



KIT Royal
Tropical
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Technical Report

Mobile Migrant population study Suriname
Assessment of mobile migrant population size, demographics,
turnover, movement, and priority health needs

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Abbreviations

| | |
|-------------|---|
| API | Annual parasite incidence (of <i>Plasmodium</i> , which causes malaria) |
| ASM | Artisanal Small-scale Gold Mining |
| COVID-19 | Coronavirus disease |
| HIV | Human Immunodeficiency Virus |
| JAP Airport | Johan Adolf Pengel International Airport (Suriname national airport) |
| KIT | KIT Royal Tropical Institute, Amsterdam, The Netherlands |
| LMICs | Low- and Middle Income Countries |
| MoH-MP | Ministry of Public Health, Suriname Malaria Program |
| SARS-CoV-2 | Severe acute respiratory syndrome coronavirus 2, the virus causing COVID-19 |
| SRH | Sexual and Reproductive Health |
| STD | Sexually Transmitted Disease |

Foreign words and jargon

| | |
|--------------|--|
| Burinho | Porter (litt: little mule) |
| Cabaret | Brothel in the ASM areas |
| Garimpeiro | Brazilian artisanal and small-scale gold miner |
| Garimpo | ASM area |
| Marreteiro/a | Traveling salesman/-woman |

On the Cover

Top left: Gold mine in Suriname. (Picture by Marieke Heemskerk, 2021)

Top right: Field interview of ASM worker. (Picture by Marieke Heemskerk, 2021)

Bottom left: Field interview of ATV driver. (Picture by Marieke Heemskerk, 2021)

Bottom right: Field interview of ASM service provider in Ronaldo / Antonio do Brinco (Picture by Marieke Heemskerk, 2021)

Executive Summary

Over the past two decades, Suriname, a republic on the northeast coast of South America, has experienced a significant change in malaria transmission risk and incidence. Following a major decline from highest annual parasite incidence and concentration of *Plasmodium falciparum* cases in the Americas in the early 2000s, Suriname is now moving towards malaria elimination. Essential in this effort is the Suriname Malaria Program network of Malaria Service Deliverers (MSD). The MSD are non-medical people from the target population who live in the malaria risk areas, and who are trained to test and treat malaria free of charge. Successful implementation of prevention and control interventions by the Ministry of Health's Malaria Program -including its MSD network, supported by the Global Fund, the Pan American Health Organization and other partners has played a key role in this decline. Yet, challenges remain.

Suriname continues to receive imported malaria cases from other endemic countries in the region, especially French Guiana. Imported cases are mostly linked to mobile migrant populations who are active in remote artisanal and small-scale gold mining (ASM) areas and travel between Suriname and French Guiana across porous borders. Previous research has found that the vast majority of this mobile migrant population consists of Brazilians working in artisanal small-scale gold mining.

Interventions to achieve malaria elimination in Suriname focus for a large part on these mobile migrant populations who are disproportionately at risk of getting infected, especially in high malaria risk areas across the Surinamese border with French Guiana. Recent interest in this population has increased in the context of the COVID-19 pandemic, as the Ministry of Health of Suriname is formulating a national response to the pandemic. In this response, migrant mobile populations in the interior are of importance given their frequent movement, minimal use of protective measures, limited access to accurate information, and reduced health access. The present study aims to enhance understanding of the knowledge, attitudes and behaviour of this relatively unmonitored population with regard to SARS-COV-2.

This report describes the mobile migrant population's demography, movements, health perceptions, and healthcare seeking behaviours. Its main objective is to characterize and quantify the population of artisanal small-scale gold miners and their social system in Suriname and French Guiana. Specific objectives are to 1) determine mobile migrant population characteristics, 2) determine and visualize mobile migrant population mobility including cross-border movement of the population, and to 3) analyse health concerns and health care seeking behaviour of the mobile migrant population. The findings are not only relevant for malaria intervention strategies, but will also be useful to the design of targeted and relevant health interventions in the context of other (infectious) diseases such as COVID-19.

We used a mixed methods approach, combining quantitative (analysis of official and proxy data related to the target population) methods and qualitative (sociological and anthropological) research methods. . Field data collection took place in the period of November 2020 – January 2021.

In terms of population size, estimates from our study show convergence as they are strikingly similar across the different methods used. For Suriname, the mean figures suggest an ASM population of approximately 20,000 persons, whereas for French Guiana, the ASM population estimates are around

11,000 persons. These figures represent the population of gold miners in addition to those providing services, up to a total of around 31,000 individuals that are currently active in the ASM sector across French Guiana and Suriname. The data suggest population turnover of approximately 10,5% of which 95%, or some 2,000 persons annually, are newcomers to the sector in Suriname and French Guiana.

A review of the literature and further investigation identified other mobile and migrant populations with frequent cross-border movements, and who have been found at elevated risk of malaria transmission. These include Maroons who frequently cross the border with French Guiana (total estimated population 50,000-100,000), Highland indigenous people who cross the border with French Guiana and Brazil (7000), Lowland indigenous peoples living near the border with French Guiana, and up to around 1,000 Asian and a few Brazilian workers active in the logging industry.

The ASM population is dominated by adult men but also a significant number of women is present in ASM areas. Our findings suggest 25% of the ASM population in Suriname, and 20% of the ASM population in French Guiana is made up of women. In terms of age, we find negligible differences between women and men. Women were on average, 41 years of age, with a range from 22 to 68 years while the average age for men was 42, with a range from 16 to 70 years of age. Women primarily work in the mining service economy and occasionally as operation owners, while men mostly work as mine workers, and in addition are involved in virtually every other (service) job apart from sex work.

Our observations and survey data suggest that there are children (<18) present in the *garimpos* and related *currutelas* (gold miners' villages) and service areas. We estimate that about 4 to 5 children aged less than 6 years old are present per 1000 adults in French Guiana. This figure is about threefold in Suriname, where about 15 babies, toddlers or pre-schoolers were reported for every 1,000 individuals. There were no reports or observations of young children working in the mining areas, rather, young children tend to stick around with their mothers and play. Fewer primary school age children (6-15 years old) were reported in French Guiana (2.6 per 1000 adults); this number was higher in Suriname (11.4), possibly because this figure includes the Ronaldo/Antonio do Brinco service area from which some primary school age children attend school in nearby Maripasoela (FG). Some school teachers from Maroon villages near mining areas reported that during the COVID-19 pandemic school closure school boys had left in significant numbers to the mining areas.

A striking finding is that one third of respondents reported that they had worked and/or lived with family in ASM areas in 2020. In terms of earnings, our study finds that earnings of *garimpeiros* (workers) in French Guiana (300 g Au/year; ~ USD 14,000) are about 50% higher than those of gold miners in Suriname (194 Au/year; ~ USD 9,000). These average ASM earnings compare favourably to the minimum wages in Brazil (USD 2190/year) and Suriname (USD 1250/year), for the economic opportunity provided by ASM explains why this population travels to remote locations in Suriname to engage in the ASM economy. At the time of writing the price of gold remains high, at around 54 USD per gram.

Even though both women and men predominantly originate from Brazil, the population of women is relatively more diverse with regard to nationality. There are quite some, and growing numbers of, women from the Dominican Republic and Cuba working in the Surinamese ASM sector, and smaller numbers of Chinese, Guyanese, and Venezuelans. The Dominican and Cuban women working in the Suriname ASM sector are mostly active as sex workers, but also perform other service jobs.

Another important set of findings from this report relate to the flux in this ASM population. Contrary to previous reports and popular perception, the vast majority of the ASM population working in Suriname reports not crossing the border to French Guiana, and almost half of the population reports not having changed their place of work in the past 2 years. This is a bit different for ASM workers we interviewed in Suriname, but that are principally based in French Guiana, who tend to cross the border with Suriname more frequently. These results are likely biased by the fact that the research team could not conduct interviews in French Guiana due to COVID-related travel restrictions, whereby our sample may not be representative of the whole population working in the ASM sector in French Guiana. That said, and despite continuous pressure of the French authorities, even among the ASM workers interviewed for this study that worked in French Guiana 35% reported not changing their place of work in the past 2 years. A small but important segment of this ASM population, especially working in French Guiana reports very frequent movements both in terms of crossing the border (23% for ASM working in French Guiana) and changing place of work.

Our findings suggest that most ASM workers are not very concerned about COVID-19 or other diseases and health problems, and rely on a vast array of home remedies and over-the-counter medication for protection. In the total population, the main health concerns were malaria and leishmaniasis. Gender, occupation and nationality shape health concerns and behavior. Male respondents seemed most concerned about injuries, women with COVID-19 and Sexual-Reproductive Health, and Chinese shopkeepers with violence and robberies. Another key finding is that virtually no respondent reported any influence of the COVID-19 pandemic on their income. In fact it seems that ASM workers have been able to earn a relatively steady income as compared to urban businesses like cafes, restaurants, gyms and day care. Among ASM workers and service providers we documented the highly prevalent perception that there is no COVID-19 in the remote jungle areas where they operate. A significant number of individuals believed that only –or primarily- travel to, and being in, Paramaribo exposes one to COVID risk. This attitude towards COVID characterizes the ASM population's attitudes towards (new) disease: as one cannot do much to prevent or treat infection, one can only continue to work hard and pray.

The findings from this study reveal some remarkable new insights into the mobile migrant ASM community in Suriname and French Guiana. The ASM population size and its proportion of women appears larger than previously reported in the literature. Furthermore, our findings suggest a departure from the more conventionally held stereotypes of ASM workers as male lone wolves chasing gold in the remote jungle. Rather, a picture emerges of a tightly knit social structure of migrant workers with limited mobility and flux, who work hard in often precarious conditions in an effort to build a better life for themselves and for their families – both in Suriname and in their home country.

The novel insights presented here in the mobile migrant ASM population can give a new impulse to efforts by the Ministry of Health, its Malaria Program and other related organizations including the Global Fund seeking to further reduce the burden of infectious disease in this population, and ultimately in the Surinamese population.

Our recommendations center around

- 1) increasing monitoring of the size and movement of this population using some of the straightforward techniques validated in this report based on readily available data
- 2) targeting subgroups that are most in flux and thus most at risk of contracting and transmitting infectious diseases

- 3) increasing efforts to communicate risks, preventive measures and treatment options to the ASM population by leveraging the social networks using trusted community channels
- 4) continuing to explore opportunities to scale up support to ASM workers by increasing service delivery through the Malaria Service Deliverers Network, specifically for most at-risk subgroups to implement prevention and treatment options for malaria control and elimination
- 5) exploring opportunities to create political will, advocate for and support diagnosis and treatment of malaria in mining areas in French Guiana.

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1 Introduction

Suriname, a republic on the north coast of South America, which is part of the Guianas (Suriname, Guiana, French Guiana), had the highest annual parasite incidence (API) and concentration of *Plasmodium falciparum* cases in the Americas in 2004. Since then, it has reported a significant decline in the number of cases after successful implementation of prevention and control interventions by the Ministry of Health's Malaria Program with support of the Global Fund, the Pan American Health Organization and other partners.

Suriname is committed to the goal of eliminating malaria by 2020 but faces important challenges, including the reception of imported cases from other endemic countries in the region, especially French Guiana. Imported cases are mostly linked to the mobile migrant populations who are active in remote artisanal and small-scale gold mining (ASM) areas and travel between Suriname and French Guiana's porous borders (Hiwat et al, 2018). In order to document this movement, and better understand differences and commonalities between the ASM populations in Suriname and French Guiana, this report also focusses on the Western regions of French Guiana.

Interventions for malaria prevention and control, and ultimately elimination, in Suriname focus for a large part on these mobile migrant populations who are disproportionately at risk of getting infected, especially in high malaria risk areas across the Surinamese border with French Guiana. Previous research has found the vast majority of this mobile migrant population consists of Brazilians working in artisanal small-scale gold mining (ASM) (De Theije and Heemskerk, 2009; Hiwat, et al. 2012; Hiwat, et al. 2018; Van Eer, et al. 2018; Douine, 2020).

Prevention of local transmission requires proper interception and early diagnosis of cases as well as the implementation of personal preventive measures. However, the design and execution of such policy interventions by the Ministry of Health of Suriname's Malaria Program (MoH-MP) requires additional knowledge about the target population and new insights into their livelihoods, health needs and mobility.

1.1 Background: A brief review of mobile migrant populations in Latin America and Suriname and the relation with malaria transmission risk

Migration, health and infectious disease

Over the past two decades, the linkages between population health and human migration have gained increased attention (WHO, 2010; Zimmerman *et al.* 2011). Human mobility has continued to rise, both in terms of quantity and reach mainly due to air travel, which presents new challenges for global, regional and national infectious disease control efforts (Findlater & Bogoch, 2018). The recent COVID-19 pandemic has only further underscored the interlinkages between human migration and the spread of infectious disease (Sirkeci and Yucesahin, 2020; Zhan et al., 2020).

Migration, health, and malaria in the Americas

The history of malaria in the Americas is shaped by human migration. Phylogenetic analysis of *P. falciparum* and *P. Vivax* suggests malaria was introduced to the Americas by waves of human migration, notably through the forced migration of enslaved peoples from Africa (Rodrigues et al., 2017). In the 20th century, migrant workers from Mexico comprised the first index cases of a major Malaria epidemic that took place in 1922 in the United States (Packard, R., 2007). In the 1970s, migrant workers originating from neighboring endemic countries that came to work in the agrarian sector in Belize were linked to elevated malaria transmission (PAHO, 1977 cited in Cohen et al., 2012). Similarly, deforestation in Central America in the 1990s linked to a shift in agricultural practices from cotton and rice to palm and banana is reported to have increased work-related migration of people from malaria-endemic areas, which was linked to a surge in malaria (WHO, 2000 cited in Carter et al. 2015).

Malaria control efforts in LAC are hampered by ASM-related activities and migration

Over the past two decades efforts in the Americas have followed the Roll Back Malaria global partnership to end malaria, which is focused on malaria control and elimination through significant investment in national malaria programs that focus on both prevention and treatment (WHO & UNICEF, 2005). Regional cases and deaths in the Americas were reduced by two thirds from 1,5 million cases in the year 2000 to around 0,55 million cases in 2019, and these combined efforts are estimated to have averted around 1.5 billion malaria cases and 7.6 million deaths throughout the region in the same period (WHO 2020).

Despite this significant progress towards malaria control and elimination, this vector-borne disease remains an important public health concern. The vast majority of malaria cases in 2019 took place in the Amazonian region, notably in Venezuela (around 0.47 million cases in 2019, or around 53% of total cases in the region), and in Brazil (0,17 million cases in 2019, or around 19% of total cases in the region) (WHO 2020). A recent review of progress and challenges faced in the South American Amazonian region across four endemic countries, namely Brazil, Colombia, Peru and Venezuela conducted by Recht et al. (2017) concluded that among the key challenges to further decrease malaria incidence in the region are migratory clandestine populations active in gold mining. Moreover, the review concluded that gold mining is a key driver of malaria within these endemic countries, but also drives imported cases in neighboring countries, such as Suriname through Artisanal Small-scale Gold mining-related migration (Recht et al. (2017).

Thus, mobile migrant populations remain a concern for malaria control and elimination in the Americas, and a growing amount of literature shows the linkages between ASM and malaria transmission in the region. In Colombia, Castellanos et al. (2016) report a statistically significant relationship between annual parasite index (API) and gold production. The authors underline the role of ASM, with its remote locations, exposure to vectors, and low availability of disease prevention and healthcare services may contribute to maintaining malaria worldwide (Castellanos, 2016).

This hypothesis is corroborated in a recent study by Grillet et al. (2021) in Venezuela, in which the authors report that the spatial epidemiology of malaria is concentrated in hotspots in Southern Venezuela which are directly linked with deforestation resulting from ASM activity. Grillet et al. (2021) further emphasize that ASM activity “seem critical in malaria’s surge throughout the country” and underline the importance of understanding cross-border malaria dynamics and investing in innovative, localized approaches as “successful control of Venezuela’s ongoing malaria epidemic requires hotspot-targeted control at the national level and regional coordination to avoid cross-border malaria spillover”.

A review by Douine et al. (2020) of malaria in gold miners in the Guianas and the Amazonian region further adds to this evidence base by reviewing correlations between recorded malaria cases and deforestation in Brazil and Colombia, gold production in Colombia, gold prices in Guyana and location of the mining region in Peru, Colombia, Venezuela and Guyana. The authors also emphasize that focus on transmission in gold mines is crucial to prevent (re-)emergence of malaria, and point towards a need for innovative strategies tailored to context that take into account ASM workers' (cross-border) mobility (Douine et al., 2020).

ASM migration and malaria in the Guiana Shield

The majority of ASM-related mobile migrant workers in the Guianas has historically originated from Brazil (De Theije & Heemskerk, 2009; Le Tourneau, 2020). In Brazil, ASM increased rapidly in the northern Amazonian states throughout the 1970s, and further deforestation, agricultural development and the rising price of gold have fueled the number of ASM workers active, and production of gold in the region throughout the 1980s (Le Tourneau, 2020). At the height of ASM production, eleven government designated ASM "reserves" were active and annual production was estimated at around 90 tonnes of gold per year in the late 1980's (Cleary, 1990; Araujo Neto, 2009 and DNPM/Sumario mineral 1990-2016 cited in Le Tourneau, 2020). Changes in government from military rule to a new republic, changing social perceptions, increased awareness of environmental consequences and a shift towards a preference for industrial gold mining resulted in drastic decreases in annual gold production, down to 10 tonnes of gold per year in the early 2000s (Le Tourneau, 2020).

Throughout the 1980s, small groups of miners started making their way into Suriname and French Guiana, where they were welcomed by fighters in the ongoing civil war that could use the Brazilian's know-how to mine the areas controlled by the jungle commandos, the proceeds of which were used to maintain supplies and weapons (Le Tourneau, 2020). This changed with the end of the civil war and throughout the 1990s, the newfound stability in the Surinamese interior combined with the technical expertise of the Brazilian *garimpeiro* community led to an exchange of small scale mining technologies and a further increase and scaling up of ASM activities in Suriname and neighboring French Guiana, where by now several hundreds of *garimpeiros* were estimated to be active (De Theije en Heemskerk 2009; De Theije 2011; Oliveira 2014 cited in Le Tourneau, 2020).

ASM migration and malaria in Suriname and the final push to malaria elimination

As the ASM sector in Suriname developed throughout the 1980's and 1990's, malaria was still endemic in Suriname. Malaria remained so prevalent in Suriname throughout the early 2000s, that the country was responsible for the highest reported concentration of *P. falciparum* in the Americas up until 2006 (WHO, 2005 cited in van Eer, 2018). Following the efforts throughout the region previously mentioned and an increased investment in malaria prevention and control, Suriname rapidly reduced indigenous malaria cases through a combined strategy of tailored approaches and innovation, resulting in near-elimination levels from 2016 onwards (van Eer et al., 2018; Hiwat et al., 2018).

Now that Suriname has committed to move towards elimination of malaria, and since the majority of malaria cases reported to Suriname's Malaria Program in the past years have been traced back to imported cases within the ASM community, the mobile migrant ASM population consists of a final frontier in malaria eradication (Suriname Ministry of Health, 2020). To accelerate the push towards elimination, the Malaria Program in Suriname has put in place elaborate prevention and control efforts that focus on

outreach and detection in key ASM areas in the country by leveraging a Malaria Service Deliverers Network (Suriname Ministry of Health, 2020). It should be noted here that in recent years, malaria re-appeared in migrating populations outside of the ASM community. In 2018 cases of malaria were recorded in the Indigenous community along the Lawa, linked to gold mining in French Guiana. In 2019 and 2020, there have been malaria outbreaks in indigenous communities along the Tapanhony river, linked to Indigenous peoples who move between Suriname and the north of Brazil¹.

Attention of health authorities has turned to cross-border cooperative efforts to coordinate malaria control. These efforts have gained increased urgency after malaria outbreaks in Suriname have been linked to imported cases from French Guiana ASM working sites (Douine, 2019). Innovative, contextualized approaches have also been explored for putative high endemic areas in French Guiana with frequent cross border connectivity to Suriname that may contribute to the imported cases registered in Suriname. Legal constraints and the illegal status of ASM in French Guiana, which is an overseas department of France and forms an outermost region of the European Union, continue to hamper direct treatment of ASM workers in French Guiana's gold mines (Nacher et al., 2013). As Suriname's malaria program can only serve ASM workers on Surinamese territory, and these regulatory issues prevent implementation of conventional malaria control strategies in French Guiana, a trinational intervention (Suriname, French Guiana, Brazil) was piloted that aimed at the provision of kits for self-diagnosis and self-treatment of *Plasmodium* infections to people working in the French mining sites, (Douine et al, 2018).

In order for Suriname to most effectively close the gap between malaria control and elimination, however, all migrant populations should be considered. While little is known about the number of persons working in the illegal logging sector in Suriname, there are a number of other populations that are known to also frequently engage in unmonitored cross-border migration between Suriname and areas with high risk of Malaria transmission. These are principally the Maroon population living on the border with French Guiana, and the Amerindian population living on the Southern border with Brazil (Heemskerk, 2007; Heemskerk, 2019; Menke, 2016; Price, 2002). In addition, recent political upheaval and socio-economic challenges have led to an increase in mobile migrant populations arriving in Suriname to work, many of them women from the Dominican Republic, Cuba, and Venezuela who end up in sex work in the gold mines and add to the migrant population at risk of contracting and transmitting malaria and other infectious diseases.

1.2 Study rationale

Following the current state of malaria control and elimination efforts in Suriname, the design of targeted and relevant health interventions for malaria and other infectious diseases requires a better understanding of the ASM mobile migrant population's size, demography, movements and health perceptions, and health care seeking behaviours. Our development of an innovative yet straightforward way to estimate the size of the ASM population can help inform the design and implementation of such interventions. Such figures are not only relevant for malaria control and elimination strategies, but will also be useful to design strategies to combat other (infectious) diseases such as COVID-19.

At the same time, the ASM population often has poor access to health services for a variety of reasons, including remoteness of the work locations, distance to health services, language barriers, and lack of

¹ Personal communication, Coordinator of the Malaria Program in Suriname, 30-3-2021

insurance. To support Suriname in its efforts to prevent the spread of malaria, COVID-19 and other diseases throughout its interior districts it is therefore imperative to research health care seeking behaviour in general and, given the current COVID-19 pandemic, perceptions and behaviours of the ASM population in relation to COVID-19.

The current study focuses on Artisanal and Small-scale gold Mining (ASM) areas in Suriname and French Guiana (see map in Figure 1) with particular focus on the border region between the two. As mobile migrant populations engaging in ASM activities are known to move between Suriname, Brazil and French Guiana, this study examines the migratory patterns along this geographic area.

1.3 Study goals and objectives

The overall objective of the mobile migrant study, as presented in the terms of reference provided by the Ministry of Health of Suriname (see Study protocol) is to ***characterize and quantify the population of artisanal small-scale gold miners and their social system in Suriname and French Guiana***. The ASM social system includes a large number of service providers such as sex workers, suppliers of food, gasoline and medicines, and miners' family members, among others. The aim of this study is to identify the magnitude of this population of ASM workers and their social system, migration patterns and mobility, and main health needs and health care seeking behaviour in Suriname and the border area with French Guiana.

The specific objectives of this study are:

1. To determine mobile migrant population characteristics

This includes population size and general population demographics such as the gender ratio, presence of children, and division of labor (job descriptions).

2 To determine and visualize (mapping / stratification) mobile migrant population mobility including cross-border movement of the population

This includes the direction, motivation, and frequency for movement, mobility within Suriname and French Guiana, with motivations for movement and population turnover.

3. To analyze health related factors of the mobile migrant population

This includes knowledge, attitude and practices regarding the prevention, testing, and treatment of disease and perceived COVID-19 and health-risks of the mobile migrant populations as well as perceived priority health needs of the mobile migrant population.

2 Study design and Methodology

2.1 Study design

The study follows a mixed methods approach where primary and secondary data, and quantitative and qualitative data are triangulated to come to a best estimate of population size, demographics, turnover, movement, and priority health needs of the mobile migrant population under study. The study design relies on both quantitative (analysis of official and proxy data related to the target population) methods and qualitative (sociological and anthropological) research methods. Data collection took place in the period of November 2020 – January 2021. A detailed description of the methods used can be found in the study protocol that was approved by the Ministry of Health.

2.2 Quantitative survey

3.1.1 Survey locations

A quantitative survey was conducted with 361 inhabitants of ASM areas, among whom about half were working in French Guiana (46.8%) and the other half (53.2%) in Suriname (see Table 1). It was not possible to conduct surveys in French *garimpos*. Therefore, the survey team targeted people working in French Guiana in the mining service centres in Suriname on the border with French Guiana: Papatam (Albina) in the north, and Ronaldo/Antonio do Brinco in the south (Figure 1). In these locations, gold miners and mining service providers planning to work in French Guiana come to rest or buy supplies, or wait to find a suitable moment to cross the river. In order to complete the target numbers of persons working in French Guiana, additional interviews were conducted in Paramaribo city.

