BACKGROUND STUDY FOR REDD+ IN SURINAME:

# MULTI-PERSPECTIVE ANALYSIS OF DRIVERS OF DEFORESTATION, FOREST DEGRADATION AND BARRIERS TO REDD+ ACTIVITIES

Strengthening national capacities of Suriname for the elaboration of the national REDD+ strategy and the design of its implementation framework

UNIQUE
forestry and land use

Background study for REDD+ in Suriname:

# Multi-Perspective Analysis of Drivers of Deforestation, Forest Degradation and Barriers to REDD+ Activities

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**Disclaimer**

The content of this report does not necessarily reflect the official policy or position of any agency of the Government of Suriname. The purpose of the report is to feed the REDD+ readiness process with background information that will be further analysed and considered when developing the national REDD+ strategy for Suriname. Views and opinions expressed in this report, as well as assumptions made within the analysis, are those of the consultants or their informants and should not be seen as definite facts. The report includes some analysis that is based on preliminary data, since final numbers were not yet available when the work was carried out. Annex 6 includes official numbers for deforestation and land areas for different classes that have since then been validated by SBB. In cases where there is a difference between the analysis and Annex 6, the latter is valid. It can be expected that future research will continue to improve data relevant for this report.

Cover photo: The Rosebel Gold Mine (jointly owned by IAMGOLD and the Government of Suriname) in the Brokopondo District

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| A/R | Afforestation and Reforestation |
| ASGM | Artisanal and Small-scale Gold Mining |
| CBO | Community Based Organization |
| CCD | Climate Compatible Development |
| CELOS | Center for Agricultural Research in Suriname |
| CoP | SBB Code of Practice |
| DDFDB+ | Drivers of Deforestation, Forest Degradation and Barriers to REDD+ |
| ESIA | Environmental and Social Impact Assessments |
| FAO | Food and Agriculture Organization of the United Nations |
| FCMU | SBB's Forest Cover Monitoring Unit |
| FCPF | Forest Carbon Partnership Facility |
| FPIC | Free, Prior and Informed Consent |
| FMU | Forest Management Unit |
| FSC | Forest Stewardship Council |
| FSC-CW | Forest Stewardship Council, Control Wood |
| GOS | Government of Suriname |
| ha | hectare |
| HFLD | High Forest cover, Low Deforestation rate |
| IDB | Interamerican Development Bank |
| IDCS | Investment and Development Corporation Suriname N.V. |
| IIRSA | Initiative for the Integration of the Regional Infrastructure of South America |
| IMF | International Monetary Fund |
| INDC | Intended Nationally Determined Contribution |
| LBB | Dienst 's Lands Bosbeheer |
| MUMA | Multiple-Use Management Areas |
| NCCPSAP | National Climate Change Policy, Strategy and Action Plan |
| NGO | Non Governmental Organization |
| NIMOS | National Institute for Environment and Development in Suriname |
| NS | REDD+ National Strategy |
| OGS | Presidential Commission to Regulate the Gold Sector |
| OP | Suriname's Multi-Annual Development Plan (Ontwikkelingsplan) |
| PA | Protected Area |
| PMU | Project Management Unit |
| PRODOC | Project Document |
| RAC | REDD+ Assistants Collective |

| | |
|---|---|
| RGM | Rosebel Gold Mines N.V. |
| ROS | Republic of Suriname |
| REDD+ | Reducing Emissions from Deforestation, forest Degradation, sustainable management of forests, conservation of forest carbon stocks and enhancement of forest carbon stocks |
| REL/RL | Reference Emissions Levels / Reference Levels |
| RGB | Ministry of Physical Planning, Land- and Forest Management |
| R-PP | Readiness Preparation Proposal |
| SBB | Foundation for Forest Management and Production Control |
| SBSTA | Subsidiary Body on Scientific and Technological Advice |
| SCF | Suriname Conservation Foundation |
| SFM | Sustainable Forest Management |
| Stinasu | Foundation for Nature Conservation in Suriname |
| UNDP | United Nations Development Programme |
| USD | United States Dollars |
| WRI | World Resources Institute |

# EXECUTIVE SUMMARY

## Introduction and objectives

**Suriname stands out as one of the world's countries with highest forest cover and lowest deforestation rates**.[1] Its forests form part of the Guiana Shield tropical forest ecosystem, one of the largest contiguous and relatively intact forested ecoregions of the world. These forests provide important goods and services at local and global levels, including income and food security for forest communities and climate mitigation and biodiversity preservation for society at large. Recognizing the importance of these forests, Suriname has been actively preparing its institutions and stakeholders to engage in the international forest climate mitigation mechanism REDD+, collectively known as "reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries."

**In preparing the national REDD+ strategy, REDD+ participant countries conduct a series of analytical studies to support informed decision making.** In this context, the National Institute for Environment and Development in Suriname (NIMOS) and Suriname's Foundation for Forest Management and Production Control (SBB) commissioned a study to better understand the past, current and potential future land use change dynamics that affect the country's forest cover and composition: *Background Study for REDD+ in Suriname: Multi-Perspective Analysis of Drivers of Deforestation, Forest Degradation and Barriers to REDD+ Activities* (hereafter referred to as the "DDFDB+ Study"). In addition, the DDFDB+ study is meant to provide explanatory factors for these land use trends. Given the numerous institutions and individuals that have an interest, or stake, in Suriname's forests, the study seeks to take into account the multiple stakeholder perspectives. Although this study provides an objective overview of the historical deforestation that has been identified through remote sensing, the study also contributes to an important dialogue that is being held in Suriname with regard to deforestation, forest degradation and how best to address the drivers of that deforestation through REDD+. To make sure that the key stakeholders agree on the main drivers that should be addressed through REDD+, the dialogue must continue beyond this study.

**The overall objective of the DDFDB+ study is to identify crucial challenges and main points for improvement related to drivers of deforestation and forest degradation in Suriname, as well as to barriers for sustainable management of forests, conservation of forest carbon stocks and enhancement of forest carbon stocks.** Specific objectives of the overall study are:

- Explanation of Suriname's high forest cover and low deforestation (HFLD) status to better understand how Suriname can follow a development pathway that does not compromise its HFLD status moving forward;
- Deeper knowledge about the direct and underlying drivers of deforestation and forest degradation linked to each land-use sector in Suriname and interactions between them;

[1] In technical terms, Suriname is referred to in the context of the forest transition theory as having High Forest cover, low Deforestation rate (HFLD) (Angelsen & Rudel 2013).

- Determination of the relative significance of drivers in terms of greenhouse gas emissions, with respective spatial disaggregation;
- Analysis of local community perceptions of drivers and barriers, and their visions for the forest.

**In order to better understand the causes of this deforestation, this study combines a variety of methods to undertake a comprehensive assessment that incorporates the perspectives of numerous key stakeholders.** The methodological steps employ simple tools that are transparent, replicable and understandable for a large set of stakeholders. A capacity building approach was employed throughout the study.

**The stakeholder engagement approach applied for this study was designed and conducted in close collaboration with NIMOS/SBB**, as the key national institutions responsible for developing a national REDD+ strategy. The DDFDB+ study built on their existing and on-going stakeholder engagement efforts. From the beginning, it was emphasized that this study should prioritize the *process*, not only the end *product*. Therefore, the study was launched through a 2-weeks inception mission where the key stakeholders were consulted and the study was introduced. The approach was explained, and preliminary analysis was presented and discussed (see Annex for full lists of stakeholders consulted). After the introductory meetings, numerous bilateral interviews and meetings were conducted to allow for in-depth discussions with key stakeholders. These stakeholders represented public, private and civil society groups in Suriname. The in-depth drivers analysis mainly consulted stakeholders engaged in land use and decision-making surrounding land and forest use. At the national level, key stakeholders were organized into thematic issues grouped according to sector. These thematic groups were given the opportunity to provide feedback on interim results of the study that were shared in the form of concept note working papers.

**Thereafter, a draft DDFDB+ study report was broadly shared with over one hundred stakeholders that were invited to the national validation workshop.** The draft report was shared one week in advance to give stakeholders the opportunity to read and thoroughly digest the findings. Then, during the validation workshop, in-depth discussions were held surrounding the results. This was organized through working groups where stakeholders were again divided into thematic groups to provide specific feedback, critique and suggestions for improving the report. Stakeholders were especially engaged to provide constructive and forward-looking feedback in the form of next steps and were invited to share how they feel they can personally contribute to Suriname's national REDD+ process. The consultant team conducting the DDFDB+ study facilitated these working groups to ensure that the key messages arising from the group discussions were incorporated in the revised draft of the final report.

## Main findings

**This executive summary provides a synopsis of the key findings to facilitate policy learning and swift uptake of the study findings in Suriname's REDD+ process.** With regard to the first task, the analysis of Suriname's HFLD status suggests that a number of unique contextual factors explain the country's historically low levels of deforestation and forest degradation (for more details, see Annex 1). Therefore, this study began by looking backwards for explanations for why Suriname has maintained its HFLD status, but also taking into consideration that history does

not always provide a sound basis upon which to predict future developments. Suriname's forests have been subject to increasing pressures causing degradation and conversion to other land uses.

**The main direct drivers of deforestation in order of importance in Suriname from 2000 to 2015 were mining (73%), road infrastructure (15%), and urban development (4%).** All drivers of deforestation have increased over that time period. In terms of forest degradation, shifting cultivation and forestry are two proximate drivers quantified. A number of other activities may have a negative impact on forest health and composition, e.g. forest fragmentation due to mining or non-anthropogenic natural causes such as forest fires or storms. These however, have not been analyzed in the scope of this study as these are difficult to quantify in terms of their spatial impact due to a number of reasons, including the extent of these drivers may be fragmented and below the minimal mapping unit, making them difficult to observe through remote sensing. It is recommended to assess these activities in the near future.

**Shifting cultivation deserves special attention in the context of Suriname as this land use exemplifies the different stakeholder perspectives.** SBB considers expansion of shifting cultivation as forest degradation because the forest carbon stock is reduced when transitioning from primary forest to shifting cultivation. Other stakeholders have a slightly different perception, stating that shifting cultivation is comprised of diverse agroforestry systems, some of which can be considered deforestation if the trees established in that system do not meet the minimum criterion of forest cover, while others recuperate the minimum forest cover over time. The forest area affected by shifting cultivation has expanded less (50% less) in the period 2009-2015.

**The predominant forestry practices in Suriname entail selective logging where forest cover (albeit degraded to different degrees) remains post-harvesting.** More data is needed to assess forest degradation from logging and the potential to address this in the REDD+ strategy. It is recommended to conduct field research in the near future to measure the impacts of the various forest management types in terms of forest degradation and carbon stock losses.

**Although road infrastructure and urban development contribute directly to deforestation, these drivers are also highly relevant as underlying causes as they often lead to increasing deforestation in other land use sectors such as mining and agriculture.** Therefore, road infrastructure and urban development are analyzed taking their cascading effects into account. Further, there is a significant link between mining and expansion of energy generation, since energy needs of the mining sector motivates the construction of hydrodams with negative impact on forest cover.

**To support REDD+ strategy design and inform policy-makers with objective information, deforestation and forest degradation and their respective drivers were quantified in a number of ways.** The study analyzes key land use change drivers in three enumerated ways: 1) in terms of their contribution to forest loss and forest degradation; 2) contribution to national GHG emissions; and 3) opportunity costs. The deforestation rate has increased by a factor of five over the past fifteen years, from roughly 0.02% in 2000-2009 to 0.1% in 2014-2015. The majority (73%) of this deforestation is due to mining, especially small- and medium-scale gold mining (SBB 2016; Rahm et al. 2016). Land-based emissions due to mining amounted to 49.35 million $tCO_2$ and 3.29 million $tCO_2$ /year on average in the 15-year period, including aboveground, belowground and soil carbon pools. Large-scale mining has the highest opportunity costs of all land

uses, estimated at USD 212/$tCO_2$. Small-scale mining has an opportunity cost of USD 122/$tCO_2$. In total between 2000 and 2015, the agricultural sector was responsible for 2,344 ha of deforestation in the country, which is 2.7% of the total deforestation in Suriname. From 2009-2015, the annual average deforestation rate associated with agriculture more than doubled to 245.2 ha per year (in total 1,471 ha). Agriculture contributed 1.69 million $tCO_2$ of GHG emissions (112,850 $tCO_2$ /year). Small-scale mining has an opportunity cost of USD 122/$tCO_2$. The opportunity costs of agriculture range between USD 4-22/$tCO_2$, depending on the crops, markets and production systems. Regarding forestry, roughly 1.6 million ha have been issued as logging concessions and other forestry production titles, 737,507 ha for community forest, and 168,363 ha for Incidental Cutting Licenses (including an ICL for submerged timber in the hydropower lake). Of this, 396,880 ha was certified for sustainable forest management (SFM) in late 2015. Over a 20-year period, conventional logging results in carbon stock loss of 31 $tCO_2$/ha while controlled and SFM certified logging results in carbon stock losses of 23.2 $tCO_2$/ha. This takes into account biomass extraction in year 1 and biomass regrowth over 20 years. The different forest management types have opportunity costs per $tCO_2$ that range from USD 1.5 to USD 6.4.

**Various indirect causes help to explain the documented deforestation and forest degradation**. Taking the perspective of the deforestation or forest degradation (DFD) agent is helpful to explain DFD, as this allows for better understanding their incentives or circumstances leading them to carry out their activities identified as harmful. In many cases, DFD agents do not have alternative options to support their livelihoods. This is especially the case for artisanal and small-scale gold miners (ASGM) and small-scale farmers. To shed light on the potential explanations for DFD, a cost-benefit analysis was conducted for the different agents identified. A key outcome of the cost-benefit analysis is the opportunity cost assessment explained above, but this is complemented with an assessment of costs and benefits that are not easily quantifiable.

**Underpinning proximate or direct drivers of deforestation are underlying causes**. Understanding these causes is important because deforestation often finds its root causes in global trends found 'outside the forest'. The causes underlying forest loss and degradation differ according to driver and agent, with some underlying causes more relevant for others and vice versa. Figure 12 shows that different strategies will need to be developed for the different sectors causing deforestation and adapted for the different agents identified.

At the same time, certain underlying causes are cross-cutting in that they affect all drivers to some degree. **One of the main underlying causes identified is the lack of integrated land use planning that combines the development priorities of all relevant sectors while ensuring sustainable forest management.** Forests in Suriname, except those on privately owned land, are under the responsibility of the Ministry of Physical Planning, Land and Forest Management (RGB). The control over forest management is mandated to the Foundation for Forest Management and Production Control (SBB). Other tasks, such as infrastructure development in the interior, mining exploration and mineral resource extraction, are the responsibility of other ministries or government agencies. The overarching government body (Council of Ministers linked to Cabinet and supported by the National Planning Office as technical working arm) needs to be strengthened to exercise its functions effectively by taking a lead role in balancing the trade-offs between the different land use pressures in a way that fosters REDD+.

**Different strategies will need to be developed for the different sectors causing deforestation and adapted for the different agents identified**. In general, the analysis shows that

demographic trends, such as population growth and migration, plays a minimal role in causing current and future deforestation, except for small-scale gold mining, where demographic trends play a key role as the number of small-scale gold miners is expected to increase.

**Economic and technological factors such as poverty, capacity and production techniques play an important role in influencing current and future deforestation for smallholder land users.** Poverty has significant explanatory power for small-scale deforestation agents such as community forest operators, small-scale miners and subsistence farmers, and in all cases, the impact of poverty is expected to become more exacerbated in the future. This is strongly linked to the technological factors such as production techniques for the different land uses. Therefore, poverty reduction strategies, e.g. through policies and measures to improve smallholder productivity or sustainable livelihood alternatives, are seen as key intervention levers to reduce deforestation while fostering sustainable development in Suriname.

**The main policy issue identified relates to collective land rights, where there is a strong link with the work carried out for community perceptions.** The lack of legal recognition for collective land rights is often seen as a barrier to sustainable land and forest management. This is corroborated by the work on community perceptions, which identified poor governance and lack of secure land rights as the greatest obstacles to achieving sustainable forest management and use. Securing land rights is seen as important to safeguard the protection of the land, the waters and the wellbeing of the indigenous and tribal peoples. At the same time large commercial and development projects that are beneficial to the government and enterprises take place in communities' vicinity. Issues such as corruption and vague promises cause and increase distrust.

**While the existence of comprehensive policy and institutional frameworks is important, their lack of effective implementation (i.e. governance) is considered a fundamental underlying cause.** Weak institutional capacity at the national and decentralized level has led to poor law enforcement and a resulting negative impact on deforestation. The fact that governance is expected to continue business as usual suggests that investments to improve forest and land governance through REDD+ may be a promising approach to reduce deforestation and forest degradation in Suriname. In other words, in the lack of a REDD+ program, one can expect that poor governance will continue to be problematic in Suriname.

**The environmental underlying causes identified are particularly important and most relevant for the mining and agriculture sectors**. To a large extent, they cannot be changed. In the former, resource availability and access dictate the ability of miners to continue their practices, while in the case of agriculture, climate change and biophysical factors such as soil fertility and changing weather patterns will play an important role.

**In general, there is a recognized risk that the current trends of accelerating deforestation and forest degradation will continue** as national development plans focus on infrastructure construction and engaging investors in extractive industries in forest areas. Current policy documents propose that Suriname may be entering an era of increased economic and industrial development, promoting large-scale agriculture and further natural resource extraction.

**From the perspective of the forest communities that participated in this study, forests are valued for numerous reasons, including productive activities, such as subsistence agriculture, hunting, fishing, timber harvest and small-scale gold mining.** Indigenous and tribal peoples groups in the interior claim exclusive and inalienable rights to the village grounds and their

surrounding forest lands. By law, however, these groups do not have rights to the lands they customarily inhabit and use for their livelihoods. Many live in communities within gold or forest concessions, or in their zones of impact. Further, the Surinamese society embodies large disparities between the coastal zone and the rural interior. The rural interior is poorest and most marginalized, with limited access to decent education and health services. Many forest community members have no alternative income opportunities to agriculture or mining economic, with both activities often crucial for food security. Such realities must be taken into account when conducting drivers studies to ensure that REDD+ strategies do not adversely affect already marginalized stakeholders.

**As one of the few countries in the world classified as HFLD, Suriname provides a unique opportunity to maintain some of the world's most important biodiversity and freshwater resources while simultaneously avoiding greenhouse gas emissions.** This chapter integrates the synthesized outputs of the different tasks carried out throughout the duration of the study to provide a concise summary of the entire analysis. Key points are extracted to set the frame for the pathways forward, specifically related to the main priority moving forward: development of a national REDD+ strategy. Table 25 below summarizes the main findings of the analysis of the REDD+ eligible activities, demonstrating the key areas where REDD+ can intervene forSuriname to maintain its HFLD status and continue to act as key net carbon sink (GOS 2015).

**Table 1: Summary overview of REDD+ eligible activities in Suriname**

| REDD+ eligible activity | Current status | Relevance for REDD+ in Suriname | Main barriers | Opportunities |
|---|---|---|---|---|
| **Avoiding deforestation** | Minimal impact (i.e. low deforestation rate), but potentially expanding significantly in future. | Addressing mining (main driver) will be crucial for REDD+ strategy, especially given the significant non-carbon (social and environmental) benefits that can be generated (Rahm et al. 2015). | High opportunity cost for addressing mining; significant influence of international gold price (Dezécache 2015), which is difficult to regulate through REDD+. | Integrate REDD+ in NDC* and Vision 2035 to maintain HFLD status. |
| **Avoiding degradation** | Known degradation drivers are forestry and shifting cultivation. Other potential drivers of degradation still need to be assessed. | Addressing degradation caused by poor law enforcement considered to hold significant potential, esp. in community forests and HKVs**. | Law enforcement (Code of Practice) is lacking. | Significant areas of logging concessions currently under conventional logging with potential to shift to sustainable forest management. |
| **Conserving forest carbon stocks** | 13.5% of the country currently protected. The degree of enforcement is different, depending especially on whether the protected area (PA) is located where mining potential is high, i.e. in the Greenstone belt. | Highly relevant due to Suriname's HFLD status. | Potential to expand PA network in Greenstone belt extremely limited, despite high biodiversity in those areas. | South Suriname Conservation Corridor aims to establish 7 M ha PA to increase total PA area to 45%, thereby preserving much of Suriname's highly valuable |

| | | | | |
|---|---|---|---|---|
| | | | | pristine forest ecosystems in the south of the country. |
| **Sustainable forest management** | See "avoided degradation" above 1.65 million ha under concession for logging. | Highly relevant as 1.65 million ha are under concessional forest management. | Lack of governance enforcement leading to forest degradation. | Increase the effectiveness of law enforcement and efficiency of SFM asa principle. |
| **Enhancing forest carbon stocks** | Limited success and limited relevance for aforestation/reforestation (A/R) or enrichment planning. | Only relevant for mining areas. | Limited success due to poor up-take of enrichment planting treatments. | Reforesting abandoned bauxite mines. |

*Note: * NDC stands for Nationally Determined Contribution, which entails the translation of Suriname's INDC into an actionable plan to achieve the stated goals; **HKV are community forest titles that have been granted to village chiefs before the 1992 Forest Management Act. Both are under conventional logging, without pre-harvest planning such as logging compartments, roads, landings and skid trails.*

**Although Suriname's forest cover and deforestation rate currently maintains the country's HFLD status, the trend in the deforestation rate appears to be strongly increasing, and if it continues to increase linearly, the annual deforestation rate may exceed 0.5% around 2025 (total forest cover will by then have fallen below 90%).** Suriname's historically low deforestation rates cannot necessarily serve as the basis for how deforestation trends will evolve in the future. In the period 2009-2013, the average annual forest loss is estimated at 9,591 ha (annual deforestation rate 0.06%), of which 73% is estimated to be caused by gold mining; in the preceding years (2000-2009), the annual rate was 3 times lower (0.02%).

## Next steps

**The below summary of findings takes a forward-looking approach in that the combined results are explained in a way that considers which drivers and barriers would be the most appropriate to address through REDD+.** While this study provides important information, the design of Suriname's REDD+ strategy will be informed by a comprehensive assessment of the different strategic options (i.e. policies and measures) that can not only address deforestation and forest degradation but also support conservation, sustainable management of forests and carbon stock enhancement. Moving forward, it will be important to develop criteria for identifying and prioritizing REDD+ strategy options that not only contribute to climate mitigation but also to poverty reduction, biodiversity conservation, or other key areas that Suriname prioritizes for its Climate Compatible Development pathway. Trade-offs are inevitable when designing REDD+ strategies, and this report helps to understand the type of decisions that will need to be taken. For example, REDD+ in Suriname may not only address those drivers that are causing the most deforestation, but potentially also those that deliver the most important livelihood benefits at the local level. The nature of the REDD+ strategy will also depend on the priorities prescribed by the source of REDD+ finance. REDD+ strategy options may include sector-based interventions to improve land or forest productivity while reducing negative impacts on forest cover and composition. Strategy options can also include cross-cutting actions and measures that address the underlying causes of deforestation, such as integrated land use planning and capacity building.

**Mining, especially small-scale gold mining, is the main cause of deforestation from 2000 to 2015 in Suriname and its impact is likely to increase in the near future as alternative economic opportunities remain limited.** Although gold mining is a serious cause of deforestation, there is an absolute limit to gold mining-related deforestation, due to the fact that the known gold bearing geological formations (Greenstone Belt) occupy no more than about 7% of Suriname's land surface (excluding the Brokopondo lake, which is located in the Greenstone Belt). Despite the concentrated nature of this driver in geographic terms, however, the ensuing social and environmental harms are significant, widespread and exacerbating. Therefore, in order for Suriname's national REDD+ strategy to be comprehensive, this driver must be addressed, especially ASGM where most miners do not have alternative livelihood options and a significant portion of them are foreigners. Any effort in this area, however, must be closely coordinated with the numerous on-going and planned interventions in the ASGM sector.

**Addressing shifting cultivation in the interior as a key driver of forest degradation offers pro-poor REDD+ options.** Although the expansion rate of forest area affected by shifting cultivation has decreased in the recent past, addressing this driver provides the opportunity to produce significant additional benefits for marginalized members of the Surinamese society. The rural population in Suriname's interior is adversely affected by the lack of government services, economic development remains hampered and income from alternative opportunities are scarce. Further, it is largely women that are engaged in this type of small-scale subsistence agriculture. Therefore, addressing this driver through REDD+ offers a proactive gender-sensitive approach that can increase resilience in vulnerable households and communities. However, certain shifting cultivation practices are part of the cultural heritage of many forest communities. According to the work on community perceptions, forest communities show some differences when it comes to reasons for shifting cultivation. The primary reason is for subsistence, and surplus is sometimes sold or shared. When it comes to selling products, indigenous peoples focus more on wildlife trade, while agricultural products have no /less commercial aspect. Tribal peoples have a tendency to be pro-active and develop themselves as small scale entrepeneurs, selling products to community members/visitors. This is done mostly by women while men earn an income from other labour activities (sometimes in other villages or in Paramaribo).

**The forestry sector may provide a key entry point for developing REDD+ strategy options**. Although timber harvesting does contribute to carbon stock losses, sustainable forest management that follows the guidelines set out in Suriname's legal framework is generally considered to have low impacts. Therefore, sustainable forestry as prescribed by Suriname's laws can be regarded as an effective means to maintain high carbon stocks while generating economic value to forest managers and conserving biodiversity. Considering the growing number of timber harvesting licenses that have been issued since 2001, combined with the ambition to further increase the annual timber production to one million $m^3$ in 2020 (SBB 2016), the creation of large forest management units (FMUs) that are sustainably managed under the minimum requirements of controlled logging, should be stimulated and effectively enforced. The relationship with communities needs to be improved in this process to build trust in SFM.

**When addressing the main proximate drivers in Suriname, it is important to also take into account the link between road construction in the Interior and land use expansion into forest areas.** The impact of road construction in itself may not be a major driver of deforestation, but

the fact that accessibility and product transportation is facilitated by roads means that gold mining and possibly other activities such as agriculture may increase substantially as a result of road construction. Therefore, road infrastructure should be a key driver addressed through the national REDD+ strategy, ideally through integrated land use planning at the national and decentralized level.

**Although energy generation and large-scale agriculture have caused deforestation in previous times, the impact of these drivers in the recent past (i.e. 2000-2015) has been limited and is generally expected to remain limited in the near future**. However, it is important to note that the GOS does plan to significantly increase agriculture production – with the Government's aim to become the Caribbean's breadbasket – and the prospects for expanding energy production through hydro remains in the latest Annual Plan 2017 (GOS 2017). The ability to address such planned drivers that may contribute significantly to national economic development needs to be carefully and realistically assessed moving forward.

**As a HFLD country, Suriname's central challenge with regard to REDD+ will be avoiding the introduction of enabling conditions that improve accessibility to the currently isolated swathes of relatively undisturbed forest**. Especially opening the interior through road construction may increase anthropological pressure and risks significantly increasing forest conversion, whether due to large-scale investments or small-scale mosaic deforestation. The policy recommendation therefore is to carefully plan against actions and public and private investments that would trigger a process of accelerating deforestation. In order to maintain its HFLD status, Suriname will need to avoid, or very carefully plan, building roads, establishing large resettlements or agro-export schemes, or supporting commercial projects (e.g. mining) with accompanying infrastructure and energy supplies through hydrodams.

