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NEGATIVE IMPACTS OF ARTISANAL GOLD MINING ON AGRICULTURE, CLIMATE AND SOCIAL CHANGES ON FOUR MINING SITES IN THE PREFECTURE OF MANDIANA IN THE REPUBLIC OF GUINEA

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Abstract

This survey was carried out at four gold mining sites in the Prefecture of Mandiana in order to assess the level of perception of peasants (farmers, gold miners and agro-miners) on the negative impacts of this activity. The study showed that traditional gold mining has had negative impacts on: i- agriculture (migration of agricultural labor to the mining sector and impacts on plants and animals); ii- impacts on climate change, and iii- social and health aspects. During an exploratory survey carried out in May 2019, it was revealed by many actors and operators in Mandiana that agriculture is declining, plant diversity is decreasing, soils are depleted, agricultural yields are low, wildlife is 'impoverished in this locality. This decrease in biological diversity resources is due to a large extent to gold mining and other effects of climate change. Social upheavals (crime and health risks) are on the rise in the locality. The results reveal that: 62.51% of respondents maintain that gold mining has encouraged the migration of agricultural labor to the mining sector, against 33.33% who claim the opposite; 52.09% support its negative impact on plants and animals against

14.58%; 77.09% recognize its impact on global warming against 22.91% and 87.50% support its impact on the increase in crime, against 12.50%.
Keywords: Gold panning, social, biodiversity, climate change, Mandiana.

1. Introduction

Gold panning is a controversial activity. For some it contributes to the degradation of the environment, on the other hand, for others this activity remains an alternative to the fight against poverty by improving the production capacity of agricultural households. Without being exhaustive, this activity causes deforestation, deforestation, soil degradation, air, soil and water pollution, loss of biodiversity and the shaping of the landscape [1-6]. For the present study, it is on certain negative impacts resulting from gold mining in the Prefecture of Mandiana in the Republic of Guinea that we have carried out a survey. Four mining sites were selected in order to assess the perception of the actors evolving in the "antagonistic" activities of agriculture and gold panning regarding the negative impacts generated by gold panning on agriculture, their perception of climate change and their perception of negative social and health impacts. To better understand this problem, the research was based on an important documentary base and field surveys in the mining sites of Mandiana where gold panning is carried out cumulatively with other economic activities such as agriculture, breeding, trade and crafts. The investigation carried out demonstrated the negative impact of gold mining observed in Mandiana on agriculture, plants and animals, global warming and the social side.

2. Materials and Methods

2.1.Materials

The surveys took place on four selected gold washing sites: Siguifily (Urban Commune of Mandiana), Nafadjilén and Missima (Rural Communes of Morodou) and Kourouni (Rural Commune of Kantoumanina) with the actors at all levels, which constitute the human material used in this study.

2.2. Methods

A-Documentary analysis

The documentary analysis allowed us to constitute a secondary database with the peasants (farmers, gold washers, agro-gold washers) and facilitated the preliminary analysis and orientation of the study. The actual data collection work began on May 1, 2020 and was completed on May 20 of the same year. The surveys targeted a population considered as a target estimated at 48 households located in the cities mentioned, ie 12 households per mining village.

Data collection is nothing more than a process that was applied in order to obtain the necessary information from each unit selected in the different sites of this study. Data collection techniques include face-to-face interviews (individual or group) either structured by interviewers or by the principal investigator himself using guides designed for this purpose. Each enumerator went to the field with a set of questionnaires as indicated in a table.

Group discussion is a qualitative method of collecting data in which one or two researchers and several participants meet to discuss a given research topic. On this occasion, the researcher plays the role of facilitator of the discussion to learn social norms and perspectives within the community or sub-groups. Now is a good time to dissect sensitive subjects[7].
It was after these various operations that the production of the study report was made. In sum, the analysis revealed that the survey reached 48 households with 324 people, or an average of 6.75 per household.

B- Qualitative data

It consists in seeking the causes of a phenomenon without necessarily having recourse to statistical data as a demonstration instrument. The major question of this study was: is artisanal gold mining in the prefecture affecting the physical and social environment of the study setting?
The work of artisanal gold mining is very arduous even if it guarantees the worker a regular income in a relatively short time; its negative impacts on agriculture, the physical and social environment in Mandiana dispel all doubts from the results obtained in this study.

3. Results and Discussion

Les enquêtes de terrain ont permis de produire six catégories de résultats qui sont présentés dans les tableaux 1 à 6. La première analyse la migration de la main d'œuvre agricole vers le secteur minier. La deuxième se réfère aux impacts négatifs de l'orpaillage sur les plantes et les eaux. La troisième se réfère à la perception que les paysans ont du changement climatique, pendant que la catégorie quatrième fait le point sur les différents effets du changement climatique. La cinquième traite des impacts négatifs de l'orpaillage sur la vie sociale à travers la hausse de la criminalité et la sixième analyse l'aggravation de la situation sanitaire conséquences de l'orpaillage dans la préfecture de Mandiana.