Persons working in Suriname were in part interviewed in the area surrounding Alimoni (Alimoni I and II, Bode, Agua Branca, Baika creek) south of the Brokopondo lake (Figure 1, area 3). In addition, people working in Suriname mining areas were interviewed in Paramaribo city. Those interviewed in Paramaribo city worked in a wide variety of *garimpo* areas throughout the country. Interview locations in Paramaribo city included the bars and stores where migrant miners congregate along Anamoestraat (“Little Belem”); in front of the hotels where migrant miners stay at Prinsessenstraat; at the bus station for busses going to the interior; at the dermatological clinic where female sex workers go for sexual and reproductive health services; and at the malaria program TropClinic at Geyersvlijt.

Table 1. Number of individuals surveyed per survey location

| Survey location | Work location | |
|---------------------------|------------------|-----------------------|
| | Suriname (N=192) | French Guiana (N=169) |
| Antonio do Brinco/Ronaldo | 36 | 82 |
| Paramaribo | 38 | 45 |
| Alimoni | 57 | 0 |
| Agua Branca | 52 | 0 |
| Albina | 3 | 42 |
| Baika keek | 6 | 0 |

3.1.2 Sampling method and sample characteristics

Inclusion criteria for the quantitative survey were that:

- (1) The person had worked in the ASM sector for at least one year; not necessarily one consecutive period.
- (2) In 2020, the person had worked in a gold mining area in either Suriname or French Guiana.
- (3) The person was 18 years or older.

In addition, the objective was to include in the quantitative survey:

- A least 300 valid interviews
- Similar numbers of persons working in Suriname and in French Guiana
- In each country 25% women to allow for gender differentiated analysis
- In each country 50% gold miners (i.e. individuals who are part of the actual mining activities, such as the mine boss, the laborers, and the excavator operator) and 50% service providers such as transport providers, fixed and traveling merchants, cooks, sex workers, and owners of bars, *cabarets*, restaurants and hotels
- For Suriname, 20% of Surinamese, 60% of Brazilians, and 20% of other migrants
- People of different age groups

Table 2 below summarizes the achieved sample characteristics.

Table 2. Sample characteristics

| | Suriname | French Guiana | Total |
|--------------------------|-------------|---------------|-------------|
| Total N | 192 (53.5%) | 169 (46.8%) | 361 (100%) |
| Gender | | | |
| Women | 64 (33.3%) | 41 (24.3%) | 105 (29.1%) |
| Men | 128 (66.7%) | 128 (75.7%) | 256 (70.9%) |
| Profession | | | |
| Gold miners | 83 (43.2%) | 82 (48.5%) | 165 (45.7%) |
| Mining service providers | 109 (56.8%) | 87 (51.5%) | 196 (54.3%) |
| Age group | | | |
| 18-24 | 12 (6.3%) | 18 (10.8%) | 30 (8.4%) |
| 25-45 | 92 (48.2%) | 96 (57.5%) | 188 (52.5%) |
| >45 | 87 (45.5%) | 53 (31.7%) | 140 (39.1%) |
| Nationality | | | |
| Brazilian | 122 (63.5%) | 154 (91.1%) | 276 (76.5%) |
| Surinamese | 37 (19.3%) | 1 (0.6%) | 38 (10.5%) |
| Other migrants | 33 (17.2%) | 14 (8.3%) | 47 (13.0%) |

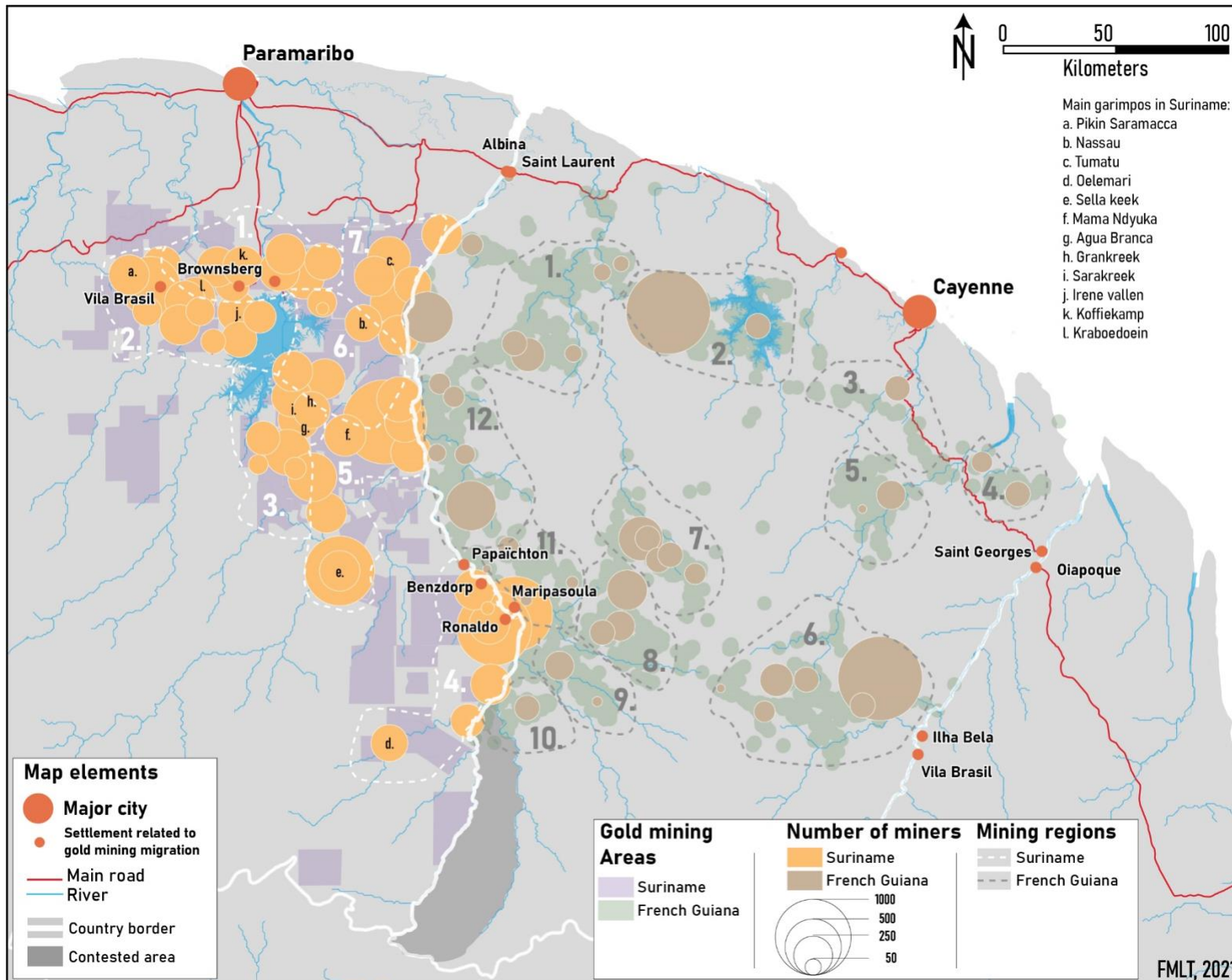
2.3 Calculation of size of the population

Our methods for estimating population size are described in detail in Annex 2. The primary idea behind our estimation method is to extract and calculate informed estimates from different sources, in a way that is replicable. By comparing the outcomes of the different sources, a likely mean figure and range was established. Table 3 below lists our methodological approach and data sources.

Table 3: Overview of data sources used to calculate size of the migrant population

| Method | Description and logic | Data sources |
|---------------------------------------|---|---|
| Adding site estimates | We identified by name 80 larger and smaller ASM areas. By asking survey respondents to estimate the population in their work area, by calling persons from different areas, and by visits to a number of sites in Brokopondo (north and south of the lake), we obtained population counts and estimates for 59 mining areas. Population sizes of the unknown <i>garimpo</i> areas were set at the average value of the population at sites with an estimated value (Figure 1). | <ul style="list-style-type: none"> - Quantitative survey with ASM population. - Field visits to selected regions - Phone interviews |
| Estimates based on gold production | The total annual amount of gold produced by ASM miners in Suriname and western French Guiana can be approximated by gold export figures. If we know how much gold is produced by the average gold miner, the population of gold miners can be estimated as: $\frac{\text{Total national gold production from ASM /yr}}{\text{Average amount of gold produced per miner / yr}}$ | <ul style="list-style-type: none"> - Quantitative survey with ASM population. - National annual gold export data from the Currency Committee (<i>Deviezen-commissie</i>), Suriname. |
| Estimates based on deforestation data | The total annual amount of ASM-induced deforestation can be measured from satellite imagery, and is monitored by the Suriname Forest service (SBB). If we know how much area is deforested by the average ASM operation, and we know the average number of persons per operation, the population of gold miners can be estimated as: $\left(\frac{\text{Total national ASM induced deforestation /y}}{\text{Total area deforested per mining team/yr}} \right) \times \text{Mean number of gold miners/team}$ | <ul style="list-style-type: none"> - Quantitative survey with ASM population. - SBB deforestation data - Secondary data and expert estimates on av. area deforested per ASM team/yr. |
| Expert estimates and reports | Different experts were asked to provide their informed estimates about ASM population numbers and make-up. | <ul style="list-style-type: none"> - In-depth interviews with experts |

Figure 1. Location of main ASM sites in Suriname and French Guiana



Source: Map produced by François-Michel Le Tourneau for this report

Additional insights in cross-border movement were obtained by combining results from the survey data, qualitative interviews, and statistical records from different sources including:

- Passenger numbers traveling to, and arriving from Brazil at the Johan Adolf Pengel International Airport Suriname
- Brazilian Institute of Geography and Statistics (IBGS) migration records
- Suriname Bureau of Statistics (ABS) census data and migration records

2.3.1 Analysis of Quantitative survey

Survey data were entered in a statistical software package and analysed using descriptive univariate and bivariate statistics. These key variables included:

- General population demographics such as the age, gender-ratio, presence of children, and division of labor (job descriptions) found among respondents;
- Variables related to movement, migration and places of work, including where respondent reports to live, work, how many places respondent has worked at in the past 12 months, and whether respondent has visited countries other than Suriname;
- Variables related to health-related factors such as where to seek care for injuries, infectious diseases and COVID-19, perceptions on COVID-19, etc.
- Other variables of interest

2.3.2 Qualitative interviews

Qualitative in-depth interviews were conducted with key experts and several members of the target population to obtain information additional population estimates, and to better understand and contextualize the quantitative findings.

2.4 Limitations and challenges

Due to the COVID-19 pandemic, cross-border travel and travel to and from mining areas was periodically limited. This situation may have affected the answers people gave on certain questions. For example, some *garimpeiros* mentioned that they did not want to travel to Paramaribo because they were convinced that they had less exposure to COVID-19 in the mining areas. Also, some interviewees mentioned that flight restrictions to and from Brazil had motivated them to enter Suriname either by boat (from Oyapock to Albina) or walking through the French Guiana forest. Because the survey data suggest that not many persons changed their behaviour as a result of COVID-19, we do not believe that this situation has affected the study outcomes.

Due to the COVID-19 pandemic, interviewing of respondents took place wearing a face mask, which was both uncomfortable for the interviewers and somewhat awkward for the interviewees. We do not believe this has affected the results.

Due to COVID-19 travel restrictions, a choice was made to interview a significant number of survey respondents in Paramaribo rather than to travel to more mining areas. We believe that this approach has positively affected the data, because it allowed us to collect data from persons working in a wider variety of ASM areas.

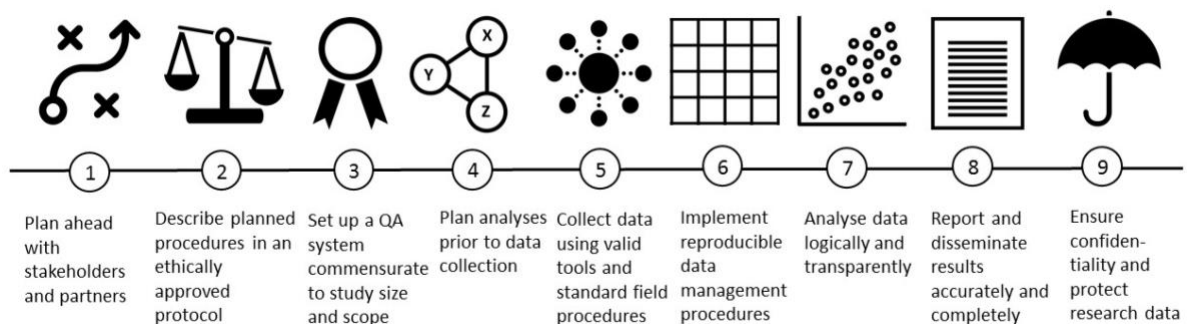
Data from the ASM population in French Guiana were collected in Suriname. In other words, our results about gold miners and mining service providers in French Guiana represent the situation of persons traveling to the transition sites along the border of French Guiana with Suriname. These people were typically working in the Western part of French Guiana, and may have been more mobile than the “average” person working in French Guiana ASM areas. It is possible that the less mobile persons in the French *garimpos* would have provided different answers. Among others, this methodological challenge has possibly caused overestimation of the mobility of the French Guiana ASM population. Also, because very few interviewees worked in the eastern regions of French Guiana, the results are possibly based in underestimating migration flows from Brazil into eastern French Guiana.

2.5 Ethical considerations

Ethical clearance was obtained for the research protocol (Annex 1) for this study and any addenda from the Ministry of Health on 16th of November 2020. Informed consent was obtained from every interviewee and survey respondent, after they had been informed of the study objectives and been offered the possibility to refrain from answering or withdraw from the interview/discussion at any point without further consequences. All results in any reports’ tables, charts, graphs, figures or maps are presented in a way which protects confidentiality and anonymity of individual respondent data.

2.6 Quality assurance plan

The recently developed internationally peer reviewed and validated Guidelines for good epidemiological practice developed by KIT Royal Tropical Institute epidemiologists was used as a basis to ensure that the study is conducted with scientific integrity and in fair collaboration with all research partners and stakeholders. The Guidelines consist of 9 standards accompanying criteria spanning the entire implementation of an epidemiological study from study preparation to data storage and data sharing. Details of our GEP Guidelines can be found in our website and are summarized in the visual below.



3 Results

3.1 Estimation of mobile migrant population size

3.1.3 Population size estimates

For Suriname, four different population estimation methods were used: expert estimates, wisdom of crowds+ (supplemented with actual on-the-ground counting and phone calls), use of gold production data, and (4) use of deforestation data (Figure 2). For French Guiana, the use of deforestation data was not possible because *garimpeiros* are increasingly working underground, resulting in minimal deforestation.

Our population estimates are summarized in Table 4. Annex 2 provides more detailed information about the way that these estimates were obtained. The various methods combined suggest that the population living and working in ASM areas in Suriname is ~ 20,000, and in French Guiana ~11,000, plus or minus 20%. This estimate includes both gold miners and mining service providers.

Table 4: Population estimates of ASM mobile migrants, including margins, source and method of estimation

| Population estimate | Population margin low and high margin | | Source | Method |
|----------------------|---------------------------------------|--------|--|---|
| Suriname | | | | |
| Mean | Low | High | Dataset or informant | Description of method |
| 21,823 | 16,500 | 30,000 | SHMR, Paansa, Newmont | Expert estimates |
| 19,146 | 15,317 | 22,975 | Quant survey Population counts Phone calls | Per site estimates: Respondent estimates combined with regional counts in Brownsweg area |
| 17,500 | 14,000 | 21,000 | Deforestation data 2018, SBB | National ASM-induced deforestation divided by deforestation rates per team of 6 miners |
| 21,572 | 17257 | 25,886 | Gold production | National gold production divided by production per mining team*10 |
| French Guiana | | | | |
| 12,300 | 9,840 | 14,760 | Quant survey (respondent self-report on area of work) | Wisdom of the crowd: Respondent self-report of number of persons working in <i>garimpo</i> |
| 11,807 | 8,938 | 14,675 | Malakit programme | Expert estimates |
| 8,978 | 7182 | 10,773 | Gold production data | Divided by production per area / team / person |

The results presented in table 4 inform the following observations:

- The population estimates using different methods are strikingly similar.
- ASM population estimates for both countries are higher than reported in many reports about the ASM sector for this region. This finding has implications for the delivery of health and other services to this mobile and migrant population.

Using a simple formula, the “deforestation-method” and the “gold-production” method offer ways to rapidly estimate population numbers on an annual basis, and generate results similar to the more laborious and costly exercise of obtaining data from all different ASM areas. On the basis of gold production data, the following formula may be used to estimate the ASM population in Suriname:

$$\frac{(Total\ reported\ national\ gold\ production\ from\ ASM / yr) * \frac{2}{3}}{481}$$

As a proxy for national gold production by ASM one can use the annual amount of gold produced by ASM producers that is exported from Suriname. These data are available at the Suriname currency committee (*deviezencommissie*) of the Ministry of Economic Affairs, Entrepreneurship and Technological Innovation. It is common knowledge that most gold mined in French Guiana is sold in Suriname. According to a French ASM expert, this amount may even be 90% of gold mined in French Guiana² Hence the figures of the Suriname currency committee, which total the amounts from all Suriname gold buyers and exporters, include gold that was mined in French Guiana and subsequently sold in Suriname gold shops. No-one knows what share of the formal Suriname gold exports is in fact French gold. Given that in Suriname there are many more ASM sites than in French Guiana, it is likely that the share of French gold is less than half. We estimate that $\frac{1}{3}$ of ASM gold exported from Suriname was produced in French Guiana; when better estimates become available the formula can easily be adjusted. For now, we multiply the exported amount of gold by $\frac{2}{3}$ to correct for gold that was mined in French Guiana but sold in, and exported from, Suriname. .

Figure 2. Use of ASM-induced deforestation data to estimate population size



² F.M. Le Tourneau, Research Director at the French National Center for Scientific Research, CNRS, pers. com. 23/03/2021

On the basis of deforestation data, the formula to estimate the total ASM population would be:

$$\left(\frac{\text{Total national ASM induced deforestation /yr}}{3 \text{ (ha deforested per team /yr)}} \right) * 6 \text{ (persons/team)} * 2 \text{ (incl service providers)}$$

Or: Total national ASM induced deforestation in ha * 4

Data on national gold mining-induced deforestation can be obtained from the Forest Cover Monitoring Unit (FCMU) located in the Foundation for Forest Management and Production Control (*Stichting Bosbeheer en Bostoezicht – SBB*).

We realize that many assumptions were made to get to these estimates. We perceive these formulas as a work in progress that can be improved when additional measurements are performed and additional data are obtained.

3.1.4 Population turn-over

In order to provide insight into population turn-over, we used total population numbers, information about people’s history in ASM, and information about countries where the person started working in mining. Starting with estimates of the ASM population in the past couple of years, we use the method described above (Table 5). These data suggest that the ASM population may have remained rather stable in the past five years, averaging ~19-20 thousand persons, with a dip in 2016. This suggests that each year, the number of new entries is about equal to the number of persons leaving the ASM sector in Suriname.

Table 5. Estimated ASM population in Suriname, using the deforestation and the gold production methods

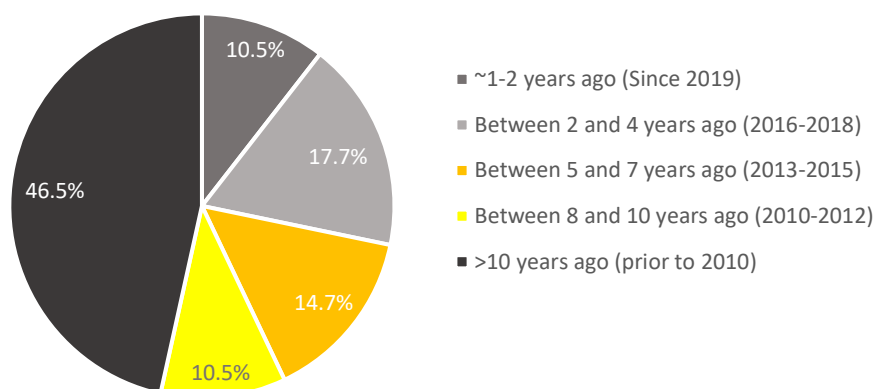
| Year | ASM-induced deforestation ³ | Est. ASM pop. (deforestation method) | National ASM gold exports (g) | Est. ASM pop. (Production method) |
|------|--|--------------------------------------|-------------------------------|-----------------------------------|
| 2015 | 5768 | 23072 | 14,302,651 | 19823 |
| 2016 | 4217 | 16868 | 10,484,636 | 14532 |
| 2017 | 4450 | 17800 | 14,529,352 | 20138 |
| 2018 | 4375 | 17500 | 17,035,035 | 23611 |
| 2019 | No data | - | 15,175,910 | 21034 |

In order to calculate turn-over in the Suriname-French Guiana mining region, we looked at two populations of newcomers: (I) persons who had never been mining before and entered the sector for the first time in Suriname or French Guiana, and (II) persons who had started their career in the ASM sector in another country, and moved to Suriname-French Guiana at some later stage.

In the total sample, we find that 10.5% of inhabitants of ASM areas had started mining in 2019. All of them had started work in the ASM sector in either Suriname (78.9%) or French Guiana (21.1%) (N_{total}=38). In other words, in 2019, the ASM population in Suriname and French Guiana consisted for 10.5% of persons who started work in the ASM sector in that same year (newcomers type I).

³ Area deforested by gold mining without Rosebel en Newmont (in ha), data obtained from SBB

Figure 3. Number of years ago that the person started working in the ASM sector



The data suggest that a much smaller share of the ASM population in Suriname and French Guiana consists of newcomers to the region who worked in ASM somewhere else before. Table 6 lists the share of persons that started their work in ASM in the Suriname-French Guiana region in different time periods, versus those who had started elsewhere in that period. We see that these figures are constantly around 90%. In the past decade (2010-2018), 8.4% of inhabitants of ASM had started their work in the ASM sector outside of the Suriname-French Guiana region (e.g. Brazil, Venezuela), and had made their way to this region some time in these years. This reasoning implies that annually, in the past decade, the ASM population has consisted for 0.4% of Newcomers type II.

Table 6. Percentage of persons who had their first experience in ASM in the Suriname-French Guiana mining region in different time periods.

| Years started mining | Share with first experience in ASM in Suriname-French Guiana |
|----------------------|--|
| 2016-2017-2018 | 92.2% |
| 2013-2014-2015 | 92.5% |
| 2010-2011-2012 | 89.5% |
| 2010-2018 (9 years) | 91.6% |

Almost half of respondents had started to work in the ASM sector more than 10 years ago, some even more than 20 or 30 years ago (46.5%, $N_{total}=361$) (see Figure 3). One third of this group had started their gold mining work in Brazil (35.7%). These persons were often part of the exodus of Brazilian *garimpeiros* out of Brazil in the late 1990s, when Brazil implemented much more stringent regulations on *garimpagem* (De Theije and Heemskerk, 2009). This well documented history, and qualitative interviews with old-time gold miners, suggest that the *garimpeiros* who started their work in Brazil more than a decade ago entered the Suriname-French Guiana region many years ago. It is extremely unlikely that these people are among the newcomers in the ASM population in these countries.

From the above we deduct that the **turn-over rate in the ASM population of the Suriname-French Guiana mining region is approximately 10.9%**, or with a 20%-margin, between 8.7% and 13% annually. The grand majority of newcomers (~95%) are persons who entered the ASM sector for the first time, the remaining ~5% of newcomers to the region have experience in the ASM sector elsewhere.

The data suggest that turnover is strongly linked to profession. Almost two thirds of sex workers were relatively new arrivals; they had started work in the ASM sector only 1 to 2 years ago (62.1%, $N_{total}=29$). This group included five Cuban women, twelve Dominicans and one Brazilian. Qualitative interviews suggest that they view work in the ASM sector as a temporary hurdle; a job that earns them some money to build up something better for themselves and their children.

We also observe significant differences in work history between persons from different countries – though this observation is at least partly a result of the association between nationality and profession. All but five individuals among those who had started working in ASM more than 10 years ago were either Brazilians or –to a lesser extent- Surinamese. For these people, gold mining is a way of life and it is very unlikely that they will leave the sector voluntarily; in this group, turn-over occurs when people become physically unable to mine. On the other hand, all seven Cubans, the one Venezuelan and 44.4% of Dominicans ($N_{total}=27$) had started working in the ASM sector less than 2 years ago. Given their small numbers and relatively recent arrival in the ASM sector, we cannot predict whether this relatively new presence of a Latin population in the ASM sector is the start of a rising trend, or just a short-term phenomenon.

Chinese respondents did not have a very long history in the ASM areas; half of them had started in the ASM areas between 2 and 4 years ago (55.6%, $N_{total}=9$). These figures could signal an ASM related migration trend, where relatively fewer “new” Brazilians arrive. In absolute numbers though, Brazilians continue to constitute the large majority in ASM areas in Suriname and French Guiana.

3.2 Mobile migrant population demographics and characteristics

The ASM population is dominated by adult men, but a significant number of women, and smaller numbers of young children and teenagers can be found in ASM communities. In this section we describe the population composition.