**Avoiding the construction of publicly funded penetration roads is extremely important in this context because, once completed, they spur the construction of privately funded roads by small-scale miners or investors in agricultural enterprises.** Some of these projects may still be pursued for purposes of income generation, but they should be undertaken only when careful Strategic Impact Assessments accompany the projects and the appropriate environmental countermeasures are taken. In the lack of any legally binding impact assessment standards at the national level, extreme caution should be taken when considering how REDD+ can be integrated into current and future development plans. Deforestation and forest degradation are of increasing concern in Suriname, in particular due to increasing gold mining activities. In Suriname's current context of economic hardships, it is important that the country does not turn to allotting large-scale forest concessions with the aim to stimulate foreign direct investment. A similar situation was visible in the early nineties, when Suriname granted 25-40% of the country's forest area to Asian logging companies (GOS 2013). This report as well as the stakeholder engagement exercises conducted throughout the course of the study is highly valuable for development of the future REDD+ strategy. The knowledge sharing and capacity building should continue to ensure an open dialogue that can foster the consensus building required for successful REDD+ strategy design and implementation.

**Moving forward, Suriname plans to develop a Vision 2035, which could be based on a green development pathway, with REDD+ forming an important element of that development vision.** Including REDD+ in this Vision 2035 may support the maintenance of Suriname's HFLD status by providing political support, similar to previous situations. Therefore, the multi-sectoral

dialogue that is in part instigated by this study provides a key opportunity to not only better understand the current problems and future challenges, but more importantly, to find joint solutions that can inform the future REDD+ national strategy.

# 1 INTRODUCTION

**Suriname is one of the world's few tropical forest countries with a High Forest cover and Low Deforestation (HFLD) status**.[2] Recent trends show, however, that increasing pressures on Suriname's forests could change this situation in the future. According to Suriname's Intended Nationally Determined Contribution (INDC), the country aims to maintain its high forest cover and low deforestation rate by practicing sustainable forest management in an effort to promote multiple use of its forest resources while at the same time exploring options for the payment of forest climate services that its forest provides (GOS 2015).

**REDD+[3] is considered a promising implementation approach for maintaining the country's HFLD status.** Suriname aims to develop a national REDD+ strategy to be integrated into broader development plans for the country, and REDD+ is mentioned in the Multi-Annual Development Plan – Ontwikkelingsplan (OP) 2017–2021. According to recent decisions taken under the United Nations Framework Convention for Climate Change (UNFCCC), national REDD+ strategies or action plans must be developed in a way that addresses the drivers of deforestation and forest degradation, barriers to sustainable forest management, conservation and enhancement of carbon stocks.[4] Therefore, this *Background Study for REDD+ in Suriname: Multi-Perspective Analysis of Drivers of Deforestation, Forest Degradation and Barriers to REDD+ Activities* (hereinafter referred to as the "DDFDB+ Study") lays the foundation for national REDD+ strategy development.

### Study objectives

**On August 1, 2016, the National Institute for Environment and Development in Suriname (NIMOS) contracted UNIQUE forestry and land use GmbH to carry out the study: *Background Study for REDD+ in Suriname: Multi-Perspective Analysis of Drivers of Deforestation, Forest Degradation and Barriers to REDD+ Activities*** (hereinafter referred to as the "DDFDB+ Study"). The study falls within the framework of the REDD+ Readiness project *"Strengthening national capacities of Suriname for the elaboration of the national REDD+ strategy and the design of its implementation framework"* of which NIMOS is the implementing partner and Suriname's Foundation for Forest Management and Production Control (SBB) is responsible partner partner**.**[5]

**The overall objective of the DDFDB+ study is to identify crucial challenges and main points for improvement related to drivers of deforestation and forest degradation in Suriname, as well as to barriers for sustainable management of forests, conservation of forest carbon stocks and enhancement of forest carbon stocks.** The study will provide the main background analysis for REDD+ national strategy (NS) development, the development of the National Forest Monitoring System (NFMS), Forest Reference Emission Level/Forest Reference Level (FREL/FRL), Strategic

[2] HFLD countries have more than 50% forest cover and an annual deforestation rate which is lower than the global average of 0.22%.
[3] REDD+ stands for *Reducing Emissions from Deforestation and forest Degradation, conservation of forest carbon stocks, sustainable management of forests and enhancing forest carbon stocks.*
[4] According to Paragraph 71 of decision 1/CP.16, national REDD+ strategies are highly dependent on national circumstances: http://redd.unfccc.int/fact-sheets/national-strategy.html.
[5] For more detailed information on REDD+, see Suriname FCPF Country page: https://www.forestcarbonpartnership.org/suriname.

Environmental and Social Assessment (SESA) and Safeguard Information System (SIS) in Suriname.

Specific objectives of the overall study are:

- Explanation of Suriname's high forest cover and low deforestation (HFLD) status to better understand how Suriname can follow a development pathway that does not compromise its HFLD status moving forward;
- Deeper knowledge about the direct and underlying drivers of deforestation and forest degradation linked to each land-use sector in Suriname and interactions between them;
- Determination of the relative significance of drivers in terms of greenhouse gas emissions, with respective spatial disaggregation;
- Analysis of local community perceptions of drivers and barriers, and their vision for the forest.

## Report structure

**In order to facilitate information uptake for the development of the national REDD+ strategy, this report is structured according to the five eligible REDD+ activities[6] in the context of Suriname.** This is meant to facilitate knowledge assimilation and its swift application to best guide the country's REDD+ process, which prioritizes information sharing amongst a multitude of stakeholders. The five activities are as follows:

1. Reducing emissions from deforestation;
2. Reducing emissions from forest degradation;
3. Conserving forest carbon stocks;
4. Sustainable management of forests;
5. Enhancement of forest carbon stocks.

Although there are overlaps between these activities, the analysis described in Chapters four to six deal mainly with the first two activities, while Chapter eight explains the general status, relevance, main barriers and challenges of the last three activities. This is complemented with the summary findings of the community perceptions related to these five activities, presented in Chapter seven.

**It is important to note that these activities still need to be defined in the precise context of Suriname through the development of the national REDD+ strategy, and a detailed assessment of REDD+ strategy options is planned as part of the REDD+ Readiness process** (UNDP 2014). The guidance provided by the UNFCCC surrounding the definition of these activities is limited. Defining REDD+ activities at the international level is challenging, exemplified by how the Food and Agriculture Organization of the United Nations (FAO) attempted to inform the definition of the term "forest degradation."[7] So as definitional issues do not become constraints, REDD+ countries are encouraged to define the relevant activities within their country contexts (Morales-Barquero et al. 2014). Therefore, the following definitions are provided for the first

[6] 1) Reducing emissions from deforestation; 2) Reducing emissions from forest degradation; 3) Conserving forest carbon stocks; 4) Sustainable management of forests; 5) Enhancement of forest carbon stocks.
[7] See http://www.fao.org/docrep/009/j9345e/j9345e08.htm.

two activities in the context of Suriname (see Chapter 8 for a detailed explanation of the last three activities).

### Reducing emissions from deforestation

**SBB (2016) defines deforestation as the direct and/or induced conversion of forest cover to another type of land cover in a given timeframe**. More specifically, deforestation has taken place whenever a previously area designated as forest no longer meets Suriname's forest definition criteria, which is Land mainly covered by trees which might contain shrubs, palms, bamboo, grass and vines, in which tree cover predominates with a minimum canopy density of 30%, a minimum canopy height (in situ) of 5 meters at the time of identification, and a minimum area of 1.0 ha (ibid.).

### Reducing emissions from forest degradation

**SBB (2016) defines forest degradation as a human-induced or natural loss of the goods and services, provided by the forest land, in particular the forest carbon stocks, not qualifying as deforestation, over a determined period of time**.[8] In other words, a reduction in the forests' ability to produce goods and services, and especially the reduction in carbon stocks, entails degradation. In the current context of Suriname, the main degradation drivers assessed through this study are shifting cultivation and forestry activities, i.e. timber extraction or logging. In this sense, the main distinction between deforestation and forest degradation is the permanence of changes in forest cover, with shifting cultivation entailing only temporary changes. Also, the extent of the forest patches affected by shifting cultivation also plays a role, as a recent analysis conducted by SBB suggests that more than 50% of the patches were smaller than one hectare. Other potential drivers of forest degradation that need to be assessed are amongst others forest fires and mining.

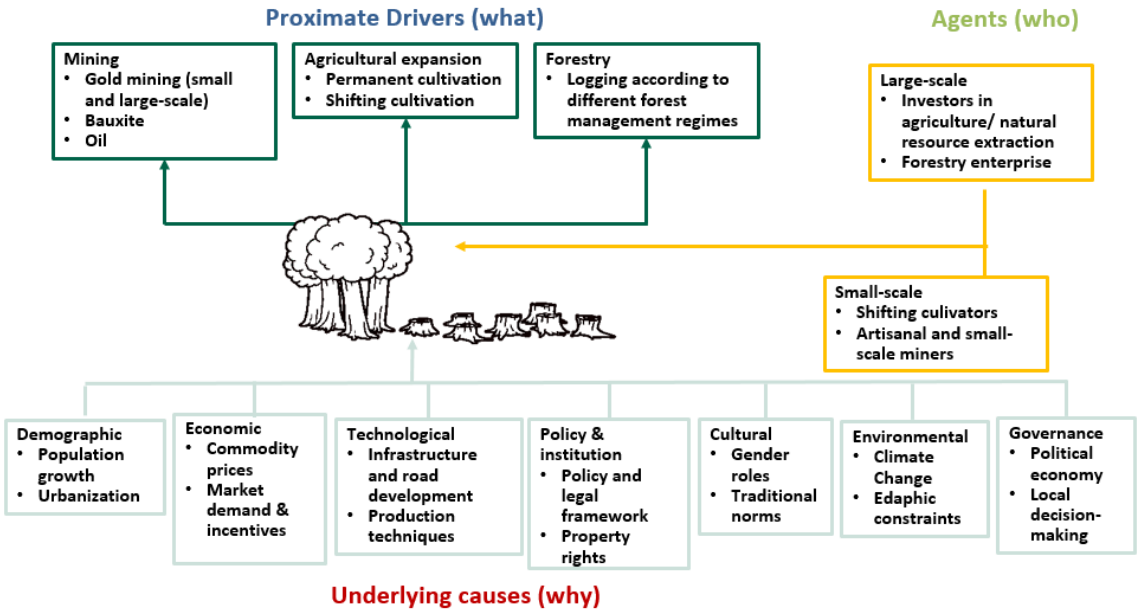
[8] This definition is currently being reviewed nationally, but corresponds with the definition proposed by the IPCC (2003) and the definition of FAO (2002) Proceedings: second expert meeting on harmonizing forest-related definitions for use by various stakeholders. Rome.

# 2 APPROACH AND METHODOLOGY

**When developing analytical approaches for studying drivers, it is important to note that deforestation dynamics are often complex and not easily reduced to a single factor or linear explanations.** The variability of actors, situations and relationships calls for localized analysis in forested areas. However, deforestation finds its root causes in global trends and drivers are often found 'outside the forest.' This study applied Geist & Lambin's (2001, 2002) archetypal work on proximate drivers, underlying causes and agents (depicted in Figure 1). This conceptual framework considers the variety of possible proximate drivers and causes underlying deforestation, dividing them into easily-understandable categories.

**Proximate or direct drivers of deforestation and forest degradation are human activities and actions that directly impact forest cover and result in the loss of carbon stocks.** As shown in Figure 1 below, these drivers are commonly grouped into general categories, including i) mining of different minerals; ii) agricultural expansion, such as commercial agriculture, shifting cultivation or cattle ranching; and ii) forestry, e.g. through unsustainable logging. Underpinning these proximate causes are underlying causes, a complex of economic issues, policies, and institutional matters; technological factors; cultural or sociopolitical concerns; governance; and demographic factors. While conceptually distinguishing between drivers, agents and underlying causes is relatively straightforward, the interlinkages and feedbacks between them depend on nuances and complex contextual factors that are often difficult to disaggregate and/or isolate.

**Figure 1: Conceptual framework: Examples of proximate drivers, agents and underlying causes**



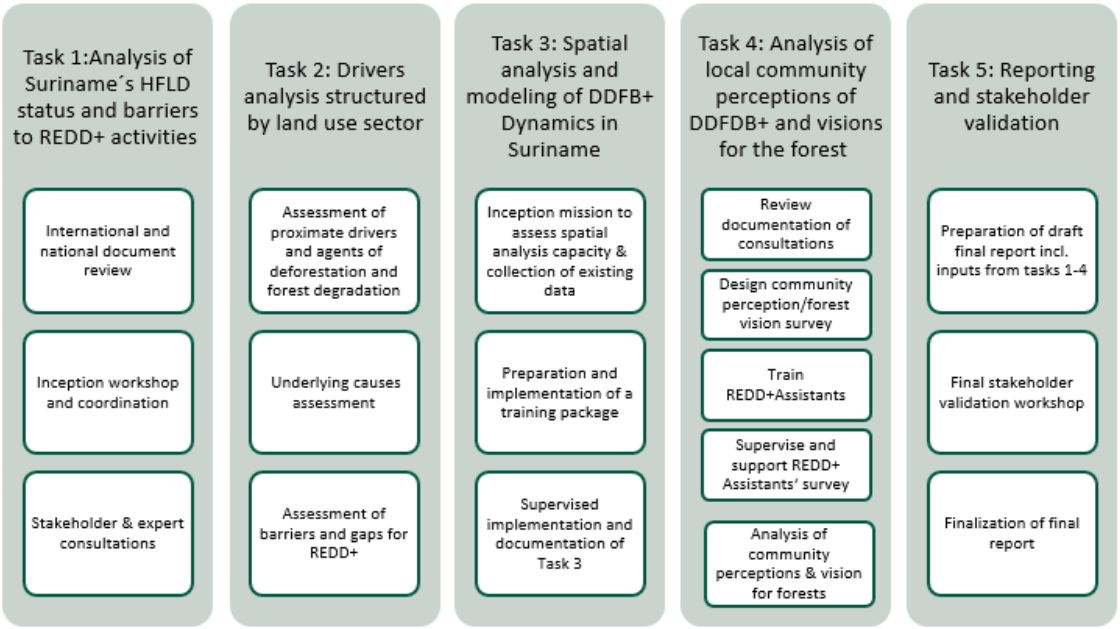

*Source: adapted from Geist and Lambin (2001, 2002)*

## Step-wise methodology

**Suriname is a diverse country, both culturally and ecologically, and thus a careful approach has been adopted to ensure that the assignment can accurately reflect the country's diversity** (see Annex for list of stakeholders consulted). Throughout the study, a highly participatory

approach was employed to incorporate the diverse views and understandings. This began during the study's inception phase, where a number of national and community stakeholders were engaged in detailed discussions about the preliminary findings of historical reasons underpinning land use change dynamics. Thereafter, information collection included quantitative and qualitative data, using perspectives from bottom-up (forest community perceptions) and macro-level analysis (remote sensing). Methodological triangulation was employed throughout the study, which involves using more than one method to gather data, such as informed judgments, expert interviews, gray and peer-reviewed literature, and non-published research. Figure 2 presents the series of interlinked analytical tasks conducted throughout the course of the study. More details on the precise analytical tools employed are provided in Annex 1.

**Figure 2: Overview of DDFDB+ Study Tasks and Activities**



# 3 OVERVIEW OF FORESTS IN SURINAME

**With 15.2 million ha of forest cover (93% of its total area), Suriname is one of the most forested countries in the world.** Due to its vast forest areas which act as a carbon sink, Suriname is a carbon negative country. In Suriname's Multi-Annual Development Plan (Meerjaren Ontwikkelingsplan – OP) 2012 – 2016, the protection of the natural environment, with focus on the safeguarding of carbon sinks, biodiversity, soils and water, has been identified as a key area of interest. The government aims to integrate this into the country's longer term development plans, where sustainability of the social, economic and natural environment is key. According to Suriname's Intended Nationally Determined Contribution (INDC)[9], the country aims to maintain its high forest cover and low deforestation rate by practicing sustainable forestry management in an effort to promote multiple use of its forest resources while at the same time exploring options for the payment of forest climate services that its forest provide.

### Context of Suriname: high forest low deforestation (HFLD)

**Designing and implementing effective REDD+ policies critically depends on a country or region's particular circumstances** (Angelsen & Rudel 2013). In the context of Suriname, REDD+ must incentivize avoided destruction of old-growth forests. Existing research at the global level highlights a number of general characteristics that can typically be expected of HFLD countries. These include low population densities, with the related remoteness of forests. Social characteristics typical of HFLD countries include a high correlation between poverty rates and forest cover (Sunderlin et al. 2008), poor access to government services and markets, low public and private investments, insecure land tenure, and relative difficulty in capturing potential forest rents (Angelsen & Rudel 2013). Further, because forest areas are remote in HFLD countries, governance challenges related to limited government capacity to implement measures and enforce regulations are generally perceivable at the first stages of the forest transition curve. A detailed analysis of the contextual factors specific to the case of Suriname explaining the country's HFLD status can be found in Annex 1. Table 2 below provides a summary of the main factors influencing Suriname's continued HFLD status. See section 5.5.4 for a more detailed analysis of the impact of infrastructure – in terms of road construction – on Suriname's HFLD status.

[9] Republic of Suriname, Intended Nationally Determined Contribution under UNFCCC, 30 September 2015.

**Table 2: Summary of explanatory factors for Suriname's HFLD status**

| Factors (general categories) | Explanation/specific examples |
|---|---|
| Policy and legal framework | ▪ National development planning is not effective in realizing large-scale infrastructure plans<br>▪ Sound legal framework governing forests<br>▪ Complicated institutional arrangements governing land and forest<br>▪ Weak enabling environment for private investment<br>▪ Conservation policy places much of Suriname's forests under protection |
| Biophysical | ▪ Terrain (some mountains and steep slopes)<br>▪ Edaphic (poor soils not suitable for agriculture)<br>▪ Rivers (with rapids and not possible for transporting certain bulky goods such as timber via shipping)<br>▪ Highly heterogeneous forest composition with many non-commercial tree species |
| Historical | ▪ Colonial heritage<br>▪ Ancestral land rights<br>▪ Political inertia |
| Social | ▪ Demography (low population pressure)<br>▪ Traditional lifestyle<br>▪ Limited economic opportunities in the Interior |
| Economic | ▪ National income and economic growth – focus on extractive industries with impact on forest confined to mining concessions<br>▪ Structure of the economy |
| Infrastructure | ▪ Limited roads and transportation networks<br>▪ Energy production (hydrodams) – not sufficient for large scale drivers (e.g. mining, sawmills) |

*Note: These factors have not been listed according to order of importance.*

# 4 OVERVIEW OF DEFORESTATION AND FOREST DEGRADATION

**The spatial analysis carried out for this study applied a capacity building approach, whereby UNIQUE forestry and land use worked closely with SBB/FCMU to map, quantify and project deforestation and forest degradation.** This chapter provides an overview of the spatial trends, introducing the main land use sectors identified as directly causing deforestation (mining, agriculture, infrastructure, and urban development) and forest degradation (shifting cultivation, forestry).

### Historical deforestation and forest degradation 2000 – 2015

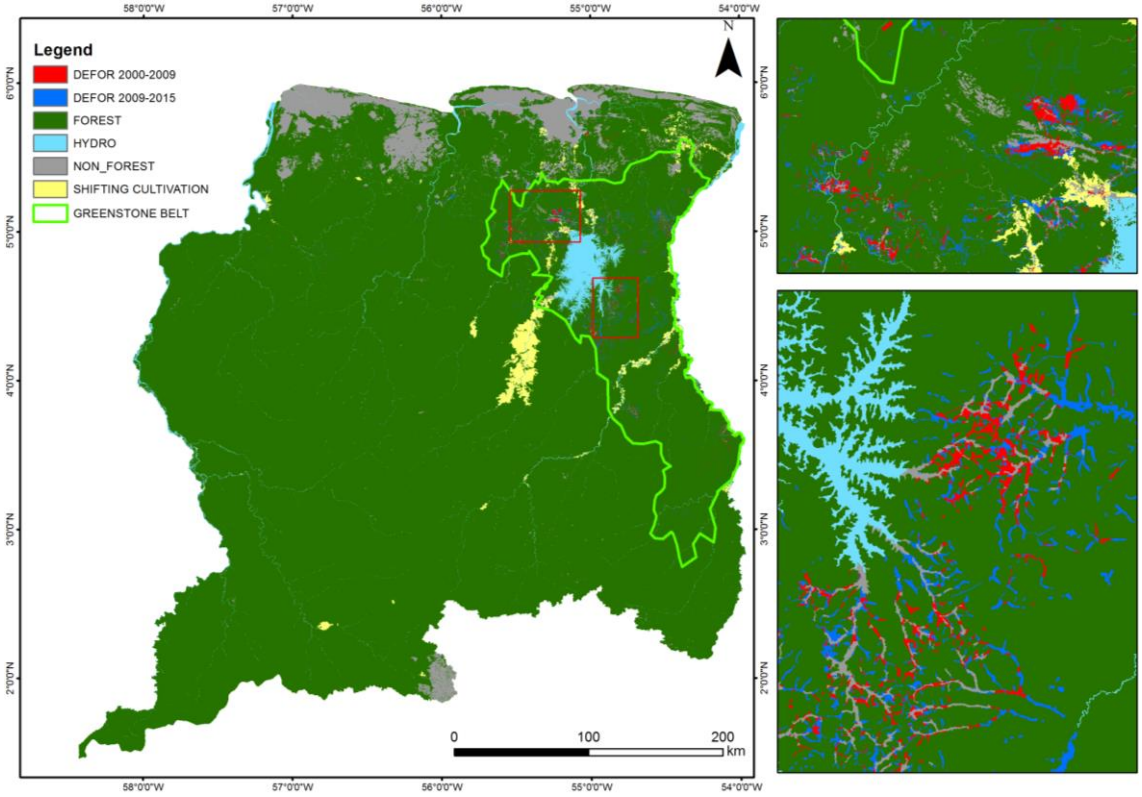
**According to the joint SBB/UNIQUE analysis, the total deforestation in Suriname between 2000 and 2015 amounted to 85,147 ha or an average of 5,676 ha/year, which is equivalent to an annual deforestation rate of 0.04%.**[10] Between 2000 and 2009, the annual deforestation rate was estimated at 0.02%, equivalent to an average 2,754 ha/year. Between 2009 and 2015, the deforestation rate more than tripled to 0.07% average annual deforestation rate or 10,060 ha/year. These results correspond with studies that SBB's Forest Cover Monitoring Unit had already carried out before[11].

**Map 1 shows deforestation is geographically focused on Greenstone belt area and surrounding the Brokopondo Lake.** A simple visual interprettion of the map shows that the spatial deforestation patterns are linked to historical deforestation. In other words, new deforestation is happening mostly adjacent to previous deforestation. The map also suggests that the deforestation between 2000 and 2009 occurred in larger patches (the upper left in-laid box shows the deforested blocks in the IAMGold concession), in contrast to the deforestation from 2009 to 2015, which is more scattered and in smaller patches. A simple extrapolation of historical patterns suggests that future deforestation is likely to continue in the Greenstone belt, concentrated around the Brokopondo Lake. This is further corroborated by the fact that gold mining, the largest deforestation driver, is unlikely to occur outside the Greenstone belt, where most gold occurrences were reported upon.

[10] Total forest in 2015 is estimated at 14,963,593 ha.

[11] The final results are available in SBB (2017 – in press). Technical report forest cover monitoring for Suriname. By Forest Cover Monitoring Unit Suriname.

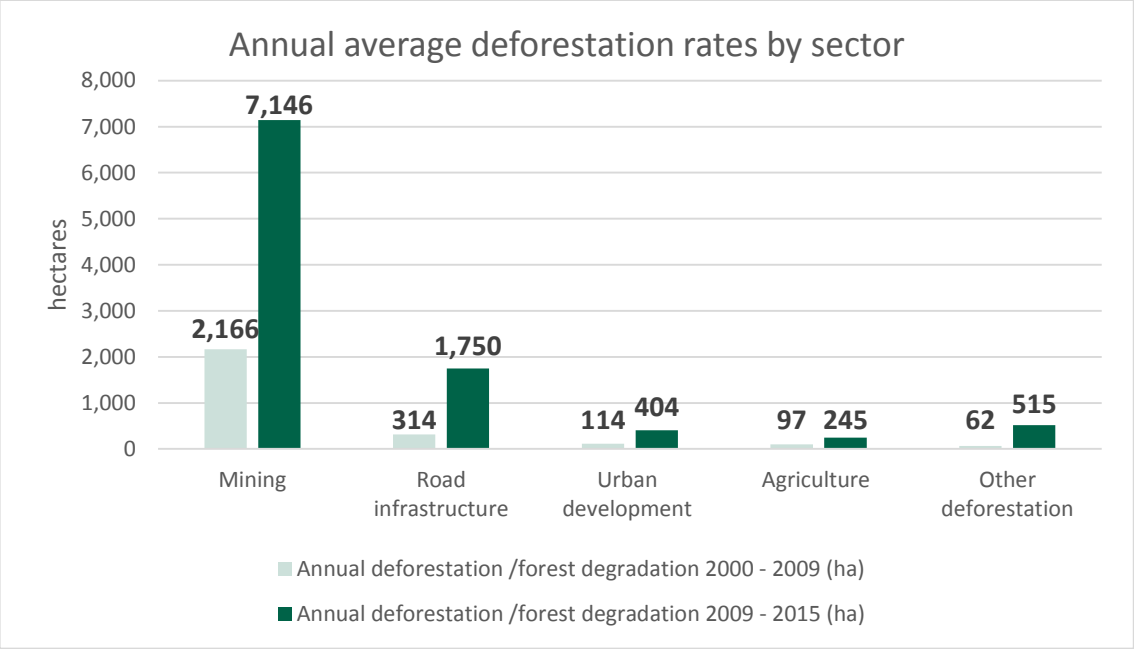
**Map 1: Deforestation map (2000 – 2015)**




**In terms of attributing deforestation to different drivers, the deforestation assessments focused on anthropogenic sources.**[12] Disaggregated according to sector, 73% (62,370 ha) of deforestation is attributed to mining between 2000 and 2015. Infrastructure, or road construction, is the second largest area-wise driver of deforestation, responsible for 16% (13,329 ha) of total deforestation. Urban development contributed 4% (3,451 ha) and agriculture (excluding shifting cultivation) contributed 3% (2,344 ha). The forest area subject to shifting cultivation increased by a total of 19,441 ha between 2000 and 2015. Therefore, when shifting cultivation is considered, agriculture appears to become the second biggest sector responsible for forest related GHG emissions due to deforestation and forest degradation for that time period. Figure 3 shows how deforestation trends have changed over time. Mining increased from 2,166 ha/year in 2000-2009 while shifting cultivation amounted to 1,604 ha/year in the first time period and decreased by more than half to only 369 ha/year in the second time period. Urban development is discussed in more detail in section 6.1.5.

[12] Natural sources of deforestation such as fires and storms have not been assessed in detail, but data from the MODIS products for active fire and burned area (http://modis-fire.umd.edu/index.php) suggests fire is not a major driver of deforestation in Suriname.

