, 2019