3.2.1 Presence of women and gender differences

Survey respondents were asked to estimate the number and share of women in the area where they worked. Combining this information with the data from phone calls and counts in different mining areas, suggests that the percentage of women in Suriname mining areas is between 16% and 24%, and in French Guiana between 20 and 30% (see Figure 4). The median cited share of women in the total survey sample was 25 percent women⁴ ($N_{total}=324$). Estimates of the share of women in different *garimpos* varied between 0 and 2/3 of the mining population. This latter figure appears an overestimate. The data suggests that the share of women working in the ASM sector in Suriname and French Guiana is higher than believed earlier (Heemskerk and Duijves 2012b, 2019).

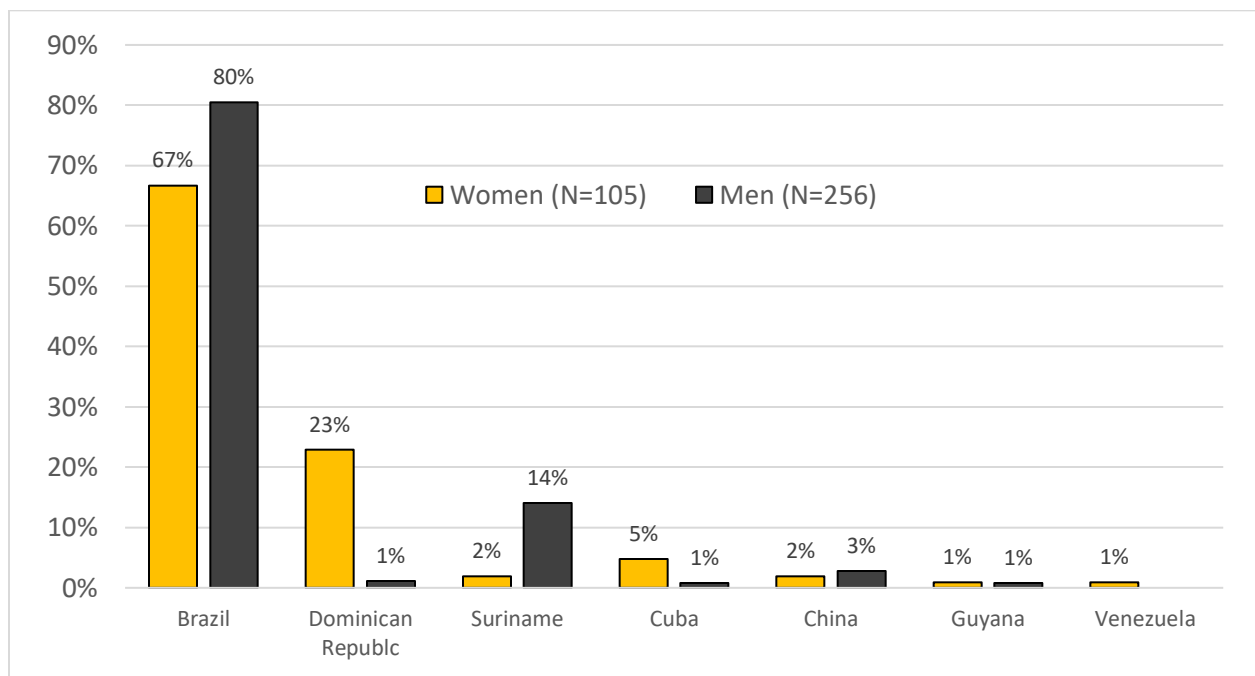
In terms of age, we find negligible difference between women and men. Women were, on average, 40.6 years of age, with a range from 22 to 68 years ($N_{total}=105$). For men, the average age was 42.2, with a range from 16 to 70 years of age ($N_{total}=253$). In terms of occupation, however, there are significant differences between women and men. Women primarily work in the mining service economy and occasionally as operation owners, but they are not involved as actual mine workers in the mining pit (see

⁴ Excluding 4 outliers >= 67%

¶3.2.2). Men most often work as mine workers, and in addition are involved in virtually every other (service) job apart from sex work.

We also observe gender differences with regard to country of birth. The grand majority of surveyed men was Brazilian (80.4%), and a smaller but still significant group of men were Surinamese (14.1%). Only 5.5 percent of surveyed men came from other countries. The national backgrounds of women were somewhat more diverse. Two-thirds of women were Brazilian (66.7%), but we also encountered a sizable number of women from other Latin American and Caribbean countries: mostly from the Dominican Republic (22.9%), but also from Cuba, Suriname, Cuba and Venezuela. These data on nationality are somewhat affected by the choice of research areas, as we would have encountered more Surinamese men and women in mining areas in Brokopondo district, which were not visited.

Figure 4. Reported country of birth (N=361)



3.2.2 Children and teenagers

Our observations and survey data suggest that there are children (<18) present in the *garimpos* and related *currutela* (gold miners' villages) and service areas, but their presence tends to be low (see Table 7 and Table 8).

Young children (<16) encountered in the mining areas usually accompany their mother and/or -less commonly- their father. Most women who work in the ASM sector with young children leave their children in the care of a family member, often their own mother, when going off to work in the forest. While some women leave their children behind in their home county, others rely on paid or unpaid child care in Paramaribo or one of the ASM service areas. In the border enclave of Ronaldo (Suriname), for example, the researchers spoke with a woman who was taking care of the children of three different other women who were working across the border in French Guiana *garimpos*.

If women feel they have no options to leave their young children behind in the care of others, they may take them with them. As our data suggests, this is relatively more common for young children under 6 years of age, who are not yet required to attend school (Table 7 and Table 8). Due to the repressive regime of the French government against ASM in French Guiana, taking dependent children to the *garimpo* happens more often in Suriname than in French Guiana. Based on our survey data, we estimate that in French Guiana ASM areas, there are about 4 to 5 young children per 1000 adults. In Suriname *garimpos* and related service areas, one finds about 15 babies, toddlers and pre-schoolers for every 1,000 individuals: three times as many. There have been no reports or observations of such young children who are working in the mining areas; they usually stick with their mothers and play around.

Table 7. Presence of children in the *garimpos* of French Guiana

| Estimated presence in ASM areas | Under 6 | Ages 6-15 | Teenagers ages 16-17 |
|--|---------------|--------------|----------------------|
| Total number in ASM areas in country | 56 ± 11 (20%) | 32 ± 6 (20%) | 58 ± 12 (20%) |
| Mean number of children per <i>garimpo</i> | 1.2 | 0.7 | 1.3 |
| Range of number of children per <i>garimpo</i> | 0 – 4 | 0-7 | 0-10 |
| Mean ratio adults : children | 218 : 1 | 390 : 1 | 212 : 1 |

Table 8. Presence of children in the *garimpos* of Suriname

| Estimated presence ASM areas | Under 6 | Ages 6-15 | Teenagers ages 16-17 |
|--|----------------|----------------|----------------------|
| Total number in country | 286 ± 57 (20%) | 107 ± 21 (20%) | 123 ± 25 (20%) |
| Mean number of children per <i>garimpo</i> | 2.9 | 1.1 | 1.2 |
| Range of number of children per <i>garimpo</i> | 0-30 | 0-25 | 0-14 |
| Mean ratio adults:children | 67:1 | 88:1 | 77:1 |

As compared to the very young children (<6 years of age), children of primary school age are less likely to be present in the *garimpo* and surrounding service areas. In French Guiana, no primary school children were reported in 20 out of 32 *garimpos* for which observations were reported. The largest number of children in the ages 6-15 was reported for the *garimpo* Grand-Santi. We do not know if these children went to school in this village. For Suriname, no children in the ages 6-15 were reported in 44 of the 59 ASM areas with population estimates. On the other hand, school-aged children were reportedly abundant in the ASM service area Ronaldo/Antonio do Brinco in Suriname. Some of these children attended school in nearby Maripasoela (FG).

Migrant (Brazilian, Dominican) children in the ages 6-15 in the ASM areas are typically not involved in mining related labour. It is relatively more common for Maroon children –usually boys- in this age group to work (part-time) in the mines with their father, uncle, or other brother (see Figure 5). In a 2012 study on child labour in ASM areas in Suriname, we concluded that child labour in Suriname ASM areas is very rare, particularly for young (<16) children, and absent in most *garimpo* areas (Heemskerk and Duijves, 2012). At the time it was reported that the most popular job for child miners was panning, which was often performed by boys living in a village near a mine site, especially in weekends and school holidays. In addition, one out of ten child miners were mostly performing work that may be characterized as domestic activities (e.g., cooking, doing dishes) and only occasionally assist with the actual mining work.

Like other mining work, panning exposes children to a hazardous environment, in which they are handling mercury. Nevertheless, because these children tend to work with other children and close to their home, they are not as exposed to the adult miners' environment and the work is not as physically demanding as work in the mining pit:

“Work in the mining pit to remove stones and cut tree roots (19.3 percent) or work with hydraulic hoses (3.1 percent) poses even more risks [...]. The children performing this type of work are doing physically demanding work. They work long hours in the burning sun and stand in dirty water, with little time for rest. They also often work full-time: 12 hours a day, for 6 days a week [...] in an adult male environment.” (Heemskerk and Duijves, 2012).

The 2012 study found that children working as members of mining teams were typically Maroon teenage boys (ages 15-17), who worked with family. Even though this study was performed almost a decade ago, our continuous observations in ASM areas suggest that these general findings continue to be valid. Based on data collected in the context of the present study, our informed estimate is that between 46 and 60 teenagers may be working in the French Guiana *garimpos*, and between 98 and 148 in Suriname mining areas.

This past year during the COVID-19 pandemic, when primary schools were closed for many months, school teachers from Maroon villages near mining areas lamented that school boys had left in significant numbers to the mining areas. We have never seen, or heard about Brazilian children of primary school age who worked in actual mining activities in Suriname.

Figure 5. Maroon children of primary school age performing mining activities, Brokopondo district



3.2.3 Working with family

One third of survey respondents reported that in 2020, they had worked and/or lived with family in the ASM areas. This observation counters the popular idea that gold miners are lone wolves, who work and move around independently from family. The most often mentioned family member to work and/or live within the ASM areas was a spouse (18.6%), sometimes in combination with children (2.8% of total, $N_{total}=361$). Women were more likely than men to stay with their spouse in the area (35.2%, $N_{total}=105$ vs 11.7%, $N_{total}=256$).

Other family members to work and/or stay within the *garimpos* or related service areas in the interior were child(ren) not in combination with the partner (1.9%), one or more brothers (4.7%) and/or sisters (1.1%), cousins (M/V, 3.9%), uncles or aunts (2.2%), mother (1.7%) and/or (step)father (1.1%), a grandfather (1 person), grand children (1 person), a bother in law (1 person), or a combination of the above mentioned ($N_{total}=361$).

3.2.4 Professions

Almost half (45.57%) of survey respondents could be classified as gold miners. The other half were persons delivering a wide variety of services to the ASM sector. Gold miners were classified persons working as labourers in the mines, the equipment owners or bosses, and excavator operators. Based on earlier work in Suriname ASM areas, we are confident that our sample displays an accurate representation of the actual ratio of gold miners to service providers as 1:1.

There are a number of methods frequently used in the ASM sector in Suriname and French Guiana (for an illustration, see Figure 6). Among ASM working as gold miners in Suriname, more than half of those who were interviewed worked in an operation that used hydraulicking, or *spoiti-soigi* in Sranantongo (Por: chupadeira) (68.3%, $N_{total}=82$). Eleven percent of gold miners worked with a small pump (Sur: *sumajé* / Por: *requeira*), and another 13.4 percent worked with a mill (Sur: *kroesjer*, Por: *moinho*). Only three persons worked in an operation that exploited a tunnel. The remaining persons worked on a raft (1 person), with a metal detector, or with an “isri daal” (1 person). Also most persons working in French Guiana reported that they were hydraulicking with either a large or a small pump system (71.4%, $N_{total}=84$). Contrary to what we had expected, only 10.7% of gold miners in French Guiana reported that they worked in a tunnel. Others used a mill (9.5%), worked manually with a gold pan (4.8%), used a combination of hydraulicking and milling (2 persons) or used a metal detector (1 person) (Figure 6).

When comparing jobs performed by women and men, and those delivered in Suriname and French Guiana (see Table 9), several patterns appear. First of all, a much wider variety of mining-related services are provided in Suriname than in French Guiana. For example, Surinamese men reported 28 different jobs in ASM areas, including in the category “other”: baker, barber, ATV repair shop owner, welder, fisher, and collection of fees for the concession owner. Men in French Guiana represented only six different jobs. One possible explanation for this observation is that due to the repressive regime vis-à-vis small-scale gold miners in French Guiana, service providers may find it more practical to settle on Suriname soil, even if they cater to *garimpeiros* working in French Guiana. For an ATV repair shop, which is not very mobile, it will be more difficult to establish itself in French Guiana. By offering services from Ronaldo, the shop is strategically located for clientele from a large number of French *garimpos*.

Figure 6. Artisanal and Small-scale Mining methods used in Suriname and French Guiana

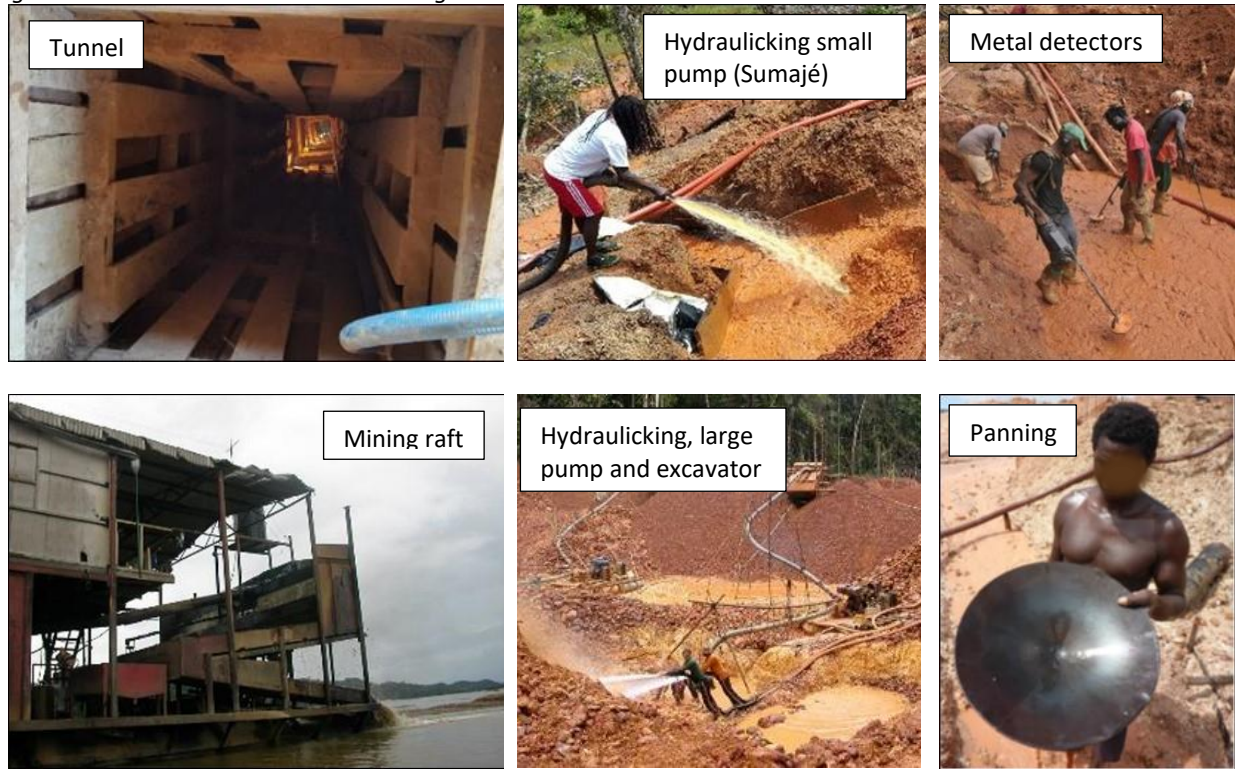


Table 9. Professions of male and female respondents in Suriname and French Guiana mining areas.

| Profession | Women | | Men | |
|--|-----------------|----------------------|------------------|-----------------------|
| | Suriname (n=64) | French Guiana (n=41) | Suriname (n=128) | French Guiana (n=128) |
| Gold miner/ <i>Porcentista</i> | | | 61 (47.7%) | 74 (57.8%) |
| Traveling vendor / <i>Marreteiro/a</i> | 5 (7.8%) | 14 (34.1%) | 1 (0.8%) | 16 (12.5%) |
| Cook | 22 (34.4%) | 11 (26.8%) | | |
| Transport (boat/ATV) | | | 13 (10.2%) | 20 (15.6%) |
| Sex worker | 15 (23.4%) | 14 (34.1%) | | |
| Equipment owner / boss | 2 (3.1%) | 1 (2.4%) | 12 (9.4%) | 7 (5.5%) |
| Store owner | 3 (4.7%) | | 7 (5.5%) | |
| Spouse of gold miner, no income | 9 (14.1%) | | | |
| Carpenter / <i>Serrador</i> | | | 8 (6.3%) | |
| Excavator operator | | | 8 (6.3%) | |
| Carrier / <i>Burinho</i> (mule) | | | | 6 (4.7%) |
| Store help | | | 5 (3.9%) | |
| Brothel owner | 3 (4.7%) | 1 (2.4%) | 1 (0.8%) | |
| Mechanic | | | 2 (1.6%) | 2 (1.6%) |
| Other | 5 (7.8%) | | 17 (13.3%) | |

There are certain jobs that are very specific to the country, as a result of the way that the sector is organized (see Table 9). For example, in French Guiana *garimpeiros* cannot work with excavators, as these will be rapidly detected by the gendarmerie, and loss of an excavator will result in a large economic loss. In Suriname, excavators are common pieces of equipment in gold mining operations. Hence, we find excavator operators working in Suriname, but not in French Guiana. Also store owners are not (much) found in French Guiana *garimpos*, as stores are not mobile and cannot easily be moved when fleeing from the French authorities. On the other hand, the carrier or *burinho* (mule) is commonly found in French Guiana but hardly in Suriname. Carriers carry loads of about 40 kg on their backs (fuel, food, necessities) to bring supplies to mining teams. The *burinho* traverses the forest along narrow foot paths, unseen, thus reducing detection of the site by the gendarme. In most Suriname *garimpos*, gold miners do not hide from the national authorities and transport goods and supplies openly typically with ATVs, cars or boats⁵.

Furthermore, in Suriname it occurs that non-working spouses of gold miners join their husband to the mining area. Because ASM is tolerated by national authorities, couples may build a little house for themselves in the ASM area to stay together –sometimes with a child. In addition to preventing the long periods of separation, it is cheaper than renting a house in Paramaribo. Especially in more established ASM areas where people stay longer, couples may construct a rather comfortable place for themselves, with cement floors to keep the dust out, a bed rather than a hammock, and a vegetable and herbs garden.

The data also show gender differences in jobs that are performed in ASM areas. Only 1.8 percent of gold miners were women, and these women were all equipment owners (N=30). There were no female *porcentistas* (labourers earning a percentage share) or excavator operators. Also, all interviewed carriers, mechanics, carpenters and transport providers were men. Female ATV drivers may be observed in some ASM areas, but they are uncommon. On the other hand, all interviewed cooks and sex workers were women. Women are also well-represented among the (traveling) merchants (Box I). In many years of research, we never encountered a male cook in a Brazilian mining team, though men sometimes cook in Maroon mining teams.

3.2.5 Earnings

Garimpeiros with experience working on both sides of the border emphasized that earnings in French Guiana are much higher; which is why they are willing to take the risks and financial losses involved in confrontations with the French gendarme. This pattern is apparent in our data, where we find that average reported annual earnings of *porcentistas* in French Guiana may be about 50% higher than those reported in Suriname (300 g Au/year vs. 194 Au/yr). In monetary terms, these amounts translate to net year salaries of about USD9,000 for *porcentistas* in Suriname and USD14,000 in French Guiana⁶. These earnings compare favourable to the minimum wages in Brazil and Suriname of, respectively, USD 2190/yr and ~USD 1250/yr.

3.2.6 Country of origin

Brazilians dominate the ASM population; three-quarters of interviewees were Brazilians. In French Guiana, Brazilians constitute more than 90 percent of the ASM population. In addition, Dominicans –

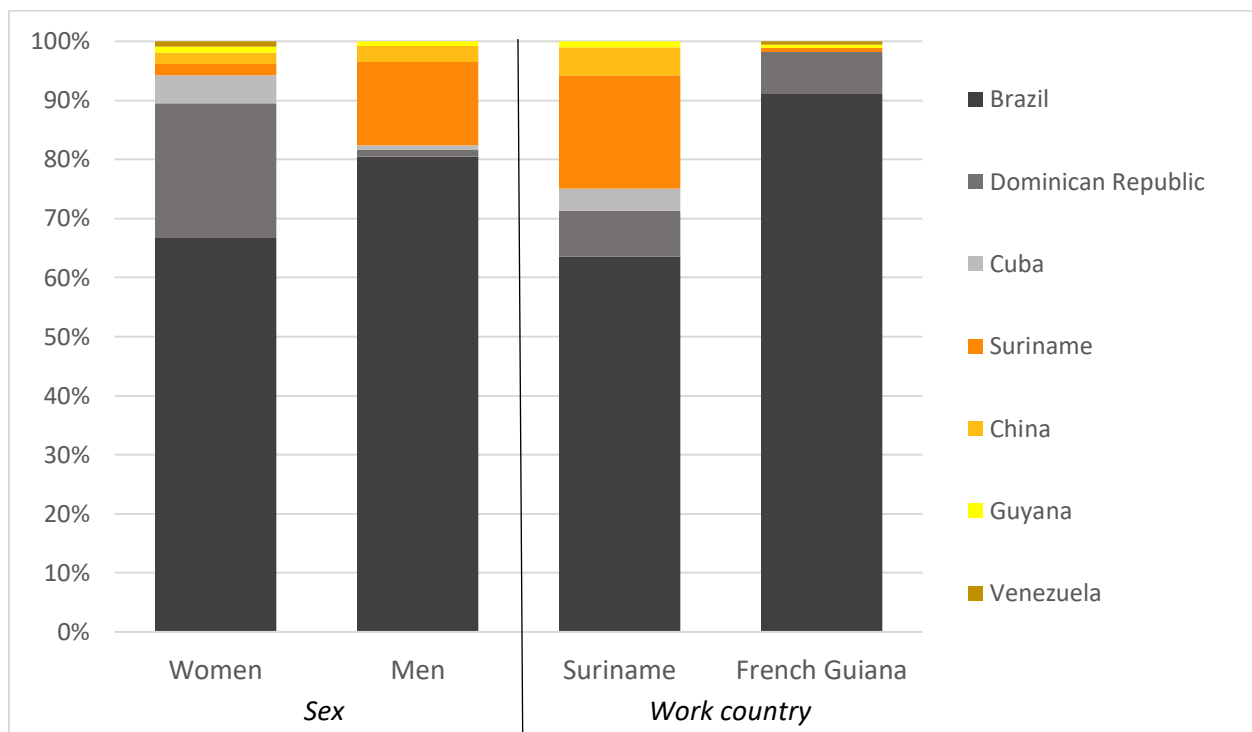
⁵ In the past (1990s), when the use of ATVs was not yet widespread throughout Suriname ASM areas, carriers were also common in Suriname. Nowadays, we see them rarely.

⁶ Based on an international gold price of USD 55 (March 2021), minus 15% to compensate for impurities and grade (karatage), and deducting royalties and administrative expenses of the buyer.

mostly women- increasingly participate in ASM in French Guiana. This appears to be a relatively new trend. Among the 11 Dominican women working in French Guiana in the sample, seven had started only recently; between 1 and 2 years ago, and another two women had started between 2 and 4 years ago. More Dominican (and Cuban) women working in French Guiana were encountered, but they were not interviewed because of the inclusion criterion that they had to be working for at least one year in the ASM sector. Of the 11 Dominican women working in French Guiana, ten were sex workers and one worked as a *marreteira* (traveling sales woman). Very few persons working in French Guiana come from other countries. The sample of those working in French Guiana included one Venezuelan woman, one Guyanese man, and one woman who was born in Suriname but had Brazilian parents and the Brazilian nationality.

In Suriname, the ASM population is more diverse. Also here, Brazilians dominate. Still, relatively more people of other nationalities work in the Suriname ASM sector, including sizable populations of Surinamese (mostly men) and Dominicans (mostly women). In addition, we encountered smaller numbers of Cubans (mostly women), Chinese (men and women), and Guyanese (women and men) working in Suriname. The result for Suriname has been affected by our sampling strategy, which focused on the mobile and migrant populations. We did not conduct interviews in Brokopondo district, where relatively more Surinamese are active in ASM. At a national level, Surinamese men, and some women, have a relatively larger representation in the ASM population as is suggested in Figure 7.

Figure 7. Country of origin of the ASM population, differentiated by sex and work country.