**Figure 3: Average annual deforestation and forest degradation disaggregated by sector**

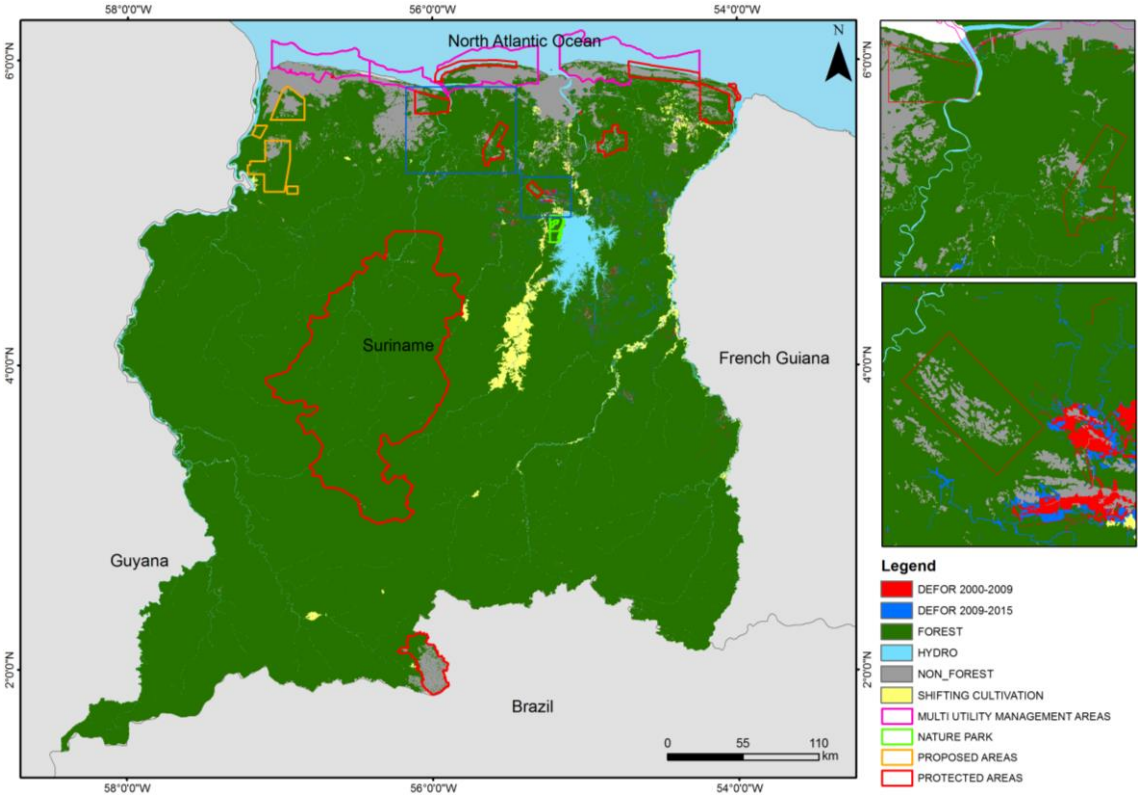



*Note: The category "Other deforestation" includes areas deforested but reason not identified by SBB/FCMU, as well as burned areas, pasture, or second vegetation.*

## Protected areas

**At present, Suriname has 16 legally established protected areas, and four proposed protected areas.** In the protected area the total deforestation was limited over the past 14 years, amounting to 321 ha. Suriname's forest carbon stocks are formally conserved in the protected areas. Suriname has 16 legally established protected areas, and four proposed protected areas (these have been proposed since the early 1980's). The legally established ones cover 21,383 km2 (i.e. 13.5% of Suriname's land territory), and the proposed ones 1,320 km2 (i.e. 0.8%). The Central Suriname Nature Reserve, located in the Interior, is by far the largest, covering 15,920 km2 (i.e. 9.7%). The other reserves are relatively small, no larger than 1,000 km2 (i.e. 0.6% or less), and most of them are located less than a 100 km from the coast; the notable exception is the Sipaliwini Nature Reserve in the south of Suriname, which was established to protect Suriname's largest savanna landscape (main source: ATM Biodiversity Profile, 2009; updated).

**Map 2: Deforestation and Protected Areas**



# 5 PROXIMATE DRIVERS, AGENTS AND UNDERLYING CAUSES

**This chapter describes the main sectors affecting land and forest cover in Suriname.** A sector-based analysis is useful in the context of REDD+ because this allows for identifying areas that may serve as key interventions or mitigation levers when designing REDD+ strategies and programs. This forward-looking approach thus serves as an important information base for the identification and analysis of REDD+ strategy options. The three sectors selected are not necessarily the largest drivers/emitters but these represent a broader numbers of land users and thus potential REDD+ beneficiaries, to support the design of an equitable REDD+ strategy for Suriname. Each sector analysis begins with a short introduction, which gives an overview of the sector from a historical, economic and governance perspective. Thereafter, interpretation of the spatial analysis is provided, followed by a description of the main deforestation and forest degradation drivers, agents and respective production systems. This is followed by a standardized economic assessment that allows for comparing the opportunity costs associated with different land use options associated with drivers. The economic assessment is then complemented with an assessment of non-carbon and non-monetary benefits derived from this land use option, and finally, the assessment of underlying causes underpinning the identified DFD agents.

## 5.1 Forestry

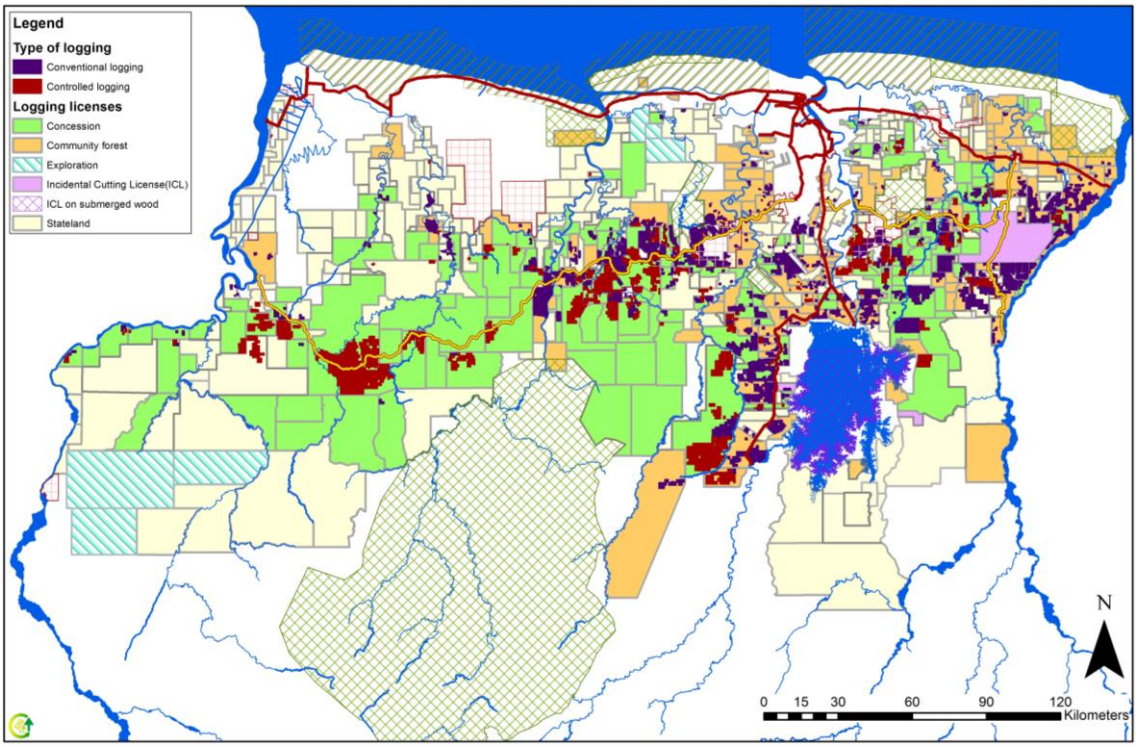
### 5.1.1 Introduction to the sector

**The economic value of Suriname's forests have long been recognized, with forestry production dating back to colonial times** (Werger et al. 2012). In these early days, logging mostly occurred in private timber estates. The Government's first attempts to regulate the forestry sector was around 1900 with the country's first 'Forest Service' established in 1904. Mechanized timber harvesting and forestry industry was introduced after the Second World War. In 1947, the *Lands Bosbeheer* (LBB) developed and for some time stood as a model forestry institution in the region (ibid). Beginning in 1978, the Center for Agricultural Research in Suriname (CELOS) conducted in-depth research to develop a sustainable timber production model known as the CELOS Management System (CMS). From 1990 until the present, the forest management concept in Suriname is based on ecological and economic principles of sustainability.

**Forestry affects roughly one third of Suriname's 15.2 million ha of forests.** In addition to the 13.5% forest with a protection status, the National Forest Policy (2006) aims to leave the forest south of 4° N latitude unaffected by commercial logging, which is partly explained by the poor accessibility of the southern forest reserves, making commercial logging not profitable. According to the Forest Management Act (1992), forests are to be designated for different production purposes or uses. The main classifications of forest designation are: (permanent forest (which includes permanent production forest, protected forest, and special protected forest); conversion forest; and forest to be temporarily maintained. According to the National Forest Policy (2006), 4.5 million ha have been defined as potential production forest, but these areas have not been formally designated. Due to the lack of an integrated land use plan at the

national level, in practice, therefore, mining (and even agriculture to a limited extent) takes place in these areas, thus making it difficult to practice sustainable forestry.

**Map 3: Map of forestry production in Suriname**




*Source: SBB (2016)*

Roughly 1.6 million ha have been issued as logging concessions and other forestry production titles, and 737,507 ha for community forest and 168,363 for Incidental Cutting Licenses (ICL) (SBB 2016). Of this, 396,880 ha was FSC certified in late 2015 (ibid). At present, there are no ongoing activities to expand the forest area under (FSC) certification. The present contribution of the timber industry to the gross domestic products is 1.7% and provides employment to 5,500 people[13] (SBB PTT, 2015).

**Table 3: The status of forest lands**

| Suriname's land cover | Area (ha) | % |
|---|---|---|
| Overall land cover: | 16.4 M ha | |
| Total forest area:<br>▪ of which state owned<br>▪ remaining private forest | 14.8 M ha (100%) | <br>99.7%<br>0.3% |
| Of which excluded from forestry:<br>▪ forest located below 4° N latitude<br>▪ protected areas | 10.36 M ha (70%) | <br>57%<br>13% |

[13] According to SBB (2016), there are 211 logging companies, 96 sawmills and one plywood factory in operation.

| Suriname's land cover | Area (ha) | % |
|---|---|---|
| Potential production forest: | 4.44 M ha (30%) | |
| Of which under licenses: | | 62.1% |
| ▪ Logging concessions | 1,655,000 ha | 37.3% |
| ▪ Exploration permits | 325,000 ha | 7.3% |
| ▪ Community forests/HKV's | 612,000 ha | 13.7% |
| ▪ Incidental Cutting Licenses (ICL) | 52,000 ha | 1.2% |
| ▪ ICL's for submarine logging | 115,000 ha | 2.6% |

*Source: SBB, 2016*

### 5.1.2 Deforestation and forest degradation patterns within the forestry sector

**The forestry sector in Suriname does not contribute significantly to deforestation or degradation.** In the context of Suriname, most forestry practices are characterized as low impact selective logging based on Reduced Impact Logging (RIL) principles which aims to mimic natural forest dynamics (Werger et al 2012), and thus are not associated with significant levels of degradation. A number of rules apply to all forestry operations regardless of the harvesting license. These include for example, the demarcation of bufferzones, a minimum tree diameter of 35 cm, no more than 1 tree felled within a circle of 10 m, and maximum production of 25 $m^3$/ha. The intention of the Forest Management Act (1992) and the conditions accompanying the concession license documents is to ensure every license holder applies controlled logging – or intensive management – whereby license holders are required to conduct exploration and preharvest planning.[14] However, companies or communities may ask the SBB for an exception from controlled logging because of unexpected conditions like overlaps with gold mining activities. If this is approved, a license holder is only obliged to indicate the area where they are planning to work (this area must be clearly delineated in the field, controlled and approved by SBB). Further planning activities relevant for controlled logging (e.g. pre-harvest inventory, skid trail planning) are not required. This latter type of forestry operations are known as conventional logging, also termed extensive management.

**Despite a significant increase in timber production in the past decade, actual harvesting levels remain far below the allowable cut.** The risk of degradation caused by over-exploitation and/or undue damage to the residual forest stand is considered minimal. In 2003, SBB presented its ambition to nearly double the annual timber production to 500,000 $m^3$/year by 2008 (FAO, 2003). As the conditions were subsequently put into place, the timber production objective was first reached in 2015. However, due to Suriname's forest composition (i.e. tree species), the harvesting levels from selective logging are still far below the annual allowable cut per ha, in practice being only 7.4 $m^3$ (SBB 2016).[15] The range is from 4.8 to 10.7 $m^3$/ha. Intensive

[14] Concession operators practicing controlled logging may seek third party certification to demonstrate their commitment to Sustainable Forest Management (SFM).

[15] In Suriname an allowable cut of 25 $m^3$/ha with a cutting cycle of 25 years is suggested, based on the outcome of CELOS experiments in the past. This implies that for a concession of certain size the Annual Allowable Cut (AAC) in $m^3$ equals the total net productive area in hectares. This net productive area is far less that the gross area as mentioned in the concession license. On average, 20% of the gross forest area will not be included in the 100 ha cutting blocks. Within these cutting blocks, again 20% of the area is excluded from logging (due to steep slopes, creeks and rivers (buffer zones), infrastructure and areas with high conservation values). Addi-

management, improved planning and controlled logging, results in the higher production levels (SBB 2016). The overall logging intensity is well within the legal limits: 25 $m^3$/ha in combination with a 25 years rotation. The timber extraction rate may thus not be a cause of concern in the view of forest degradation. Forest that have been logged at these modest rates, are assumed to be able to fully recover in due time and being able to restock and restore the associated carbon stocks as further assessed in the opportunity cost assessment below. Nevertheless, further field research is necessary, because the carbon loss is not only determined by the extracted logs but also by the damaged trees, logging infrastructure and logs left behind.

**Another risk of forest degradation may occur in the short-term and medium-term concessions when the felling cycle of 25 years cannot be completed.**[16] As a result, these forest areas may be logged over in fewer years, after which they are returned to the Government and become domain forests again. Theoretically, SBB should 'red flag' these concessions, not available for re-issuing until the full period for forest recovery (minimum 25 years) has past. However, in practice, the Government may consider to re-issue these forest areas to potential new applicants. This argumentation is possibly based on the recorded harvesting volumes being below the allowable sustainable cut for that concession area.

**The forestry sector does not directly cause deforestation.** When a domain forest will be converted to another land use e.g. mining or agriculture, an ICL can be applied for. With the ICL, the trees that are being removed can be traded commercially. According to Article 38 of the Forest Management Act, these licenses are subject to management rules and conditions that apply to all other timber harvesting licenses. Although the forest area under ICL has accumulated in 2015 to 53,363[17] ha, only a very limited area has been actually deforested. An exemplary case is the ICL of 52,000 ha attributed to the China Zhong Heng Tai to establish an oil palm plantation, which recently began operations.

**Table 4: Area and production under Incidental Cutting Licenses (ICL's)**

| 2001* | | 2005 | | 2010** | | 2015** | |
|---|---|---|---|---|---|---|---|
| ha | $m^3$ | ha | $m^3$ | ha | $m^3$ | ha | $m^3$ |
| 62,000 | 25.873 | 14,920 | 1,402 | 170,663 | 5.783 | 168,363[18] | 2,727 |

* Start of the SBB log tracking System (LOGPRO) from which the here presented data is derived.

**Note: 2010 and 2015 include timber submerged in the Brokopondo Lake.

tional to this, it is recommended to reduce the AAC by an 'exploitation factor' to reflect losses occurring during logging (stem breakage, trimming of logs, not extracted logs) and a 'decay factor' to reflect damage to the residual stand and a losses because of decay and other defects. The exploitation factor is close to 0.9 when applying controlled logging (RIL) and to 0.8 when applying conventional logging (CL) (Hendrison, 2006, pg. 18). This implies that the AAC over the net productive area should be reduced to approximately 18 $m^3$/ha when applying RIL and 16 $m^3$/ha when applying CL. Over the gross concession area, the AAC should be reduced to 14.4 $m^3$/ha and 12.8 $m^3$/ha respectively. Hendrison additionally suggests reducing the AAC by another 20% because of the 'decay factor' related to the residual forest stand. If applied indeed, the presently recorded harvesting rate is close to the AAC.

[16] Article 19 in the Forest Management Act states that the minister must award rest for recovery, but the Government has not taken the responsibility to do so. One of the recommendations in the National Forest Policy/Strategic Action Plan is to review and update existing concession policy and the Act to ensure and enhance sustainable management of the forest.

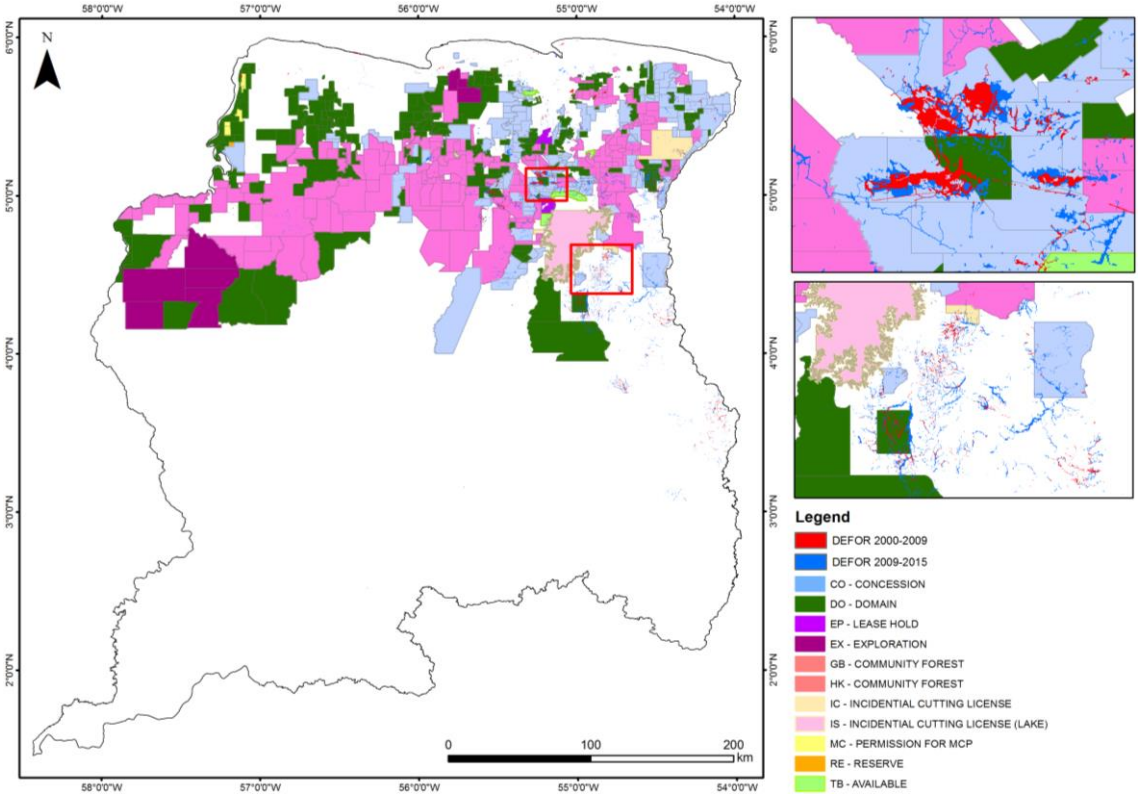
[17] In addition, an area of roughly 115.000 ha is issued for areas under water where trees that were flooded in the 1960s because of the creation of a hydro lake now are extracted. There is currently no forest there, only waterbody with dead trees under the water.

[18] The area ICL's in that specific year and eligible for deforestation- note this includes the area underway explained in above footnote.

### Deforestation in the production forest

Out of the total 85,000 ha deforestation area in Suriname, 55% (47,245 ha) occurred in the production forest (this includes all concession types, as well as those not currently under production). The conversion mainly occurred towards the mining sector, with 68% of this deforestation due to mining.

**Map 4: Deforestation in production forestry areas**




## 5.1.3 Drivers and agents of deforestation and forest degradation

**To facilitate the analysis of deforestation drivers and agents, the dominant forest management practices currently applied in Suriname are summarized into three main management regimes.** These management regimes are used as the analytical lens because they may have impacts on the losses of forest carbon stocks in natural forests. The type of management is not always directly correlated with the type of forest concession granted through the Forest Management Act (1992, Article 27). Forest concessions vary according to size, period and management requirements (Table 5). Although there are exceptions, these generally correlate with the below-described management regimes. This analytical lens is useful because the type of management can also be linked to the type of agents (forestry operators) in the forestry sector.

**Table 5: Forest concessions by period, size and management regime**

| Name | Period | Maximum size | Management regime[19] | Number for Felling Blocks (SBB 2016) |
|---|---|---|---|---|
| Short term concession | Up to 5 years | 5,000 ha | Intensive (controlled logging) | 68 |
| | | | Extensive (conventional logging) | 154 |
| Medium term concessions | 5 to 10 years | 50,000 ha | Intensive (controlled logging) | 263 |
| | | | Extensive (conventional logging) | 219 |
| Long term concession | 10 to 20 years | 150,000 ha | Intensive (controlled logging) | 314 |
| | | | Extensive (conventional logging) | 54 |

## Conventional logging (extensive management)

**In conventionally managed forests, timber can be harvested without prior timber stock inventories and the demarcation and planning of roads and skidding trails.** Extensive management, also known as conventional logging, is allowed in short-term forest concessions (< 5,000 ha) and the majority of community forests and the so called timber harvesting licenses (HKV's). Community forests (including HKV's)[20] are issued to forest dwelling communities (villages) for the main purpose of fulfilling subsistence needs. Additionally, commercial logging in these forests is permitted, providing that the rules for commercial logging are applied. In practice this means that the cutting blocks must be demarcated and logged according to the by SBB approved cutting plan. These minimum requirements are the basis for SBB production control.

## Controlled logging (Intensive management)

**Intensively managed forests,** also known as **controlled logging**, applies for all forest concessions from 5,000 ha upwards. Third party **certification of controlled logging** may be seen as a third level in forest management. This relates to how the FSC certified forest management units in Suriname work in compliance with the national controlled logging regulation and in compliance with the FSC standard.

[19] Intensive forest management is not equivalent to intensified logging (more volume being harvested of a land unit). Based on the SBB Forest Sector Analysis 2015 (SBB 2016), in which the timber harvesting rates are calculated over 531 cutting blocks (58,166 ha), logging rates ranges from 4.8 - 7.1 $m^3$/ha under conventional logging (= extensive management) and are between 8.8 and 10.7 $m^3$/ha under controlled logging (= intensive management). The overall calculated average is 7.4 $m^3$/ha.

[20] Till the Forest Act 1992 was in place, Timber Cutting Licenses (HKV's) where issued to forest dwelling (interior) communities, mainly for subsistence use only. However, commercial logging was allowed. The license was issued to the village chief. Since 1992, under the new Forest Act, hinterland communities can apply for a Community Forest, which are, if granted, issued in the name of the community. Next to community forests, HKV licenses issued before 1992 still exist. Both aim at a fair distribution of potential income from forest use, contributing to the development of the village community. However, especially in case of commercial logging, it was not always clear whether the revenues from logging benefit the community as a whole.

**Intensive management implies the making of an overall forest management plan and the annual cutting plans**. SBB provides the concession holder with the requirements for making these plans: forest inventory, infrastructure planning and the planning of annual cutting blocks. All plans need to be approved by SBB before the logging operations can start. SBB approval of the (annual) cutting plan comes with additional rules regarding sustainability and the concepts of reduced impact logging (RIL). For all concessions both the annual area fee and the volume based retribution must be paid. Renewal, extension of the concession license[21], can only be granted for one period by law, meaning that for most of the concessions - apart from the long-term concessions - the concessionaire is theoretically not entitled to a second felling rotation (set at 25 years). The consequence of this is that all investments need to be recovered (depreciated) during one single harvesting rotation[22].

**According to the type of license and the (combined) scale of operations (FMU), forestry operators engaged in commercial logging can operate under the conventional or the controlled logging regimes.** In 2015, close to 1.4 million ha (medium and large) concession forests were registered under the controlled logging regime (> 5.000 ha each). Of this, 0.4 million ha, managed by four companies, were FSC certified. In the same year nearly 1.0 million ha was under a small concession license (< 5.000 ha) and community forests / HKV's.

**In 2015, close to 2.4 M ha (2,352,200 ha) was issued for timber harvesting**. Besides concessions, this also includes all community forest and HKV's. Although not primarily issued for the purpose of commercial logging, these forests contributed close to 20% to the total timber production in 2015 (110,864 out of 568,657 $m^3$). Table 6 gives a breakdown of the overall forest area by the size of the FMU, reflecting the actual scale of (sustainable) forest management and timber harvesting operations / operators. The Suriname state receives a royalty/retribution of USD 3.98 per $m^3$, area tax is 5 SRD/ha.

[21] More than one forestry area can be included in one and the same concession license; More than one concession license can make up for one forest management unit (FMU); over time, the area under an FMU may increase by including additional concessions.
[22] For a good understanding of the various concepts of concession size, forestry terrain (bosbouw terrein) and Forest Management Unit (FMU), some additional clarification is needed. If not interpreted correctly, mixed use of these terms may lead to misunderstanding, confusion and inadequate conclusions.

1. A forestry concession license, issued by the government, can cover one or more forestry areas of varying size and at different location. The total area of the combined forestry areas under this one license should be managed as one single FMU, meaning that the overall management plan covers more than one forestry area to complete the 25 years harvesting rotation. The overall size of this combination of forestry areas determines whether the concession falls under the short-, medium- or long-term requirements.
2. One or more forestry concession licenses, also if these have been issued at different moments in time, can be managed as one single FMU, meaning that the overall management plan can cover more than one concession license and/or forestry areas to complete the 25 years harvesting rotation.
3. At any time, an existing forestry concession license can be combined with an additional concession licenses, thus enlarging the total area to be managed under one single FMU plan. If so, then small (short-term) concessions must be intensively managed (controlled logging). In practice, more than one concession can be managed as one FMU, and then the overall size of the FMU is the basis for the applied management regime.

**Table 6: Concession size vs FMU size in 2015**

| Forestry concessions | | | Forest Management Units (FMUs) | | |
|---|---|---|---|---|---|
| **Type** | **Area (ha)** | | **Type** | **Area (ha)** | **# Operators** |
| Small concessions | 193,034 | | FMU < 5,000 ha | 193,034 | 63 |
| Medium concessions | 1,094,878 | | FMU > 5,000 ha | 1,022,779 | 42 |
| Large concessions | 324,781 | | FMU certified* | 396,880 | 3 |
| Comm. forest/HKV | 739,507 | | Comm.For./HKV | 739,507 | 94 |
| **TOTAL** | **2,352,200** | | **TOTAL** | **2,352,200** | **202** |

** Source: SBB 2016; Note: per August 2016, at the request of the certificate holder, the FSC-CW certificate has not been renewed.*

Table 6 shows that the actual forest area under conventional logging is close to 932,541 ha, being 40%. 157 out of the total of 202 FMU-operators are engaged in conventional logging. The average scale of these small scale operation is close to 6,000 ha each. The remaining 60% are managed under controlled management regime.