3.1. Negative impacts of gold mining

3.1.1. Impacts on agriculture

The decline in agricultural production, especially food crops, is caused by the almost generalized practice of gold mining. Agriculture, another time, the main activity practiced in the winter season, has for some time been relegated to the background after gold panning, which is now practiced without interruption. This is how members of farming households have, in some cases, abandoned farming altogether in favor of gold mining. The time and effort spent on agricultural activities was transferred to the mining sites. However, a few households have hardly abandoned the land because agriculture is the most profitable of the economic activities.

Table 1: Migration of agricultural labor to mining sites

Site / Abandonment	Nafadjilén	Kourouni	Siguifily	Missiman	Total	%
Yes	5	7	8	10	30	62,51
No	6	5	4	1	16	33,33

NSP	1	0	0	1	2	4,16
Total	**12**	**12**	**12**	**12**	**48**	**100**

The data in Table 1 show that 62.51% of respondents maintain that gold mining has encouraged the migration of a large part of the agricultural workforce to the mining sector against 33, 33% who support the opposite. Similar results were obtained by [8] in Bantako where, despite the strengths and potential of the village in the field of agriculture, there is a sharp drop in agricultural activities linked to the development of gold panning and which results in the 'non-use of agricultural land and lack of agricultural development. According to [9], even if the inhabitants of the villages surveyed do not recognize it, gold panning exerts a real pressure today on the cultivated lands, because of the rapid gain it provides and the fact that families are now lacking. of arms to cultivate the land.

3.1.2. Impacts sur les plantes et les animaux

An observation of the mining sites reveals vast expanses of deforested and turned upside down land that have become unsuitable for all crops and pastoral activities. Thus, gold mining causes enormous damage to agricultural land and vegetation. Also, the presence of a large number of people on the gold washing sites also has a negative impact on the surrounding fauna which thus pays a heavy price, as well as the pressures which are exerted on the existing waterways to satisfy the needs. domestic needs and the needs of the mine (treatment or washing of minerals).

Table 2 : Negative impacts observed on plants and animals

Site / **Modalities**	**Nafadjilén**	**Kourouni**	**Siguifily**	**Missiman**	**Total**	**%**
Yes	8	7	5	5	25	52,09
No	2	2	2	1	7	14,58
NSP	2	3	5	6	16	33,33
Total	**12**	**12**	**12**	**12**	**48**	**100**

According to the results contained in Table 2, 52.09% of respondents are unanimous on the negative impact of gold mining on these resources against 14.58% who think the opposite, while 33.33% have no opinion.

On flora and vegetation, an accelerated destruction of the plant cover is noted. According to the head of Cantonment des Eaux et Forêts de Kantoumanina (Personal Communication), "no gold miner has a cutting authorization. The support uses an average of 15 woods (tree trunk) per meter. A well would require approximately one load, or approximately 400 to 500 tree trunks for its support. This means that we are witnessing a deforestation of the immediate area of the mining sites, destruction of the vegetation cover thus promoting erosion and leaching ".

The savannah is thus completely deforested because no effective surveillance is in place. The administrative authorities are not considering any plan for the restoration of degraded areas

following these mining activities. Thus, communities and authorities both contribute to the depletion of natural resources, especially agricultural land.

Gold panning activities on these sites contribute to the loss of wildlife species in this area due to deforestation and noise production, which at the cost of destroying ecological niches and reducing certain animals.

3.1.3. Impacts on global warming

a) Perception of gold miners on the links between gold washing and climate change

Table 3: Perception of the effects of climate change

Site / Modalities	Nafadjilén	Kourouni	Siguifily	Missiman	Total	%
Yes	11	11	10	5	37	77,09
No	1	1	2	7	11	22,91
Total	**12**	**12**	**12**	**12**	**48**	**100**

It appears in Table 3 that 77.09% of respondents recognize that gold mining has impacts on global warming against 22.91% of people who give a contrary opinion. Hence the need for more environmental information and education to better explain to populations the interactions between human activity and environmental degradation. The different effects of climate change felt by the populations in Mandiana are mentioned in Table N ° 4.

3.1.4. Effects of climate change cited by artisanal miners

The effects of climate change cited by the artisanal miners are shown in Table 4.

Table 4: The effects cited by the respondents

Site / Effects	Nafadjilén	Kourouni	Siguifily	Missiman	Total	%
Early drying up of rivers	12	11	10	8	41	15,18
Frequent flooding	6	7	3	4	20	7,40
Prolonged drought	12	11	11	9	43	15,92
Temperature rise	12	9	12	7	40	14,81
Disappearance of certain animal species	6	8	2	3	19	7,03
Degradation of agricultural land	6	7	9	8	30	11,11
Impoverishment of fauna and flora	10	9	9	5	33	12,22

Decrease in rainfall	12	11	10	11	44	16,35
Total	**76**	**73**	**66**	**55**	**270**	**100**

The results of **Table 4** reveal that 16.35% of respondents recognize that climate change is manifested in the locality by the decrease in rainfall followed by people who note that global warming is felt by prolonged droughts (15.92%) , the drying up of rivers is mentioned by 15.18% of respondents, and the impoverishment of flora and fauna is underlined by 12.22% of respondents.