Taisa⁷ (Female *marreteira*, age 32)

Taisa is a Brazilian woman with a warm smile, who came to Suriname about four years ago, with her two young sons, then 3 and 5 years old. Her mother, Iosa, already lived in Paramaribo, where she ran the kitchen of a simple hotel that is often used by Brazilian gold miners when they come to Paramaribo. Iosa had arrived in Suriname about 20 years earlier, leaving her two children, Taisa and her brother, in the care of her own mother to go work in the gold mining areas. She had not seen her children since. Four years ago, Iosa convinced Taisa that life was better in Suriname; she could help Iosa in the restaurant and work in the *garimpos*.

Taisa now works as a traveling vendor, known as *marreteira* in Brazilian Portuguese. She sells cigarettes, cachaça (Brazilian alcohol), perfume, and simple food items. She buys these products in Suriname, where they are relatively cheap, and sells them in the French *garimpo's*, where prices are hugely inflated – and paid in gold. When she travels to French Guiana, she takes about 500 kg of goods with her, which she hides in a hole in the forest. When she travels to a certain mining area, she takes a part of the goods, and the remainder is left behind – out of sight of robbers and gendarmes; the latter will burn everything when they find her merchandise. Taisa pays someone to guard the goods, a practice that is common to protect merchandise against thieves.

Traveling to the mining areas is very expensive, especially in French Guiana where the boat men, ATV drivers, carriers, and other transport providers integrate the expenses of a possible capture by the gendarmes in their price offer. When the gendarmes capture a canoe full of merchandise, they will burn the boat, merchandise, and personal belongings of the passengers (i.e. clothing, toiletries), and destroy the motor in an effort to discourage illegal gold mining in French Guiana. To economize, Taisa stays in the forest for long periods of time; her shortest stay was about 6 months and her longest stay one year and four months. When she runs out of merchandise, Iosa sends a new load her way. During Taisa's stay in the mining areas, her sons stay with her mother and attend elementary school in Paramaribo.

Taisa was now about one year continuously in the French Guiana *garimpo*, when the gendarme discovered the mining operations in the area where she stayed. She and her colleagues ran into the forest to hide, while the gendarme burned their camps. Fortunately, she says, she had already sold everything so the only thing she lost were some clothes. Because of this incident, she decided to return to Paramaribo. There was no other reason, she said; if the police had not been there, she would have asked her mother to send another load. Now that she is in Suriname, she uses the occasion to renew her residency license so that she can legally stay in Suriname. She expects to receive her papers by March and until that time she will stay, with her family.

Taisa knows that she will return to French Guiana, but not to what *garimpo*. At the time of travel she will call some friends for information. This way, she will hear where there is a *fofoca* (*gold rush*), and what area will be most profitable.

⁷ Not her real name

The data suggest that even though both women and men predominantly originate from Brazil, the population of women is relatively more diverse with regard to nationality. There are quite some, and growing numbers of, women from the Dominican Republic and Cuba working in the Suriname ASM sector, and smaller numbers of Chinese, Guyanese, and Venezuelans. Particularly the presence of Cuban women in the Suriname ASM sector is relatively new. All Cuban women in the sample were sex workers and had started work in the ASM sector recently (1-2 years ago). Their presence may be a sign of a new trend that is likely to enter French Guiana as well.

The Dominican women working in Suriname were working mostly as sex workers (16 out of 24), but also performed other jobs such as cook, traveling sales woman, and bar owner, and one Dominican woman was the spouse of a gold miner.

3.3 Cross-border movement

3.3.1 International ASM-related migration to Suriname by air.

The migrant population in the ASM sector of Suriname and French Guiana is dominated by Brazilian nationals. Qualitative interviews suggest that both these Brazilians, and other migrants (Dominican Republic, Cuba, China), initially enter Suriname legally through the Johan Adolf Pengel (JAP) international airport of Suriname.

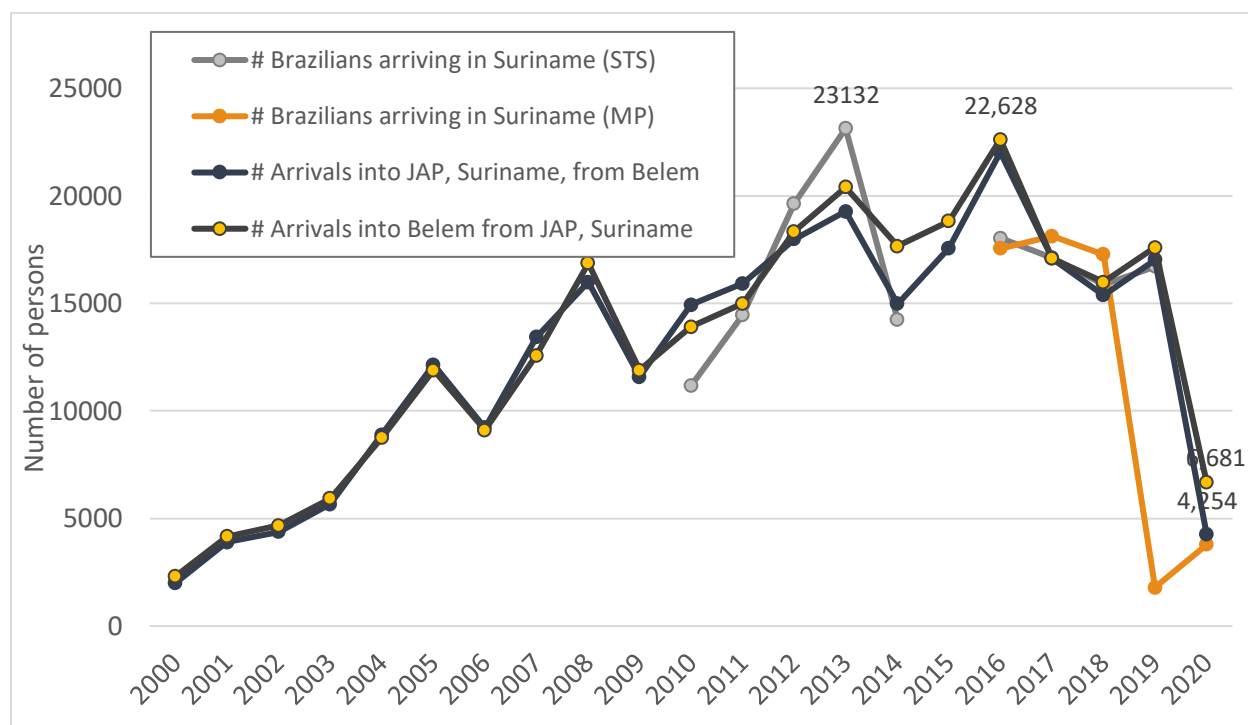
Different institutions provide figures on the annual number of persons entering Suriname from Brazil (see Table 10). Data from the Stichting Tourisme Suriname (Tourism Foundation Suriname, STS) for the years 2020 to 2010 (2015 and 2020 are missing) suggest that in the past decade, a mean number of 14,860 Brazilians entered Suriname annually, with a peak reported number of 23,132 Brazilians in 2013 (Figure 8). The Military Police (MP) records the same data but reports different figures from 2016 to 2020.

International flight data from the IBGE show that annually, between 10 and 15 thousand persons travel from Brazil to Suriname (Figure 8). It is likely that the grand majority of these persons (80-90%) work in ASM-related jobs. Given that (a) a share of passengers are tourists, (b) a share of passengers are active in ASM related jobs but work in Paramaribo, (c) some persons fly multiple times, and (d) a share of persons working in French Guiana *garimpos* travel through Suriname; it may be concluded that Suriname annually receives between 7,000 and 10,000 individuals who work in ASM areas in the Suriname and French Guiana interior.

Table 10: Average numbers of passengers and range (in annual figures) entering Suriname from Brazil at JAP airport

| Average annual number of passengers | Low annual figure | High annual figure | | |
|-------------------------------------|-------------------|--------------------|-----------------------------------|---|
| 14,860 | 11,177 (in 2010) | 23,132 (in 2013) | STS (Stichting Tourisme Suriname) | Average # of annual arrivals from Brazil 2010-2020 in Suriname |
| 11,711 | 3797 (in 2020) | 18,131 (in 2017) | MP (Military Police) | Average # of annual arrivals from Brazil 2016-2020 |
| 16,041 | 4254 (in 2020) | 19,273 (in 2013) | IBGE flight data | Average annual passengers on flights between Belem and Suriname |

Figure 8: Annual arrival of Brazilians in Suriname according to data provided by Stichting Tourisme Suriname (STS) and the Military Policy (MP), and annual number of passengers from and to Brazil as recorded by the Instituto Brasileiro de Geografia e Estatística (IBGE)



The Brazilian Institute of Geography and Statistics (IBGE) tracks flight data between Johan Adolf Pengel (JAP) International Airport and Belem, the main connection by air between Suriname and Brazil. Their data give an annual average of the number of persons arriving on flights from Brazil of 16,041 in the years 2010-2020. A similar number of persons leaves the JAP International Airport annually on route to Belem.

Using the assumption that 90% of passengers traveling from Brazil to Suriname are Brazilians, that about 75 percent of reported passengers are unique cases (i.e. subtracting multiple trips of one person), and that 80%-90% of Brazilian passengers are active in the ASM sector, these figures suggest that annually,

about 9,000 persons arrive from Brazil in Suriname to work in the ASM sector of Suriname and French Guiana.

3.3.2 Entry routes into Suriname

Once migrants with an intention to work in the ASM sector have arrived in Suriname they may decide to either work in Suriname or in French Guiana. Border crossing between these countries typically occurs clandestinely. Table 11 lists information about the most recent time that respondents working in either Suriname or French Guiana had entered Suriname. It appears that the majority of those who work in Suriname had most recently entered Suriname through the international airport. Just over a quarter of respondents working in Suriname had most recently arrived in Suriname by crossing the border with French Guiana at Albina (Marowijne River) or Ronaldo/Antonio do Brinco (Lawa River). Some of these persons had only briefly visited French Guiana, for example to visit a medical post. Particularly for persons working in the Suriname-French Guiana border region (e.g. Benzdorp), the medical posts in French Guiana are perceived as part of the general area in which they move around.

Table 11: Modes of entry into Suriname, the most recent time that the person entered (N=323, only migrants)

| Mode of entry | Suriname | | French Guiana | |
|---|------------|-------------|---------------|-------------|
| | n | % | n | % |
| Crossing the Lawa/Litani River (border French Guiana) | 29 | 18.7% | 94 | 59.5% |
| Plane (JAP airport) | 94 | 60.6% | 8 | 5.1% |
| Crossing the Maroni River at Albina (border Fr. Guiana) | 14 | 9.0% | 51 | 32.3% |
| Crossing the Oyapock River and continue on foot through French Guiana) | 3 | 1.9% | 6 | 3.8% |
| Crossing Oyapock River by car, drive to border, and cross at St. Laurent/Albina | 0 | - | 2 | 1.3% |
| Cross Marowijne river elsewhere (Gakaba, Snesi kondre) | 0 | - | 3 | 1.9% |
| By boat from Brazil to Albina | 9 | 5.8% | 4 | 2.5% |
| By car through Guyana (Boa vista / Roraima – Georgetown) | 6 | 3.9% | 0 | - |
| Total | 155 | 100% | 168 | 100% |

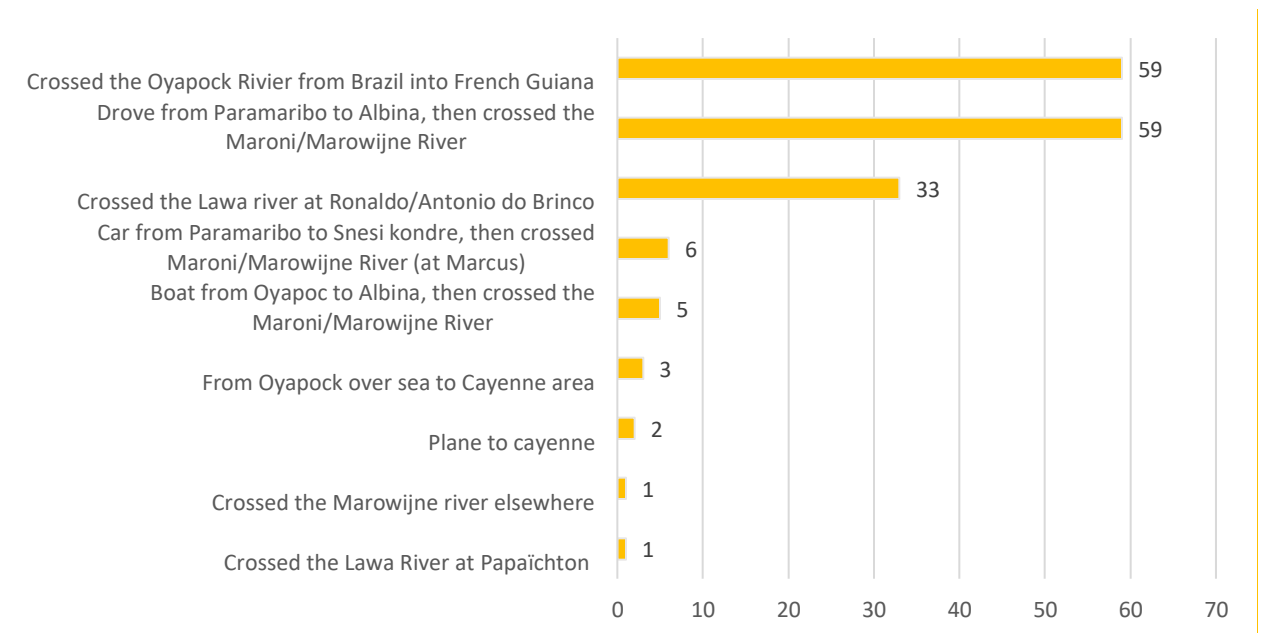
Survey respondents who worked in French Guiana mostly reported entering Suriname the last time by crossing the border with French Guiana. They had crossed at Albina (Marowijne River, 32.2%), at Ronaldo/Antonio do Brinco (Lawa river, 59.5%), or occasionally elsewhere along the Marowijne river (1.9%; N_{total}=168). These figures are largely the result of the fact that people from this target group were largely interviewed in Albina and Ronaldo, and may not accurately represent the way that people working in French Guiana usually enter Suriname. Notwithstanding this potential bias, it is certain that the border with French Guiana is an important entry point for migrants entering Suriname. Smaller numbers of migrants entered Suriname by car through Guyana or by boat from Oyapock (Border Brazil-French Guiana) across the sea to Albina (Table 11).

3.3.3 Entry routes into French Guiana

No single interviewee who was working in the ASM sector in French Guiana was born in this *Departement* of France, indicating that all have crossed the border into French Guiana in some way. Individuals working in the ASM sector in French Guiana were asked how they had entered French Guiana *the first time* that they had traveled there to work. Slightly under two-thirds of respondents had entered Brazil through Suriname (62.1%, $N_{total}=169$; Figure 6)⁸. Most of these people had first taken a plane from Brazil to the Johan Adolf Pengel (JAP) international airport of Suriname. From there, they had traveled to Paramaribo. From Paramaribo, they had taken a car to Albina or Marcus/Snesi Kondre, to cross the Maroni/Marowijne River, or a domestic flight to Tabiki to cross the Lawa River –usually at Ronaldo/Antonio do Brinco. A smaller share of persons had first taken a boat from Oyapock (municipality in Brazil), across the Atlantic Ocean, to Albina, and from there crossed the border (3% of those working in French Guiana, $N_{total}=169$).

Brazilians who work in the *garimpos* of eastern French Guiana, or those who want to work in western French Guiana but do not have the funds to buy a plane ticket to Paramaribo may also simply cross the Oyapock River to enter French Guiana from the east (Figure 9). These gold miners and mining service providers typically cross the Oyapock River at Ilha Bela/Vila Brazil (south) or Saint George (north). Because most ASM activity is concentrated in the west of French Guiana, persons taking this route may still need to travel quite some distance to their final destination. Various individuals mentioned that they had walked one or two weeks through the forest to reach the *garimpo* where they wanted to work. For a map that provides a comprehensive overview of the presented data on international migration routes of persons working in the ASM sector to Suriname and French Guiana, see Figure 10.

Figure 9. Point of entry into French Guiana, the first time the person entered French Guiana to work in the *garimpo* ($N_{total}=169$)

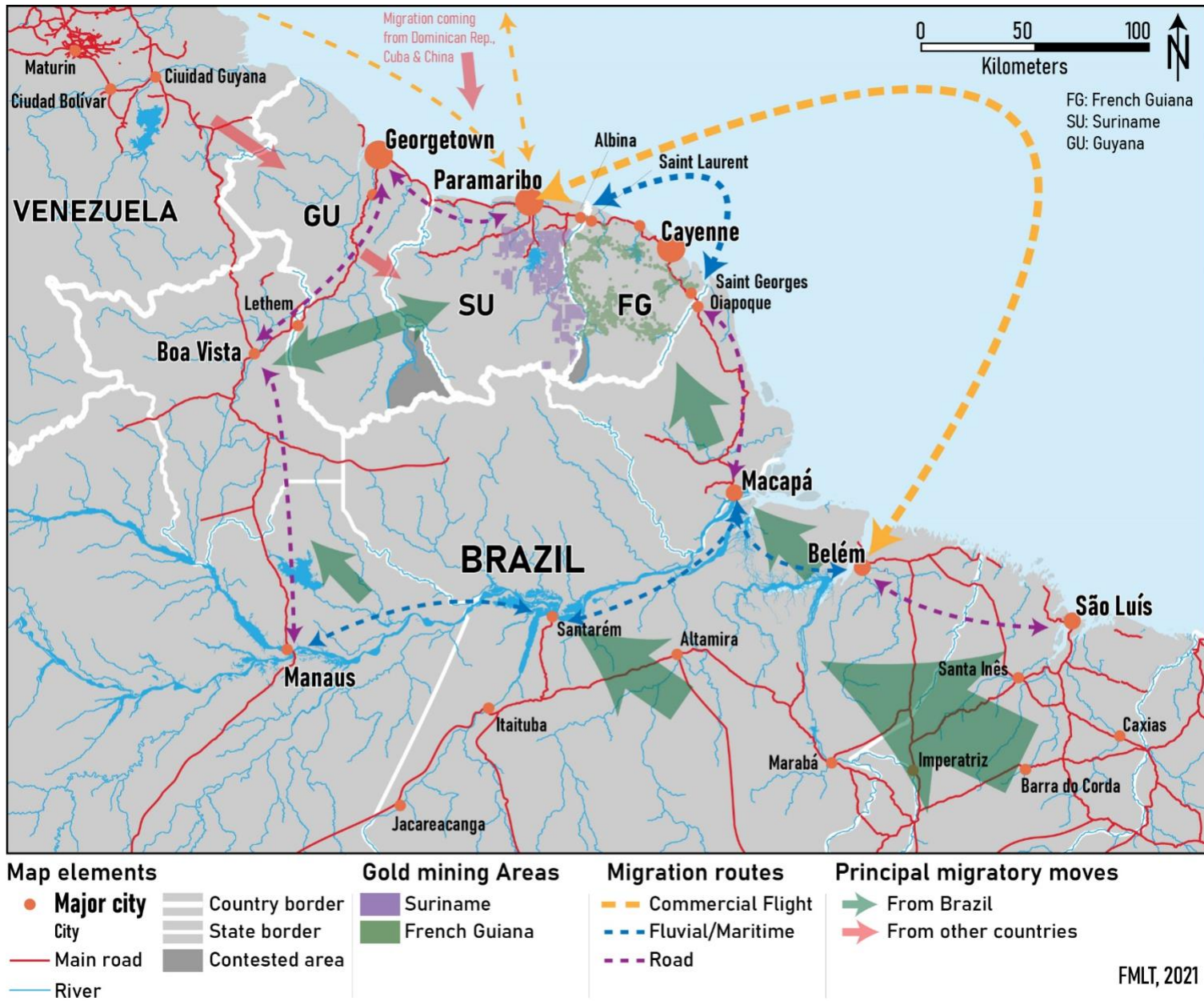


⁸ It is likely that this figure slightly inflates the trough share of persons working in French Guiana who entered through Suriname, because the interviews were conducted in Suriname.

When asked about *the most recent time* that *garimpeiros* and ASM service providers had entered French Guiana, a much larger share reported that they had entered from Suriname; mostly at Ronaldo/Antonio do Brinco (59.2%) but also through Albina (36.7%). This result is likely affected by the fact that the survey was conducted in these places. Nevertheless, the statistical figures, combined with qualitative data, suggest that many persons working in French Guiana, once they have entered the ASM sector, do not often return home, but rather continue to live and work in the general Suriname-French Guiana region.

Migrant from other countries (Dominican Republic, Venezuela, Cuba) who work in the French Guiana ASM sector all entered French Guiana through Suriname.

Figure 10. International migration routes of persons working in the ASM sector in Suriname and French Guiana



FMLT, 2021

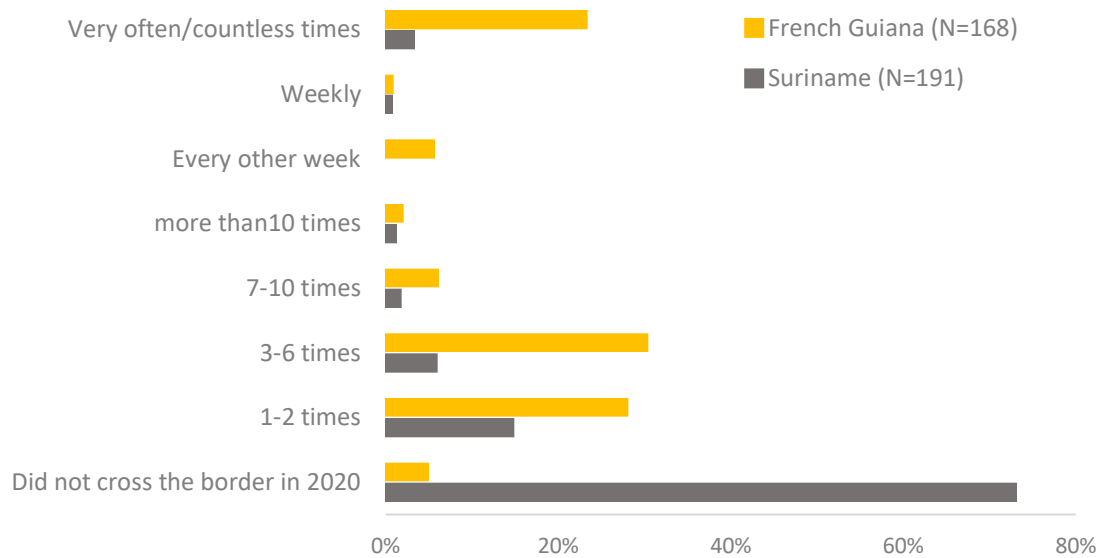
Source: Map produced by François-Michel Le Tourneau for this report

3.3.4 Cross-border movement between Suriname and French Guiana

Of particular interest in the context of the provision of health services to mobile migrant ASM population is cross border movement. In fact, one of the reasons to cross the border from Suriname to French Guiana is seeking health care. As a *Département* of France, French Guiana hospitals (e.g. Maripasoula, St. Laurent, Papaïstou) offer a level of health care that, gold miners believe, is superior to the health care one will receive in Suriname. The clinics and hospitals are better equipped and the largest share of medical staff is French – which also facilitates communication with the Brazilian ASM population. Moreover, obtaining health care in French Guiana is largely free of charge. Indeed, as explained on the French Government InfoMigrant website: “In France, migrants without papers [...] have the same rights to access the medical system as any French citizen. AME (state medical aid) helps those without papers with the financial costs, offering means-tested reimbursements for some of the costs depending on a person's residence status and financial means” (2019). In the experience of those working in ASM on either side of the border, when you visit a french hospital you may have to wait a while for your turn, but you will be helped in a professional manner and without pay. In the words of one garimpeiros; the wait is OK, because “after all, we do not pay taxes there”. This leads to the paradoxical situation where, on the one hand, French authorities are chasing garimpeiros and French law prevents the provision of malaria detection and treatment in mining areas (Nacher et al., 2013) while, at the same time, the undocumented mobile migrant population in both French Guiana and Suriname seeks free health care in French Guiana when they are ill, injured or pregnant.

The data presented in Figure 11 suggest significant differences between those working in Suriname and those working in French Guiana with regard to how often they cross the borders between these countries (Figure 11). Among those working in Suriname, 72.9 percent did not cross the border to French Guiana at all in 2020 ($N_{total}=168$). Particularly persons working at some distance from the border region have little reason to travel to French Guiana, other than visiting medical services. Those who did cross the border mostly did so incidentally; 1-2 times (14.6%) or 3-6 times (5.7%) in the year 2020. The majority of those who had crossed the border were working in the Benzdorp general area, specifically in and around Ronaldo/Antonio do Brinco. They crossed the border to French Guiana to visit the hospital in Maripasoela, which offers the nearest by medical services. Very few persons who named Suriname as their primary working location had traveled to French Guiana ‘very often’ in the past year (3.1%).