**Infobox: Minor timber product extraction**

Beyond logging, the harvesting and processing of other wood-based products (**minor timber products**, **MTP's**) is another form of natural forest use which refers to **Non Timber Forest Products (NTFP's).** It comprises wild plant (and animal) products found in forests and other natural vegetation types. The term non-wood products, frequently used in international projects (FAO, 2000), excludes the variety of wood products others than timber (Van Andel, 2000). While SBB keeps record of this variety of wood-based products that enter the (domestic) market, labelled as the abovementioned MTP's, quantitative data of other NTFP's that are collected, used and traded from Suriname's forests, are not recorded. However, over recent years, also in Suriname, the role of NTFP's related to sustainable forest management is growing. The recorded harvesting of minor timber products is modest, volumes (in terms of Roundwood Equivalent) are small and their contribution to the overall timber taxation is just about 0.5% (Van Dijk, 2011). True harvesting levels are assumed to be much higher, as many of the MTP's are harvested for subsistence use. A significant amount of MTPs are produced in HKV's and community forests, where MTP extraction is not managed. Apart from length-split poles (Walaba, *Eperua falcate*) for fencing and traditional cremations, and fishery poles (Manbarklak, *Eschweilera coriacea*), only a small portion of these products is entering the local market. Because of the limited harvested volumes over years, operators engaged in these timber extraction activities are currently not considered a main agent with regard to forest degradation, but further research is required to confirm this.

## Agents in the forestry sector

**Generally production forest are managed by the forest operators.** Forestry operators (FMU managers) are not necessarily the same person that holds the forest concession license, the right to extract timber from concessions may be rented out. Also, forestry operators may engage in commercial logging activities from community forests/HKV's.

Based on the overall FMU size rather than on the concession size, forestry operators can be sub-divided in the following categories:

- Small scale operators:
  - The overall size of the FMU < 5,000 ha
  - Operating in small concessions and/or community forests / HKV's
  - Applying a minimum required level of forest management and planning
- Large scale operators:
  - The overall size of the FMU > 5,000 ha
  - Operating in one or more concessions that are managed as one FMU
  - Applying controlled logging (intensive management)
- Large scale (FSC) certified operators:
  - Large scale operators that have obtained (FSC) SFM certification

From 2001 to 2015, with time intervals of 5 years, Table 7 provides an overview of forest areas and related timber production from these areas for each of the identified types of licenses.

**Table 7: Forest area and timber production under different licenses**

| | Forest Management Regime | Area and production under different licenses | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2001* | | 2005 | | 2010 | | 2015 | |
| | | ha | $m^3$ | ha | $m^3$ | ha | $m^3$ | ha | $m^3$ |
| Large conc. | controlled | 1,185,299 | 46,163 | 585,955 | 84,181 | 638,350 | 114,824 | 324,781 | 360,272 |
| Medium conc. | controlled | 522,524 | | 493,367 | | 639,437 | | 1,094,878 | |
| Small conc. | conventional | 53,623 | | 106,807 | | 111,956 | | 193,034 | |
| Com.Forest/HKV | conventional | 515,017 | 34,318 | 524,832 | 47,589 | 596,222 | 62,034 | 739,507 | 110,864 |
| ICL | clear cut | 205,680 | 25,873 | 173,410 | 1,402 | 170,563 | 5,783 | 168,363 | 2,727 |
| Others | unknown | 69,076 | 56,259 | 69,076 | 49,378 | 69,076 | 64,736 | 69,076 | 94,794 |
| TOTALS | | 2,551,219 | 176.516 | 1,953,447 | 182,550 | 2,225,604 | 247,377 | 2,589,639 | 568,657 |

** Start of the SBB log tracking System (LOGPRO) from which the here presented data is derived.*

**Infobox: Illegal logging**

Due to its nature, little information on illegal logging in Suriname can be traced. The only research document dealing with the issue of 'legality' dated back to 2006. In that year, the Platform Timber Industry Suriname (PHS), supported by Tropenbos International (TBI) Suriname and WWF-Guianas, commissioned the local consultancy ESS to assess the level and impact of the aspects of illegal timber harvesting and trade (Legality of Timber Harvesting and Trade in Suriname, Inception Report Paramaribo, Suriname, December 2006, ESS Environment). Based on stakeholder consultations, the project revealed several potential illegal activities related to timber harvesting, to mention:

- Illegal logging at far away places, next to roads, etc. Though only in low volumes;
- Direct processing after felling with mobile saw mills and chainsaws and transporting timber 'out of sight';

- Timber from HKV's is often sold outside formal markets;
- The areas which local communities consider as their land are often bigger than the official HKV's. When they cut outside the HKV, but inside their assumed land, they do not consider this illegal, according to national laws however this is illegal.

In general, illegality is not considered a big problem, as most of the timber is checked. However SBB's estimation of non-registered timber is quite high (could be more than 20% of all timber). Legality of this timber is discutable, the more because no fees are paid. (ESS, 2006/2007).

Besides this research in 2006, research by Playfair (2007) shows similar results. No recent information on illegal timber harvesting practices is available. However, although the annual timber production has increased significantly since then, so has the level of law enforcement and production control by SBB. Nevertheless it should be mentioned that in recent years SBB went through a crisis impacting the presence in the field. Thus, it is assumed that illegality is not a major issue in the forestry sector. However, additional research is recommended to support this assumption[23].

## 5.2 Mining

### 5.2.1 Introduction to the sector

**Suriname's mineral sector comprises the production of oil, gold, bauxite/alumina, building materials, and natural stones**. This sectoral analysis focusses mostly on gold mining – both large and small-scale – because 73% of total deforestation and 95.5% of mining induced deforestation are caused by gold mining (SBB, 2015; LULC working session 2016). Oil extraction and bauxite mining are discussed to a lesser extent, including past impacts and projections for these sector for the near future.

Table 8 below present an overview of the mining sector, focussing on gold, oil and bauxite, which are the most important commodities for Suriname's economy, accounting for 90% of exports and 30% of the GDP in 2013 (World Bank, 2015).

[23] Last year's management crisis within SBB resulted in a severe limitation of its field operations and law enforcement power. The overall impact of these limitations on 'illegal logging' cannot be judged yet

**Table 8: Mining sector factsheet**

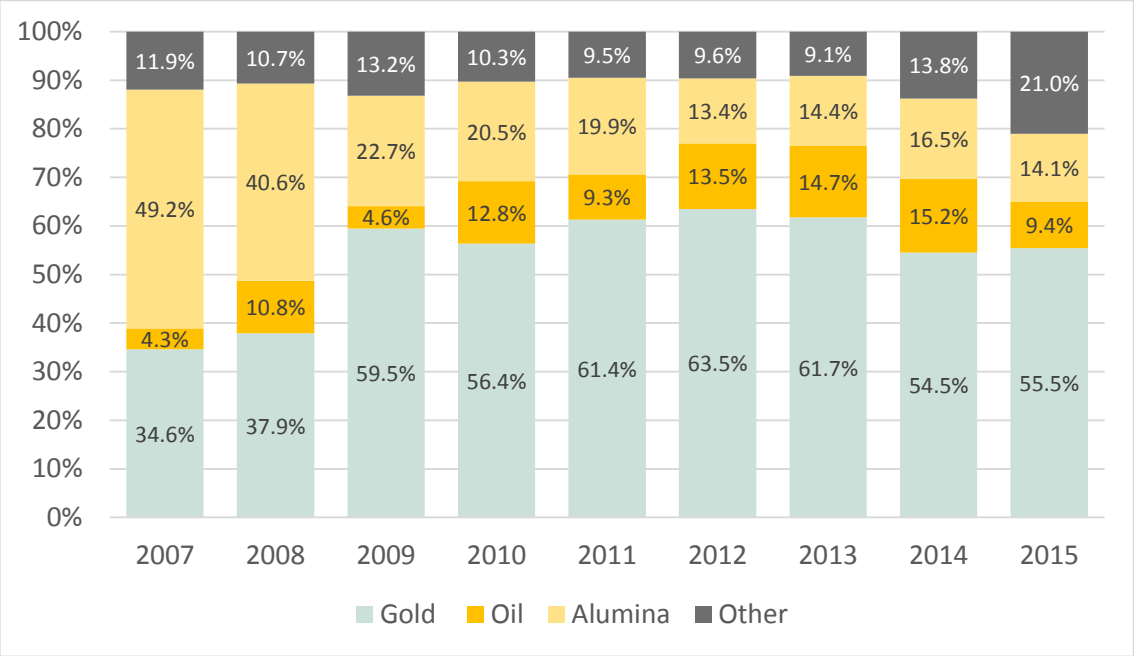
| **Mining, general** | |
|---|---|
| Total government revenue (SRD Mln) | |
| Mining | 303 SRD Mln |
| Non Mining | 3,096 (CBvS 2016[24]; 2015 data) |
| Mining sector government revenue, 2015 | |
| Gold | 58% |
| Oil | 33% |
| Bauxite | 9% (CBvS 2016, 2015 data) |
| Exports (US$ Mln) Total, 2015 | 1,652 Mln |
| Gold | 917 Mln |
| Oil | 156 Mln |
| Alumina | 233 Mln (CBvS 2016, 2015 data) |
| Commodity sector contribution to government revenue in % of GDP | 3.9% (CBvS 2016; 2015 data) |
| Gold | 0.6% |
| Oil | 3.1% |
| Bauxite | 0.2% |
| Export of minerals, metals and mineral products | |
| In US$ Mln (2015) | |
| As a % of total exports | |
| Mining sector employment, as % of total employed (only formal sector) | 3.4% (CBvS 2016; 2014 data) |
| **Artisanal and small-scale gold mining (ASGM)** | |
| Estimated number of ASGM (incl. services in mining areas) | 11000-15000 |
| Amount of gold produced by ASGM | 18.9 tonnes (2015 data) |
| ASGM production as a percentage of total gold production | 67.9% (2015 data) |
| Royalty on gold produced by ASGM | 2.75% |
| Royalties earned from ASGM | 9.6 Mln USD (~€7.2 Mln) (2013 data; Deviezencommissie 2014) |

**Suriname's economy profits considerably from mining, particularly large- and small-scale gold mining**. In the past decade, mining products (gold, oil, bauxite) have accounted for 80 to 90% of the value of national exports (Figure 4). Since 2009, gold has become the economically most important export product, surpassing bauxite/alumina in export value. Corporate income taxes, royalties and dividends applied to gold, bauxite and especially oil are a major source of government revenues (World Bank, 2015). Revenues generated by gold, oil and bauxite accounted for 95% of the national revenues. Planned new gold mining projects will further

[24] Central Bank of Suriname (2016). Suriname Country Profile. https://www.cbvs.sr/images/content/statistieken/CP/Suriname_Country_Profile_19jul2016.pdf

increase the country's dependence on mining, in particular with the government taking substantial equity stakes in large-scale gold mining projects (World Bank, 2015).

**Figure 4: Composition of exports (in USD million) as % of total export value**




*Source: Central Bank of Suriname, 2016*

### 5.2.1.1 Gold Mining; Large-scale versus small-scale

**Discrepancy exists between the government/legal definition of small-scale mining versus large-scale mining, and the operational definition of small- versus large-scale mining typically used in Suriname society and this report.**

#### Government definitions

**Mining activities are regulated by the 1986 Mining Decree**[25]. This Decree distinguishes mining on two scales: "mining" and "small mining" (*kleinmijnbouw*)[26]. The legal differences between these two forms of mining are presented in Table 8 below. In regular mining, different mining titles need to be applied for during different stages of the mining process; reconnaissance (*verkenning*), exploration and exploitation. With every transition of title (e.g. from reconnaissance to exploration) the concession area has to be reduced in size, while the maximum validation of the right increases. Small mining rights are allocated for a period of two years and cover all mining activities (reconnaissance, exploration and exploitation). The maximum size of a small mining right is 200 ha. The law does not define small mining on the basis of the type of equipment used or amount of ore processed. Small mining rights can only be extended for mining of

[25] DECREET van 8 mei 1986, houdende algemene regelen omtrent de opsporing en ontginning van delfstoffen (Decreet Mijnbouw) (S.B. 1986 no. 28), S.B. 1997 no. 44.
[26] Exploitation of building materials is a separate category, which is subject to different regulations.

minerals other than bauxite, radioactive minerals, hydrocarbon, and building materials. The 1986 Mining Decree stipulates that small mining can only take place in areas that have been selected for that purpose by Ministerial disposition.

**At present, the Mining Decree is being revised by the Commission Revision Mining Decree and Mine Development Agent in Suriname (*Commissie Herziening Mijnbouwwet en Mijnontwikkelingsovereenkomst in Suriname*),** which consists of representatives from state mining firm Grassalco NV, the Ministry of Regional Development, the Geology and Mining Department (GMD), the Ministry of Finance/Tax department, the Ministry of Natural resources, the Bauxite Institute Suriname, the National Institute for Environment and Development in Suriname (NIMOS) and the Foundation of Mining Title Holders (*Stichting Houders Mijnbouwrechten*). It is expected that the new draft mining law will revise the existing government definitions of large and small-scale mining.

**Table 9: Differences between "mining" and "small mining" in the 1986 Mining Decree**

| Parameter | Mining | SSM |
|---|---|---|
| **Sequence of mine development** | Phased, moving from reconnaissance to exploration to exploitation | Reconnaissance, exploration and exploitation rights granted at the same time |
| **Size of claim during phases** | A reduction scheme: 200,000 to 40,000 to 10,000 hectares | 200 hectares for all phases |
| **Term** | 2, 7 and 25 years | 2 years (with option for extension) |
| **Right of disposal** | Exploration and exploitation permits may be transferred | None |
| **Plans or feasibility study including work schedule** | Required for all phases, including investment budget and work schedule | Not required |
| **Reporting** | Required for all phases | Required |
| **Royalty payment** | 6% | 2.75% at point of sale |

*Source: Healy and Heemskerk, 2005*

## Operational definitions

**Internationally, Artisanal and Small-scale Gold Mining (ASGM) has been defined in many different ways.** Generally, ASGM refers to an activity that is: performed with rudimentary techniques, by a work-force that is not formally trained in mining, and takes place largely or completely in the informal sphere. The World Bank (2009) distinguishes between Artisanal and Small-scale Mining (ASM) versus Large-Scale Mining (LSM):

> "ASM, like subsistence agriculture, means low investment, labor intensive local production, informality, as well as no or low levels of mechanization and access to market. LSM, like industrial agriculture, implies large investments, high yields and comparatively low levels of employment."

**For the purpose of the present report we use this broad categorization, acknowledging that there are ASGM operations where not all of these conditions apply.** Nowadays ASGM operations are quite mechanized, working with excavators and heavy machinery that require substantial investments varying from several thousands to over a million USD. As compared to the LSM operations of Iam Gold and Newmont Suriname, however, the level of mechanization

and investment is relatively low. Moreover, ASGM operations typically invest minimally in exploration and long-term mine planning, so that their actual earnings are uncertain, volatile and fluctuating.

**In the 1990s, small-scale gold mining became an attractive income generating activity for Maroons in East Suriname; the area that had been hit hardest by the interior war and hosts the country's gold deposits** (Heemskerk, 2000). Around the same time, increasing numbers of Brazilian miners (*garimpeiros*), who were confronted with more stringent restrictions on small-scale gold mining in their own country, moved into Suriname (ibid.). Nowadays Brazilian *garimpeiros* and Maroons dominate the work force in the ASGM sector (Heemskerk et al. 2016). These concessions include areas that Maroons traditionally consider as their tribal home lands, to which they claim customary rights. Differences in culturally and legally defined property regimes sometimes lead to tensions about the access rights of different user groups involved (Heemskerk and Duijves, 2013).

**Nowadays much ASGM takes place on legal mining concessions but under illegal circumstances. In many cases, for example, title holders of an exploration or reconnaissance right allow ASGM mining teams to work on their concession in exchange of a percentage share of their earnings (typically 10-12.5%), a practice that is not legally allowed without explicit permission from the Minister of Natural Resources and under specified conditions.** Moreover, few concession title owners comply with the legal reporting requirements. For ASGM miners to become legal they would have to apply for a small mining title, which is often a lengthy process. Moreover, because a relatively small number of title holders have obtained rights to large stretches of land, very few -if any- interesting mining locations are still available.

**An exception to the above is state-mining firm Grassalco N.V., which is a relatively newer player in the gold mining business.** In 2011, Grassalco N.V. obtained concession rights to the Maripaston Concession, situated in Para district rough 2 hours' drive from Paramaribo city. Grassalco has constructed a small-scale mining plant, which went into production in November 2014. This plant processed tailings from ASGM operations that used to work in the Maripaston area, using gravity concentration methods without the addition of mercury.

**Around the same time that Brazilian and Maroon ASGM miners swarmed out over Eastern Suriname, multinational gold exploration companies started looking at Suriname's gold deposits.** In 1992, Golden Star Resources Ltd acquired exploration rights for the Rosebel property, situated in Brokopondo district, roughly 1.5 hours' drive from Paramaribo city. In 2003, Rosebel Gold Mines (RGM) started the construction of a gold mine that became operational in 2004. This moment marked the beginning of large-scale gold mining activities in Suriname. Later in 2004, Newmont Suriname obtained exploration rights to the Merian concession, in East Suriname, roughly 3-4 hours' drive from Paramaribo city. Newmont Suriname obtained exploitation rights to its Merian concession in 2014, and started commercial production in October 2016.

**ASGM, which largely takes place in the informal sector, accounts for a substantial part of mineral production and government mining revenues.** Of the 27.8 tons of gold that were recorded as being produced in Suriname in 2015, two-thirds (18.9 tons of gold) were produced by small-scale miners. Gold buying houses in Suriname pay ASGM miners the actual spot price, compensated for the purity, minus 6 - 7%. The reduction is composed of 2.75% royalty to the Central Bank of Suriname, license duty and statistical fee (consent en statistiekrecht; 1.5%), fee

to Kaloti (0.25%), expenses (processing, transportation, administration; ~1.5%), and profit margin of the buying firm (~0.5%). In 2014, the Suriname state earned USD 7.5 million in royalties from the small-scale mining sector alone (Heemskerk et al., 2016). Furthermore, in 2013, gold exporters paid USD 14.3 million (SRD 47.3 million) in export taxes (*consentrecht*)[27].

It must be mentioned that a share of gold sold in, and exported from, Suriname has probably be mined in in Guyana and French Guyana. In 2016, the Guyana Minister of Natural Resources disclosed that an estimated 15,000 ounces of gold were slipping across the borders every month. The Minister tentatively put the smuggled figures between 50 and 60 percent of total Guyanese ASGM production, resulting in an annual loss in taxes and royalties of USD 40 million[28]. Suriname was mentioned as one of the destinations where Guyanese gold is smuggled to. The much higher royalties and taxes in Guyana (8%, versus 4.25% in Suriname) make selling gold in Suriname lucrative. A delegation from Guyana has also visited the Central Bank of Suriname to request assistance in halting gold smuggling from Guyana (Wolfram, Manager Corporate Affairs CBvS, pers. com. 20/05/16). In French Guiana, gold taxes are low. In 2015, gold mining operations had to pay, depending on the type of enterprise ("small and medium enterprises" or "other enterprises"), 1 to 2% of the annual medium gold price per Kg on the London Bullion Market in 2014. However, there are other reasons for people working illegally in French gold fields (an estimated 10,000 persons) to sell their gold abroad. In the first place, French gold buying houses ask for identification and proof that the gold was mined legally. Even though there may be ways around this by selling to an intermediary, it makes selling gold more difficult. Secondly, garimpeiros (Brazilian gold miners) without legal residency status have much more freedom of movement in Suriname. So even though they work in French Guiana, they may live, rest, and have their family in Suriname. And, third, many ASGM who work in French Guiana buy fuel and other supplies in Suriname, where prices are lower. As a result, it is likely that a significant share of illegally mined gold from French Guiana –particularly near the border- is sold in Suriname. In Suriname, this gold becomes part of the legal economy when it is sold to a legal gold buyer.

In addition to gold illegally entering Suriname, it is also possible that gold is smuggled out of Suriname to other countries, for example to Brazil. Because the undeclared transfer of gold across borders is an illegal activity, it is impossible to provide a reliable figure of the amount of gold illicitly brought into or taken out of Suriname.

Estimates of the amount of gold produced from mining rafts on rivers and the lake versus land-based operations are not available, because this information is not recorded at the point of sale. When someone sells gold at a gold buying house, the origin of the gold (region, concession, operation) is not registered by the buyer (Mr. Paansa, Chief exploration and geology, Geology and Mining Department (GMD), pers. com. 10/12/'16).

All gold produced under the caption Large-Scale Gold Mining came from the Rosebel Gold Mines N.V. (RGM) project of IAMGOLD in Brokopondo district. Large-scale mining firm Newmont Suriname (previously Surgold) only started production in 2016. It can be expected that with Newmont coming into production and Suralco leaving, the relative economic importance of gold mining for Suriname (versus other mining products) will increase in coming years.

[27] Only ASGM sector

[28] Kaieteur News Online January 7, 2016. URL:
http://www.kaieteurnewsonline.com/2016/01/07/fbi-shares-infoon-gold-smugglers/

#### 5.2.1.2 Oil

Presently oil is commercially produced from just a small number of onshore fields producing approximately 16,000 barrels of oil per day. The national oil company, Staatsolie Maatschappij Suriname (Staatsolie), has traditionally led the sector, playing the role of regulator and operator (World Bank, 2016). Offshore exploration has so far failed to lead to commercially recoverable reserves, in part due to a lack of quality seismic data (McKenna, Rhodes and McDonald, 2014). Oil production occurs primarily in uninhabited swamp areas and on farmer's lands. The recent World Bank *Suriname Extractive Policy Note* (2016) named off-shore oil mining as the "most promising prospect" for the Suriname government, with a "very strong growth potential".

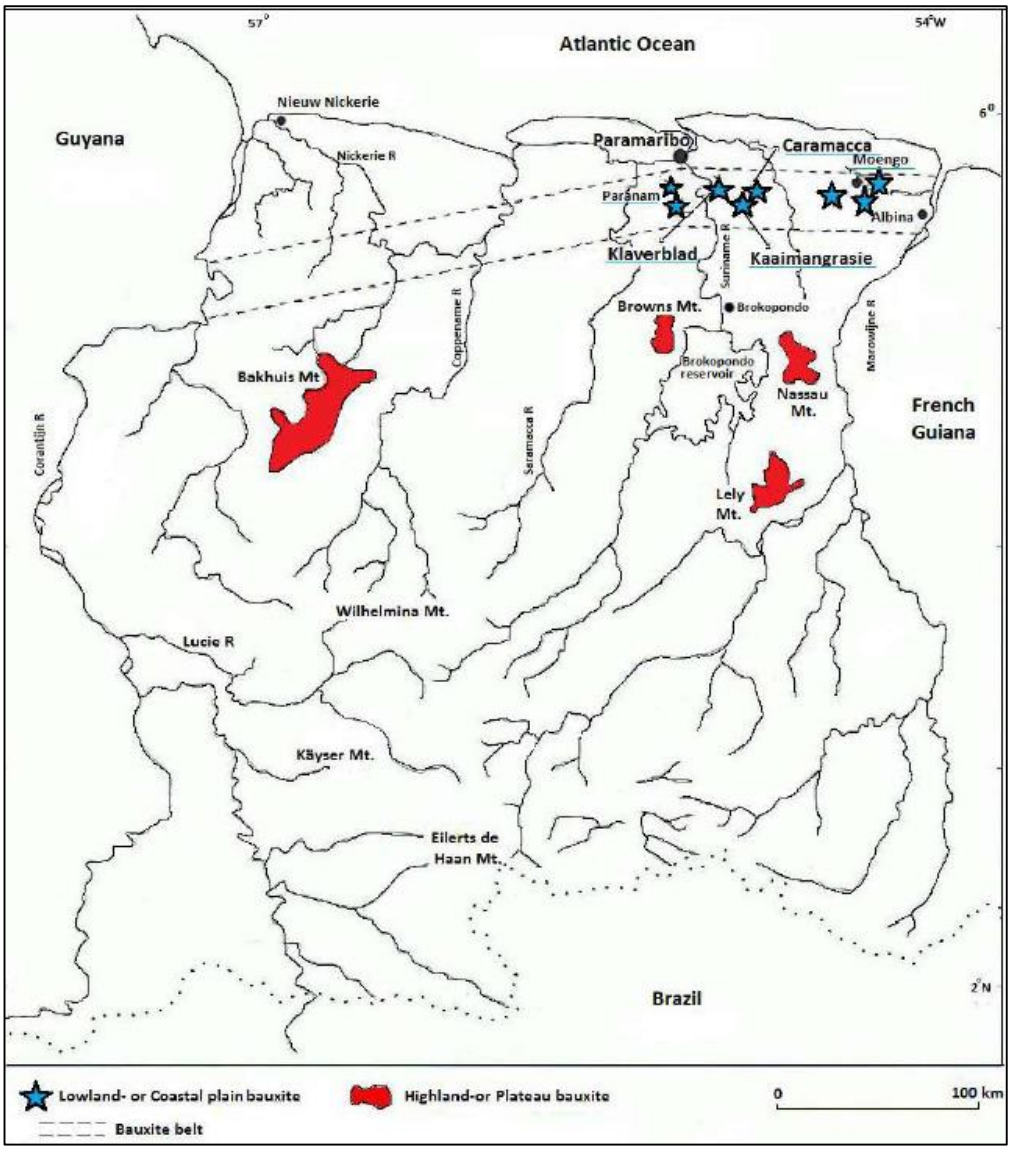
With regard to environmental impacts, oil exploration has caused structural disturbance of coastal wetlands (ICZM 2009), including the removal of mangrove forest, for example at the Tambaredjo oil field in Saramacca district, though the scale was relatively limited. In recent years, Staatsolie has introduced more environmentally conscious policies, as is evident in Staatsolie's Health, Safety and Environment (HSE) Policy and in Staatsolie's National Oil Spill Contingency Plan (done in collaboration with international oil companies). In case of (projected) forest disturbance, the Environmental section provides proposals for alternative development strategies and compensation, as demonstrated in the drilling program 2015-2020. In places where mangroves must be removed, the company presents proposals to remediate the negative effects.[29] Oil and gas exploration / exploitation can be considered a driver of deforestation to a very limited extent, and only in relation to the Coastal Plain. To access drill sites and place pipelines, some deforestation has taken place, and will continue to take place for the next few decades, as new drill sites are progressively made operational. There is only limited information on ongoing operations in the public domain, especially on how any rehabilitation is proceeding.

#### 5.2.1.3 Bauxite

**Although Suriname had a thriving bauxite industry for decades, the main company Suriname Aluminum Company (Suralco), now bought by Alco, closed its aluminum smelter in 1999. In the 4$^{th}$ quarter of 2015, alumina production in the refinery was stopped.** Bauxite production has taken place in five locations: Coermotibo/Moengo, Lelydorp I, Klaverblad, Kaaimangrassi, and Caramacca (Map 5). Mine closure has caused substantial job loss. At present, Alcoa is working on rehabilitation of its mines at Coermotibo/Moengo and Klaverblad/Onverdacht, which has to be finished within 5 years. No information could be obtained about the exact details of these rehabilitation efforts in terms of size (no. of ha.), extent (what is included, e.g. tailing ponds), and approach (types of species planted, etc).

[29] Pers. Com, Ms. M. Riedewald, community relations officer Staatsolie. 06-10-16.

**Map 5: Bauxite deposits and mines**




*Source: D.J. La Point, in World Bank, 2015*

Due to the high energy demands of refining, bauxite mining is closely linked with hydrodam construction, exemplified by the Brokopondoplan, which combined the construction of a smelter, alumina refinery and a hydroelectric dam.

At this moment it is uncertain if, how, and under what umbrella Suriname's bauxite industry will continue to produce in the near future. With existing mines being exhausted, further bauxite production would require the development of new mines. Such a step will require heavy investment in infrastructure to reach new and further deposits as well as in energy to process lower quality ore. At the same time, significant environmental and social liabilities will have to be dealt with (World Bank, 2015).