Participants in the focus groups believe that rainfall is not the same as it was 50 years ago. According to the Mayor and some notables (Personal Communication), "the rainy season used to cover 6 months (May to October) and sometimes started at the end of March. Nowadays, not only does it no longer reach 6 months, but also it experiences serious disturbances which are detrimental to agricultural activities. Because of these climate disturbances caused mainly by human actions, the agricultural calendar is no longer under control ".

The destruction of the vegetation cover and the warming are currently resulting in rains accompanied by very violent winds which sow enormous damage in their path. For example, in May 2020 several houses were disheveled in Kantoumanina following a strong tornado. Some people attribute these dramatic events to divine will, while a large part of the population believes that degrading practices on the environment, especially gold mining, are among the underlying causes of climate change.

3.1.5. Social and health impacts

a) Impacts on crime

Table 5: Perception of the increase in crime and delinquency as a result of gold mining

Site / Modalities	Nafadjilén	Kourouni	Siguifily	Missiman	Total	%
Yes	10	8	11	12	42	87,50
No	1	4	1	0	6	12,50
Total	**12**	**12**	**12**	**12**	**48**	**100**

One of the negative impacts of gold mining revealed by this research is the rise in crime in the villages of Mandiana once considered peaceful areas. The increase in criminal and misdemeanor acts caused by gold panning is recognized by 87.50% of respondents while 12.50% say the opposite. Gold panning has led to new violent behavior that mining sites did not know in the past. The consumption of illicit psychotropic drugs, the decline in family education and the desire for rapid and effortless enrichment largely explain these violent behaviors, according to the Sub-prefect of Kantoumanina (Personal Communication). Breach of trust, swindling, assault and battery against partners, armed robbery are recurrent violence in Mandiana prefecture.

Table 6: Perception of health risks

Site / Problems	Nafadjilén	Kourouni	Siguifily	Missiman	Total	%
Landslides / accidents	5	4	6	6	21	32,32
Malaria	5	4	2	4	15	23,07
Diarrhea	4	5	3	4	16	24,61
STI / HIV / AIDS	3	4	1	5	13	20,00
Total	**17**	**17**	**12**	**19**	**65**	**100**

The vast majority of artisanal miners know that there is a link between gold mining and the health of populations. Respondents therefore cited health risks associated with traditional gold mining; 32,32% cited landslides and accidents often causing physical disabilities and death of men; 24.61% mentioned diarrheal diseases, 23.07% mentioned malaria and 20% mentioned STIs/HIV/AIDS. Our results are similar to those of [10]. According to them, the gold miners surveyed were unanimous on the aches and pains they feel after gold mining. Others have cited premature wear and tear on the body as one of the impacts of gold mining on their health.

According to participants in the focus groups, the artisanal miners are most often exposed to a number of diseases which are linked to the living and working conditions on the site.

According to the nurse of the Kantoumanina health center (Personal Communication), « We are witnessing the manifestation of diseases linked to the lack of sanitation on the site and the lack of hygiene, but also many cases of accidents. In order of importance, we have malaria, diarrheal diseases, typhoid fevers, cholera, skin diseases, etc. Exposure to dust causes respiratory illnesses (cough, pneumonia, angina, etc.). Mercury vapors represent a real public health problem ». (Personal Communication).

The risks of transmission of STIs/AIDS are also highly developed at the gold mining site due to the depravity of morals. The presence of prostitutes is reported on the sites (20,000 to 25,000 GNF, the pass), but from the interviews we have had with them, it appears that they use protection methods. The problem lies in the level of female traders (during the day) and luxury prostitutes (at night) to whom gold miners can easily give large sums when production is good. Because of these sums, alcohol and drugs helping, they can have sex with miners without protection. Constantly changing partners, they can be a source of dissemination of STIs/AIDS.

Empirical data from interviews and field observations reveal the degrading nature of gold mining on natural resources.

4. Conclusions

Research results show that traditional artisanal gold mining is a widespread economic activity in Mandiana Prefecture. While it is generally accepted that traditional gold panning provides consistent income to the households that practice it, allowing them to afford a certain quality of life and services, it is however at the origin of the decline in agriculture and contributes to

the degradation of natural resources: water, land, plants and animals and at the base of the deterioration of social life. This is why more in-depth discussions bringing together all the players from the top of the State through the decentralized services, local officials to direct stakeholders (farmers, gold miners, agro-miners, etc.) would be the result. better forum to consider one or more strategies that would better manage this thorny problem of gold panning.

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