Figure 11: How many times did the person cross the border from Suriname to French Guiana in 2020



The situation is different for those working in French Guiana, though –again- this finding has been skewed by the fact that those working in French Guiana were interviewed in Suriname. They were not necessarily the “typical” *garimpeiros* working in French Guiana. Among those working in French Guiana, 23.1 percent had crossed the border from Suriname to French Guiana countless times in 2020 ($N_{total}=168$). Their movement was usually work related. These people included *burinhos* (porters) carrying loads of goods, and boatmen bringing people and freight, from Suriname supply areas to French Guiana *garimpos*. On the other hand, one third of those working in French Guiana had crossed the border only 1 or 2 times (27.8%) or not at all (4.7%; $N_{total}=168$).

3.3.5 Problems with authorities during migration

Crossing the border between Suriname and French Guiana is illegal without the proper documents. Virtually none of the migrants working in the ASM sector in French Guiana or Suriname can legally enter both countries. It is surprising therefore, that with the continuous border crossing, virtually no-one had encountered problems with border authorities of either countries. People even crossed without problems during the COVID-19 pandemic, when border patrols were increased to prevent the spread of this disease.

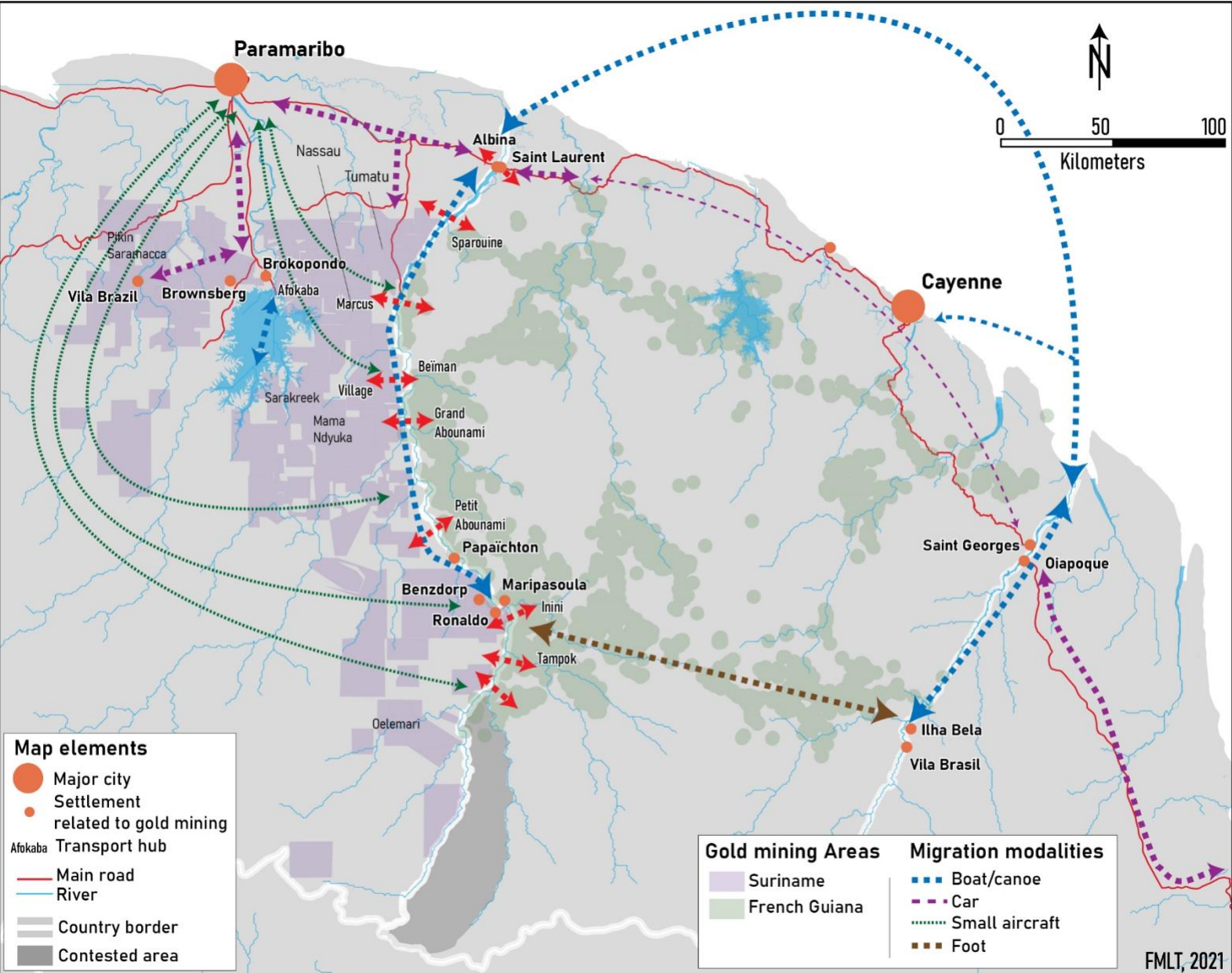
Only six persons (1.9%) reported problems the most recent time they crossed a border to Suriname (from any country) ($N_{total}=320$). These problems ranged from a drunken captain and overcrowded boat, to bribes paid to the police (200 euros), destruction of property by police, apprehension by police, and forced quarantine as a result of COVID-19 policies. One respondent reported problems with the police despite all his papers being in order.

Similarly, only seven individuals (3.3%) had run into trouble the most recent time they had crossed the border to French Guiana, mostly from Suriname ($N_{total}=315$). Six of them reported problems with the gendarme/police, and one person experienced that the dugout canoe capsized.

3.3.6 Mapping migration to and within Suriname and French Guiana

The data presented in this chapter on international migration routes are illustrated in two maps: Figure 10 illustrates the international migration routes, whereas Figure 12 below displays migration routes within Suriname and French Guiana. Both maps display three principal routes. For international migration, there is the historical flow of ASM workers originating from Brazil, either by air from Belem to JAP airport or by land and boat to Albina, or land and car, through Boa Vista and Guyana to Suriname. The second route is a more recent one, originating from Venezuela by way of Guyana, mostly by bus or car. Lastly, ASM MMP originating from further away arrive by air at JAP, principally from the Dominican Republic, Cuba, and China. Once in Suriname, they continue their route either by car if their place of work is in Brokopondo area, or by car and boat for Lower Marowijne, and small plane and boat for Upper Marowijne.

Figure 12. Travel routes of artisanal and small-scale gold miners and mining service providers within Suriname, and between Suriname and French Guiana



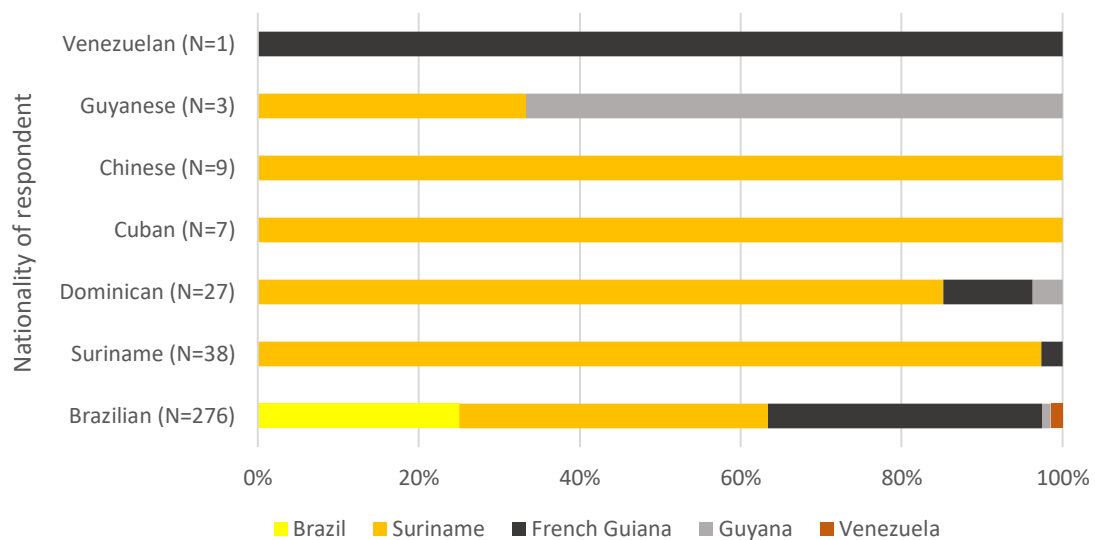
Source: Map produced by François-Michel Le Tourneau for this report

3.4 Mobility: Choosing and changing work locations

3.4.1 Selecting a country to work

Respondents were asked in what country they had started to work in the ASM sector (Figure 13). Again, there are significant differences between persons from different countries. Brazilians display the largest diversity in terms of countries where they started to work in gold mining, and they are the only group that includes persons who started working in Brazil. All Chinese, all Cubans, and all but one Surinamese had started working in gold mining in Suriname. Two Guyanese, one Dominican and three Brazilians had started their ASM career in Guyana.

Figure 13. Where did the person start work in the ASM sector ($N_{total}=361$)



In contrast to the popular image of *garimpeiros* crisscrossing the Amazon in search of gold, we find that changing work country is not very common. Two-thirds of Brazilians had only worked in one country (64.9%) and almost all other Brazilians (33%) had worked in two countries in the five years preceding the interview ($N_{total}=276$). The Venezuelan woman, all Cubans and Chinese, and 89.5% of Surinamese had only worked in one country in the past five years. The Dominicans and Guyanese in the sample had worked in either one or two countries. Only 1.7% of survey respondents had worked in three different countries in the past five years, and only one person (0.3%) in four countries ($N_{total}=361$).

3.4.2 Selecting a place to work

Gold miners and ASM service providers were asked what had motivated them to select the work location where they were working at the time of the interview. We observe differences between persons working in Suriname as compared to French Guiana ASM areas (Table 12). In both countries, reports of the quantity of gold to be found is most often named as a reason to select a work location. Nevertheless, while about half of persons working in French Guiana are primarily motivated by money, this is the case for only a quarter of inhabitants of ASM areas in Suriname. Another 16% of those working in French Guiana ($N_{total}=169$), and 12% of those working in Suriname ($N_{total}=191$), named the amount of gold and potential earnings as a secondary reason.

The broader social network plays an important role in selecting a place to work, especially in Suriname. One out of every five persons working in Suriname had found a place to work based on recommendations from others, either as the principal (19.3%) or secondary (3.6%) motivation. Relatively fewer of those working in French Guiana had relied on recommendations from others (14.2%, $N_{total}=169$). Those working in Suriname also were relatively more likely look for a place to work jointly with their husband or other family members (mother, brother, cousin). Four persons working in French Guiana insisted that the proximity of work friends was important. One man explained:

As garimpeiro it is important to work with people that you know well. You do not have family to help you when you get ill.

Furthermore, familiarity with the location was mentioned by about one out of every six persons working in Suriname and French Guiana as a primary or secondary motivation to select a work place (resp. 16.2%, $N_{total}=191$; and 17.1%, $N_{total}=169$).

Table 12. Primary reason to select the working location where the person is working at the moment

| | Suriname | | French Guiana | |
|---|----------|--------|---------------|--------|
| | n | % | n | % |
| I heard earnings are good here; I go "after the money". | 52 | 27.1% | 81 | 47.9% |
| Someone offered me a job | 40 | 20.8% | 27 | 16.0% |
| Recommendation of others | 37 | 19.3% | 16 | 9.5% |
| I already went here before, knew the location | 17 | 8.9% | 22 | 13.0% |
| it is a peaceful place/ no problems here | 19 | 9.9% | 7 | 4.1% |
| Location; close to the home community/city/supply sites/clients | 4 | 2.1% | 7 | 4.1% |
| Husband works in this location | 8 | 4.2% | 1 | 0.6% |
| Family members already worked here | 7 | 3.6% | 1 | 0.6% |
| Other | 8 | 4.2% | 7 | 4.1% |
| Total | 192 | 100.0% | 169 | 100.0% |

Relative comfort also plays a role, again, primarily in Suriname. Inhabitants of Suriname ASM areas are about three times as likely as those working in French Guiana to choose places they expect to be peaceful: 14.6% of people working in Suriname named this as a principal or secondary reason to pick a work place, versus 5.3% of those working in French Guiana. In addition, different individuals in both countries referred to the geographic location of the site that provided some comfort by being close to the city, the traditional home community, supply sites, or clientele for offered services.

‘Other’ motivations to choose for a work location were diverse. A sex worker had selected her current work location because it was “clean, and they take good care of you“. A young Maroon man explained that his grandfather was the traditional rights owner of the area, and he was helping his grandfather by

collecting percentage shares from the mining teams. A Chinese store owner commented that he looked for a place where the security situation is good (no robberies) and where there are sufficient people in the area to sell to. And a Brazilian man lamented that he was still waiting for a payment from his boss, so he was stuck at the place.

3.4.3 Leaving a work site

Changing work sites is also partly motivated by push factors. The principal reason to leave a work site is, both in Suriname and in French Guiana, the fact that there is no or too little gold (Table 13). For 38.1% of respondents, scarcity of gold had been the *only* reason to leave their previous work site (N_{total}=358).

Table 13. Primary reason to leave the previous working location

| Primary reason to leave the previous working location | Suriname | | French Guiana | |
|---|----------|--------|---------------|--------|
| | N | % | N | % |
| There was no/too little gold | 83 | 43.5% | 82 | 49.1% |
| Too many problems with the gendarme/authorities | 12 | 6.3% | 22 | 13.2% |
| In my profession you have to move location frequently | 9 | 4.7% | 18 | 10.8% |
| We were removed from that place | 6 | 3.1% | 12 | 7.2% |
| Problems with other gold miners | 6 | 3.1% | 4 | 2.4% |
| ik wilde dichterbij mijn familie/gezin werken | 4 | 2.1% | 3 | 1.8% |
| Payment problems/Conflict about payment | 4 | 2.1% | 1 | 0.6% |
| Other reasons | 36 | 18.8% | 13 | 7.8% |
| N.A., I never changes working locations | 31 | 16.2% | 12 | 7.2% |
| Total | 191 | 100.0% | 167 | 100.0% |

National law enforcement authorities also are responsible for the mobility of inhabitants of ASM areas. Particularly in French Guiana, problems with the gendarme /authorities and forced removal rank high among reasons to leave an area. One out of every five respondents named eviction or other problems with law enforcement as either a primary or secondary reason to leave a work place (N_{total}=358). Problems with other gold miners or with the mine operator/boss had motivated another 2.8% persons to leave their previous work location (N_{total}=358).

In some cases, it is simply the nature of ones work that motivates persons to move frequently. Sex workers, for example, mentioned that they stayed only 2-3 months at a location before moving, as clients of cabarets want to see new faces. Also porters and *mareteiros* (traveling sales persons) also tend to move around quite a bit. They are more mobile than gold miners, and once they have served clients in one area, they may move to the next. Three Chinese store owners mentioned the safety situation and armed robberies as a main motivation to leave a place. One of them had been assaulted four times when he decided to leave the place.

Under the label “other reasons’ people named a wide variety of motivations to move. A couple of persons were unhappy with the working conditions, usually the payment terms (N=5) or food (N=3), for example;

There was too little food. The place was run by a Suriname man and the food was poor (Brazilian man, gold miner, age 31)

There was a Chinese employer and the percentage he paid was too low
(Suriname man, gold miner, age 23)

We worked longer hours for much less pay than what we receive here
(Suriname man, gold miner. Age 35)

Others wanted to move closer to friends or family, just try something new, had separated from a partner, or had left because of poor health conditions.

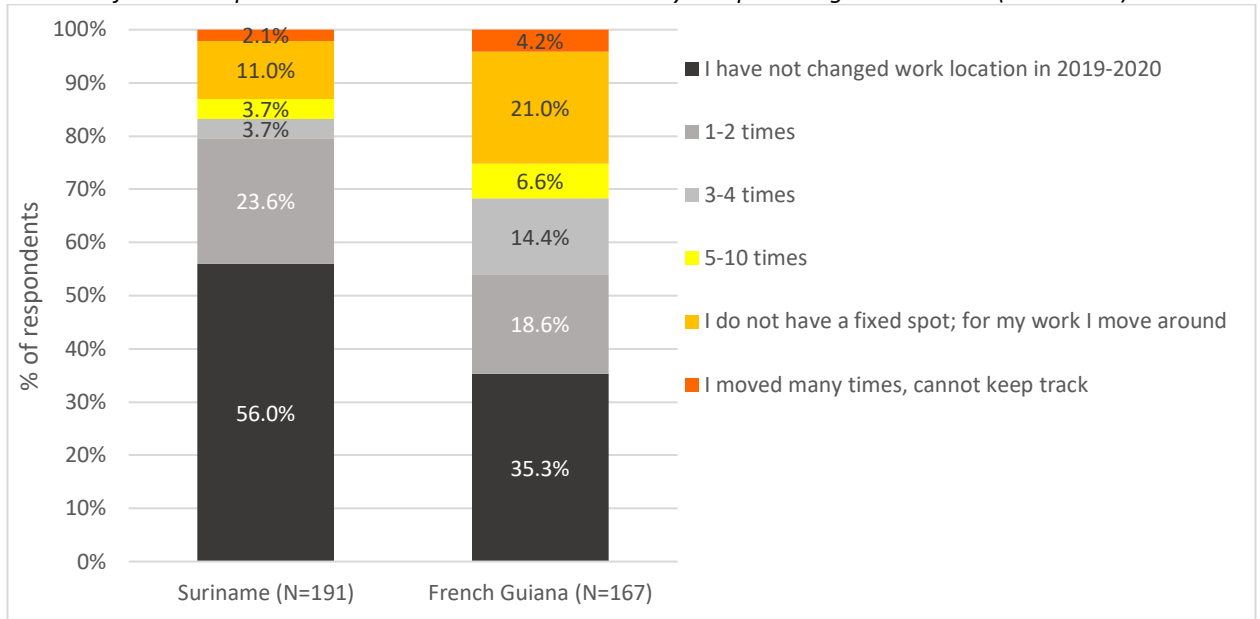
3.4.4 Frequency of changing work locations

About half (46.4%) of the surveyed population had not moved their place of work in the past 2 years (2019 and 2020; $N_{total}=358$). As compared to those working in French Guiana, people working in Suriname were much more likely to stay at the same location during the two years preceding the interview (35.3%, $N_{total}=168$ vs. 56%, $N_{total}=191$, Figure 14). This observation can be explained by the continuous pressure of the French authorities on illegal ASM sites, which forces *garimpeiros* to move.

Another 16.8% of those working in Suriname, and 7.8% of those working in French Guiana had only moved work place once in the past 2 years (resp. $N_{total}=191$ & $N_{total}=167$). In Suriname, only one out of every five persons had moved work location more than twice in the past two years (Figure 14). Moving more than twice is more common for those working in French Guiana; about one third of this population had moved five or more times (6.6%), had moved so often that they had lost count (4.2%), or had been continuously on the move (21.0%; $N_{total}=167$). There was no difference between women and men in their propensity to move work locations.

The data reveal that occupation affects people’s mobility. Gold miners (55.5% of all *porcentistas* surveyed, $N_{total}=135$) and equipment owners (77.3% of all machine owners, $N_{total}=22$) were relatively likely to report one or less changes of work location, whereas 72.4% of surveyed sex workers ($N_{total}=29$) and 50% of porters (*burinhos*, $N_{total}=6$) reported being constantly on the move. Other professions that often reported no movement in the past 2 years were shopkeepers (90.0%, $N_{total}=10$) and store clerks (80.0%, $N_{total}=5$), cooks (48.5%, $N_{total}=33$), brothel owners (80%, $N_{total}=5$), mechanics (75%, $N_{total}=4$) and wives of *garimpeiros* (77.8%, $N_{total}=9$). The story of Antonio (Box II) illustrates the motivations to change work locations, or to stay.

Figure 14. Number of times the person moved work locations in the two years preceding the interview (2019-2020)



BOX II. Antônio, motoqueiro, age 33 (ATV driver)

Antônio comes from a small village in the poor, Northeastern state of Maranhão. His father used to be a *garimpeiro*; he worked in the famous mine Serra Pelada. In 1984 Serra Pelada was closed, and he stopped working in the *garimpo*. For Antônio, there were not many opportunities in the village. His family was poor, he did not go to school much and he did not have work. He had heard about Suriname because people from his region talked about it.

Brazil also has *garimpos*, even in the state where he lived, Maranhão. However, experienced gold miners advised against going there. In the first place, the Brazilian *garimpos* were known for the high frequency of malaria. Moreover, in Brazil one cannot work “freely”. In Suriname, he explained, if you have a mining equipment, you can place it in an area and start working. But in Brazil only the large companies are allowed to work. *Garimpeiros* are considered illegal and have to work secretly. When you are discovered, the police destroys your material and you will go to jail. In the village there was a lot of talk about Suriname; people said that here in Suriname, the police is not difficult. Moreover, the *garimpo* in Suriname is healthy; while in Guyana and in French Guiana there is a lot of malaria. Furthermore, in French Guiana, people had warned him, work is dangerous; many people are killed there, either by bandits or in personal conflicts. Suriname was presented as peaceful and healthy.

So he left Brazil and arrived at international airport Zanderij Suriname on the 11 of January, 2010. In Paramaribo, Antônio soon found someone to work with. Equipment owners who need workers often go to the city; they ask around in hotels where Brazilians stay, talk with the hotel owner if he has heard about someone searching to work, or they may leave their number. With this *dono de máquina*, Antônio started working at Km 32, along the road to Atjoni. He only stayed there for four months; there was not much gold. He moved to Afobakka, and went to work for a Chinese equipment owner who was mining near the hydropower dam. He only stayed for 2 months; again because there was too little gold. When you search for a place to work, the bosses always say there is a lot of gold, but they lie about it, he says.

After he left Afobakka, he went to Paramaribo and then moved on to French Guiana, where people say there is more gold. He went as *porcentista* (a worker earning a percentage) to Sparouine. The gold there was good. Some of mining areas there earn much more than here in Suriname. He worked there for 4 months and then went to Paramaribo because he wanted to start something for himself. He bought a metal detector, and returned to French Guiana. He started working in an area along the road from Cayenne to Brazil. He worked here with two other *pewpewzeiros*, one of whom lived in Cayenne.

They found some gold there, but it was difficult. He did not have a car, it was difficult to buy food, and after two month he had enough of it. He decided to return to Brazil, and went to work in a *garimpo* in Amapa. It was one of the hidden *garimpos*. He worked there from January 2011 through March 2013, without leaving the mining area. He contracted a lot of malaria there; in these two years, he tested positive for malaria 31 times with SUCAN (Brazilian government malaria program) health workers. He tested, took the medication, went back to the mining area, and immediately fell ill with malaria again. Once he was hospitalized for a week, and another time for three days. The health worker told him he had to leave the *garimpo*. And, because of the malaria, which left him more dead than alive, he left.

On March 13, 2013, he entered French Guiana again. Now he started to work as “socio”; the partner of the equipment owner in a mining operation. They had a milling operation. He only stayed 8 months, when he returned to Maranhão, to spend the holidays with his family there. In February 2014, he left there again, and travelled to Suriname. In April, just 2 months after he had come back, he met his current wife

Maria in Koemboe creek, a mining area near Brownsweg. They have been together since. In June 2014, they left Koemboe creek together and went to work in Tjilipasi, south of the hydropower lake, until the end of that year. They spend two months in Paramaribo, and the remainder of 2015 in a *garimpo* in Brokopondo district. Finally, in 2016, they went to a *garimpo* named Moro de Macaco (Monkey mountain), where they were still in December of 2020.

In Moro de Macaco, Antônio earns an income as an ATV driver, and the couple has settled down. They have a son now, who will have to start pre-school in the upcoming academic year. At that point in time they will have to decide if they will leave their child in the care of someone else, or if Maria will move to Paramaribo with their child. He would like to stay in this area for another 5 years.

Antônio never bothered to ask for residency status. He thought he would stay for only 1 or 2 years. But then his passport expired and he just let it slip. He is planning to change this though, because he has a wife and a son now, and his wife does have permanent residency in Suriname. In order to request a passport, Antônio already called the Brazilian embassy to make an appointment.

In the past 6 years, neither Antônio nor Maria have visited their families in Brazil. Nevertheless, contact is frequent. Antônio regularly sends money for his two children and for his parents in Brazil; not every month, but certainly every six to eight weeks. Many people in Maranhão live from the money from Suriname, he says. One and a half year ago, his brother also came to Suriname and now he can also help their parents. Among others, Antônio sent his mother money to build a house for herself. She does not get a state pension, and during the entire time that he has been in Suriname, she has lived of the money he has been able to send home. This is the case for many people in Maranhão, he explains; because of the money they receive from Suriname they can buy the basics or have a just a little bit better life.