The Kabalebo hydropower project was originally (1970's) envisaged as an essential part of a larger strategic 'West Suriname' program to develop a new industrial and urban center in the west of Suriname. This program includes bauxite mining at the Bakhuis Mountains in West Suriname, and possibly smelting the bauxite nearby. This program was partially initiated but

abandoned in the 1980's; none of the three projected Kabalebo hydropower reservoirs was ever built. The program was partially revived in the mid-2000's when BHP-Billiton did extensive exploration for bauxite at Bakhuis and developed a feasibility plan for bauxite mining. The plan was abandoned before the end of the decade, at a time when commodity prices were high, and is not likely to be revived soon, given that commodities like aluminum have been fetching much lower prices on international markets in recent years. If the demand for aluminum products picks up, however, a mine at Bakhuis would likely be targeted for development, leading to the building of new reservoirs and deforestation (of up to an estimated 200,000 ha).

In 2014, the GoS signed a Memorandum of Understanding (MoU) with Suralco reflecting both parties' intent to find a solution for the future of Suralco. Among others, the MoU expresses that both will jointly develop a feasibility plan for a Bakhuis mine over the next two years, and will both seek investors for such a development. Further, the Bakhuis bauxite mining project in West Suriname, if revived, would result in the reconditioning / re-opening of roads from Apura until Avanavero, and would possibly lead to the rehabilitation and pavement of the road from Zanderij to Apura (the 'road to West Suriname'). Pavement of the latter may have additional impact on the area which has several connecting roads to villages such as Kwakoegron.

#### 5.2.1.4 Other minerals

There may be exploration for other minerals in Suriname's southern forest reserves, such as cobalt, which could have significant impacts on forest cover. But the information available is limited.

### 5.2.2 Deforestation and forest degradation patterns within the mining sector

**In Suriname, gold mining is by far the most important driver of deforestation** (see Figure 3). The spatial analysis conducted for this study shows that by 2015, 73% of total deforestation in Suriname is attributed to mining, which is equivalent to 59,553 ha between 2000-2015 (see Map 7). When considering the mining sector only, within the period 2000-2015, mining for gold was the most important driver of deforestation; accounting for 95.5% of mining-induced deforestation. In this time period, mining for bauxite and building materials accounted for just over one percent of mining-induced deforestations (resp. 1.17% and 1.23%; Table 10).

**Table 10: Amount of deforestation caused by different types of mining, 2000-2015**

| Mining type 2000-2015 | | Area (ha) | % | Remark |
|---|---|---|---|---|
| 1. | Gold | 59,553.86 | 95.90 | Validated during the LULC work session |
| 2. | Building Materials | 762.14 | 1.23 | Validated during the LULC work session |
| 3. | Bauxite | 727.55 | 1.17 | Klaverblad and Kaimangrasi area |
| 4. | Others | 1058.53 | 1.70 | Mining type is unknown |
| Total | | 62098.46 | | |

Fluctuations in gold prices and exhaustion of easily accessible ore supplies have not resulted in a significant reduction in ASGM activities in the past five years. This is corroborated by a recent report that suggests gold mining induced deforestation in Suriname has doubled between 2008 and 2014, as compared to the 2001-2008 period (+97%) (Rahm et al. 2015).

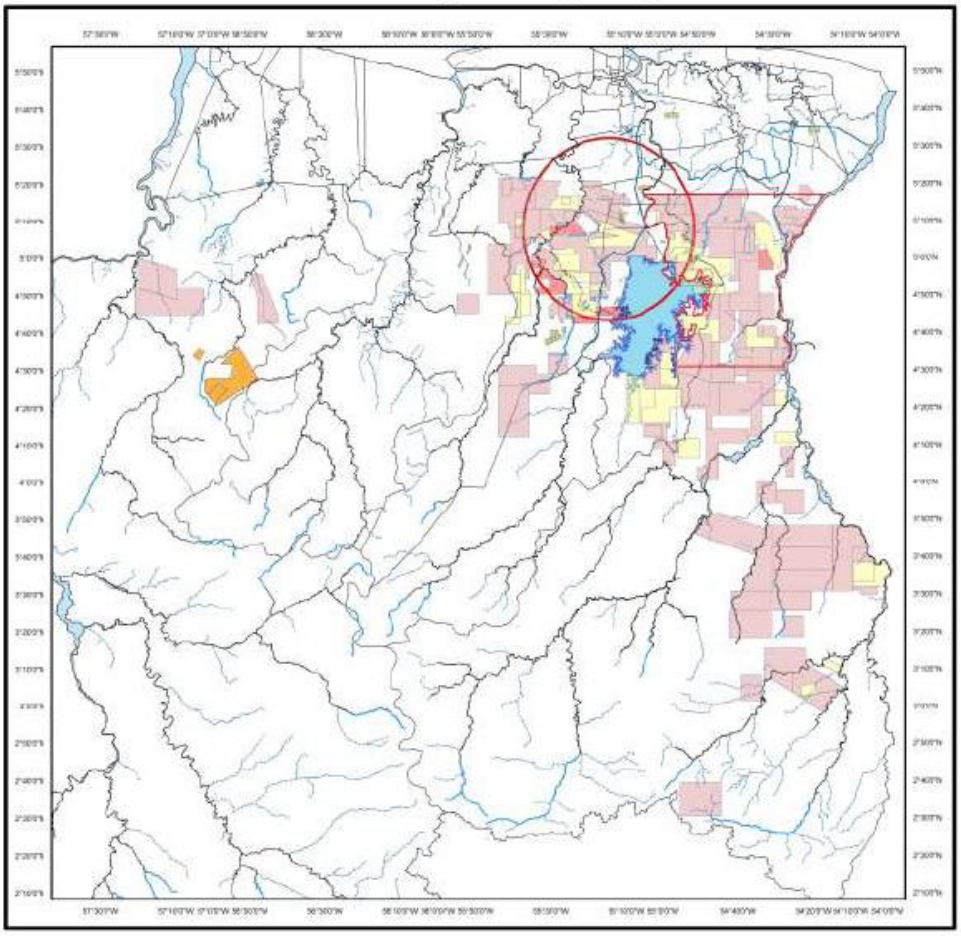
### 5.2.3 Impact of mining on GHG emissions

Gold mining resulted in GHG emissions of 55.05 million $tCO_2$ (3.67 million $tCO_2$/year) from 2000-2015. Land-based emissions related to deforestation amount to 49.35 million tCO2 and 3.29 million tCO2/year on average, including aboveground, belowground and soil carbon pool. The remaining 5.7 million tCO2 (0.38 million tCO2/year) is due to diesel fuel consumption to extract gold.

Based on GMD data, the recent World Bank Policy Note (2015) reports that there are currently 123 exploration titles covering 1,882,514 ha; 60 exploitation titles covering 307,185 ha and 55 small-scale titles covering 10,037 ha. The total area under concession is equivalent to 13.5% of Suriname's territory. The area under concession largely overlaps with the so-called Greenstone belt, which covers 24,000 $km^2$ of Central-East Suriname. Spatial analysis indicates that within the greenstone belt, actual mining activities are concentrated **around the Brokopondo Lake and in the East of Suriname, bordering French Guiana** (see Map 7). In 2009 it was estimated that fifty villages were situated in the Greenstone belt. Many of these communities are situated within mining concessions.

The map of mining concessions is not yet publicly available, but preparations are made by the Geological Mining Service to share the map online in the near future.

**Map 6: Map of mining concessions**

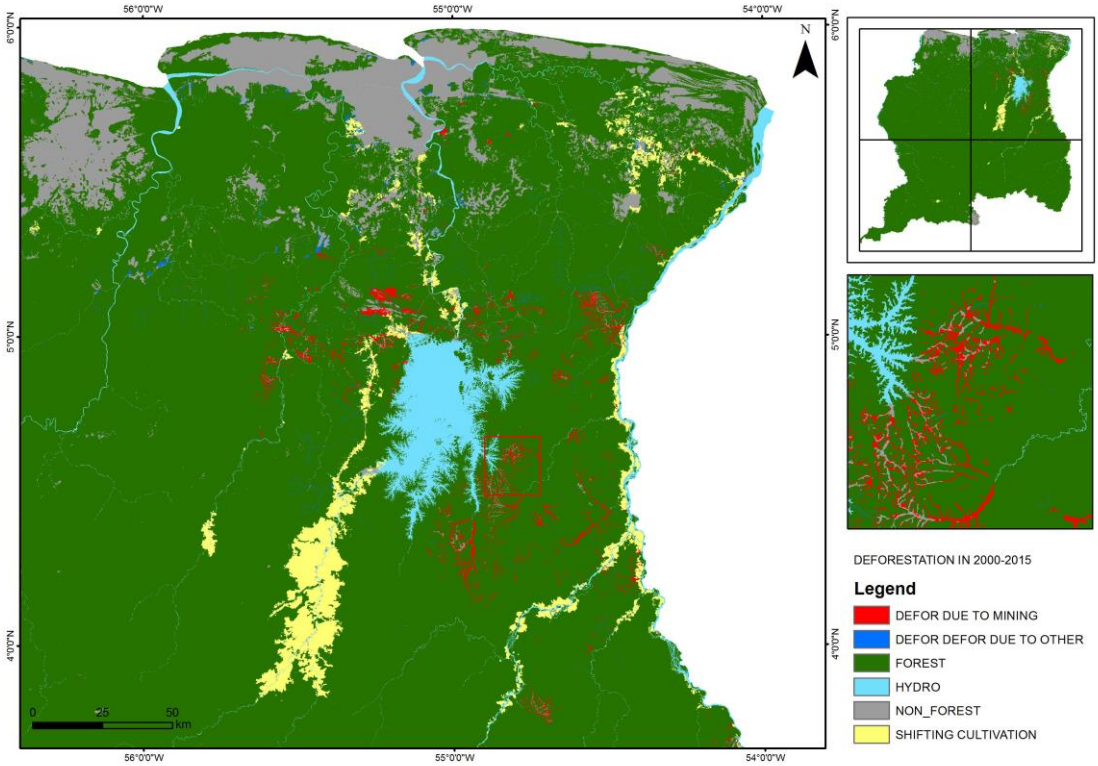


**Legend**
Gold mining titles
- Exploitation
- Exploration
- Small-scale mining (<200ha)
- Reserved

0 15 30 60 90 120
Kilometers

**Legend**
Other minerals
- Exploration
- Exploitation

**Map 7: Deforestation due to mining in Suriname (2000-2015)**




## 5.2.4 Drivers and agents of deforestation and forest degradation

**As reported above, gold mining in Suriname takes place by roughly two different systems; large scale mining (LSM) by multinational firms (Newmont Suriname and Iam Gold) and artisanal and small-scale mining (ASGM) by –mostly- rural land users.** The methods used for gold mining are very different. For both types of mining, forest is removed, which leads to complete deforestation including the removal of the most important forest ecosystem carbon pools.

### Small-scale gold miners

ASGM miners typically dig a couple of holes (by hand or using an excavator) or use a hand auger to take a couple of samples, but their prospection methods are usually haphazard and do not result in a reliable cost-benefit analysis. In practice, when small scale miners have decided to work on a particular spot, they most often do not perform efficient bush cutting before starting their operations. They simply slash the large trees and burn the rest (Veiga, 1997). Because many mining operations are not working with a proper mining permit, and because they tend to be too far from access routes to make the sale of wood possible and profitable, ASGM miners typically do not sell the wood they remove from the forest – though they may use some to build a camp or sluicebox). Neither do they apply for ICL permits. ASGM miners have no information about the use of the original soil for reforestation purposes (Veiga, 1997).

ASGM miners mostly use gravity concentration methods, using hydraulic power and/or milling systems with sluices to separate the gold particles from the gold. Mercury is typically applied to

facilitate this process. The various ASGM techniques used in Suriname have been described in greater detail in Heemskerk et al. (2016). As a result of inefficient mining planning and operation, ASGM miners sometimes are unable to recover their investment expenses at a specific location.

Another consequence of minimal mine planning, in addition to the ASGM's uncertain legal status and limited government presence in the interior, is that ASGM is associated with widespread environmental degradation including deforestation, river siltation, and mercury contamination.

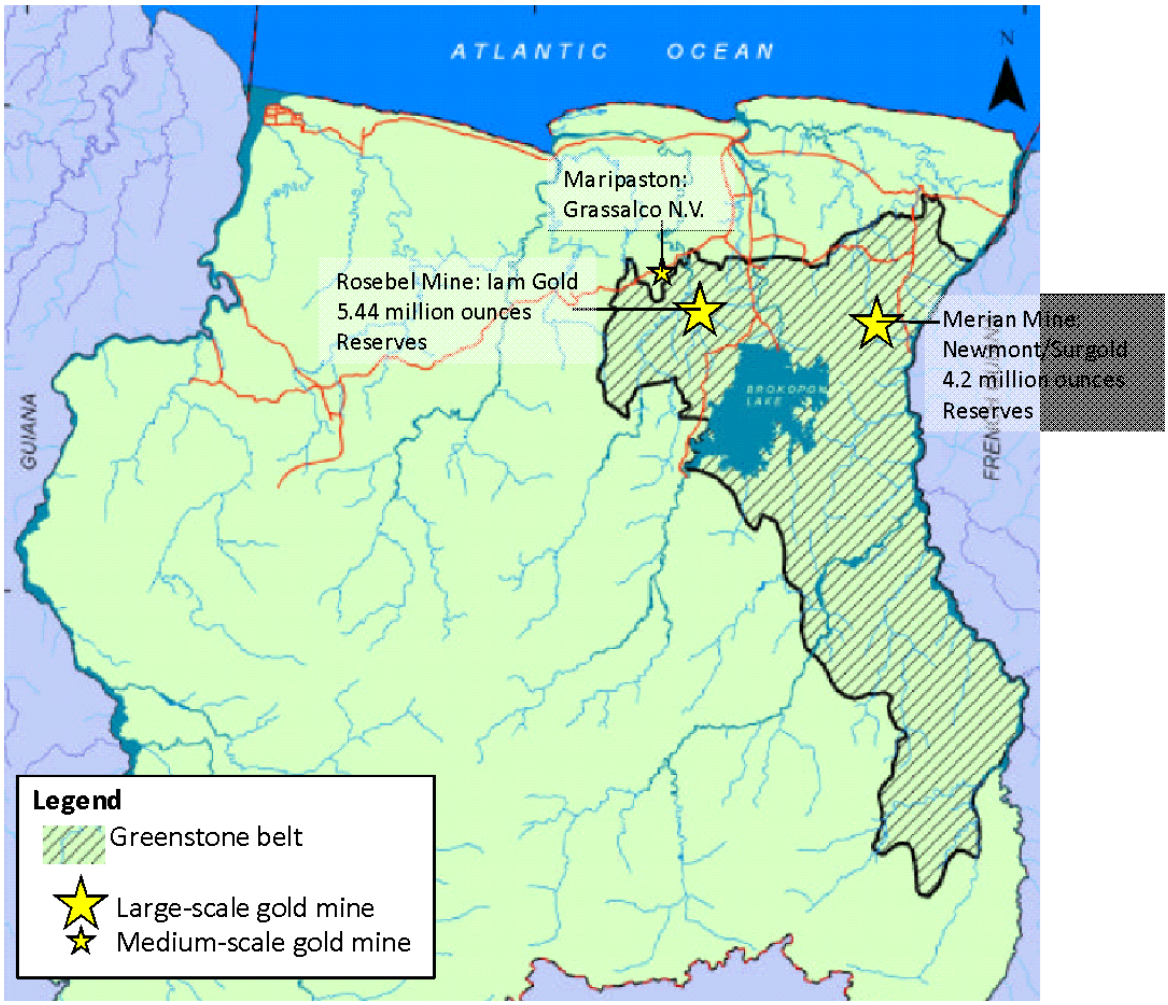
**Small-scale mines are often re-mined, one or multiple times.** Because gold miners fail to extract an estimated half to two thirds of the gold in the soil, the exploitation of old mining sites is economically viable when mining efficiency improves (Peterson and Heemskerk, 2001). For example, a small-scale miner in Nieuw Koffiekamp explained that with the use of more advanced equipment, it was still worth the effort to mine a spot that had been mined for 4-5 times before (pers. comm. Mr. Libretto, 2016). Yet, the amount of small-scale mining taking place on old sites versus new locations has never been estimated.

### Large-scale gold mining companies

Prior to starting mining, LSM firms invest several years and substantial capital in research and exploration. The LSGM mining firms in Suriname work with cyanidation. After the overburden is removed, large trucks move the ore from the pit to a processing plant, where it is treated using cyanide to dissolve and separate gold from ore. Waste water is deposited in taling ponds, where cyanide is hydrolyzed under the influence of sunlight.

Through their Mineral Agreements, the large-scale gold mining firms are obliged to restore the area they have mined to original conditions, provided that the area was not affected earlier by small-scale gold mining activities. The construction of roads by large-scale companies open forest areas and may result in relatively small area-wise deforestation. On the other hand, it is also apparent that LSM companies apply for concessions and start mining for gold in areas where ASGM miners are already working. The extent of any spill-over effects has not been established.

**Map 8: Locations of the Gross Rosebel Gold Mine (Iam Gold), the Merian Concession (Newmont Suriname), and Maripaston in Suriname**




## 5.3 Agriculture

### 5.3.1 Introduction to the sector

**In Suriname, about 1.5 million hectares are theoretically suitable for agricultural activities[30], of which 85% are located in the coastal plains and 15% on the river terraces in the interior.** The larger part of the coastal plains consists of fertile heavy alluvial clay of a marshy nature. It is intersected at various locations by sand and shell deposits. With distance from the coast, the soil fertility decreases as lateritic soils develop on the Precambrian Guiana Shield. This reduces the potential deforestation due to large-scale agricultural development in the interior region, while making the coastal plain the most suitable region for mechanized agriculture in Suriname, followed by the savanna areas which are suitable for mechanized agriculture as well. As a result,

[30] Assuming an estimated 16 million total area, this equals roughly 9% of total.

a substantial area of forest land in Suriname's coastal zone was cleared and transformed into plantations, mostly to plant cash crops, during colonial times. After the abolition of slavery and the decline of the contract workers system, most plantations were abandoned and many areas have since regrown into forest.

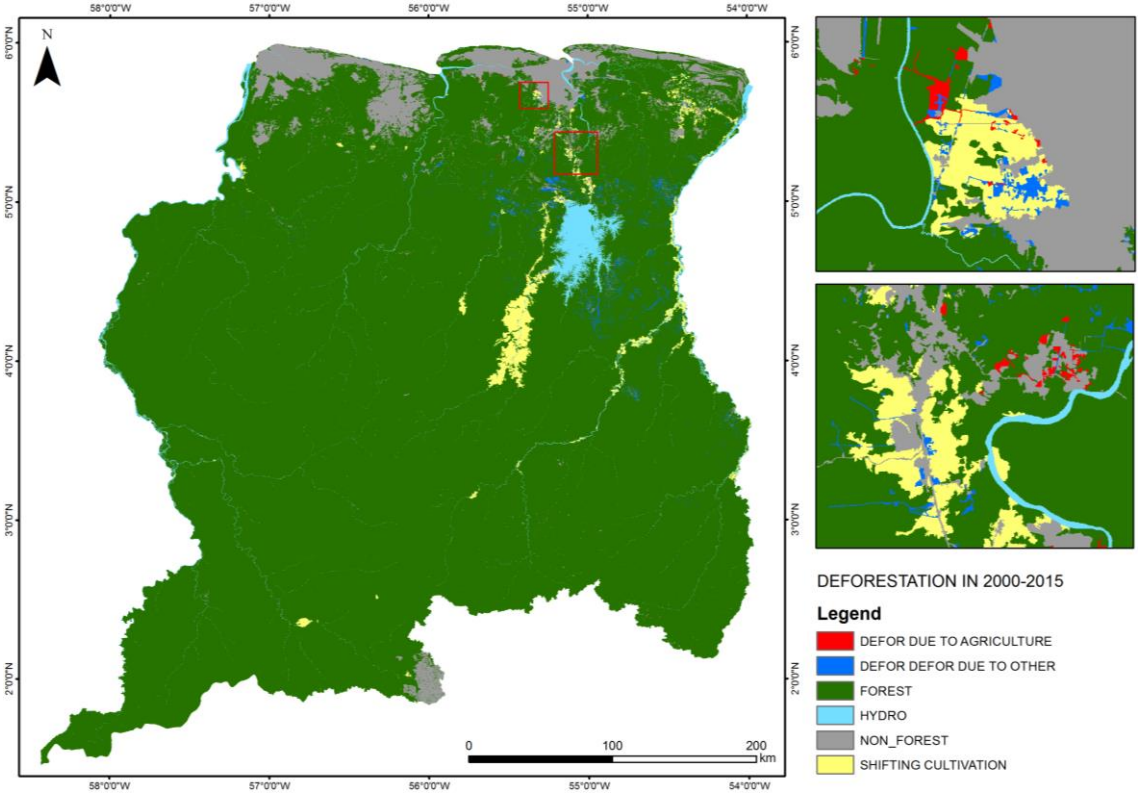
**Today, the agricultural sector plays an important socio-economic role in Suriname, providing food for local consumption and providing livelihoods especially in rural areas.** According to a 2013 IADB news release[31], the agricultural sector employs 17% of the labor force (ranked third in employment) and represents approximately 7% of the GDP (Suriname Central Bank, 2015). Agricultural growth has constantly been lower than GDP growth in recent years, and the sector's GDP contribution declined consistently between 1991 and 2002, rising again slightly from 2003 to 2014, except for 2014 (Suriname Central Bank, 2014).

### 5.3.2 Deforestation and forest degradation patterns within the sector

**Deforestation in the agricultural sector is related to the conversion of forest land to non-forest land which mainly occurs by small-scale farmers, medium commercial farmers and by medium and large scale investors.** In total between 2000 and 2015, the agricultural sector was responsible for 2,195 ha of deforestation in the country, which is 2.6% of the total deforestation in Suriname. As shown in the map below, this deforestation is located mainly in the Greenstone Belt and coastal area. This equals an average annual deforestation of 156.3 ha. In the time period 2000-2009, deforestation amounted to 872 ha at an annual rate of 97 ha /year. From 2009-2015, the annual average deforestation rate more than doubled to 245.2 ha per year (in total 1,471 ha). This has results in GHG emissions of 1.69 million tCO2 of GHG emissions (112,850 tCO2/year).

[31] http://www.iadb.org/en/news/news-releases/2013-12-17/suriname-agricultural-productivity,10703.html

**Map 9: Deforestation due to agriculture expansion**




**Forest degradation in the agricultural sector is mainly due to the shifting cultivation practices, where the forest landscape is generally a dynamic interplay between land and vegetation clearing for cropping purposes and secondary forest regrowth in the fallow periods.** Shifting cultivation leads to forest degradation. Since 2000 the total shifting cultivation landscape has increase by 8,6% to 209,708 ha in 2015. The expansion of area under shifting culitvation amounted to 16,651 ha between 2000-2015. However, in the timeframe between 2000 and 2009, conversion of forest to shifting cultivation land amounted to 14,436 ha and has reduced by more than half in the period between 2009-2015 (total 2,214 ha). The average GHG emission amounted to $tCO_2$ 0.92 million/year (13.8 million $tCO_2$ in total). The deforestation and forest degradation maps depict how the location of small-scale agriculture is gradually shifting from the interior to areas closer to Paramaribo. Such demographic trends also explain the decrease in total area under shifting cultivation, as explained further in section 5.5.3.

**For shifting cultivation, village members are allotted a piece of land, primary or secondary forest, based on social and cultural rules.** In this system men and women have their own specific duties, which may differ for every region or group of villages. It is the task of the men to clear the forest and burn down a plot for agriculture. Women are traditionally the ones to tend the fields and crops. Unfortunately, the traditional and trusty system of self-sufficiency is now experiencing some setbacks as a result of improved accessibility of many parts of the interior and because (young) men tend to migrate to the goldfields and the coastal areas. Consequently, the successful preparations of new farmland every year are becoming quite complicated. Many (young) women are facing more responsibilities, apart from an increased workload. In many parts of the interior, poverty is quite common, especially for single mothers and elderly people,

resulting in poor nutrition and, often increasingly, food insecurity. At least 66% of the total area is used for annual crops. Approx. 12% of the total area is used for growing semi-perennial crops.

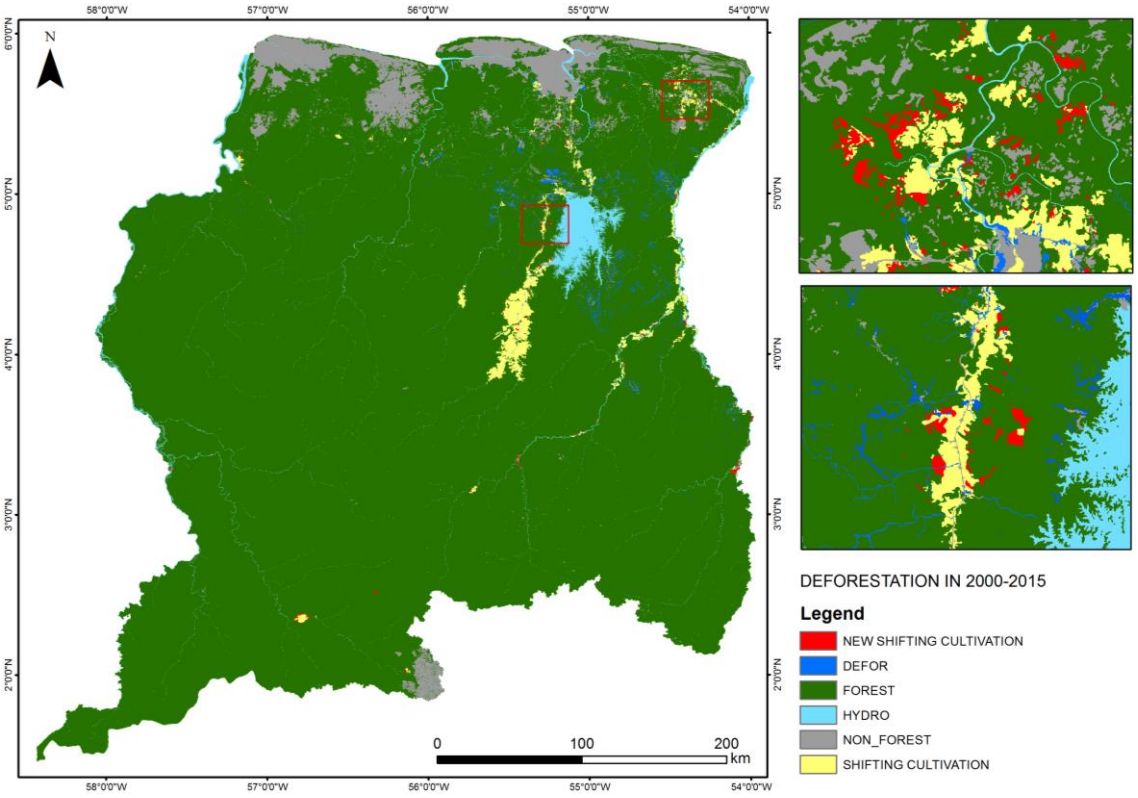
**This piece of land is deforested; wood that can be used is extracted and the remaining stumps and vegetation are burned**. In the past, indigenous peoples especially, were nomadic people and if the soil was depleted they would move the village to another area. Nowadays, depending on the area, villages might have a more permanent character and instead of leaving the soil to recover for 10-15 years, areas are farmed more frequently. This causes soil depletion, lower yields which in turn forces them to shorten the cultivation periods to 1-3 years, but also soil erosion and an adverse effect on groundwater management. Analysis of satellite images by NARENA/CELOS (2002) has shown that about 250,000 ha largely primary forest and, for a smaller part savanna, has been used one or more times as farm land.