3.4.5 Taking a break: leaving the *garimpo*

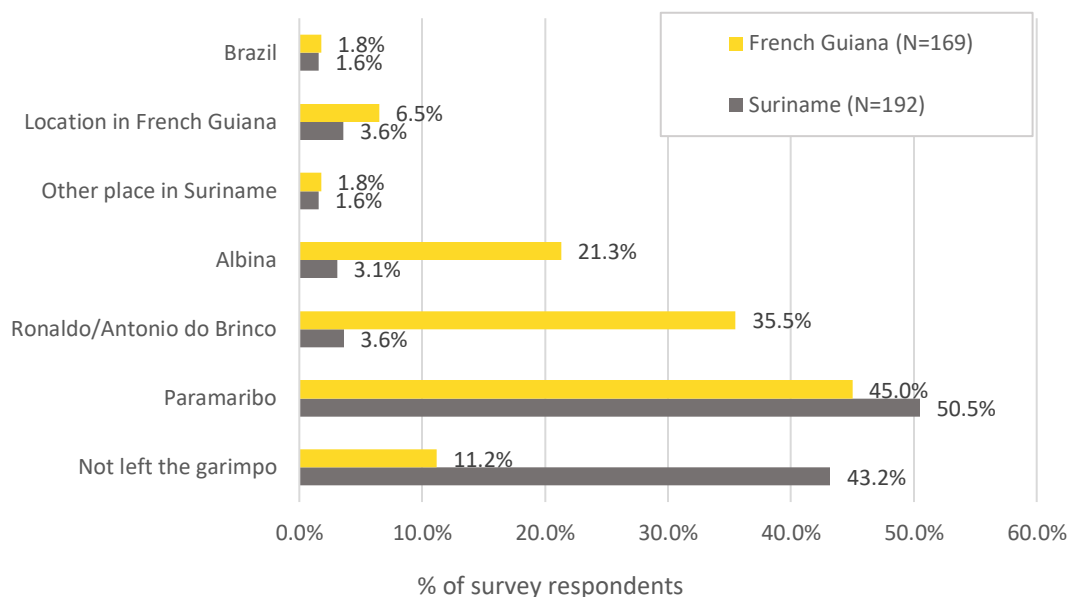
Respondents were asked if, in the past year 2020, they had left their work location in the *garimpo* for more than a week. 28.3 Percent of respondents reported that in 2020, they had not left their work site at all ($N_{total}=361$). It is possible that the COVID-19 played a role in some of these cases; some persons are convinced that there is no Covid in the gold mining areas, and hence they did not want to leave the forest (see Section 3.5).

Again, we find substantial differences between those working in Suriname, among whom 43.2% had not left the *garimpo* in 2020, and those working in French Guiana, among whom only 11.2% had stayed in the mining areas for the entire year (Figure 14). Qualitative information suggests that this difference may be explained by the fact that Suriname *garimpos* are more like home for people. There are persons who stay in the ASM location for many years in a row and have built a rather comfortable place there. They have less reason to leave the mining area than persons working in French Guiana, who are constantly running from the gendarme and living a more stressful life. There was no difference between women and men in their likelihood to leave the *garimpo* area for a week or more.

Regardless of their work location, those leaving the *garimpo* most often went to Paramaribo (47.9% of total, $N_{total}=361$). People who worked in the ASM sector in French Guiana often did not travel so far though, and frequently stayed right at the border, either in Ronaldo/Antonio do Brinco (35.5%) or in Albina (21.3%, $N_{total}=169$). Fewer persons had traveled to another place in Suriname (home/village outside

of Paramaribo), a location in French Guiana (Mostly St. Laurent, but also Maripasoula, Cayenne and Camopi) or Brazil (Manaus, Maranhao, Belem, etc.) (Figure 15).

Figure 15. Where did people go when they left the garimpo for at least a week in the year 2020.



The mean reason to leave the mining area for a week or more is simply to take a break from work, followed by buying supplies (Table 14). Women were more likely than men to leave to buy supplies, possibly because they are relatively more often working in service jobs. For *porcentistas*, everything they need is provided for by the equipment owner.

Table 14. Reasons to leave the garimpo for at least one week in 2020

| Reasons to leave the <i>garimpo</i> for at least one week | Suriname (N=109) | French Guiana (N=150) | Men (N=181) | Women (N=78) |
|---|------------------|-----------------------|-------------|--------------|
| Just a break, rest | 44.0% | 53.30% | 51.9% | 43.6% |
| Buy supplies | 33.0% | 41.30% | 30.9% | 53.8% |
| Medical reasons | 15.6% | 23% | 16.6% | 26.9% |
| visiting partner, children or family | 32.1% | 12% | 23.8% | 12.8% |
| Activities of the gendarme/police | 0.9% | 11.30% | 7.7% | 5.1% |
| Celebrations, family affairs, church | 4.6% | 1.3% | 3.3% | 1.3% |
| Find other work location | 2.8% | 0.0% | 0.6% | 2.6% |
| Send money home | 1.8% | 0.0% | 1.1% | 0.0% |
| Other | 4.6% | 5.3% | 5.0% | 5.1% |

Women were also more likely than men to leave the *garimpo* for medical reasons. This finding is in line with studies that suggest that women are, all other things being equal, typically more likely than men to be concerned about health issues and/or to see a doctor. Persons working in Suriname were more likely than those working in French Guiana to leave the *garimpo* to visit their spouse and/or children. We do not have a proven explanation for this difference, but it can possibly be due to the fact that it is more difficult and expensive to enter and leave the *garimpo* in French Guiana. Not surprisingly, activities of the gendarmerie/law enforcement have relatively more impact on work continuity in French Guiana than in Suriname (Table 14).

3.5 Other mobile and migrant populations in Suriname

In addition to inhabitants of ASM areas, there are several other migrant and mobile populations that are relevant for health monitoring in the Suriname interior. The main groups are the highland Indigenous peoples, Maroons, Guyanese working in the interior, and migrants (mostly Asians) in the logging industry. We discuss these groups and their migration movements briefly, and summarize their characteristics in Table 15 below.

3.5.1 Highland Indigenous peoples

The main tribal groups of highland indigenous peoples in Suriname are Trio (also: Tiriyo or Tarëno) and Wayana. There is a smaller group of Akurio, but they do not have villages of their own. In addition, in the Trio and Wayana villages live numerous individuals belonging to other Indigenous groups. Up to the early 1960s, the highland Indigenous peoples were nomadic people, whose territory stretched across South Suriname, Southwest French Guiana and North Brazil, with little regard for national borders.

Nowadays these groups have settled down in semi-permanent villages, but forest tracking continues to be essential to their livelihood strategy, culture, and establishment of a social environment. It is not uncommon for Trio families to walk through the forest to Missão Tiriyo, a large Trio community across the border in Brazil. Trios may visit relatives in Brazil, attend gatherings, or simply move for a couple of years. Likewise, the Wayana in Suriname have strong connections with the Wayana in French Guiana. Individuals and families commonly cross the border into French Guiana, much like the Trio visit Brazil. In addition. In the absence of Suriname schools in the Wayana frontier area, Wayana children from Kawemhakan (Anapaike) and surrounding settlements typically attend school in the Wayana villages across the border. An additional reason to go to French Guiana, for both Wayana and Trio, is that there are jobs on that side of the border that pay in Euro, many times the wages that may be earned in Suriname. Suriname Indigenous peoples cut agricultural fields, and perform other manual labour for people – often relatives – in French Guiana.

3.5.2 Lowland Indigenous peoples

Lowland Indigenous peoples populate the coastal areas of Suriname and French Guiana. In the Suriname coastal district of Marowijne, which borders French Guiana, Indigenous peoples live in six Kaliña villages – Christiaankondre, Langamankondre, Pierrekondre, Bigiston, Erowarte and Tapuku; and two Lokono villages – Marijkedorp and Alfonsdorp. In French Guiana, along the northern stretch of the Maroni River, the Kaliña have their most prominent presence in the province (commune) of Awala-Yalimapo, where one finds the Kaliña villages of Awala (town hall), Yalimapo, Ayawande, and Piliwa. The only Lokono village along the Maroni River is the small settlement of Balaté, situated in the province of St. Laurent –du-

Maroni. There are strong family and social relations between the Kaliña and Lokono on both sides of the border, and members of these groups visit each other frequently for social or economic reasons. Even more than in the south, the availability of jobs that pay in Euro's, and a market for agricultural produce that pays in Euros, are among the economic reasons to cross the border.

Table 15. Non-mining mobile and migrant populations in the Suriname interior

| Type of population (ethnicity) | Population size | Location | Direction of mobility | Driving forces | Sources (year) |
|--|------------------------------|---|---|---|---|
| Maroon population; Ndyuka, Saamaka, Paamaka and Aluku. | 50,000 | Suriname interior | Between Suriname and French Guyana, along the Lawa (Aluku, Nduka) and Marowijne (Ndyuka, Paamaka) Rivers. | Family visits, social events, trade, medical care, and employment. In some areas, Suriname | Heemskerk, 2019, Price 2002 |
| | 60,000-100,000 | French Guyana | Saamaka people do not have traditional communities along the border rivers. | Ndyuka (Aukaners), Paamaka and Aluku (Boni) children who live in the border area with French Guyana attend school in French Guiana. | Richard and Sally Price, 2021, Bellardie and Heemskerk, 2019b |
| Trio (Tarëno / Tirïyo) indigenous population | 1,500 | South Suriname | Between Suriname and Brazil (Missão Tiriyo). | Family visits, social gatherings, barter. | Heemskerk and Delvoye, 2007 |
| Trio (Tarëno / Tirïyo) indigenous population | 1,464 | Northern Brazil in border lands w. Suriname | Between Suriname and Brazil | Family visits, social gatherings, barter. | Nankoe, 2017; |
| Wayana Indigenous population | 523 | Southeast Suriname | Between Suriname and French Guiana, across Lawa River (South). | Family visits, social gatherings, barter. Suriname Wayana children also attend school in French Guiana | Heemskerk et al., 2007 |
| Wayana Indigenous population | 1,500 | Southwest French Guiana | Limited movement to and from Brazil | | Bellardie and Heemskerk, 2019a |
| Kaliña and Lokono Indigenous population | 2,000 | Galibi/ Marowijne | Mobility between Suriname and French Guiana, across Marowijne river (North) | Family visits, social gatherings, employment | Zaalman et. Al, 2006 |
| Kaliña and Lokono Indigenous population | 3,000 Kaliña 1,500 Lokono | French Guiana | | | Bellardie and Heemskerk, 2019a |
| Asian migrants (Filipinos, Malaysians, Chinese, Indian) and few Brazilians | 500- 1,000 | North-Central Suriname | Between home countries and Suriname | Logging industry | SBB, 2021, personal communication |

3.5.3 Maroons

Historically, the Aluku were the only Maroon group which, as a tribal group, resided in French Guiana. Living on the French banks of along the Lawa River, they also consider the Suriname banks of the river as part of their tribal territory. Meanwhile up to the 1980s, the Ndyuka and Paamaka lived primarily in Suriname, along the Tapanahoni and Marowijne Rivers. On their turn, they considered the French banks of the Marowijne River, and the lower end of the Lawa, as part of their tribal territory, where they claimed customary rights to hunt, fish, cut wood, and establish agricultural camps (Bellardie and Heemskerk, 2019b).

Migration of Suriname Maroons to French Guiana has occurred in different waves (Price and Price, 2021). In the mid-20th century, construction of the *Centre Spatial Guyanais* in Kourou drew many Suriname Maroons to French Guiana. The Saamaka dominated the Maroon work force, but also substantial numbers of Ndyuka and Aluku were among them. During Suriname's interior war (1986-1992), a large number of Maroons fled to French Guiana, and many stayed after the conflict ended. As the socioeconomic position of Suriname worsened in the 21st century, many more Maroons migrated to French Guiana, attracted by European level social benefits, wages, medical care and education. As a result, today about half of the regional Maroon population may live in French Guiana. There is a strong connection between Suriname and French Guiana Maroons, and people regularly cross the border to visit family and attend rituals, festivities and funerals.

Apart from social reasons, there are economic, health and educational reasons to travel back and forth between Suriname and French Guiana. Many Suriname Maroons in the border region have sought (and obtained) French residency or nationality, which provides access to the generous French social welfare system. They also are attracted by the higher wages in hard currency, which become ever more attractive as Suriname's dollar rapidly loses value. Maroon women in the border region may deliver their children in the hospital of St. Laurent, and Suriname Maroon children in this area may attend school in French Guiana. The school boat of Apatou (FG), for instance, also picks up the children from Langatabiki (SUR). As a result of all these different historic, socioeconomic, and cultural ties between Maroons in the two countries, individuals of these groups continuously cross the border.

3.5.4 Migrants in the logging sector

The Suriname industrial logging sector is dominated by foreign companies, primarily from Asia. The workers for these companies are also largely Asian. Asian migrants employed by logging firms include Filipinos, Malaysians, Chinese, and Indians. In addition, the Suriname firm Brokopondo Watra Woods employs Brazilians who are specialized in underwater sawing.

3.6 Health

3.6.1 Health concerns

Survey data collected as part of this mobile migrant study suggests COVID-19 (26.9%), malaria (24.4%), leishmaniasis (23.3%), and accidents (20.3%) are of most concern to respondents. Other health issues of concern are sexual and reproductive health (SRH) including sexually transmitted infections (STIs) and HIV (16.3%). Injuries due to violence and other mosquito borne diseases are perceived as less dangerous, and

15.6% of respondents reports that no single health issue is of concern to them when working in the gold fields (Figure 16).

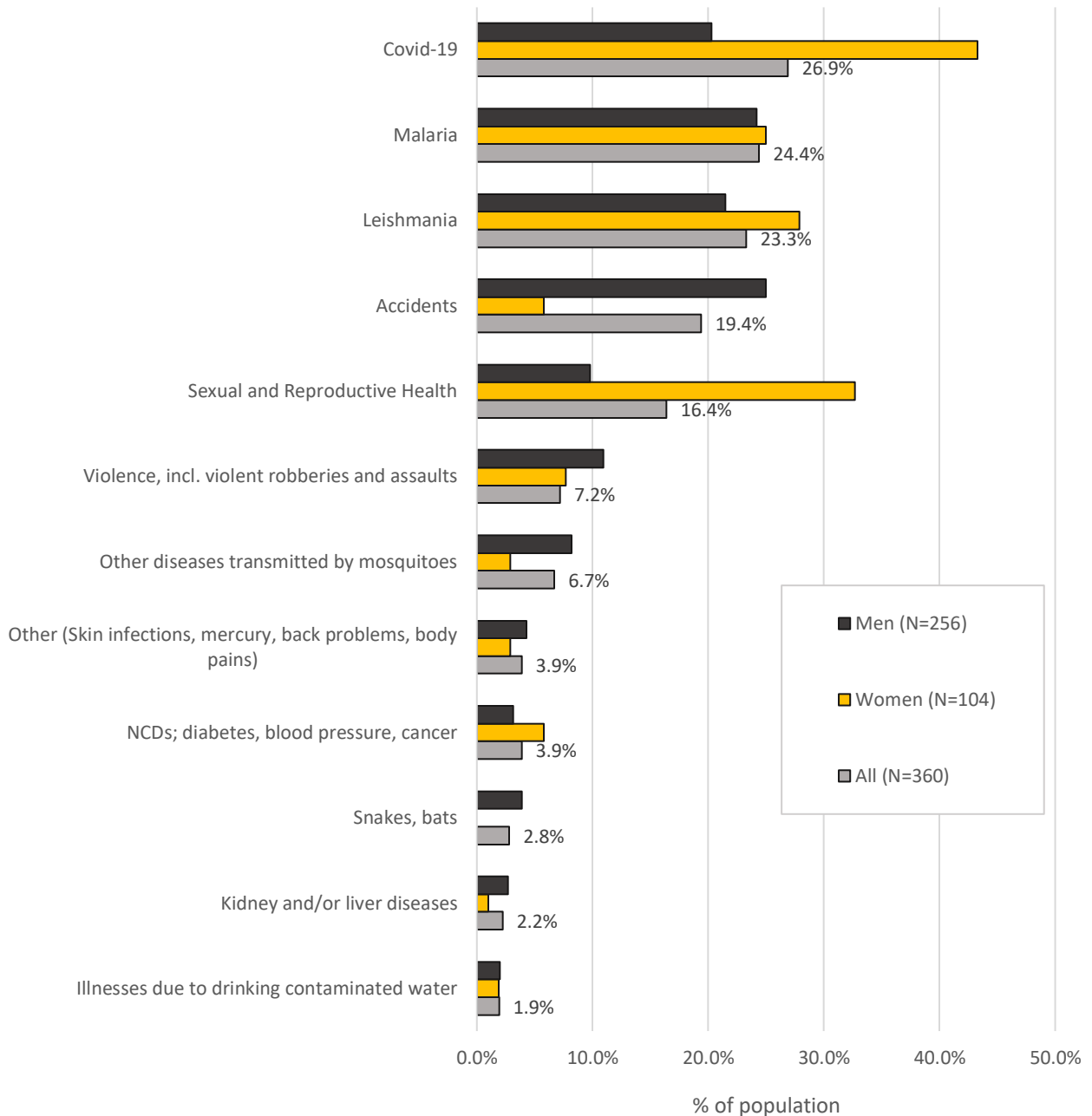
Gender affects disease perceptions (Figure 16). Compared to women, men more often mention work accidents as a source of concern (5.8%, $N_{total}=104$ vs 26.2%, $N_{total}=256$). Men also were twice as likely as women to report that they were not concerned about any health issue in the *garimpo* (resp. 18.0% vs. 9.6%). On the other hand, one third of women (32.7%, $N_{total}=104$) expressed concern about SRH issues, versus 9.8% of men ($N_{total}=256$). Also, women were twice as likely as men to name COVID-19 as a health concern in the mining areas (43.3% vs 20.3%).

As compared to those working in Suriname, people working in French Guiana were more concerned about malaria (13.5% vs 36.7%), about SRH (12.0% vs. 21.3%) and about (19.3% vs. 27.8%) (Suriname $N_{total}=191$; French Guiana $N_{total}=169$). It is likely that the Suriname Ministry of Health programs to fight malaria and STIs⁹ explain some of these answers. For unknown reasons, persons working in Suriname relatively more often expressed concern about COVID-19 (32.5% vs 20.7% in FG).

Health concerns are also affected by profession. Of the ten persons who were concerned about violent robberies and assault, eight were store owners, one was a store assistant, and one was the wife of a store owner.

⁹ The Suriname Dermatological service HIV Clinic provides free of charge SRH services to sex workers, including (undocumented) migrants.

Figure 16: Health issues that are of most concern respondent when working in the gold mines (N=360). Percentages refer to the complete sample (“all”)



The survey also asked respondents what types of health services they would like to see in the gold fields, should the Government of Suriname provide more health services in the gold mining areas. Most frequently named as a direly needed health service in the ASM areas was a general practitioner (46.6%), followed by a first aid/emergency clinic (18.9%). Fewer inhabitants of ASM areas referred to a pharmacy (8.6%), a lab (4.7%), an SRH clinic (1.9%), or COVID-19 related services (1.9%) (N_{total}=360). Women were more likely than men to express a need for SRH services in the ASM areas (5.8%, N_{total}=104 vs. 0.4%, N_{total}=256) but there were few other differences in responses. Especially in the ASM service area Ronaldo, many persons complained about the hygiene situation, and requested that the government would support with trash collection/processing and/or clean drinking water (5.3%, N_{total}=360). Five persons

conveyed that everything was needed, as there was nothing in terms of health services in the area where they worked.

Various migrants expressed the need for services that catered to their specific status as a migrant. They asked for support with insurance or the payment for health services, which is particularly complicated for migrants (6 persons). They also asked for services in their own language (2 persons) and better treatment of migrants in general (2 persons). Shop owners and assistants – all Chinese in Suriname- expressed the need for improvement of the security situation by dispatching more police and military to the *garimpo* areas. Obviously, no-one working in French Guiana asked for more police.

14.4% of respondents was of the opinion that the government of Suriname did not have to do anything, as things were going well already (14.4%, $N_{total}=360$). This opinion was more frequently expressed in French Guiana (20.7%, $N_{total}=169$) than in Suriname (8.9%, $N_{total}=191$). Different persons commented that they doubted that *garimpeiros* would use improved health services in Suriname, even if they would be more, more diverse, or better:

“No-one has time. The garimpo is to work. Those who are ill have to leave”

“They [government health workers] should not come there. Garimpeiros themselves have to find their way to a clinic. It is not always good when other people interfere too much. Those who are ill should just leave.”

“Gold miners are ungrateful. Even if they get everything for free they will not cooperate.”

3.6.2 Access to health care

The quantitative survey asked questions related to access to health care. Respondents were asked where they would seek treatment for a number of health issues, including accidents, getting an operation, delivering a baby (themselves, their wife, or someone in their surroundings), or a blood or HIV test (Figure 17). Location of work largely seems to be linked to report of where ASM workers report seeking treatment for the different health issues mentioned above. Of those who reported working in Suriname, a majority seeks care in Suriname (60.0%, $N_{total}=192$) followed by French Guiana (30.0%, $N_{total}=192$). Few ASM workers that principally worked in Suriname seek care in Brazil (7.0%, $N_{total}=192$) or other locations (3.0%, $N_{total}=192$) which include China ($n=1$, $N_{total}=192$) and Dominican Republic ($n=2$, $N_{total}=192$) for an operation, and other, unspecified countries.

We see a similar yet more pronounced pattern for ASM populations that report working in French Guiana, with 81.0%, $N_{total}=169$ of ASM workers reporting seeking care for services in Suriname, followed by 15.0%, $N_{total}=169$ that stays in French Guiana when seeking care. Similar to the population principally working in Suriname, a much smaller number of ASM workers seeks care in Brazil (3.0%, $N_{total}=169$) and an even smaller percentage (1.0%, $N_{total}=169$) seeks care in other countries, including China ($n=1$, $N_{total}=169$) for an operation.

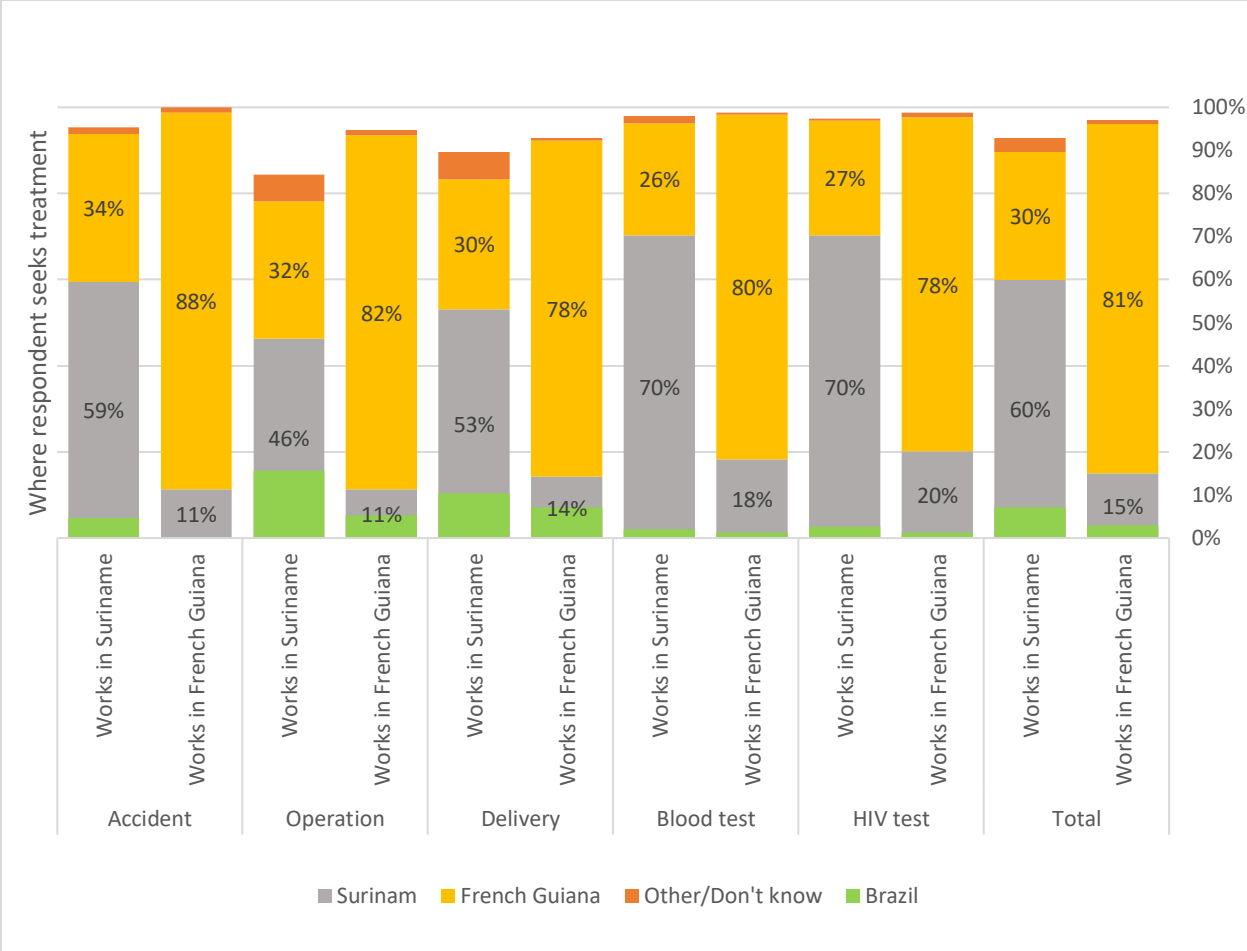


Figure 17: Respondents report of where they would treatment by type of disease and location of work (n=192 for ASM workers mostly working in Suriname, n=169 for French Guiana)

In terms of access, we also asked respondents whether they ever felt discriminated against or unfairly treated when visiting health services in Suriname or in French Guiana, the results of which are displayed in

Table 16 below. The vast majority of respondents reported that they never experienced discrimination or unfair treatment when seeking access to health services (92.5%, $n_{total}=361$). Discrimination by health workers had occurred in Suriname (2.5%), in French Guiana (2.2%) or in both countries (1.1%). As compared to men, relatively more women had felt discriminated against (3.6%, $N_{total}=253$ vs. 11.4%, $N_{total}=105$).