**As a rule, a large variety of crops is planted simultaneously. Plant material is retained from the previous crop**. The main characteristic of this system is that its primary objective is the production of food crops in "mixed cropping" systems, for self-supply. Production activities take place on many scattered areas. Agriculture depends largely on weather conditions, so the results may differ substantially from one year to the next. Since the year 2000 there have been two important changes:

- the introduction of small livestock (chickens in the upstream villages; goats and sheep in some villages in the coastal area);
- growing food crops for sale, more or less as monoculture.

In the district of Sipaliwini 77% of the population grows crops only for their own consumption. Surplus, if any, is either sold or bartered to provide for other basic needs. In Marowijne it is the other way around. Here, people focus mainly on sales of their agricultural crop. In Brokopondo 56% of the people grow crops for their own consumption while 44% focus on sales.

**Map 10: Forest degradation due to shifting cultivation**




## 5.3.3 Drivers and agents of deforestation and forest degradation

**This section explains the typology of the dominant agricultural techniques currently practiced in Suriname, as well as the key motivation of the agents of the deforestation and forest degradation.** Suriname's agricultural sector can generally be classified into crop production, shifting cultivation and pastures. The key agents include small-scale farmers and local / indigenous groups practicing shifting cultivation in the hinterland, commercial medium and large scale farmers. The proximate drivers responsible for deforestation and forest degradation can be subdivided into two main categories:

1. **Permanent crop cultivation causing deforestation:** the most common agricultural production method in the coastal plain of Suriname. Various inputs are used for cultivation, including fertilizers, pesticides, basic machinery and devices. Depending on the location of the farm, either natural waterways or rain water is used for cultivation.
2. **Shifting cultivation causing forest degradation:** the most common agricultural production method in the interior of Suriname, mainly small-scale for subsistence or local consumption. In most cases the agent is dependent on rainfall and soil fertility to cultivate crops.

### Permanent crop cultivation

**Rice and banana production are of great importance for national food security.** Together these crops constitute 80% of the agricultural export. The third largest group of agro-food products is vegetables and fruits. After gold, oil and bauxite/alumina, rice is the fourth largest export product.

**When comparing 2015 and 2010, an increase of the cultivated area of approx. 11% can be observed according to the national statistics**. This increase is mainly the result of annual crops, especially paddy. During the past 5 years, the government introduced development policies that focus on expanding the extent of the area under cultivation. Mostly these areas are not forested, but abandoned lands are taken into cultivation again. The growth in the cultivated area of semi and perennial crops is negligible.

**Table 11: Cultivated agricultural area development in Suriname**

| Land use | Area in 2010 (ha) | Area in 2015 (ha) | **Net change (ha)** |
|---|---|---|---|
| **Agricultural land** | **60,322** | **67,711** | **7,389** |
| ANNUAL CROPS | 54,763 | 61,932 | 7,169 |
| SEMI-PERENNIAL CROPS | 2,572 | 2,782 | 0,21 |
| PERENNIAL CROPS | 2,987 | 2,997 | 0,01 |

*Source: Agricultural statistical data 2010-2015*

**A potential source of growth and, thus a potential threat for Suriname's forest, is agro-commodities, such as oil palm, cocoa, sugar cane, rice and banana**. In the recent years, many international companies have shown interest and actively approached Suriname to invest in large-scale commodity production, but most have not materialized. A number of reasons underlie Suriname's poor investment climate in the agriculture sector, which is explained in more detail in the section related to underlying causes.

## Livestock production

**The livestock census from 2015 indicates that there are 4,856 livestock farms in the country, approximately 60% of them are in the district of Wanica, 13% are in the district of Para and 12% are in the district of Nickerie.** The other farms are in the districts of Commewijne, Saramacca, Coronie and Para. Cattle and pig rearing is the largest in number and production, with the cattle herd estimated at 38,150 in 2010 and 37,620 in 2015; and the pig herd at 32,125 in 2010 and 36,716 in 2015.[32] The cattle herd decreased by approximately 35% during the past 5 years, but the number of pigs has increased by 14% over the same period. In 2015, total area of pastures was 16,329 ha; this is a decrease of approximately 1,000 ha compared to the year 2010. According to the Chief veterinary officer from Ministry of Agriculture, more cattle was consumed than produced. This explains the Ministry's approval in 2013 to begin importing beef cattle from Brazil.

**The fact that Suriname does not export livestock is mainly due to its unconducive legal framework**[33], in contrast to countries in the Caribbean community, thus hampering Suriname's

[32] MAAHF Agricultural statistics 2009-2015.

[33] The project "Strengthening the Sanitary Regulatory Framework of Suriname" implemented under FAO's Technical Cooperation Programme 2012-2015 states that the current legislation is unable to address the risks of diseases which could potentially impact both animal and public health in the country. Through this FAO project four acts were drafted for the livestock industry: the draft

competitive advantage for export. Unless legal reform results in additional incentives for livestock expansion, it is not considered likely that livestock will be a main driver of deforestation in the near future.

## Agents in the agricultural sector

**Four main agents of deforestation and forest degradation are identified in Suriname:**

1. Subsistence farmers: Communities in the interior of Suriname mainly practicing shifting cultivation on a small scale. This involves growing crops to be mainly used by an individual family, with farming being a significant source of their livelihood (Lininger, 2011). Shifting cultivation typically involves clearing the land, burning much of the biomass, planting and harvesting crops, and then abandoning the plot of land (letting the land go fallow) before moving to a new plot (ibid). This is the most common agricultural production method in the interior of Suriname.
2. Small-scale farmers who produce agro-food crops such as vegetables mainly on a very small scale as part-time farmers.
3. Medium-size commercial farmers who practice permanent cultivation and operate mainly in the coastal areas. Various inputs are used for cultivation, including fertilizers, pesticides, basic machinery and devices. Depending on the location of the farm either natural waterways or rain water is used for the cultivation of crops.
4. Medium & Large scale investors who invest into medium and large scale agricultural production to achieve return on investment from agricultural production.

## Subsistence farmers

**There are approximately 62,000 inhabitants (Census 2012) in the interior of Suriname; predominantly of tribal and indigenous descent.** They live in villages along the major rivers and in the savanna plain. The fifth Agricultural census has shown that for approximately 3,350 households farming is the main source of income. 94% of these farm households (+/- 3150) operate as independent farmers. The plots of these small-scale farmers range from 0.08 ha up to 4 ha (A. Helstone & M. Playfair, 2014). Van Kanten R. et al. (2016) stated that the plots of the Samaaka people are generally 0.5 to 1.0 hectare.

**Village members are allotted a piece of land in primary or secondary forest based on social and cultural rules.** In this system, men and women have their own specific duties, which differs according to region and village. It is the task of the men to clear the forest and burn down a plot for agriculture. Women are traditionally the ones who work on the fields and produce crops. These women who are the ones mainly responsible for the farm have limited access to information/ knowledge on among others good agricultural practices, new developments related to new technologies/ techniques. Generally a large variety of crops is planted simultaneously. Plant material is retained from the previous crop. The main characteristic of this system is that its primary objective is the production of food crops in “mixed cropping” systems,

Animal Health, Production and Welfare Act, the Veterinary Professions Act, the Slaughterhouse and Meat Inspection Act and the Animal Feeds Act. These acts were revised where necessary under the IADB policy loan.

for self-supply. Agriculture depends largely on weather conditions, so the results may differ substantially from one year to the next. Farm inputs are very low and poor agricultural practices result in soil degradation often leading to increasingly more deforestation for agricultural purposes.

**Removal of tree cover occurs by first extracting wood that can be used and the remaining stumps and vegetation are burned**. The crops such as root crops and pineapple are cultivated for at least 2 years and after a new plot is cleared in year 3, the old plot is left fallow for about 3 years. This is classified as the shifting cultivation system with a short fallow period which is practiced by shifting cultivators in Brokopondo and Cottica area and in Para. This short fallow system causes soil depletion and lower yields. This in turn leads to further soil erosion and has adverse effects on groundwater.

The key characteristics of the shifting cultivation system with a long fallow practiced by shifting cultivators in the Boven Suriname river, de Boven Saramacca, de Tapanahony en Lawa are that the each year a new plot is cleared to produce crops such as root crops, rice, watermelon and some vegetables and the old plot is left fallow for a period of 5- 10 years. (A. Helstone & M. Playfair, 2014)

The Samaaka people cultivate the land during 1-3 years and after that it is left fallow for 5-15 years. Roots and tubers such as cassava (*Manihot esculentum*), napi (*Dioscorea trifida*), dasheen (*Xanthosoma sagittifolium*), yams (*Dioscorea alata*) are the main crops produced by them. Fruits and vegetables are also produced but mostly close to the village (Van Kanten R. et al., 2016).

### Small-scale farmers

**In 2015, 32,972 ha of agro-food crops such as vegetables (i.a. string beans, tomatoes, hot pepper, okra, pumpkin), tubers (i.a. cassava, sweet potato, tannia) and fruits (i.a. coconut, citrus, mango) were grown with a yield of 230,450 tons, the bulk of which was intended for the local market**. Production predominantly takes place on farms smaller than 12 ha. The farmer usually is a part-time farmer. According to FAO (2009), there are between 10,000 and 12,000 smallholder farmers. The Agricultural Census report (2008-2009) states that there are 10.188 family farms. Of these, 6,652 (65%) are managed by men and 3,536 (35%) by women. However, this report does not distinguish between small, medium-size and large scale farms.

**Farmers are not specialized in specific crops.** Production is labor intensive, with a low level of mechanization and/or automation. Because of the small-scale of the farms, there is very little incentive and possibility to invest in new technologies and post-harvest measures. This subsector is characterized by the use of relatively large quantities of chemicals used for fertilization and pest control.

**This agent has in general very little scientific knowledge as there is no accessible knowledge network**. Therefore these farmers do not have access to information about new developments related to market trends, technologies or best cultivation practices. This causes farmers to use outdated production means and methods leading to low productivity per ha. Many farmers do not have an agricultural education.

### Medium-size commercial farmers

**Companies cultivating land larger than 12 ha are defined as medium size commercial farmers.** Main cultivated crops are rice, cassava, pineapple, podosiri, candied peel, citrus fruit and vegetables. In 2015 they used in total 32,972 ha for cultivating agro-food crops (together with small scale farming). These farmers are specialized in one or a few crops and apply open cultivation, which makes them dependent on weather fluctuations. A growing group of agents applies semi- closed or closed cultivation in greenhouses.

**Commercial farmers have better access to information about new technological developments.** Their production infrastructure is relatively good and they are able to invest in new planting and post-harvest measures. The medium size commercial farmers sell their fresh or processed produce locally or internationally. To meet the basic requirements of many export markets, most commercial farmers are internationally certified (i.a. GLOBAL GAP, EKO). This certification, however, does not ensure that agricultural production is deforestation free. Driven by the opportunity to export tropical crops, raw or processed, commercial farmers continuously work on increasing their capacity. While this agent group has limited deforestation impacts in the past, this trend may change in the future to meet the national and/or international demand.

### Medium and large scale investors

**With the exception of one investment by a Belgian company in bananas, most recent investments in the agricultural sector have either come from existing companies or, in a few cases (citrus, ducks, candied fruits), from Dutch citizens who have moved to Suriname** (World Bank 2016). However, these investments were very limited in terms of scale. Further, development partners have been hesitant to invest in agri-business due to the high likelihood of reputational risks if tensions arise between the enterprises and local citizens (World Bank 2016). This may change in the future considering that president of the Republic of Suriname has suggested some projects that can be labelled as large scale agri-business investments, including:

- 1,000 ha for coconut plantations in Coronie and Saramacca
- 2,000 ha for cocoa production in Phedra
- 1,000 ha to extend the banana production in Saramacca by the Belgian company FAI
- Oil palm plantations by renowned companies from China, Malaysia and Indonesia
- Increase of rice production by large scale rice companies

## 5.4 Cost-benefit analysis

**The aim of cost-benefit analyses in the context of drivers studies is to understand the perceived or real incentives for DFD from the perspective of the land user, or DFD agent.** An opportunity cost assessment was carried out for the above-described DFD agents following the state of the art methods developed for such analyses in the specific context of REDD+ (World Bank 2011).[34] Standardized one hectare land use models were developed to facilitate comparison between the main drivers. The opportunity costs were quantified on a one ha basis and on a per $tCO_2$. In order to assess the opportunity costs of different land use alternatives, the

[34] The full opportunity cost assessment manual is available for download: https://www.forestcarbonpartnership.org/redd-opportunity-costs-training-manual

long-term carbon stock average were quantified for each land use type. We assume no forest use (i.e. forests not managed or used for productive purposes) is the reference land use type, which correlates with the highest carbon stocks and lowest economic benefits. The following general assumptions are made (see Annex for sector-specific assumptions):

- Aboveground and belowground biomass carbon stock estimates and logging related GHG emissions are based on "State of the art study: Best estimates of emission factors and carbon stocks for Suriname," carried out by CATIE, while soil carbon data is based on the study carried out by Crabbe et al (2012[35]).
- For belowground biomass quantification we use the IPCC tier 1 default value for tropical natural forest of 0.2.
- For all calculation a 20 years period is assumed.
- For the reference land use option (no use), an average carbon stock of 791.2 tCO2/ha[36] is assumed including aboveground, belowground and soil carbon stocks.

**This economic and carbon mitigation assessment is complemented with an assessment of costs and benefits that are not easily quantifiable in economic terms, such as environmental services or social considerations.**

### 5.4.1 Forestry

#### Opportunity cost assessment

**The opportunity cost assessment in the forestry sector is based on three key forest management types (controlled logging; conventional logging, and concessions that are certified for applying controlled logging).** These have different implication in terms of economic profitability and long-term carbon stocks of forests. The average logging data is based on the SBB Forest Sector Analysis 2015 (SBB 2016), in which the timber harvesting rates are calculated over 531 cutting blocks (58,166 ha), logging rates ranges from 4.8 - 7.1 $m^3$/ha under conventional logging and are between 8.8 and 10.7 $m^3$/ha under controlled logging. For conventional logging, the average extraction rate every 25 years results then in 5.95 $m^3$/ha and for controlled logging at 9.75 $m^3$/ha.

The opportunity costs are calculated based on very general Emission Factors. It is recommended to do an updated assessment in the field to assess the Emission Factor for the different types of logging (planned for 2017).

**Table 12: Average long-term carbon stock for forest management types**

| Forest management type | Conventional Logging | Controlled logging | Controlled & certified logging | Source |
|---|---|---|---|---|

[35] Results of Forest carbon assessment and monitoring project in Suriname available at: http://sbbsur.com/wp-content/uploads/2015/06/FINAL-Carbonreport.pdf

[36] Abg: 579.3 $tCO_2$/ha (CATIE, SBB, CELOS state of the art study average); BGB 115.9 $tCO_2$/ha (based on IPCC Tier 1 default factor); soil carbon stock: 96 $tCO_2$/ha (0-30 cm soil depth based on Crabbe et al, 2012 data in Suriname)

| | | | | |
|---|---|---|---|---|
| **Average aboveground carbon stock before logging (tCO2/ha)** | 579.3 | 579.3 | 579.3 | CATIE, SBB, CELOS state of the art study |
| **Belowground carbon stocks (tCO2/ha)** | 115.9 | 115.9 | 115.9 | IPCC Tier 1 default factor (0.2) |
| **Soil carbon stock (tCO2/ha)** | 96 | 96 | 96 | Crabbe et al, 2012 |
| **Total carbon stock (tCO2/ha)** | **791.2** | **791.2** | **791.2** | |
| | | | | |
| **Average extraction rate every 25 years ($m^3$/ha)** | 5.95 | 9.75 | 9.75 | SBB forest sector analysis 2015 |
| **Average log emissions (tCO2/ha)** | 1.17 | 1.17 | 1.17 | CATIE, SBB, CELOS state of the art study |
| **Average logging damage emissions (tCO2/ha)** | 12.8 | 5.1 | 5.1 | |
| **Average logging infrastructure factor (tCO2/ha)** | 3.6 (*) | 3.6 (*) | 3.6 (*) | |
| | | | | |
| **Average annual aboveground regrowth (tdm/ha/year)** | 2 | 2 | 2 | IPCC tier 1 default factor for tropical wet and moist forests |
| **Average annual aboveground regrowth (tCO2/ha/year)** | 3.7 | 3.7 | 3.7 | |
| | | | | |
| **Average aboveground long-term carbon stock (tCO2/ha)** | 548 | 556 | 556 | CATIE, IPCC Tier 1 natural forest regrowth |
| **Total carbon stock (tCO2/ha)** | **759.8** | **768** | **768** | |

(*): This is a rough estimate that needs to be checked in the field (scheduled in 2017).

**Compared to the unmanaged natural forest in Suriname, the analysis show that logging in the long-run has limited carbon stock losses**. Conventional logging result in a long-term carbon stock loss of 31 $tCO_2$/ha while controlled and FSC certified logging result in a long-term carbon stock losses of 23.2 $tCO_2$/ha. For the economic analysis of the different forest management systems, historical data from literature review is used as well as data that was obtained during recent interviews with forest managers (see Annex 2). To ensure consistency with the 20 year time horizon, we assume that each ha can be harvested once per 25 years. For each harvest, the cost and revenues are annualized resulting an average annual cost and revenue and thereafter, discounted that result in a net present value (NPV). The following assumptions are made:

**Table 13: Comparison of cost logging operations (in USD/m³)**

| Forest management type | Conventional logging (CvL) | Controlled logging (CtL) | Controlled & certified logging (CL) |
|---|---|---|---|
| **Management** | | 4.2 | 6.4 |
| **Demarcations** | 1.0 | 0.7 | 3.5 |
| **Inventory** | 1.0 | 4.4 | 4.4 |
| **Roads** | 5.5 | 8.1 | 11.0 |
| **Felling** | 3.9 | 2.7 | 3.0 |
| **Skidding** | 23.3 | 11.2 | 15.0 |
| **Trucking** | 2.5 | 8.5 | 12.0 |
| **Stumpage fee[2]** | 4.0 | 4.0 | 4.0 |
| **Com/HKV-holders fee** | 12.0 | | |
| **Cost at forest road** | **53.1** | **43.7** | **59.3** |
| **Log handling** | 3.8 | 3.8 | 3.8 |
| **Road transport** | 20.0 | 18.0 | 16.0 |
| **Additional expense for certified wood (handling and export fee)** | | | 56.5 |
| **Cost at sawmill** | **76.9** | **65.5** | **135.5** |

Table 14 provides an overview of the assumed yield and revenues of an average per ha basis according to the three most applied management systems.

**Table 14: Extraction and revenues per ha for logging management systems**

| Forest management type | Conventional logging (CvL) | Controlled logging (CtL) | Controlled & certified logging (CL) |
|---|---|---|---|
| **Average logging per ha (m³/ha)** | 5.95 | 9.75 | 9.75 |
| **Average timber price at sawmill (USD/m³)** | 100 | 100 | 100 |
| **Revenue every 25 years (USD/ha)** | 595 | 975 | 1,755 |
| **Net revenue / earnings (USD/ha)** | 137.7 | 336.9 | 433.9 |
| **Annualized net revenues / earnings (USD/ha/year)** | 5.5 | 13.5 | 17.4 |
| **Net present value 20 years (USD/ha)** | **46.9** | **114.7** | **147.8** |

**In summary, sustainable forest management results to a large extent in the maintenance of forest carbon stocks while providing further economic value of Suriname's natural forests.** The analysis shows that the transition of unused forest to timber extraction results in net economic benefits of 47-148 USD/ha. Forest carbon stocks are reduced by about 23 - 32 $tCO_2$/ha over a

period of 20 years (short term losses are more significant). This result in opportunity costs per $tCO_2$ of USD 1.5 - 6.4. In other words, in order to compensate forestry operators to manage forest and extract timber, for each lost $tCO_2$ the forest operator would require a financial compensation between 1.5 and 6.4 USD/$tCO_2$.

## Social and Environmental considerations

**The management of natural forest results in socio-economic and environmental benefits.** Considering that sustainable forest management to a large extent maintains environmental services and increases socio-economic benefit to the population and to the country, overall sustainable timber extraction must be regarded rather as an environmentally and socio-economic sustainable development pathway rather than as a driver of reducing significant forest carbon stocks. If designed and implemented in a fair, participatory and gender equitable manner, Table 15 illustrates some of the key environment and social benefits that can result from forestry in the context of Suriname.

**Table 15: Forest sector environmental and social considerations of SFM**

| ENVIRONMENTAL | SOCIAL |
|---|---|
| **Service: Biodiversity: flora and fauna** | **Service: Subsistence and livelihoods** |
| ▪ The protection of biodiversity is a main value within the concept of SFM.<br>▪ Overall positive effects of SFM on biodiversity conservation is widely recognized (Van Kuijk, 2009, Putz et al, 2012[37]). Reduced impact logging operations support biodiversity in natural forests.<br>▪ For FSC certified FMUs identification, demarcation and protection of HCVF (High Conservation Value Forests) areas is compulsory. | ▪ (Certified) SFM respects the users' rights and interests of local communities and secures their land use rights.<br>▪ The creation of rural employment opportunities equitably for both women and men has a positive effect on livelihood and rural development. According to FAO Forest Resource Assessment (2015), 5,500 people were directly employed by the forestry sector. |
| **Service: Water regulation and erosion control** | **Service: Cultural and spiritual values, historical sites** |
| ▪ SFM includes strict regulations for the demarcation and exclusion from logging of rivers, creeks and gullies, and steep slopes. These terrain features determine the layout of the forest infrastructure. Application of these regulations, also strictly prescribed in the Suriname Code of Practice (CoP) for SFM, have a positive effect on the conservation of the quality of fresh water resources and erosion control. | ▪ SFM requires the identification of historical, cultural and/or spiritual sites within the FMU are those that might be affected by the forest operations. In close collaboration with the local communities, these areas should be demarcated and protected and community members must be allowed for free access to these sites at any time. |

[37] http://epubs.scu.edu.au/cgi/viewcontent.cgi?article=2473&context=esm_pubs

| Service: Avoidance of illegal activities and protection of wildlife | Service: Collection of MTP's and NTFP's |
|---|---|
| ▪ SFM also aims at the control of illegal activities, e.g. hunting and poaching. Active control measures are integrated elements of the overall SFM plan: closing of forest roads, placing of sign boards and periodic surveillance. All these measures have a positive effect on illegal activities within the FMU and maintenance of wildlife populations | ▪ SFM pays due attention to the sustainability and conservation of other forest functions than timber growth, e.g. the collection of NTFP's. Local communities, depending on these (collection of) NTFP's are allowed to continue doing so within the FMU.<br>▪ Alongside active engagement of SFM forest managers, SFM can offer positive options for fair and gender equitable benefit sharing with local communities.<br>▪ Active engagement of SFM forest managers with regards to the sustainable harvesting of minor timber products (MTP's) may offer additional income opportunities for women and men in local communities. |
| | **Service: Local employment opportunities and working conditions** |
| | ▪ SFM allows for the provision of sustained employment opportunities, provides for job-training and improved working conditions equitably for local male and female community members. |

### 5.4.2 Mining

#### Opportunity cost assessment

**Mining requires the complete removal of all major carbon pools, which implies land-based GHG emissions of 791.2 tCO2/ha.** Mined sites remain deforested for at least a decade, if not far longer and the replacement of pioneer species by old-growth forest trees takes much longer. Present-day observations suggest it may be centuries before old mining pits return to secondary forest (Peterson and Heemskerk, 2001). In addition, gold mining requires significant amounts of diesel fuel for the extractive activities, resulting in additional average GHG emissions of 91.5 tCO2/ha in small-scale mining and 137.2 tCO2/ in large scale mining. Large-scale operations are more fuel intensive as these dig much deeper and extract more gold than the technologies and machinery employed in small-scale operations.

**For the financial analysis of the gold mining sector and quantification of the cost and benefit of gold mining on a per ha level, the estimation of the overall profitability of gold mining differs based on the amount of gold the miners can extract.** Between 2009 and 2014, average gold mining by small-scale sector amounted to about 25,094 ha and a production 125,227 kg of gold.[38] Assuming approximately one third of the production has taken place on areas that were already deforested and two thirds were produced on new deforested areas, the per ha

[38] For the overall productivity of the gold mining sector, the reported data in Rahm et al. 2014 was assumed.

productivity for mining amounts to 3.3 kg/ha. For large scale mining, the assumption is that productivity is double. It is assumed that extraction occurs within one year, thus profits occur once in year 1 (see Annex for further assumptions).

**Based on the above-mentioned assumptions, the average opportunity costs of avoiding natural forest conversion to small-scale gold mining is USD 108,000 /ha or USD 122 per tCO2, from the perspective of the gold miner. For large-scale mining, the opportunity cost per ha is USD 196,364 /ha or USD 212 /tCO2 (Figure 5).**

### Social and environmental considerations

**The socio-economic benefits of gold mining are mainly economic and employment related benefits**. Fiscal benefits could increase if the government attempts to formalize the small-scale gold mining sector were successful. In the large-scale mining sector, social services benefit local villages and their communities by means of employment, income generation and community development. Because of many different factors, including the location of local communities in (projected) mining concession, interior communities have become more self-aware about their land and resource rights, and more vocal in claiming these rights.

**In terms of environmental impacts, mining has most severe environmental impacts of all productive sectors in Suriname, even beyond deforestation**. With regard to ASGM, most attention has been paid to mercury contamination. ASGM miners use mercury, which amalgamates with gold, to separate the (typically very fine) gold particles from other soil particles. After washing the gold, the Au-Hg amalgam is burned, a process during which the mercury evaporates and the gold remains behind. Existing research suggests that evaporated Hg is transported and, after depositing through precipitation, may affect a much larger area that the mining zones (Ouboter 2015). In 2016, Social Solutions and the Artisanal Gold Council estimated that ASGM operations in Suriname annually emitted 63.0 T Hg/yr (Heemskerk and Duijves 2016). Research also shows that mercury is transported through precipitation (Mol & Ouboter 2003).

**Another concern is the pollution of water with sediments and fuels (e.g. diesel, motor oil).** Tailings from ASGM operations often flow into nearby creeks and rivers. Suriname possesses 4,989 km of waterways that are in direct contact with gold mining activities. In addition, satellite imagery suggests that 8,597 km of waterways are potentially indirectly impacted by ASGM activities (Rahm et al. 2015). A main environmental impact is water turbidity, which affects the fish population (Mol & Ouboter 2003). Women are disproportionately affected by these environmental impacts considering their dependency on subsistence agricultural food production and natural water for consumption and household.

**The impact of gold mining on wildlife has not been scientifically established.** It is likely that the noise of mining equipment chases animals away. However, people working in mining operations typically do not hunt and there is no evidence of depletion of wildlife populations beyond the actual mine sites due to large- or small-scale mining. However, the forest fragmentation caused by mining may negatively impact biodiversity.

**In the case of the large scale mining industry, the use of offsets should reduce or eliminate the net loss of biodiversity and, ideally, create a net positive impact on biodiversity through conservation gains that go beyond offsetting a project's residual impact**. Newmont Suriname

is collaborating with Conservation International to design and implement a biodiversity offset program. This program informed by International Finance Corporation (IFC) and Business and Biodiversity Offset Program (BBOP) guidance.

**Table 16: Mining sector environmental and social considerations (small-scale)**

| Environmental | | Social | |
|---|---|---|---|
| **Service** | **Description** | **Service** | **Description** |
| No environmental services identified | | ***Livelihood/poverty reduction*** | For large share of households in the interior gold mining is a primary source of family income. |
| | | ***Employment*** | Provides employment in areas with few employment alternatives, and to people with few employable skills. In the SSM service sector employs a similar number of persons as the sector itself (in the interior and Paramaribo); these service providers include sellers of fuel, food, and equipment, hotel and brothel owners, sex workers, transportation providers and so forth.* |
| | | ***Rural – urban migration*** | Due to increased opportunities in the interior, reduced rural urban migration and ghetto formation in and around urban center. |
| | | ***Education*** | Persons with low/no formal education and few employable skills learn on-the-job training. |
| | | ***Safety*** | Due to increased income earning opportunities for marginalized persons lower propensity to enter criminal activities. |
| | | ***Tax income*** | Through the marketing of gold and other products such as fuel the government earns royalties and tax incomes.* |
| | | ***Infrastructural development*** | In many interior communities, the SSM sector has induced the establishment of businesses incl. gas stations, shops, hotel, supermarkets and so forth. |

**Note: See Table 8: Mining sector factsheet for numbers.*

**Table 17: Mining sector environmental and social considerations (large-scale)**

| Environmental | | Social | |
|---|---|---|---|
| **Service** | **Description** | **Service** | **Description** |
| ***Biodiversity*** | Execution of biodiversity offset projects for compensation for biodiversity impacts. | ***Livelihood/Poverty reduction*** | LS mining provides livelihood to significant share of population in surrounding communities. Employees and their families often also receive insurance benefits. |
| | | ***Employment*** | Provides employment in areas with few employment alternatives. Employment is offered directly at the firms as well as through contactors. |
| | | ***Rural – urban migration*** | Due to increased opportunities in the interior, reduced rural urban migration and ghetto formation in and around urban center. |
| | | ***Education*** | Employees with limited education receive on-the-job training and learn new skills.<br>Support to educational projects (incl. study grants) in affected communities. |
| | | ***Infrastructure*** | Road construction and maintenance, and construction of other infrastructural works incl. bridges. |
| | | ***Community development*** | Through community relations programs support for variety of projects, incl. educational, and for entrepreneurs and sports. Such projects typically target affected communities but may also be executed in other communities and Paramaribo. |
| | | ***Self-awareness*** | Due to presence of LS mining firms, communities become more self-aware about their land and resource rights, and more vocal in claiming these rights. |

### 5.4.3 Agriculture

**To better understand the economic incentives of converting natural forest land to agricultural land use, the average ha-based economic performance are quantified for the identified agents in the agriculture sector.** Representative farm-based models are used to compare the economic performance of 1 ha of land from the perspective of the agents. The following farm models are used to assess the opportunity costs in the agricultural sector.

**Table 18: Agents and farm models**

| Agent | Farm model |
|---|---|
| Subsistence farmers | Shifting cultivation (cassava production) |
| Small-scale farmers | Small-scale agricultural land use (beans production) |
| | Small-scale agricultural land use (cassava production) |
| Medium-sized commercial farmer | Medium-sized commercial agricultural land use (Rice production) |
| | Medium-sized commercial agricultural land use (Banana production) |

*Note: Medium and large scale investors are not included because this agent has yet to become important in Suriname and the farm models are comparable to the medium-size commercial farmer.*

**For the above-mentioned farm models, an economic analysis and the carbon stock losses were assessed as a basis for the opportunity costs analysis.** The carbon stock assessment is based on regional data and IPCC default factors for agricultural land use. As a reference, the average carbon stock of an unlogged natural forest of 791.2 $tCO_2$/ha[39] is assumed.

**Table 19: Average carbon stock and carbon stock losses of agricultural land use**

| Farm based models | Above-ground biomass ($tCO_2$/ha) | Below-ground biomass ($tCO_2$/ha) | Soil carbon biomass[40] ($tCO_2$/ha) | Total carbon stock losses from converting natural forest ($tCO_2$/ha) | Sources |
|---|---|---|---|---|---|
| Shifting cultivation land | 18.3[41] | 7.3 | 56 | **709.9** | IPCC tier 1 data for aboveground and belowground and soil carbon losses) |
| Agricultural land (crop production, beans, cassava and rice | 9.5 | 3.8 | 56 | **722.2** | |
| Agricultural land (banana production) | 77 | 15.4 | 56 | **643.1** | |

The information shows that the annual cropland result in the highest long-term GHG emissions per ha (722.2 $tCO_2$/ha). Shifting cultivation landscape and banana production result in GHG emissions of 709.9 to 643.1 $tCO_2$/ha in the long-term.

For the financial analysis of the farm model, we use national production data and statistics, combined with on-farm interviews with producers. All cost and revenues represent the farm-level inputs and outputs valued at local market prices.

[39] Abg: 579.3 $tCO_2$/ha (CATIE, SBB, CELOS state of the art study average); BGB 115.9 $tCO_2$/ha ( based on IPCC Tier 1 default factor); soil carbon stock: 96 $tCO_2$/ha (0-30 cm soil depth based on Crabbe et al, 2012 data in Suriname)

[40] Assume a reduction of 42% compared to natural forest over 20 year, following IPCC default factor for SOC land use change from forestry available at: https://www.researchgate.net/publication/272890797_From_forest_to_cropland_and_pasture_systems_A_critical_review_of_soil_organic_carbon_stocks_changes_in_Amazonia

[41] This number will be updated for Suriname and is probably higher.

- The farm model for shifting cultivation assumes a cultivation period of three years, followed by an average 7 years fallows period. This over a period of 20 years the farm model (an average shifting cultivation ha) produces only 6 years (14 years fallow period).
- The small-scale beans production and cassava production model assume the observed average yield and production costs based on real produces data, Praktijkonderzoek Plant & Omgeving B.V. (2010) Kaplan, (2016) and LVV statistics (2014).
- The medium sized commercial farm model for rice and banana are based on A. Zalmijn, 2016, Suriname's Agrarian Potential, 2003; S. Jairam, 2011, LVV statistics, 2014, Derlagen, C., Barreiro-Hurlé, J. and Shik, O. (2013).
- The following table presents the key production costs, yield and revenues per ha.

**Table 20: 1-ha farm models financial performance and key input variables**

| Item / Parameter | Shifting cultivation (cassava production) | Small-scale agricultural land use (beans production) | Small-scale agricultural land use (cassava production) | Medium-sized commercial agricultural land use (rice production) | Medium-sized commercial agricultural land use (Banana production) |
|---|---|---|---|---|---|
| Average establishment investment cost[42] (USD/ha) | 150 | 7,705 | 5,200 | 800 | 5,200 |
| Average annual production cost[43] (USD/ha) | 238 | 6,644 | 540 | 570 | 17,011 |
| Average assumed yields (kg/ha) | 4,000 | 7,000 | 17,500 | 4,830 | 37,142 |
| Average revenues (USD/ha/years) | 1,143 | 15,750 | 6,650 | 2,560 | 19,428 |
| Average net revenue (USD/ha) | 755 | 1,401 | 910 | 1,190 | 2,417 |
| Net present value (NPV at 10% discount - 20 years) | **USD 2,602** | **USD 11,927** | **USD 7,747** | **USD 10,130** | **USD 15,847** |

[42] Includes land clearing, land preparation, planting, fencing among others

[43] Includes labor input, such as fertilizers, pesticides and seeds

**The results show that the opportunity cost ranges between USD 2,602 /ha (for shifting cultivation) and USD 15,847 /ha (banana production).** Considering the abovementioned carbon stock losses, on a per tCO2 basis, the opportunity costs range between USD 4 /tCO2 (shifting cultivation) and USD 25 /tCO2 (banana cultivation). From a purely economic point of view, shifting cultivation is the most economical option to avoid carbon stock losses due to deforestation/ forest degradation, followed by small-scale and medium scale agricultural land use. From a social perspective, however, shifting cultivation and small and medium agricultural production are important measures to maintain subsistence and food security of the rural population as explained in the social and environmental considerations below.

## Social and environmental considerations

The social and environmental analysis illustrates that shifting cultivation has important socio-economic and food security functions while the environmental impacts can be considered negative.

**Table 21: Social and environmental considerations – shifting cultivation**

| ENVIRONMENTAL BENEFITS | | SOCIAL BENEFITS | |
|---|---|---|---|
| **SERVICE** | **DESCRIPTION** | **SERVICE** | **DESCRIPTION** |
| **Shifting cultivation and small scale farmers** | | | |
| *Soil* | Negative impacts as short fallow periods reduce soil fertility and increases erosion. | ***Food security*** | The crops are mainly for own consumption and what remains is sold. |
| *Water* | Negative impacts as soil erosion reduces water retention and negatively affects belowground water tables. | ***Income generation*** | By selling their surplus, the tribal and indigenous households generate income for their families. |
| *Biodiversity* | Significantly reduce habitats for wildlife and plants levels compared to natural forest | ***Fuel wood & construction*** | Before the shifting cultivator burns the area that will be used for farming, the valuable wood is extracted for fuel wood or construction. |
| GHG Emissions | Reduction in long-term carbon stocks by more than 650 tCO2/ha | ***Land and property*** | Forest conversion to agriculture may in some cases be seen as a means for increasing tenure security. |
| **Medium and large scale farmers and investors** | | | |
| *Soil* | Use of pesticides and herbicides results in water pollutions. | ***Provide jobs*** | These medium size commercial farmers provide employment to local communities. |
| *Water* | Use of pesticides and herbicides results in water pollutions. | ***Income generation*** | Generating income for local communities |

| | | | |
|---|---|---|---|
| *Biodiversity* | Monoculture significantly reduce habitats for wildlife and plants levels compared to natural forest | ***Worker's Health, Safety and Welfare*** | By implementing international standards such as GLOBALGAP these agents focus social aspects, such as transport of workers on public roads, food storage and rest areas, on-site living quarters, communication, health checks, and control of subcontractors |
| GHG Emissions | Reduction in long-term carbon stocks by more than 600 tCO2/ha | ***To meet national and international consumption demand*** | The produce is used for local consumption and exported to international markets to meet the demand of these markets. |

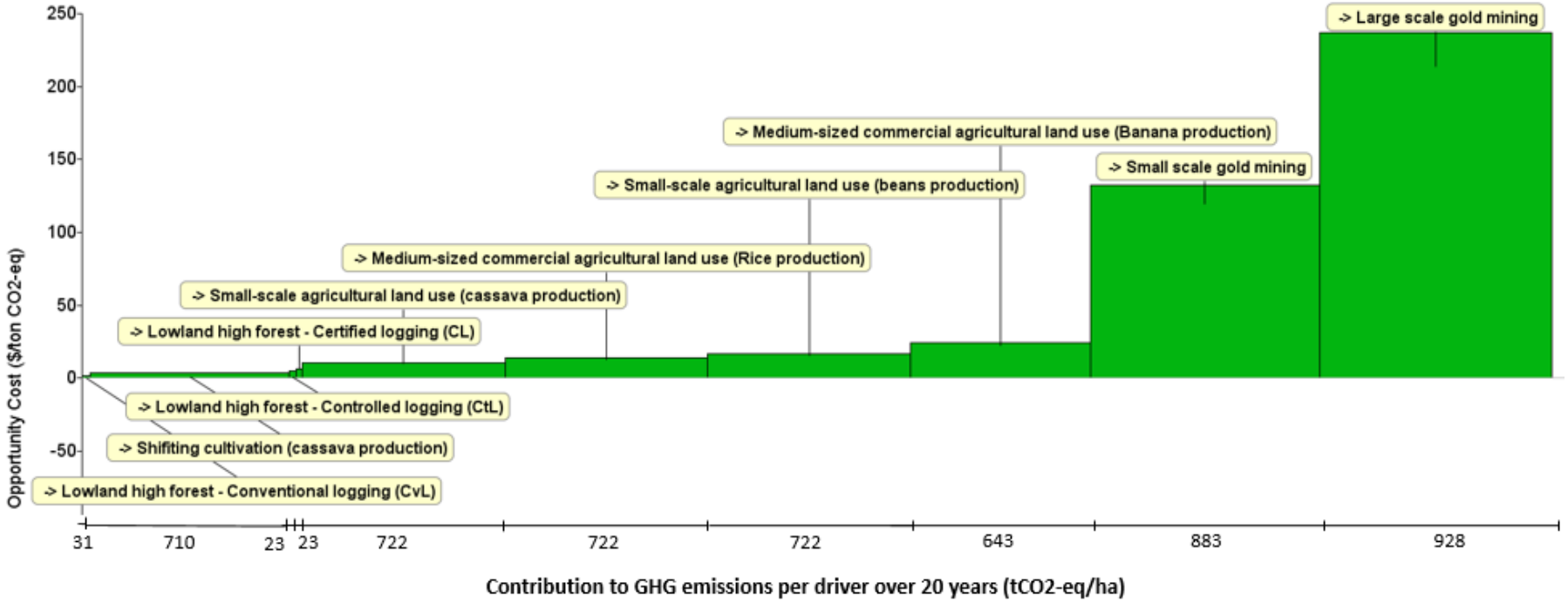
## Results overview

**The results show that gold mining is the most profitable land use in Suriname and avoiding deforestation due to mining activities is most difficult from an economic profitability perspective** (see Figure 5). Small-scale mining has an opportunity cost of USD 122/$tCO_2$, and large-scale mining is estimated at USD 212/$tCO_2$. In addition to the fact that mining contributes the most to deforestation in area terms as explained in Chapter 4, gold mining results in the highest GHG emissions per hectare, as shown in the x-axis of Figure 5. Further, conversion of forest to gold mining comes at a high environmental costs beyond forest removal, including mercury pollution and water turbidity.

**The agricultural sector also has relatively high GHG emission per hectare, but the opportunity costs are significantly lower compared to the gold mining sector.** These range between USD 4-22/$tCO_2$. It is important to keep in mind however, that agriculture provides much more than economic benefits from the land user perspective. Investments in agriculture support food security and income diversity at the national and local level. Shifting cultivation in the interior is the livelihood staple for many people, especially women who often remain engaged in agriculture whilst the male and youth household members are more likely to move to urban areas. These issues are important to consider when interpreting the opportunity cost curve to avoid coming to the false conclusion that the land use options with low opportunity costs can be easily or equitable addressed through REDD+ incentives.

**The GHG emissions resulting from different types of forestry are small compared to the other sectors when compared on a per hectare level.** The opportunity cost are also on the lower end when compared to other sectors, ranging from USD 1.5 for conventional logging to 6.5/$tCO_2$ for controlled logging that is certified for SFM (i.e. through FSC). Further, the analysis has shown that the environment benefits related to the forestry sector are also important, contributing to water and biodiversity conservation.

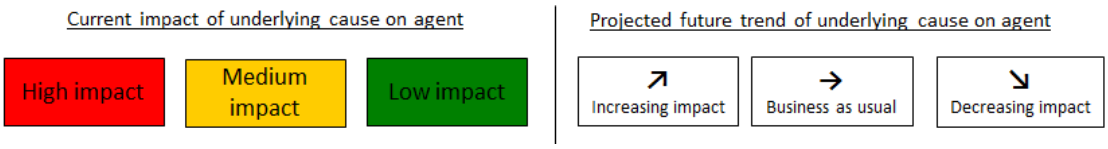
**Figure 5: Opportunity cost curve**



## 5.5 Underlying causes

**Underpinning proximate or direct drivers of deforestation are underlying causes**. Understanding these causes is important because deforestation often finds its root causes in global trends 'outside the forest'. To reduce complexity, the analysis is based on a standardized qualification of underlying causes categories, based on an international renowned conceptual framework for understanding tropical deforestation (Geist & Lambin 2001, 2002). These underlying causes categories are: demographic, economic, technological, policy and institutional, social/cultural, environmental and governance. The main indirect or underlying causes underpinning forest loss and degradation differ according to driver and agent, with some underlying causes more relevant for others and vice versa. As shown in Figure 6 below, the results of this chapter are depicted using colors and arrows, which helps to transmit the main messages arising from the underlying causes analysis. The colors indicate the current impact of the underlying cause on the driver and agent at hand, while the arrows indicate the expected future impact of the underlying cause on the respective agents. For example, when assessing the future impact of agricultural productivity on agricultural expansion (and thus deforestation), if the arrow goes up, this demonstrates increasing impact, meaning that the problem of low productivity increases for example due to exacerbating soil degradation and erosion.

**Figure 6:** Legend for underlying causes analysis




### 5.5.1 Forestry

With the current forest management practices typically applied in Suriname, the agents in the forest sector do not contribute significantly to deforestation and/or substantial forest degradation, the following assessment indicates the current and potential future impact on the forest sector that may lead to forest degradation and or deforestation within the forest sector. The below analysis illustrates the key parameters that influence the forestry sector and may pose key risk for future forest degradation of deforestation.

**Figure 7: Underlying causes relevant for forestry**

| Underlying cause → | | Demographic | | Economic | | | Technological | Policy & Institutional | | | Governance | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forestry sector | Driver/Agent ↓ | Growth & Migration | Increasing poverty | Growing domestic market | Growing global markets | Increasing certified timber demand | Insufficient capacity | Forest concession regulations | Reformed Forest fees | Poor land use planning | Poor SFM control | Introduction CoP | FLEGT / VPA |
| | Conventional logging in community forests /HKV's | → | ↗ | ↗ | ↗ | → | ↗ | ↘ | ↗ | ↗ | → | ↘ | ↗ |
| | Conventional logging in small concessions | → | → | ↗ | ↗ | → | ↗ | ↘ | ↗ | ↗ | → | ↘ | ↗ |
| | Controlled Logging | → | → | → | → | → | ↗ | → | → | ↗ | → | → | → |
| | Certified Logging | → | → | → | → | → | ↗ | → | → | ↗ | → | → | → |

**Legend:**

Current impact of underlying cause on agent

High impact | Medium impact | Low impact

Projected future trend of underlying cause on agent

↗ Increasing impact | → Business as usual | ↘ Decreasing impact

## Economic factors

**A limited number of tree species are currently demanded on the domestic and global market, thus harvesting volumes are limited to the availability of these species**. While operational costs increase and timber prices remain stable, forestry operators look for options to increase the harvesting rates by including new species in felling. Worldwide, many projects are looking into the use and marketing of these so called 'Lesser Known Timber Species (LKTS)', also in Suriname. As a result, in the near future, timber harvesting rates may increase. Currently, from the many tree species that are being harvested, only a limited number of species are commercialized and traded on a regular basis, both domestic and globally. Ongoing research into the use of lesser known timber species (Probos, 2015) aims at increasing the harvesting levels, thereby also improving the business case for forestry in Suriname. Of the >1000 tree species that can be found is Suriname's forests, about 80 of them are considered (potentially) commercial species. Should these become commercial, harvesting levels will increase per ha, potentially resulting in forest degradation if no appropriate control measures are in place. In this case, strict monitoring of the maximum volumes to be sustainably harvested is of utmost importance. Forest recovery (and the associated carbon stocks) within the 25 years' felling cycle, now including new (LKTS) species, should be investigated in detail. If not, this may become a potential driver of forest degradation. However, on the other hand, the inclusion of LKTS may reduce the overall area harvested and reduce the need to revisit the same area. As such, LKTS can help to reduce degradation. Additionally, it will increase the harvesting efficiency and might stimulate loggers to invest more in harvest planning, so also in this sense it might decrease degradation.

## Policy and institutions factors

**The Forest Management Act (1992) covers the sustainable and rational use of forest resources, taking into account the interests of forest-dwellers and the conservation of nature and biological diversity.** It provides rules governing timber production, timber processing and export. It covers the various licenses for forest product harvesting (including timber) from all different types of concessions and the use of community forests (GOS 1992). Forest use on private land is not regulated under the Forest Management Act (1992).

**The national forest policy adopted in 2005 provides broad guidelines for the use of forests for production, protection and conservation.** According to the policy, the main goal of forest management is "enhancing the contribution of the forests to the national economy and the welfare of the current and future generations, taking into account the preservation of the biodiversity". It contains economic, sociocultural and environmental goals of equal weight (GOS, 2013). The National Forest Policy (2005) assumes a potentially annual sustainable cut of 1.0 - 1.5 million $m^3$ based on a cutting cycle of 25 years and a logging intensity of 10 to 15 $m^3$/ha if a steady expansion of the package of currently lesser used species is realized. The forest management requirements allow for an annual cut of 25 $m^3$/ha, which is still far greater than the current annual harvest. In 2011, Suriname presented its National Code of Practice (CoP) for sustainable forest management. The CoP, although still a draft version and under review, describes the best practices for SFM and is applicable to all types of timber harvesting permits (SBB, 2011), thus the overall policy and institutional framework for concessional management sets a framework for sustainable forest management not posing significant risk on deforestation and forest degradation.

**One key risk of forest degradation in the conventional logging sphere is related to the issuance of small concessions, combined with a limited license period.** Further risks occur with regards to the present practice for re-issuing of concessions to (new) forestry operators. Before doing so, the logging history (and a re-definition of the AAC) should be taken into account

**Forest fees to be paid by concession holders consist of a fixed fee (annual area fee = *concessierecht*) and a flex fee (stumpage fee = *retributie*).** In early 2015 both fees were adjusted. Apart from raising the state revenues from logging operations, the main reason for adjusting these fees was to stimulate more concession holders to get engaged in timber production, by activating the so called 'sleeping concession'. Or, if not, than forcing them to return these idle concessions to the Government, allowing them to be issued to forestry operators who have a genuine desire to produce. Over years, several studies were conducted on how these 'sleeping concessions' could be activated by revising the forest charges system (FAO, 1999).

March 1st 2015, the annual area fee was increased by 1,000%: from SRD 0.05 to SRD 5.00 per ha (based on the gross concession area as mentioned in the concession license). To compensate for this increase, at the same time the stumpage fee was reduced from USD 6.00 to USD 3.95 per $m^3$. This compensation is meant to balance the combined forest fees that 'genuinely in business' forestry operators are being charged by the Government. The intended effect on 'sleeping concessions' is unknown yet. However, the forest fee adjustment may have some unintended side effects that may limit - or even reduce - the further increase of forest area under controlled logging and (certified) sustainable forest management:

- The increased area fee may 'push' forestry contractors in logging from community forests / HKV's as over these forests no area fee has to be paid, the reduced stumpage fee may be an additional stimulus for doing so;
- The increased area fee may result in growing applications for small (short-term) concessions, at the risk of a growing forest area under conventional logging;
- SFM requires minimum concessions (FMU) size > 22.500 ha. Forest managers may prefer to handback small concessions within the FMU after logging (Bodegom & De Graaf 1991);
- (FSC) certified forest operations require the permanent access to sufficient forest area to permanently complete the felling rotation.

Strict monitoring of these potentially unintended effects of the new forest fees is needed, and additional regulations might be required in the near future to stimulate further development of SFM and forest certification.

**Due to the lack of a structurally coordinated land use planning, there are numerous overlaps for land use concessions.**[44] The overlaps for land use concessions often results in a stagnation of land development activities and blocks investments in land productivity. In the current situation, licenses according to the three laws Forest Management Act, Mining Act and L-Decrete can be issued simultaneously on overlapping land. While all laws have the same legal status/weight, in practice it is very hard to carry out mining or agriculture without removing the forest cover. This results in conflicts but also uncertainty of the timber license holders about the durability of their investments in sustainable forest management. Further, de jure and de facto land use rights and land ownership is a major concern. With forestry part of the possible land use allocations, Sustainable Forest Management is the responsibility of the Minister of Physical Planning, Land and Forest Management (RGB). Since 1998, the SBB is mandated by the LBB to enforce the Forest Management Act 1992. The LBB is still responsible for the enforcement of the Nature Conservation Act 1954 and the Game Act of 1954. Infrastructure development in the interior, mining exploration and mineral resource extraction is the responsibility of other ministries or government agencies.

**The absence of adequate land use planning also has its effects on sustainable forest use.** The issuing of (forest) concessions, permitting the licensees extracting the aimed resources (timber, minerals), can be done by different ministries. Without effective land use planning and coordination, this may result in overlapping concessions and conflicting land use rights. The granting of forest concessions for the sustainable forestry (issued by the Min. of RGB) and the issuing of (gold)mining concessions (issued by the Min. of NH) frequently overlap. In 2015, 64% of the (gold)mining activities overlapped with areas that were issued for (sustainable) timber harvesting. In total, this affected 711,213 ha of forestry licenses that were initially issued for the purpose of timber extraction (SBB, 09/2016).

**Securing the overall forest area (FMU) integrity, is a major condition for (FSC) SFM certification.** Because mineral mining is preceded by land clearing (deforestation), forest managers aiming at (FSC) certification cannot meet this condition. In case of existing mining activities in forest concessions, FSC provides the option for excluding these areas from the

[44] The Planning Law (1973) *Planwet* deals with national/regional planning issues in general, but does not provide specific guidance for integrated land use planning.

certificate's scope. However, in case of new mining activities within the (FSC) certified FMU, the certificate will be withdrawn. The absence of effective land use planning and forest land allocation, at the risk of overlapping land use right and forest concessions, hampers SFM and is a serious constraint towards forest certification.

## Governance factors

**Law enforcement in the hinterland of Suriname in general – and in the forest sector specifically – is difficult due to its remote location, limited infrastructure and a constant limitation in transport facilities and other resources.** A World Bank country assessment on law compliance, prevention and control of illegal activities in the forest sector found that weak law enforcement is a combination of low capacity and not enough political commitment, especially when there are vested interests[45] (Playfair 2007). Although much has changed in the past decade, especially related to SBB's increased monitoring and enforcement capacity, many of these findings remain relevant today. A number of institutional preconditions for improving law compliance are currently not in place. The institutions responsible for forest law enforcement (SBB and the police) have limited legal authority to act, and operational capacity in terms of personnel, material, and equipment to execute control in the forest areas. In parallel, forestry operators face numerous constraints for legal compliance. Although the government administration is in an ongoing process of decentralization, forest agencies and other relevant offices for doing business are still headquartered in Paramaribo. Decentralization of the relevant departments and empowerment of SBB field stations to deal with administrative procedures would remove one barrier for producer compliance (ibid).

**Regarding community forests and HKV's, internal governance hampers SFM.** Due to lack of transparency[46], benefit distribution of the informal community timber royalties may potentially be unequal. Community members are not fully aware of their rights or the legal stipulations related to the community forests in their traditionally held forests.[47] On the production side, small entrepreneurs operating in community forests may violate the law due to their inability to follow administrative procedures or fulfill the technical requirements for SFM. Small-scale operators often have little or no formal education and lack awareness of the requirements for SFM or understanding of the legal regulations (ibid).

## Demographic factors

**In Suriname, population pressure remains low, with only 3.1 person/km$^2$ (on 163,820 km$^2$ of land, Suriname has just about half a million inhabitants).** Approximately 90% of the population lives in the Coastal Plain, in the north of the country; about 50% lives in the capital Paramaribo itself (ABS 2010). The total population is 531,170, of which 265,953 lives in Paramaribo; 95,125 in Wanica; and 40,219 in Nickerie. The rate of urbanization is 1.44% per annum, and industrialization is limited. The Savanna Belt and the Interior of Suriname are thus thinly

[45] Transparency International's Corruption Perception Index ranks countries from 100 (perceived very uncorrupt) to 0 (perceived very corrupt) and has ranked Suriname 36/100 in 2014. This is consistent with 2013 and 2012 scoring of 36 and 37 respectively. This is indicative of weak governance and unreliable official documentation.