The “other” responses included one person who did not want to explain more, and one respondent who had felt discriminated against in Brazil. In addition to being discriminated against by health workers, several migrants lamented that they had been discriminated against by others; in stores, by cab drivers, by the police, or on the work place.

Table 16: Respondent report of ever feeling discriminated against and where (N=358)

| Whether respondent ever felt discriminated against and where | n | % |
|--|------------|-------------|
| Never | 335 | 93.6% |
| Yes, in Suriname | 9 | 2.5% |
| Yes, in French Guiana | 8 | 2.2% |
| Yes, both in Suriname and French Guiana | 4 | 1.1% |
| Other | 2 | 0.6% |
| Total | 358 | 100% |

Discrimination by health workers had expressed itself by:

- Letting the person wait for a longer time
- Not listening well, not taking the person serious, not making any effort to communicate with the patient
- Not allowing for a translator to join the patient
- Having to pay more than nationals
- Making demeaning comments, being impolite, being unkind

3.6.3 COVID-19

In order to enhance understanding of how this mobile migrant population engages with new diseases, the survey team asked questions about COVID-related knowledge, attitudes and practices. Table 17 and Figure 18 display responses on two knowledge questions: “Do you know how someone can get infected with COVID-19?” and “What are the symptoms of COVID-19?”. The grand majority of respondents (88.4%) were able to name one or more ways of contracting COVID-19, though not all answers were valid. Generally, respondents were aware that COVID-19 is an infectious disease that is contracted from an infected person, either by having physical contact or by being close to the person without protection – though two persons named the mosquito and one person named the bat as transmission vectors (

Table 17).

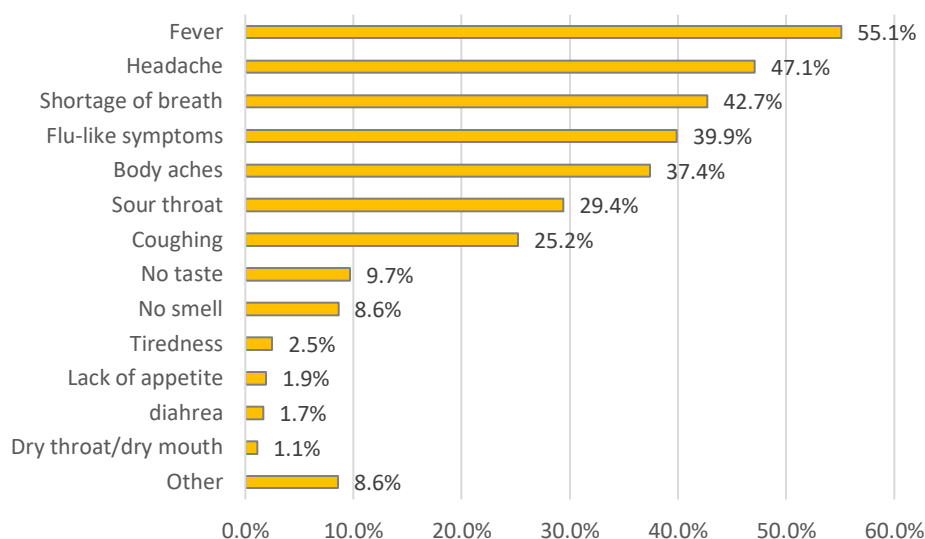
Table 17: Respondent's report on knowledge regarding means of contracting COVID-19 (n=361) and symptoms of COVID-19 (n=361)

| Means of contracting COVID-19 (only listing answers named by four or more persons) | n(%) of respondents | |
|---|---------------------|-----------------|
| | n | % ¹⁰ |
| By being close to an infected person | 202 | 56.0% |
| If an infected person sneezes or coughs in your face | 161 | 44.6% |
| By touching an infected person | 125 | 34.6% |
| Not wearing a face mask | 15 | 4.2% |
| Through the air | 12 | 3.3% |
| Being in a crowd with an infected person | 11 | 3.0% |
| Touching something that was touched by an infected person | 10 | 2.8% |
| Not washing/disinfecting hands | 7 | 1.9% |
| Lack of hygiene | 4 | 1.1% |
| Don't know | 42 | 11.6% |
| Other causes of illness and transmission ways (bat bite, mosquito, through saliva or sweat, smoking, disbelieve in God, general weakness, sex and/or kissing) | 14 | 0.3% |

The most frequently mentioned symptom of COVID-19 was fever, followed by a headache, shortage of breath, flu-like symptoms and body aches (Figure 18). All these symptoms were mentioned by more than one third of respondents. Figure 18 lists all mentioned symptoms. Under the caption other are symptoms that were mentioned by three or less persons, including: palpitations, weakness, transpiration, pain in joints and bones, pain behind eyes, poor breath, dizziness, nausea, throwing up, and stomach ache.

¹⁰ Responses do not add up to 100% because some persons named more than one transmission way

Figure 18. COVID-19 symptoms named by survey respondents (N=361)



Interviews and observations suggest that inhabitants of the ASM areas are not very likely to follow COVID-19 preventive measures. When asked what they did to protect themselves against COVID-19, almost half of survey respondents acknowledged that they did not do anything at all (45%, $N_{total}=360$). One fifth of survey respondents reported that they wore a face mask when being close to other persons, but they typically did not have a face mask on during the interview (21.1%). Other reported protective measures were wearing a face mask when leaving the camp (9.2%); regularly disinfecting hands (29.2%); and staying at a safe distance from people in the camp (9.77%) or coming from outside (8.6%), and continuously washing hands with water and soap (2.8%).

In addition to these most common behaviours, 6.1% of respondents referred to a variety of personal rules for when to wear a face mask and when not. For example, they reported only wearing a face mask when talking with “outsiders” such as people coming from Paramaribo, or when traveling to Paramaribo, French Guiana or to the river side. Some sex workers said they wore a mask during work, others required the client to wear a face mask, and others mentioned that they did not use face masks during work. One woman explained that she used the face mask with clients at night, but in day time it was too hot.

Some respondents reported that they followed different strategies to limit interpersonal contact. They protected themselves by staying in the *garimpo*, and not traveling to the city or to the entry places of the ASM area (e.g. river side). Not allowing others to visits one’s camp, limiting own visits to other camps, and staying at a distance from people from ‘outside’ were other strategies to limit contact with others. Three persons reported that they protected themselves against COVID-19 by praying to, or trusting in, God. And one person was convinced he could not get COVID-19 because he has blood-type O.

Respondent accounts suggest that at least half of the inhabitants of the ASM areas behave very consciously and responsibly in sight of COVID-19. In reality, such behaviour was not observed. In the research areas (Ronaldo, Albina, Alimoni and surroundings, Agua Branca), virtually no-one wore a face mask (though some had a mask in their pocket). People often sat close to one another, and social distancing was not noticeable.

3.6.4 Home remedies and Over-The-Counter-Medication against COVID-19

One third of respondents reported using self-medication to protect themselves against COVID-19 and boost their immune system (34.6%, $N_{total}=361$). Women were significantly more likely than man to use home remedies or Over-The-Counter (OTC) medication to protect themselves against COVID-19 (44.8%, $N_{total}=105$ vs. 30.5%, $N_{total}=256$), and people working in Suriname did so more often than those working in French Guiana (41.1%, $N_{total}=192$ vs. 27.2%, $N_{total}=169$). There were no statistically significant differences between persons from different nationalities in the likelihood to self-medicate against COVID-19, though it caught our attention that none of the Chinese reported doing so.

Inhabitants of ASM areas used an enormous variety of remedies to protect oneself against COVID-19 and to boost the immune system. These remedies can be grouped in: pharmaceuticals, vitamins, and herbal/home medicines. In addition, four respondents reported drinking alcohol (typically cachaça) to disinfect everything inside, sometimes in combination with medicinal tea.

With regard to pharmaceuticals, respondents reported the use of ivermectin, azitromicine ($n=10$) (Figure 19), other antibiotics (e.g. amoxilina) and regular pain killers and fever relievers such as paracetamol, aspirin and Dipyrone¹¹. Ivermectin is a remedy against mites, intestinal parasites, and scabies in dogs, cats and people. A recent meta-analysis of randomized trials of ivermectin to treat SARS-CoV-2 infection conclude that there is “insufficient certainty and quality of evidence to recommend the use of ivermectin to prevent or treat ambulatory or hospitalized patients with COVID-19” (Castañeda-Sabogal, 2021; see also Hill et al, 2021).

Figure 19. Pharmaceuticals used against COVID-19



Azithromycin (also: Azitrophar, Azitromicina Di-Hidratada) is an antibiotic with potential antiviral and anti-inflammatory properties, which has been used to treat COVID-19. Also for this medicine, there is no conclusive evidence about its efficiency in preventing or treating COVID-19 (Fiolet, 2020). Respondents –all Brazilians- used Azithromycin preventative (e.g. one pill each week), when they start to feel sick, or to get well when infected with COVID-19.

In terms of vitamins, respondents typically used vitamin C, B-complex, or a variety of other vitamins ($N=27$). An enormous variety of house remedies was used. These often involved one or more of the following ingredients:

- Bitá (a bitter tree bark)
- Boldo (*Peumus boldus*); a small tree with woody, bitter-smelling leaves (most popular among Brazilians)
- Lime
- Lemon grass
- Garlic, brew in water as a component for a medicinal tea
- Onion, brew in water as a component for a medicinal tea
- Ginger

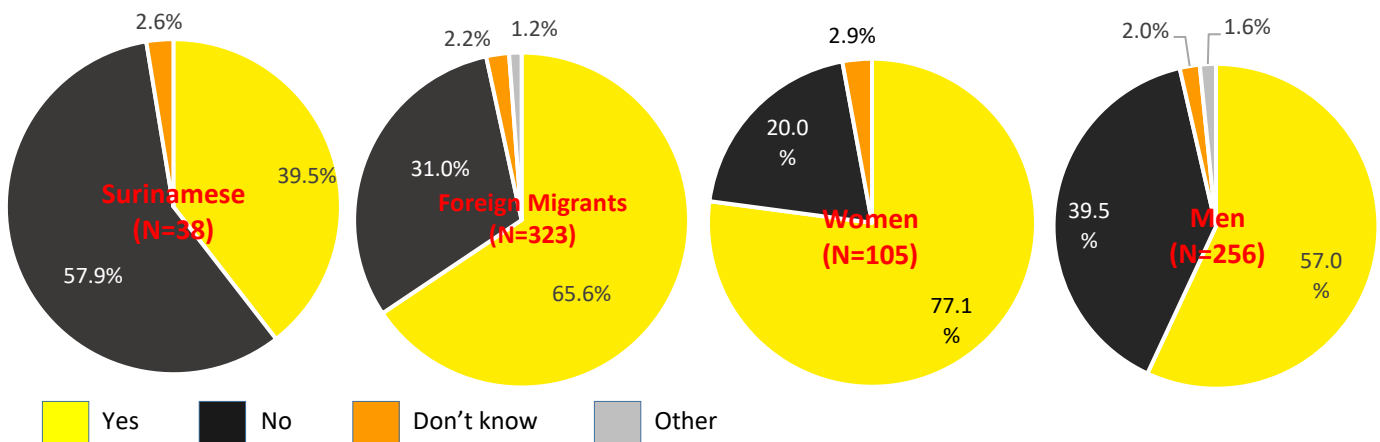
¹¹ Dipyrone is banned in the US and much of Western Europe because it can cause serious or fatal blood damage called agranulocytosis

In addition, respondents named a variety of less common ingredients for medicinal teas, including honey, *duru-duru*, creoline with water, safran, redi katun (*Gossypium barbadense*), chicory (*Cichorium sp*), black pepper, orange peel.

3.6.5 Risk perceptions

One third of survey respondents believed that they were not at risk of contracting COVID-19 (33.3%, $N_{total}=361$). As compared to foreign migrants, Surinamese inhabitants of ASM areas relatively more often believed that they were not at risk for COVID-19 (Figure 20). Furthermore, women were more likely than men to believe that they did run a risk to become infected with COVID-19 (77.1%, $N_{total}=105$ vs 57.0%, $N_{total}=259$) (Figure 16). “Other” answers included “only in the city”, “only in Albina” or “only outside of the *garimpo*”. These answers emphasized a common perception among gold miners and mining service providers that COVID-19 is primarily a problem outside of the ASM areas.

Figure 20. Do you believe you are at risk of contracting COVID-19?



Reasons for believing not to be at risk for contracting COVID-19 are listed in Table 18 below. The main reason for this idea is the perception that there is no COVID-19 in the ASM areas. Other often mentioned reasons for being “safe” from COVID-19 is that the person does not move around a lot, does not go in crowds, and generally protects him or herself. Thirteen persons shared the misperception that they could not get infected with COVID-19 because they already had it.

Respondents who believed that they were at risk to become infected with COVID-19 were also asked to motivate their answers. The most frequently mentioned reasons for believing to be at risk were simply because everyone may get it, and one cannot always see if a person is infected (Table 18). Other people made a connection between the ASM area – which was considered a healthy place- and the city –where there is COVID-19-, stating that visitors from outside and traveling to the city exposed one to increased risk of contracting COVID-19.

Contracting COVID-19 was also directly related to ones contact with other people, which often cannot be avoided. People acknowledged that they did not properly protect themselves, but also complained about other people not taking protective measures. Sex workers felt particularly vulnerable for COVID-19 infection because of the nature of their work, which does not allow them to keep a safe distance from the clients. These and additional reasons for feeling at risk are listed in Table 19.

Table 18. Reasons for believing not to be at risk of contracting COVID-19 (N_{total}=122)

| Reason why the respondent believes not to be at risk for COVID-19 | n | % |
|---|----|-------|
| People in the ASM areas do not have it | 29 | 23.8% |
| I do not go anywhere/I am not moving among a lot of people | 20 | 16.4% |
| I am careful/I protect myself | 19 | 15.6% |
| I already had it | 13 | 10.7% |
| I am healthy/strong/I never had it | 12 | 9.8% |
| I pray/believe in God | 10 | 8.2% |
| I drink alcohol | 4 | 3.3% |
| Do not believe in this disease | 3 | 2.5% |
| Already took a lot of Chloroquine against malaria | 2 | 1.6% |
| It is warm here | 2 | 1.6% |
| Because of the herbal tea I drink | 2 | 1.6% |
| Everyone where I work already had it | 1 | 0.8% |
| I have blood type O, I cannot get it | 1 | 0.8% |

Table 19. Reasons for believing to be at risk to become infected with COVID-19 (N=227)

| Reason why the respondent believes to be at risk | n | % |
|--|----|-------|
| Everyone can get it | 51 | 14.1% |
| You do not know who is infected | 36 | 10.0% |
| Many people from the city/outside come here | 26 | 7.2% |
| Many people are here / I am in contact with many people | 26 | 7.2% |
| I do not protect myself | 22 | 6.1% |
| No-one protects themselves here | 20 | 5.5% |
| There is more risk in the city; Sometimes we have to leave the ASM area. | 14 | 3.9% |
| I am weak/already have health problems | 8 | 2.2% |
| Many people are infected | 8 | 2.2% |
| One can get it twice | 4 | 1.1% |
| There is still COVID | 4 | 1.1% |
| I am not vaccinated | 2 | 0.6% |
| Only God can protect us | 1 | 0.3% |
| I am a smoker | 1 | 0.3% |

3.6.6 Impact of COVID-19 on work and income

The majority of respondents reported that the COVID -19 pandemic had not affected their lives (71.3%, N_{total}=359). The study revealed a weakly significant differences between women and men in terms of the impact that COVID-19 had on their working lives and incomes in the ASM sector; one third of women reported that they had been affected by the consequences of COVID-19, versus one quarter of men (35.6%, N_{total}= 104 vs 25.9%, N_{total}=255). There was no difference between those who worked in Suriname and those who worked in French Guiana in the likelihood that they had been affected by COVID-19.

Main impacts of the COVID-19 pandemic had been that people had temporarily stopped working (10.3%); that travel within Suriname (8.1%) or across the border with French Guiana (5.3%) had become more difficult; and that everything had become more expensive. The latter impact was probably in part due to the soaring inflation rates in 2020, but since this was also the COVID-year, price rises were attributed to COVID-19. Particularly women lamented the higher prices, possibly because they were relatively more often working as *mareteiras* (traveling sales women).

The main way in which COVID-19 affected people's working lives in income earning opportunities was by reducing the mobility and circulation of people within ASM areas, and to and from ASM areas. The pandemic motivated people to stay for longer periods of time in the forest – where many feel safe from COVID-19, and to travel less to avoid the risk of being stuck in Paramaribo during a lockdown. Transport providers were directly affected by the reduction in movement:

COVID caused a lot of income loss, because many persons [in the mining areas] do not travel to Paramaribo to buy supplies, and that is what we count on. Also few persons arrive from Paramaribo. (Suriname boatman, age 22)

Reduced movement of gold miners also affected the financial position of other ASM service providers. A Brazilian sex worker (age 36) commented:

There is less movement. You have to be careful [with your money], decide what can or cannot. You cannot stop working while there is still a room that needs to be paid and you need to take care of yourself.

A Dominican cantina owner confirmed:

Yes, there is little movement. The people are careful and prefer to stay in their homes. Sales are not really going well.

Less movement of people also has made it more difficult to find workers, explained a female Brazilian cook (age 44):

Sometimes people cannot come. For example, you need an excavator operator or workers; you search but you do not find sufficient people. Many Brazilians left for Brazil, but still they have not returned.

Others confirmed this account:

We stopped for a while with work because we had to get people from the city to work (Brazilian porcentista, male, age 51)

It is more difficult to find garimpeiros who want to work (Brazilian equipment owner, male, age 36)

We sometimes have to work more, because the boss has trouble finding laborers (Brazilian porcentista, male, age 53).

I do not work with everyone, and when someone has left i have to either stop the operation or continue with fewer men. Because of COVID I do not just accept any person to join (Brazilian equipment owner, male, age 50).

Reduced mobility not only applied to people, but also to goods. As the borders closed and distribution networks limited operations, it became more difficult to import goods that are needed to keep the business running:

Everything goes slowly. There are fewer flights. Some of the things you need to arrange you cannot get done, like buying parts for machinery (Suriname gold miner, male, age 48).

Four men commented that it had become more difficult to sell gold, but it is unlikely that this change had been (solely) caused by COVID-19. In 2020, new monetary policies made it more difficult for gold miners to sell their gold against USD or Euro.

4 Discussion and conclusion

4.1 Discussion

4.1.1 Challenging stereotypes

The results challenge various persistent stereotypes about the size and demographics of the ASM population as single, independent men, roaming around the forest in search of gold. The estimates from our study show convergence as they are strikingly similar across the different methods used. For Suriname, the mean figures suggest an ASM population of approximately 20,000 persons, whereas for French Guiana, the ASM population estimates are around 12,000 persons. These figures represent the population of gold miners plus those providing services, up to a total of approximately 32,000 individuals that are currently active in the ASM sector across French Guiana and Suriname, this is a larger number that previously reported in the literature.

Second, a significant share of the ASM population consists of women. Based on informant estimates and counts in different areas, we believe that about 20-25% of the ASM population –including the ASM service areas and *currutelas*- may be female. Our informal observations suggest that the share of women in the ASM areas has been growing in past years. Whereas women were rarely encountered in ASM areas 20 years ago in professions other than cooks and sex workers, nowadays we found that women perform a wide variety of jobs in the *garimpos*. The number of women reported in this study to be estimated in ASM work is larger than previously reported.

Thirdly, gold miners and mining service providers frequently operate in close social circles, with family and friends. One third of women who worked and lived in the ASM areas with a spouse; either someone they had entered the mining business with, or someone they had met in the area. People also frequently worked with children, parents, siblings, cousins, and other family members. For those working without family, friendship relations are often important. In different interviews, respondents emphasized the importance of working with, or in the proximity of friends.

Fourth, the data challenge the common perception that mobile migrant workers in the ASM sector are constantly on the move: over half (58.5%) of the respondents surveyed report minimal or no (1 or less) movement in terms of the place they worked in the past 2 years. Over a third of respondents (38.4%) had more frequently changed their place of work (2 or more times in the past 2 years), most often because of better earning opportunities elsewhere.

4.1.2 Migration trends

The data suggest several new migration trends that to some extent were signaled in the literature in countries other than Suriname (Castellanos et al., 2016; Recht et al., 2017; Douine, 2020) but that are now also affecting Suriname, and must be monitored. Besides the more known and previously described migration patterns of Brazilian ASM workers across the Surinamese – French-Guianese border, new groups of migrants have recently joined the ASM workforce. Our data suggest a small but steady migrant population from the Dominican Republic started to work in the ASM sector 5-10 years ago in Suriname, whereas this population was previously never described in this line of work. This new stream of migration

started with and is still characterized by women, many of them who work as sex workers in the gold mines. Our data also suggests this population is can also be found in the gold mines in French Guiana. A similar trend was observed in our data regarding Venezuelan and Cuban women, but their arrivals are even more recent, mostly in the past few years. From a health perspective, these new migrant groups entering the ASM sector are important because they may have different health knowledge, perceptions and behavior than the groups that we are relatively more familiar with.

The data also show that for those wishing to work in ASM areas across borders, law enforcement is not a barrier. In Suriname, migrants from Brazil or the Caribbean area can enter legally. If they wish to work in the ASM sector, there is very little law enforcement to keep people from traveling to, and working in ASM areas. Moreover, *garimpeiros* generally believe that in cases where the police or military should ask questions or pose a problem, they can be bribed to let them through.

Our data suggests that even in French Guiana, which adopted a strict regime against clandestine ASM, possible financial losses as a result of capture by the gendarmerie do not seem to discourage ASM miners much, or even affect them. Hardly any respondent interviewed as part of this study reported experiencing any problems when –typically illegally– crossing the border between Suriname and French Guiana. This even was the case when border patrols were scaled up during the COVID-19 pandemic. In addition, only 13.2% of those working in French Guiana had left their most recent work location because of repressive activities from law enforcement agents. By far the main motive to leave or enter a work location is simply gold. As long as earnings in French Guiana are higher than those in Suriname, as our results suggest, the movement between Suriname to French Guiana, and ASM activities in French Guiana are likely continue.

In order to support targeting of interventions and identification of lesser known groups within the ASM mobile migrant population, and in order to dispel the dominant stereotype of the ASM worker as a constantly moving lone wolf, we have attempted to compile a few profiles of types of mobile migrant within the ASM population (Table 20).

Table 20: Profile, nationality, number of movements, country of movement and factors influencing movement for migrant mobile population

| Profile of mobile migrant | Nationality | Number movements per year and country of movement | Factors influencing (lack of) movement |
|--|-----------------------|---|--|
| Local expert (already works 10 years or more in ASM, often for the same boss), includes miners, and machine owners. | Brazilian, Surinamese | 0, stays in either Suriname or French Guiana | Known terrain (expertise in certain area keeps them in one area), activity of gendarmes / army (for French Guiana), ratio price of barrel of oil : price of gold |
| Local service provider (shop owner, machine owner, transportation professional) | Brazilian, Surinamese | 0, stays in either Suriname or French Guiana | Known terrain (expertise in certain area keeps them in one area), activity of gendarmes / army (for French Guiana), ratio price of barrel of oil : price of gold |

| | | | |
|--|---|--|--|
| Hired hand (worker that is hired by different bosses, depending on potential gain will move places) | Brazilian | Moves between Suriname and French Guiana | Ease of finding / availability of gold, activity of gendarmes / army (for French Guiana), ratio price of barrel of oil : price of gold |
| Sex worker | Brazilian, Surinamese, Cuban, Dominican, Venezuelan | Many (at least 5-10), moves between Suriname and French Guiana | Needs to move constantly due to nature of work, potential dangers involved with remaining in one location |

4.1.3 Migrants and disease: the case of Covid

Our findings suggest that most ASM workers are generally not very concerned about health issues. For COVID, the ASM population relies on a vast array of home remedies and over-the-counter-medication for protection. Another key finding is that few respondents reported any influence of the COVID-19 pandemic on their income, in fact it seems ASM workers have been experiencing a rather stable income in relation to businesses in the city like cafes, restaurants, gyms and daycare. Another interesting finding in terms of knowledge, attitudes and practices is the highly prevalent perception of our respondents that there is no COVID-19 in the remote jungle areas where they operate, compared to the city. This has implications for perceptions on new infectious disease among ASM populations: as one cannot do much to prevent or treat infection, besides the aforementioned home remedies and over-the-counter medication, one can only continue to work hard and pray. It should be noted that women had higher levels of health concerns, including regarding COVID-19 and SRHR needs, which is most probably due to a large portion of women in ASM being active as sex workers. Other patterns linking sex and occupational activity with health concerns were observed: men were more frequently concerned with injuries and shopkeepers, which are mostly Chinese with violence. All respondents expressed some concern regarding malaria and leishmaniasis.

4.1.4 The cost of illegality

A recurring barrier when discussing mobile migrant ASM populations and the reintroduction of malaria in Suriname is related to the legal framework in French Guiana. As an overseas department of France, French Guiana is a remotely located region of the European Union. A complex interplay of factors related to policy, politics and bureaucracy compounds the inability of the French legal framework to treat ASM populations for malaria, due to the illegal status of gold miners (Nacher et al., 2013). Yet, our data suggests the health system does treat ASM workers and these ASM workers actively seek treatment as necessary in the French health system. At the same time, neighboring Suriname remains at risk of reintroduction of malaria, and even the development of drug resistant malaria.

4.2 Conclusion

The findings from this study reveal some remarkable new insights into the mobile migrant ASM community in Suriname and French Guiana. We estimate the current total number of ASM workers, including the services sector at around 20,000 persons in Suriname, and 11,000 persons in French Guiana. We estimate the turnover among this population at 10,5% of which 95%, or some 2,000 persons annually

are newcomers to the sector. Perhaps even more importantly, our findings suggest a departure from the more conventionally held stereotypes of ASM workers as male lone wolves chasing gold in the remote jungle. Rather, a picture emerges of a tightly knit social structure of migrant workers with limited mobility and flux that are seeking to break the shackles of lower class precarity that bound them in their home countries to enter middle class stability.

These findings provide novel insights into the mode and targeting of the provision of health services that should be taken into account by the Ministry of Health, its Malaria Program and other related organizations seeking to further reduce the burden of infectious disease in this population, and consequently in the Surinamese population. Such measures should seek to continue to monitor the size and movement of this population, focus on subgroups that are most in flux and thus most at risk of contracting and transmitting infectious diseases and leverage the strong social cohesion among the more permanently based communities.

A number key drivers of migration for the portion of the ASM population that is mobile has been identified that may also support the Ministry of Health activities in targeting the most vulnerable populations. These include the global price of gold, the ease with which gold is found in a certain area, expressed in the net gold found per barrel oil used as input to the production process, government measures including army or police operations or changes to taxation of gold sales, occupational factors (such as type of job), and the relationship with the camp boss, traditional authorities and local population in the mining area (if any).

Lastly, this study's findings shed light on knowledge, attitudes and practices of the ASM community on disease in general, and specifically on the recent COVID-19 pandemic that are of interest to policy making and program implementation. An interesting insight emerges from risk perceptions of different diseases, as the vast majority respondents in the ASM community report not being concerned with a wide variety of diseases, including malaria, other mosquito communicable diseases, or COVID-19. These findings stand in stark contrast with the data presented in this study on access to healthcare, which suggest general knowledge and awareness of the ASM population of where they can get access to health services.

Qualitative interviews and analysis of some social media channels in which the ASM community is active in the context of COVID-19 suggest distrust of formal health services in the city and trust in, occasionally clandestine home treatments. This is a remarkable perception as respondents barely reported any perceived discrimination when seeking health services. Targeted communication campaigns as well as follow up through trusted community channels such as Faith-Based Organizations may help increase awareness and reduce perceptions of distrust of health services in the city in times of COVID-19.

5 Recommendations

Our recommendations to the Ministry of Health and its Malaria program regarding targeting and supporting the health status of the ASM mobile migrant population in support of reducing the burden of infectious disease in Suriname and neighboring countries follow the findings, discussion and conclusion in this report and follow four distinct courses of potential action: to monitor, to target, to communicate and to support.

1) Continue to Monitor the ASM population

Strengthen and institutionalize periodical (yearly) data collection regarding the ASM population in terms of size and factors affecting migration.

The current study has demonstrated that a few easy-to-use estimation methods based on readily available data and described in this report yield similar results compared to more time and resource intensive survey and census methodologies. In order to better target, reach and support the ASM population and prevent diseases prevalent in this population, the Ministry of health could institutionalize periodical (yearly) data analysis to estimate the number of active ASM workers in Suriname.

This data could be further strengthened by additional data that can be readily available after minor efforts on behalf of the Ministry and Malaria Program to establish a working relationship with the data owners. Firstly, the Ministry could explore requesting the monthly unique number of users on the cellular antennas near key ASM mining areas¹² from the two mobile phone network providers in Suriname, including the number of roaming users. Secondly, this data could be further strengthened by flight passenger data from Suriname's domestic airline carriers.

2) Target interventions

Within the ASM population, focus on targeting those most in flux and most vulnerable (lack of access to healthcare) such as sex workers, burinhos (porters), itinerant salespersons (marreteios/as).

Our findings suggest a subpopulation within the ASM population that frequently cross the border with French Guiana frequently and are thus most at risk for exposure to and transmission of malaria. Efforts of the Ministry of Health and its Malaria Program should include specific targeting towards this population, for example by providing frequent communications and services at key points of entry such as the Ronaldo/Antonio do Brinco service area and other locations along the border.

3) Communicate prevention and treatment options

The ASM population consists of tightly knit social fabric in which information can circulate rapidly. The Ministry of Health should explore continuing and expanding its messaging regarding infectious disease awareness, treatment and access to services by phone, whatsapp and using trusted community channels in a manner that takes into account ASM target population (literacy level).

¹² These are Berg en dal, Brokopondo, Brownsweg and Klaaskreek for Brokopondo district, and Antino, Tabiki, New Jacobkondre, Drietabbetje, Godo Olo (Affvisiti), Sarakreek and Villa Brazil (New Jacobkondre) in Sipaliwini district

This study suggests strong social networks within the ASM community in which information is readily shared and made available. The Ministry of Health could leverage this by disseminating its messaging regarding infectious disease awareness, treatment and access to services by phone and social media channels (whatsapp, facebook) as well as by engaging trusted community channels such as Faith-Based Organizations, and the communication networks in place in mining areas organized by the foundation for mining rights holders (Stichting Houders Mijnbouwrechten Suriname) and Newmont's ASM division. Care should be taken to make sure messages are tailored with the end user in mind, including factors such as literacy level, authenticity and sharability over whatsapp and other social media. In addition, the Malaria Program can explore intensifying efforts to inform ASM workers at port of entry if traveling by air, or upon arrival in the *garimpo* of prevention and treatment options.

4) Support within Suriname

Continue and explore opportunities to scale up support to ASM workers by increasing service delivery through the Malaria Service Deliverers Network, specifically to subgroups that are least likely to have access to services (sex workers, burinhos, marreteiros/as), are most actively crossing the border, and have highest turnover to implement known (LLINs) and innovative, contextualized prevention and treatment options.

For malaria, and potentially other infectious diseases the subpopulation that most frequently crosses the border with French Guiana of ASM workers are on the frontline in terms of risk of infection. In addition, this subpopulation is most likely to import the disease into Suriname. Therefore, the Ministry of Health should continue its support and where possible scale up its support for ASM workers to implement preventive measures and seek treatment options, where possible locally, to control the burden of infectious disease including malaria.

5) Support beyond Suriname

Explore opportunities to create political will, advocate for and support diagnosis and treatment of malaria in mining areas in French Guiana.

As long as treatment and prevention options are only available on Surinamese soil, and not in the remote mining areas in French Guiana, issues related to malaria re-emergence, re-introduction and potentially even drug resistance will remain. Taking into account the complex geopolitical factors that play a role in this issue, the findings in this report confirm that concerted efforts to support diagnosis and treatment of malaria in mining areas in French Guiana are the only means of truly meeting the objective of malaria elimination in a sustainable manner.

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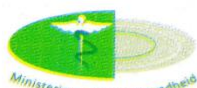
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7 Annexes

Annex 1: Ethical clearance letter



Ministerie van Volksgezondheid
Directie en Centrale
Administratie

Ministerie van Volksgezondheid
in
Suriname

No.: *Ag 3467*
Bijlage:

Paramaribo, 16 november 2020

Onderwerp: toestemming onderzoek

Aan: Dr. Hiwat- van Laar Helene
Coördinator van het
Malaria Programma
Commissaris robesweg hk. Basistostraat
Paramaribo

Geachte Dr. Hiwat,

Middels deze deel ik u mede dat het Ministerie van Volksgezondheid het protocol, met als titel: "Mobile Migrant population study Suriname: Assessment of mobile migrant population size, demographics, turnover, movement, and priority health needs", heeft voorgelegd aan ondergetekende. Naar aanleiding van het advies van Drs. D. Panchoe, wordt U toestemming verleend voor het uitvoeren van bovengenoemd onderzoek.

Dit onder de volgende voorwaarden:

1. U zult de verzamelde gegevens met de grootst mogelijke discretie behandelen.
2. Verzameld materiaal zal alleen voor dit onderzoek gebruikt worden.
3. Het Ministerie zal na aanvang van het onderzoek tussentijdse rapportages ontvangen en verwacht dat bij enige discrepanties in onderzoeksresultaten die kunnen leiden tot verandering of bijstelling van het onderzoeksprotocol, zij tijdig in kennis zal worden gesteld.
4. Het Ministerie ontvangt na afronding van het onderzoek - voor publicatie van enig resultaat - een eind rapportage van u.
5. Indien er personen zijn die de symptomen vertonen van COVID-19, moeten die aangemeld worden aan het BOG

Ik wens u veel succes met de uitvoering van uw onderzoek.

De Directeur van Volksgezondheid
Namens deze,


Drs. D. Panchoe

Annex 2: Elaboration on the various population estimates

Expert estimates

Suriname

A Suriname ASM expert and former employee Government's National Geological and Mining Service (GMD) estimates a total between 20,000 and 30,000 workers, including their social system, are active in Suriname and French Guiana¹³. The Association for Mining Rights Holders in Suriname estimated that Suriname has a total of 120 small (200 Acres) to medium size (up to 400 Acres) mining areas on which mainly Brazilian miners are active. As a rule, around 50 persons are at work on a small mining area and about twice that amount (100) on a medium size mining area, but when much gold is found or gold is easily found, the population in an area may up to around a total of 400-500 workers per area. With an estimated 50 small ASM areas, 50 medium size areas, and 20 large areas, this rule-of-thumb calculation would translate into roughly 16,500 inhabitants of ASM areas. The Brazilian Embassy provided an estimate of 25,000-30,000 Brazilians in Suriname, among whom 5,000 are registered with the embassy and living in Paramaribo. The governmental Organization for Regulation of the Gold Sector (OGS) was not available for information.

French Guiana

In 2018, the Malakit program in French Guiana conducted a study aimed at estimating the population size that regularly crosses the border between French Guiana and Suriname. Using a capture-recapture method, their calculations suggested that 7,204 persons working in the ASM sector regularly cross the border between Suriname and French Guiana. The researchers provided an upper bound estimate of 13,341 total population.

Sum of area estimates

The idea behind this method was to obtain an estimate for each *garimpo* in the country, and next add up all estimates to obtain a national figure. Using the Malaria programme database, information from the quantitative survey and personal knowledge of the survey team members, we listed 80 known *garimpo* areas in Suriname. Based on the SHMR estimate of at least 100 mining areas in Suriname, we assumed that there might be another 20 areas for which we did not know the name.

Each survey respondent was asked in what mining area she or he worked, and was requested to estimate the size of the total population in that region. For some areas, there were quite a number of observations, but in other areas there were only one or two persons who provided an estimate. We supplemented these data by calling individuals working in areas for which we did not have information. An effort was made to ask at least two individuals per site to provide their best estimate. In addition, in Brokopondo north of the lake, ASM areas were visited with the purpose of documenting the number of persons working in each area.

For Suriname, estimates were obtained for 59 ASM areas, and for French Guiana, the survey provided population estimates for 32 out of 46 known *garimpo* sites. From experience, we know that it is very unlikely that a *garimpo* exceeds 1,000 inhabitants. Hence every estimate > 1,000 persons (possibly used as the equivalent of "a lot of persons") was adjusted to 1,000. For the *garimpos* for which no estimate was provided, we used the average of all other sites in that country.

¹³ Bernard Paansa, pers. com. 13/01/2021

Using these figures (estimates from survey, estimates from phone interviews, field-based counts, and extrapolated averages) the formula for working with population estimates was as follows:

$$\text{National ASM population size} = \text{SUM (Averages of estimated population per garimpo)}$$

Production data estimates

As a proxy for **national annual production**, we use the average Suriname gold export data for the ASM sector over the years 2017-2019¹⁴: **15,580,099 g AU/yr**. This amount of gold includes gold that was produced in French Guiana; because it is difficult for unlicensed gold miners to sell their gold in French Guiana, *garimpeiros* –particularly those working in the *garimpos* of Eastern French Guiana – typically sell their gold in Suriname.

Based on the survey data, reported average gold labourers (*porcentistas*) monthly earnings in Suriname and French Guiana were, respectively, 32.1 g Au/month and 62.3 g Au/month. These figures are consistent with what we have found in literature, and estimates provided by a consulted expert from Newmont Suriname LLC¹⁵. Mining teams often lay still for some time because equipment breaks, there are no spare parts, there is no fuel, there is too much or too little water and so forth. In addition, individuals may go to the city to visit their family, to take a rest, buy supplies, or medical reasons. Our earlier work suggested that gold miners in Suriname have, on average, approximately 6 productive months in a year. Our data suggest that gold miners in French Guiana spend more time not working than gold miners in Suriname, because they lose time when they have to leave a place during French military operations against illegal mining, and because of more challenging logistics. Their actual time working was estimated at 4 months out of the year.

Porcentistas earn between 3 and 5 percent of the team earnings. Based on the per porcentista earnings, we estimated per mining team earnings. This figure was used to calculate an estimated number of mining teams in the country. The number of mining teams was multiplied by 10 (5 gold miners, 5 other persons providing services) to get at a population estimate. For French Guiana, this figure was corrected for an estimated 10% of gold that is sold in Brazil rather than in Suriname.

Table 21 summarizes our data, calculations and assumptions. Using this method, the estimated number of persons working in the ASM sector in Suriname is 21,572 (+- 20%) individuals, and in French Guiana 8,978 (+- 20%).

¹⁴ National annual gold export data obtained from the National Currency Committee (Deviezencommissie), August 17, 2020 and May 23, 2019.

¹⁵ The small-scale gold mining officer for Newmont Suriname LLC reported that ASM teams in and around the concession area reported earnings of approximately 200 g Au/week.

Table 21. Figures, calculations and assumptions to get to population figures using gold export and production data

| | Total (SU + eFG) | Suriname | East French Guiana | Assumption |
|--|------------------|---------------|--------------------|--|
| Gold produced (g/yr) <i>Source: Deviezencommissie, Suriname</i> | 15,580,099 | 10,386,733 | 5,193,366 | <ul style="list-style-type: none"> Annual gold export data are a good proxy for gold production in Suriname and east French Guiana, i.e. the gold produced in these areas is not smuggled abroad. Of the gold exported annually from Suriname, one third was produced in French Guiana. |
| Median g Au/pp/month <i>Source: Survey</i> | | 32.1 g | 64.3 | <ul style="list-style-type: none"> Gold miners reported their most recent earnings honestly. The mean reported per person earnings provides an accurate representation of the average gold miner in Suriname and east French Guiana may earn in a month. |
| g Au/per mining team if active every day of the month | | 802.5 | 1607.5 | <ul style="list-style-type: none"> Workers receive 4% of proceeds |
| Productive time/yr <i>Source: qualitative int.</i> | 5 | 6 | 4 | <ul style="list-style-type: none"> Mining teams lay idle for a large share of the month due to technical (equipment failure, lack of spare parts), logistic (e.g. actions from authorities) or climatic (too much water, too little water) problems. In French Guiana <i>garimpeiros</i> spend relatively more time not working because they are chased by the French authorities. When caught, all equipment is burned and miners have to start the production cycle all over. |
| Annual proceeds/mining team | | 4815 | 6430 | Pear team hypothetical monthly earnings * month active |
| # mining teams | | 2157,2 | 808 | National production divided by per team production |
| Population in the gold mining areas. | | 21,572 | 8080 | Observations and interviews suggest that there are about 10 persons (gold miners + service providers) per mining team. |
| Population in entire French guiana | | | 8978 | 90% of French gold is sold in Suriname (Expert estimate) |

Deforestation data estimates

Deforestation data were obtained from SBB. Annual ASM induced deforestation in 2018, the most recent year for which data is available, was 4375 ha/yr¹⁶. The size of one mining pit is approximately 1 ha. About two decades ago, we found that ASM teams mined approximately 8 mining pits per year (Peterson & Heemskerk 1999). According to mining experts, this number has been somewhat reduced because advanced technology now allows mining teams to mine deeper, and stay longer at one site. Thus the number of mining pits per team was estimated at 6 pits/yr.

Remining (Por: *repasagem*) is frequent; mining teams often return to places that were mined before because the operational expenses are less, and they know there is still quite some gold to be extracted from these locations. Some locations are even mined more than twice. Based on qualitative interviews, the amount of remaining was estimated at 50% of mining pits in Suriname. This means that one mining team mines, on average, 3 ha/yr. This implies that 1458 teams were necessary to deforest the 4375 ha. Based on the quantitative survey, the typical size of a mining team was 8 persons, including the cook, excavator operator and possible others in the team. Based on experience in the ASM sector, we can say that each team of 8 persons is composed of 6 gold miners and 2 others. Hence the number of gold miners can be estimated at $1458 \times 6 = 8,750$ persons. Given a ratio gold miners to service providers of 1;1, the estimate for the total ASM population in Suriname, using the deforestation method, is 17,500 persons.

¹⁶ C. Kasanpawiro, Forest Cover Monitoring Unit. Foundation for Forest Management and Production Control (SBB). E-mail communication March 1, 2021.

Annex 3: Additional case studies of ASM population

Márcia (40), beauty and hair-salon in Ronaldo.

Márcia¹⁷ comes from a small village in the state of Para. In Brazil, Márcia worked with the police. There was personal situation at her work, that made it difficult for her to stay. People in the village spoke a lot about Suriname, so she decided to give it a try. She arrived in Suriname in August of 2010, leaving her 6-year old son behind in the care of her brother.

The first 5 years in Suriname, Márcia worked in Paramaribo. She worked in a hair salon, and she sold Brazilian clothes and perfumes. Every three months she traveled to Brazil to buy her merchandise and to see her son. She would stay in Brazil for three months, and then return to Suriname. The clothes she sold from her home, and to do hair she worked in a salon. She had followed different courses in hairdressing in Brazil. For example, when she worked at the police, she used her leave of absence and other free time to take trainings and workshops for hairdressing and treatment.

In November 2015, Márcia took some merchandise to Ronaldo. Ronaldo is a commercial center in Suriname, which caters to *garimpeiros* who are working in French Guiana. It is a place where *garimpeiros* take a rest when they come from the French Guiana forest, and stock up to return to the clandestine gold mining sites in that area. Gold miners working in French Guiana also may stay for some days in Ronaldo when they need medical attention because just across the river from Ronaldo, on French soil, is the village of Maripasoula, which features a decent hospital. Márcia's idea was to cross the border to French Guiana and sell her merchandise there, as *mareteira* (traveling merchant). But she never crossed the River. So many women in Ronaldo asked her to do their hair that she stayed. She rented a small room where she opened her own hair and beauty salon, and sold clothes and perfumes. Soon she had saved enough money to buy her own little house to live and work from. She paid 100 gr. gold or about 3,800 USD at the time (2015).

After some time, Márcia started to work with a Brazilian friend; the daughter of a long-term family friend. She helps her to keep her store in Ronaldo supplied. Márcia looks at internet websites to select the clothes she believes will sell best. She orders, pays online, and the merchandise is sent to her friend, who will send the merchandise to Paramaribo. In Paramaribo, the merchandise is obtained by a cab driver with whom she has been working for the past 10 years. He sends her merchandise to Ronaldo.

Prior to the Covid epidemic, she would send everything by plane, through Belem, but lately there have hardly been any flights and she has had to send things by boat. The boat arrives from Belem in Paramaribo in 8 days. The costs are the same but the risks are higher. The last time, the boat almost sank and her shipment had gotten wet, and so many clothes were ruined. A lot had to be thrown out and, and the clothes that were still more or less OK had to be sold against a reduced price. She lost a lot of money that time.

Despite this downfall, Márcia has managed to save quite some money, and in 2020 she bought a larger and better located river-front home in Ronaldo, for 17,000 euro. The place used to be a restaurant, but she plans to sell everything inside, and then start her salon here. She is

¹⁷ Not her real name

looking forward to having a larger and more prominent salon, as she has a lot of clients – all women. She charges €20 to cut hair, and €40 to cut and blow dry. She also does eyebrow shaping, epilation and placement of piercings in ears and the nose.

In addition to the hair and beauty salon and the cloth shop, Márcia has started a money transfer business. She sends the money she earns in Euro to Paramaribo, with the planes that land on the nearby Tabiki airstrip. She asks a pilot to take it. A female business partner picks up the money in Paramaribo, and brings it to a Chinese Money Exchange office. He places the money in Reais in Márcia's bank account in Brazil. For example, if she sends €1000 to town, he will exchange for 5.5 and send 5500 Reais to her bank account. Subsequently Márcia pays 40 Reais to the women who helps here get the money from the Zorg en Hoop local airport to the Cambio in Paramaribo. This same way, Márcia provides a service for other people who would like to send money to Brazil, but against a slightly lower exchange rate. For example, when the Cambio gives her a rate of 5.5, she will provide a rate of 5.3. So if a *garimpeiro* wants to send €1000 to his family in Brazil, she will take his Euro's and deposit 5,300 Reais on the bank account he provides, making a 200 Reais profit (minus the share for the female business partner in Paramaribo).

In addition to this business, she sells phone recharge cards for the Digicel network service. She sells the SRD 20 phone recharge cards for €2-; making a 50 percent profit. The nearby Chinese supermarket sells these same cards for €3, so she sells much cheaper.

Márcia does not travel much to French Guiana, only for medical reasons; to see a doctor or buy medication. She also goes there for her contraceptives. During the height of the Covid pandemic there was a lot of control on the river, and they were not allowed to cross, only for emergency cases.

Soon, Márcia wants to return to Brazil. That is where her roots are. She is only here at Ronaldo for work. About a year ago she bought a house in Mato Grosso, Brazil, close to where her son lives with his uncle. He is 16 now. Her house is a beautiful, modern-looking structure with a spacious kitchen and all other facilities. If Covid had not erupted, she believes, she would have moved to Brazil already. But now, with the pandemic, everything has become more expensive and there are fewer people at Ronaldo. As a result, her sales have diminished. She still wants to leave within a year from now, but she wants to save a little more money before she goes.

Woman, equipment owner – together with husband, age 53.

Eliane went to work in the *garimpos* of French Guiana for the first time in 2016. Friends from Brazil who were already working in French Guiana were talking about it. They said one could earn good money here. She and her husband had taken a plane to Suriname (Zanderij), and then traveled over land to Albina, where she had crossed the border into French Guiana. She never experienced problems crossing the border; neither with the border police at Zanderij, nor with the gendarme when crossing the Marowijne River to enter French Guiana.

Eliane does not like the *garimpeiro* lifestyle. Their friends and acquaintances in Brazil told them they would be able to earn a lot of money here, but it has been a disappointment. The money is little, and life in the forest is difficult. Conditions are very basic, one cannot eat well, and you often feel weak. In 2019, Eliane returned to Brazil, to stay with their two daughters, but her husband stayed behind to continue to work. About a year ago, Eliane left Brazil again to join her husband in the *garimpo* of French Guiana.

In the past year, Eliane and her husband worked in a mining area relatively near Albina. This area was relatively easy to reach, but it had no money. Now they will start a new operation in Dagou-Ede, further south along the Lawa River. It is about one day traveling by boat from Albina. Her husband already moved the equipment there. Friends from Brazil also work in Dagoe-Ede, that is how they found out about this place. Suriname also has *garimpos*, but French Guiana has more money. And where she worked before it was peaceful; they did not have any problems with the gendarme.

Usually, when they work, she travels to Albina every two or three months to buy supplies for the operation. This time, however, she had traveled to Paramaribo for medical care. She had seen a Cuban doctor there, and she felt she had been treated well. She does not have health insurance, so she paid out of pocket. She never went to a medical doctor or clinic in French Guiana. When I spoke Eliane in Albina, she and her husband had just returned from Paramaribo. In Albina, they were buying supplies for the new operation, and recruited a man to come with them.

Eliane and her husband have two daughters in Brazil. They have used the mining incomes partly to pay University tuition and expenses for their youngest daughter. She lives with her sister, who is already independent and working.

Eliane and her husband would like to return to Brazil soon. It is difficult now though, because the expenses have increased and they have not been able to earn a sufficiently. The idea was that they would sell the mining equipment and return to Brazil, but where they were working before, earnings were not great and the *garimpeiros* around them did not have the money to buy the equipment. Now they have decided to work a couple of months more to earn just a little more before they leave altogether.