[46] According to the WRI Forest Legality Risk Tool, Suriname scores below average for transparency and regulatory quality indicators: http://www.forestlegality.org/risk-tool/country/suriname#tab-management

[47] This is not confirmed by the community perceptions survey but it is one of the indications of the survey.

populated. Poor accessibility, and thus isolation of people who live there, and the infertility of the soils in the Interior and much of the Savanna Belt explains the low population density. Therefore, the relative impact of this driver, especially in the dense forest areas of the Interior, is currently and in future highly limited as Suriname's population growth rate is estimated at 1.05% (2016 estimate)[48].

**The main cause of illegal activity is the high poverty rate, which is especially severe for tribal peoples in the interior** (Playfair 2007). The lack of alternative employment opportunities for workers from indigenous and tribal communities has pushed many to become sub-employed in the informal sector. They make up a group of local entrepreneurs who use chainsaws or mobile sawmills and work in both the communal and public forests. The opportunities for these individuals to obtain timber-cutting rights are currently limited (ibid).

### 5.5.2 Mining

This section provides an assessment of the underlying causes of small-scale and large-scale gold mining. It describes and graphically depicts the current impact of underlying causes on mining, as well as the projected future trend of underlying causes on mining.

**Figure 8: Underlying causes relevant for gold mining**

| | Underlying cause → | Demographic | Economic | | | | Technological | | Policy & institutional | | Social /cultural | | Environmental |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mining sector | Driver/Agent ↓ | Population Growth & Migration | Currency devaluation | Poverty | Commodity prices (i.e. fuel) | Gold price | Technological innovation | Infrastructure | Legal framework & enforcement | Corruption / lack of transparency | Urban-rural contrasts and distrust | Tribal and land resource rights | Resource availability / ease of access |
| | Small scale gold miners | → | ↗ | ↗ | → | → | → | → | ↗ | → | → | ↗ | ↗ |
| | Large scale gold miners | → | → | ↗ | → | → | → | → | ↗ | → | → | ↗ | → |

**Legend:**

Current impact of underlying cause on agent

High impact | Medium impact | Low impact

Projected future trend of underlying cause on agent

↗ Increasing impact | → Business as usual | ↘ Decreasing impact

#### Demographic factors

**Migration is a key demographic trend, impacting Suriname's economy overall and the mining sector specifically.** Currently, Suriname hosts 35,040 foreign-born registered residents – mostly Guyanese, Dutch (including those of Surinamese origin), Brazilians and Chinese (ABS, 2014). In addition, an unknown number of unregistered migrants live and work in Suriname, among

[48] CIA World Fact book, Suriname page: https://www.cia.gov/library/publications/the-world-factbook/geos/ns.html

whom significant numbers of Guyanese, Brazilian, Chinese and Dutch (IOM, 2014[49]). In particular, Brazilians are active in small-scale gold mining. In the early 1990s, besides the opening up of the Suriname interior after a period of civil unrest, the migration of Brazilian gold miners to Suriname was a major factor in the expansion of Suriname's ASGM sector. Brazilians migrated not only because of opportunities in Suriname, but also because ASGM became much more restricted at home (De Theije and Heemskerk 2009). In the late 1980s, the Brazilian government began to regulate, limit, and control small-scale mining and in 1989, a legal provision named Garimpo Mining Permit made mining rights dependent on submission of an environmental license to the appropriate environmental authority. In addition, strict restrictions to entering indigenous territories were imposed. As the factors driving Brazilians into mining did not change (e.g. poverty, few opportunities for socioeconomic advancement), many Brazilians crossed the borders into the Guianas and Venezuela to continue their work in gold mining (ibid.). Following in the footsteps of these *garimpeiros,* other Brazilians enter Suriname in the hope to benefit from the booming ASGM industry as shop and bar owners, operators of gold-buying houses and sex workers. The arrival of Brazilians has had an enormous impact on development and modernization of the ASGM sector, and Brazilians continue to be recognized as forerunners in terms of new mining methods and equipment. It is expected that this influence will remain constant in the near future. International demographic trends have not significantly impacted multinational mining firms in Suriname, and this is not expected to change.

**In past decades, there has been a steady movement of rural-urban migration, as many interior inhabitants leave the marginalized interior region of Suriname, which is characterized by poverty, unemployment, and poor access to poor access to public services, education and health care.** Rural-urban migration is not a cause of mining, but the presence of mining-related economic opportunities may affect rural-urban migration by keeping people in the interior. The presence of multinational mining firms also keeps local people in interior village, as these firms provide attractive jobs with a decent salary and social benefits.

## Economic factors

**The Surinamese economy is vulnerable to shocks from changes in global commodity prices**. International oil and gold prices have a significant influence on gold mining. For small-scale gold mining operations, fuel is the largest expense in the operation and a recent report by Heemskerk et al (2016) estimated fuel expenses at 70% of total operational expenses. For both small-scale and large-scale mining operations, the gold price is an indicator which in the worst case can implicate a necessary closure of business when falling below the break-even point. For large-scale mining, commodity prices will continue to have a significant increasing impact, exemplified by Newmont Suriname that is just starting production, and is exploring new areas for mine development.

**The national economic context was a major driver of ASGM just after Suriname's interior war ended in 1992.** At the time, much of the infrastructure in the rural interior had been destroyed, a generation of youth had not been able to attend school, and employment opportunities were

[49] IOM (2015) Suriname Migration Profile A study on emigration from, and immigration into Suriname. URL: https://publications.iom.int/books/suriname-migration-profile-study-emigration-and-immigration-suriname

severely limited. ASGM provided an opportunity for people with low formal education or professional skills to make a decent living.

**With the current economic crisis and currency devaluation in Suriname, ASGM is only becoming more attractive.** Today, a low-skilled worker in Suriname may earn about 1000-1200 SRD/month (~USD 150). In comparison, an average ASGM miner may earn about 20-30 g Au/month (~USD 800-1200). Given the value of Suriname's international debts and limited national earning capacity, it is unlikely that the national formal economy will offer better chances to marginalized and poorly skilled sub-sections of the population in the near future. ASGM will therefore remain an important income earning opportunity. The fact that gold revenues are paid in US Dollar rather than in the devaluating local currency makes ASGM a more attractive, or the only option, to survive.

Given the extreme inequities between the coastal areas and the rural interior, the National Development Plan 2012-2016 states:

> "Responsible and adequate facilities in the field of education, health and social care are lacking. There is no structured employment and many therefore lack a fixed income. The facilities for a healthy environment lacking in the interior, where poverty and thereto related problems prevail."

In this context, ASGM offers an opportunity to break the cycle of poverty. Successful gold miners typically move their families to the city, where their children can follow both better quality and continued education. ASGM is largely shaped by the huge inequalities between the impoverished interior and the urban area.

## Technological factors

**International organizations including the United States Department of State (US DoS), Conservation International (CI), the United Nations Development Program (UNDP), and the World Wildlife Fund (WWF) have expressed interest in providing technical assistance to ASGM miners, with the aim to promote more sustainable mining – i.e. reduction of mercury use.** If implemented, technical training and support programs for gold miners have a potential to reduce forest clearance for mining. But realistically, these programs will only reach a very small group of miners in the near future. WWF, for instance, has been engaged in this issue for the past decade, with minimal impact. Theoretically there could be a large effect, but in practice the effect on forest clearance will be small, if any. Improvements of ASGM exploration methods can reduce the amount of forest that is removed and simultaneously improve profits, because it would reduce the chances that gold miners clear places where there is no gold. Furthermore, simple improvements to current processing workflows can improve gold recovery and mercury reduction (Heemskerk et al., 2016). Technological innovations will likely start with a small group and for the near future, therefore, the effect of such technological innovations is expected to be small. Technological factors are not expected to affect the impact of large-scale mining on forest cover loss. On a local level, improved infrastructure built by the government, large-scale mining firms and/or logging companies improve accessibility of potential ASGM locations. As new road open up the forest, ASGM miners follow in the footsteps of the large firms. Hence infrastructure developments in the interior are likely to stimulate the discovery of new ASGM sites, but the impact of infrastructure on ASGM will not change. These developments are not likely to significantly affect large-scale mining.

## Policy and Institutional factors

**The main legislation governing the exploration and exploitation of mineral resources is the Mining Decree of 1986, which authorizes the Ministry of Natural Resources to grant mining rights and other licenses, and regulate, inspect, and monitor the mining sector.** The mining rights of the multinational mining firms have been specified in the Gross Rosebel Act (between IAMGOLD/RGM operations and the Government of Suriname) and the Mineral Agreement between the Government of Suriname and Newmont Suriname.

**Overall legislation with regards environmental and social impacts management is not fully developed for mining and oil production in Suriname** (World Bank, 1986). The Mining Decree, and particularly its section on small-scale mining (Ch. VII), is outdated and contains minimal provisions with regard to environmental and human health. In addition to the overarching Mineral Decree there are specific regulations for the different mining sub sectors gold[50], bauxite[51], and oil. Yet also these legal instruments fall short with regard to environmental and social impacts management.

**One problem has been that Suriname does not have an umbrella Environmental Law.** Environmental regulation is fragmented and specified per (economic or public) sector. Many institutions are unable to properly exercise its institutional mandate to support sustainable natural resource management. For example, NIMOS is meant to regulate and control the environmental impacts incurred from large-scale land-based investments, but is operating in a legislative environment that lacks mandatory environmental and social impact assessments (ESIAs).

Another problem is that **GoS policy with regard to ASGM suffers from a severe lack of transparency.** Information about concession titles is not publicly available and requests to obtain such information are not easily honored. Furthermore, figures about the earnings, profits and tax payments of concession owners and ASGM firms are not publicized (Heemskerk and Duijves, 2014).

In recent years, there have been efforts to improve environmental regulations and improve transparency in the mining sector, as evident in the following developments:

- A draft Environmental Act was developed. Unfortunately, this document has been in review by the Council of State and the Council of Ministers since 2002.
- The National Institute for Environment and Development in Suriname (NIMOS) has developed guidelines for environmental and social impact assessments (ESIA, 2005 and 2009). These guidelines are useful in the planning of formal mining activities, but they remain voluntary, and monitoring and enforcement have been challenging. NIMOS, for instance, does not have the capacity to monitor/enforce environmental/social standard in all of Suriname's vast onshore/offshore territory (World Bank, 2016). Another challenge has been that the ESIA guidelines are only truly enforceable when transformed into national legislation

[50] Most relevant for gold are include: the Currency Regulation (1947), the Nuisance Act (1929, most recently adjusted in S.B. 2001 no. 63), Law on Economic Crimes (1986, most recently adjusted S.B. 1989 no. 42), the Bank Act (1956, most recently adjusted in S.B. 1983 No. 94), General Orders 1 and 5 of the Currency Commission, and the Resolution on rules regarding extraction, processing and transport of gold.

[51] Most relevant for Bauxite mining are the Brokopondo agreement (1958), the Bauxite Agreement (1993) and two Protocols between the Government of Suriname and JV between Suralco (55%) and BHP Billiton (45%) to, respectively, increase the alumina refinery capacity and permit new bauxite mining and refining operations

(World Bank, 2016). Furthermore, ESIAs have hardly been performed in the ASGM Sector, which is sector with most severe environmental and occupational health impacts.

- **In 2016, the GoS Ministry of Natural Resources installed a Commission to revise the current Mining Decree and develop a Mining Law that better reflects the current realities in the mining sector as well as multilateral environmental agreements and conventions and international human rights standards that Suriname has committed to.** This Committee is composed of with representation of GMD, NIMOS, Grassalco, BIS, Staatsolie, the Foundation of mining concessionaires, Ministry of Regional Development and Ministry of Finance/Taxes.
- Suriname has been preparing for towards ratification of the Minamata Convention on Mercury. This proposal is awaiting approval by the Council of Ministers.
- A new law on Transparency of Governance (*Openbaarheid van Bestuur*) was submitted to the Council of Ministers in 2013, but has not yet been approved.
- Suriname has expressed the intention to join the Extractive Industries Transparency Initiative (EITI), and the process is well underway with a Multi-Stakeholders Group being established. To increase transparency in the mining sector it is planned to make the map of mining concessions public, to publish validated independent reports on mining incomes, to show how these incomes are used and what is brought back to local communities in areas with mining concessions, etc.
- Institutional reorganisation is planned, with a GMD/OGS/BIS mineral institute planned to be established, to be linked with EITI.

Furthermore, it must be noted that the large-scale mining companies (e.g. Iam Gold, Newmont, Staatsolie, ALCOA) have their own, typically internationally validated, Environmental and Health and Occupational Safety standards. These standards can be found on their websites.

With ratification of the Minamata convention awaiting Ministerial approval and installation of a committee to revise the 1986 Mining Decree, policy and legislation could have a slightly increasing impact on ASGM in the near future.

## Cultural factors

**Suriname supports various international declarations and standards concerning human and indigenous rights such as the UN Declaration on the Rights of Indigenous Peoples.** In doing so, the government committed itself to involving local communities in the development of policy and interventions that may affect their lives, culture and territories conform to the Free Prior and Informed Consent (FPIC) principle. Suriname also subscribed to the CARICOM Charter of Civil Society, a regional human rights instrument adopted by the heads of government of the member states of the Caribbean Community on February 19, 1997 (Arkel, Artist and Madsian in Heemskerk and Duijves, 2014). Article XI provides: “The States recognize the contribution of the indigenous peoples to the development process and undertake to continue to protect their historical rights and respect the culture and way of life of these peoples.” (ibid.). In practice, however, FPIC procedures are not followed when mining concessions are issued and there are no formal government guidelines to do so. If such guidelines were to be followed, this would have important implications for the ability of large-and small-scale gold mining firms to obtain concession titles in Indigenous and tribal lands.

**Local awareness of Indigenous and Tribal rights has slowly evolved**. In the past decade, this self-consciousness has been stimulated by a number of Inter-American Court of Human Rights cases, which obliged the GoS to demarcate Indigenous and Tribal lands, grant land rights, and refrain from granting concession title rights overlapping with indigenous lands, but to no avail. Tribal and Indigenous CBOs have also become more active in awareness rising about land and resource rights in interior communities. This trend is likely to increasingly affect the behavior of large-scale gold mining firms. Newmont's Indigenous Peoples Standard, for example, describes in detail what processes must be followed when working on Indigenous Territories. Confronted with better informed and more vocal indigenous and tribal groups, large-scale mining firms must spend more time, effort and resources on FPIC or similar procedures. One of the large-scale mining firms, for example, has committed itself to performing FPIC, and is advised by an international expert panel on such matters. In some cases, the outcome of these procedures may be that a mine will not be developed.

### Environmental factors

**Suriname's geography is a main explanatory factor for past mining and will influence mining developments in the future.** The presence and accessibility of economically viable gold supplies causes mining. Previous studies have shown that deforestation caused by gold mining is strongly correlated with the presence of the Greenstone belt, geological formation known for its large reserve of gold, especially in Suriname where the overlap reaches 99% (Rahm et al. 2015). Further biophysical factors, especially the presence of waterways, explain the presence of mining in Suriname. The impact of these factors on gold mining is expected to remain constant in the coming years.

## 5.5.3 Agriculture

**Suriname's potential for agriculture sector development is currently not realized, exemplified by the presence of very few large farms despite highly favorable conditions**. These favorable conditions include substantial water and fertile soil, a favorable climate and a historic agricultural tradition, as well as an ideal location for export potential (Kaplan et al. 2016). The majority of farmers are subsistence farmers who sell only surplus. The crops subsector produces far below its potential both in terms of yield and acreage. The coastal plain is the most suitable region for agricultural mechanized use in Suriname. Though the land in the coastal areas is the most suitable for agriculture, there are issues that inhibit agriculture investments in this region and many have to do with land tenure issues and predominantly the issue of allodial ownership (Ramautar 2015). The reasons underpinning the (lack of) growth in the agriculture sector varies for the different types of drivers and agents concerned. Figure 9 summarizes the underlying causes analysis, which is thereafter explained in more detail in the subsequent text.

**Figure 9: Underlying causes relevant for agriculture**

| Underlying cause → | | Demographic | | Economic | | Technological | | Policy & institutional | | Environmental | Cultural |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Agriculture sector | Driver/Agent ↓ | Growth & Migration | Urbanization | Poverty | Market demand | Low productivity | Infrastructure | Legal framework & enforcement | Poor governance | Climate change | Traditional lifestyle |
| | Subsistence farmer | → | → | ↗ | ↗ | ↘ | ↗ | → | → | ↗ | → |
| | Small-scale farmer | → | → | → | ↗ | → | ↗ | ↗ | → | ↗ | → |
| | Medium-size commercial farmer | → | → | → | ↗ | → | ↗ | ↗ | ↗ | ↗ | → |
| | Medium and large scale investor | ↗ | → | → | ↗ | → | ↗ | ↗ | → | ↗ | → |

**Legend:**

Current impact of underlying cause on agent

High impact | Medium impact | Low impact

Projected future trend of underlying cause on agent

↗ Increasing impact | → Business as usual | ↘ Decreasing impact

## Demographic

**The decrease in expansion of shifting cultivation areas is partly explained by the fact that the population in the interior has not grown substantially in recent years** (Table 22 shows total population per district). This is largely due to inadequate basic services such as utilities (water, electricity), healthcare, schools in the interior districts. It is not to be expected that this situation will change in the near future, as the country's financial reserves are insufficient for any large-scale investments in the interior for the purpose of improving basic services such as access to clean water, electricity and healthcare. This correlates with the migration patterns shown in Figure 10 where net migration in the Marowijne, Sipaliwini, and Brokopondo districts is negative for the period 2009-2013 while peri-urban districts such as Wanica are positive.

**Urbanization also has significant impact on agriculture as women are increasingly left alone to carry out the hard labor associated with agriculture.** Men that formerly assisted women with clearing the forest are now working in mining of gold or moved to more urban areas along the coastal plain to work in other sectors. The older children who also helped their mother have to move to Paramaribo for higher (vocational) education. These women left behind are usually not able to clear the forest. Some of them try to work on the same piece of land using the knowledge gained the past few years from organizations such as Inter-American Institute for Cooperation on Agriculture (IICA), the United Nations Food and Agriculture Organization (FAO), or CELOS. Further, growing crops in the interior is mainly for household consumption. The men who are now working in other sectors send money or food for their families in the interior, thus reducing the need for agriculture expansion.

**Regarding increasing agriculture demand on domestic markets, it is expected that Suriname's population will remain around 500,000 in the next ten years.** Therefore, growing demands from the domestic market are unlikely. Also related to urbanization is the link between

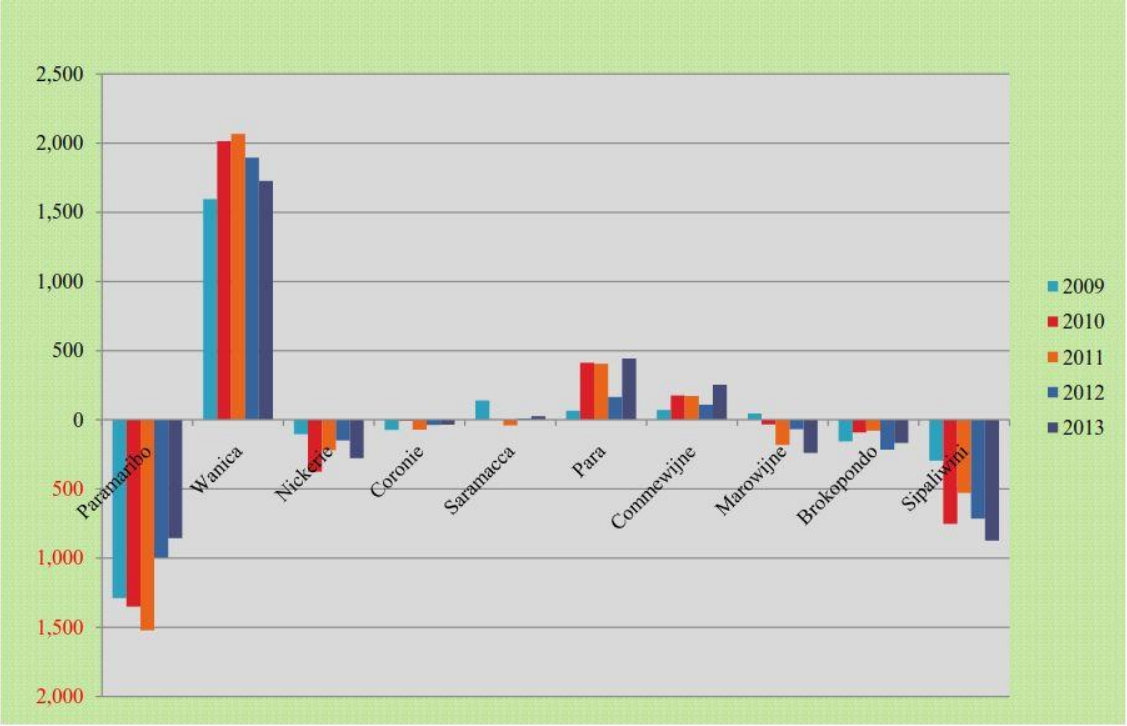
urbanization and changes in food preferences. Changes in consumption preferences, i.e. more meat and dairy, are likely to be met from increasing imports. This implies minimal impact within Suriname's territory.

**Table 22: Total population per district**

| | 2004 | 2012 |
|---|---|---|
| **Marowijne** | 16,642 | 18,294 |
| **Brokopondo** | 14,215 | 15,909 |
| **Sipaliwini** | 34,136 | 37,605 |

*Source: Algemeen Bureau voor de Statistieken, 2014*

**Figure 10: Suriname net migration at district level**




*Source: Algemeen Bureau voor de Statistieken, 2015*

## Economic

**Increasing global demand for agro commodities will likely place increasing pressure on Suriname to convert some forest areas to agro industry.** However, according to the World Bank Group (2016) there are several reasons for the fact that investors are hesitant to invest in agriculture in Suriname. These include "a policy environment maintained by successive governments that is not conducive to private sector investment in agriculture, as well as limited action to implement reforms…, such as addressing food safety issues, improving irrigation and drainage, facilitating access to land, increasing private investment in agricultural state-owned enterprises (SOEs), and easing the general process to establish a business." Although Suriname has great agricultural potential, important preconditions to increase agricultural yield and export are either not in place or limited. Suriname lacks crop-specific production standards,

laboratory facilities for residue tests and inspection and certification of agricultural companies. In the past years several investors have indicated the intention to invest in Suriname, but this has yet to take place. This reluctance of foreign investors could be due to high cost and difficulty of obtaining labor and high costs of labor and low competitiveness from a heavy import component for much agricultural production makes investors already in Suriname question the viability of bulk commodity exports (Worldbank, 2016).

**Although there is a potential for Surinamese to supply fruit and vegetables products to EU markets and regional markets, agriculture export remains limited.** Suriname's economy is a single sector dominated economy with a relative low added value in exports. Exporting higher added value products, like agro-processed or exotic fresh produce, requires a value system that has been fine-tuned to the market requirements of target markets. Though important steps have been taken, this value system is still not equipped for exporting to more demanding markets. Local prices for fresh produce are substantially high, making exports less interesting, compared to the risks involved in exports of fresh produce. This requires a focus on "precision market" and "value creation" to obtain the same margins in exports as on the local market. Other restrictive factors for agricultural growth through export include:

- lack of workers in the agricultural sector and/or too many "part time" farmers;
- no international certification like GLOBALGAP or FSSC22000;
- financing modalities at local banks are not feasible for small or midscale farmers and the banks do not have experts to evaluate loan applications for farming;
- lack of knowledge about supply and demand on international markets and how to enter international markets.

## Technological

**Although road infrastructure has improved in recent years, transport costs remain high in the agriculture sector, preventing investment from both small- and large-scale farming operators**. National and international transport and other logistical costs remain high. Further, shifting cultivation is a low-input/ low output production system and there is a lack of access to information to create local knowledge about (sustainable) farming methods. However, the government intends to set up production centers in the interior to provide services related to productivity improvement.

IICA and CELOS organised a 2-day workshop in november 2016 titled 'Sustainable Agricultural Practices for the Hinterland' to brainstorm about ways to boost the agricultural production in this part of Suriname. One priority area is promoting agroforestry systems where trees are integrated on the same land-management unit as crops and/or animals. These systems can amongst others improve soil fertility and prevent soil erosion. Implementing these systems will address some environmental issues linked to the short fallow periods presented in paragraph on social and environmental considerations.

## Policy & institutional

**Legislation related to agriculture is fragmented and some are incoherent and outdated.** This hampers economic and private sector growth. Foreign investors are reluctant to invest because of the lack of hard and fast rules regarding concessions to be granted to overseas companies. Parliament has to approve most agreements reached and this can complicate matters if the

investor decides not to continue the investments planned. If the investor is allocated a piece of land by Act of Parliament and that investor withdraws, this land cannot be allocated to anyone else until the original act has been revoked by Parliament (World Bank, 2016). Critical areas of intervention are the regulation of forest clearing for agricultural expansion and adopting a law on climate change to set up clear rules to prevent and respond effectively to impact of climate change.

The government intends to improve of the capacity of the animal health, plant health and food safety and agricultural innovation services provided by the Ministry of Agriculture (LVV). The priority areas are: legislation framework and enforcement program, Human resource development, infrastructure and equipment. within the next 5 years with an investment loan from the Inter-American Development Bank (IDB).

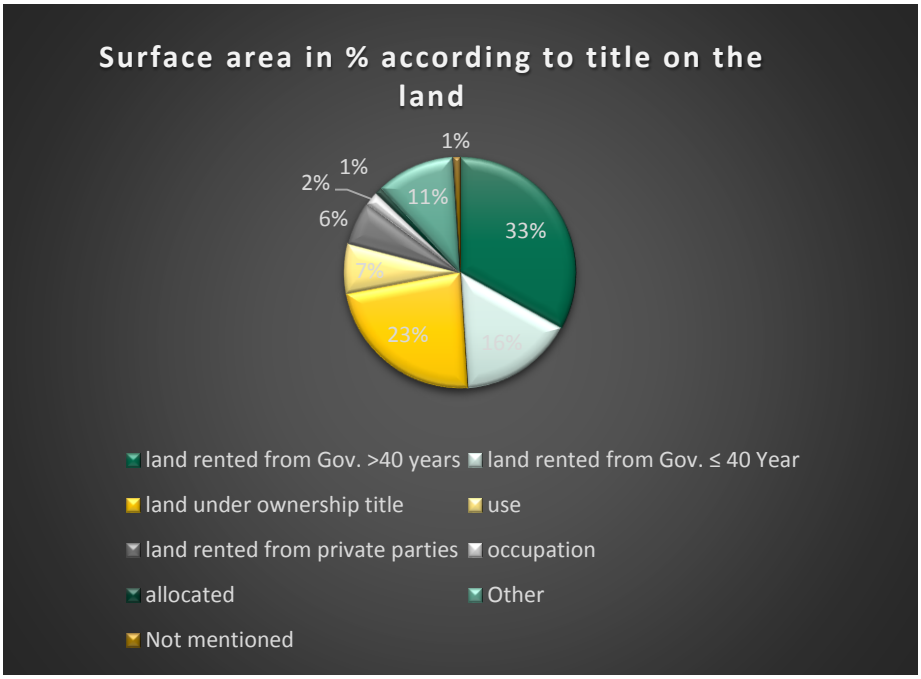
Currently the European Union is supporting Suriname through the program "Increased production and export of horticultural crops and food safety standards" from 2014-2020. The specific objective of this program is to come to an increased, more competitive and safer production of selected crops through an enabling environment and enhanced capacities of private sector and institutions. This will have little impact on the shifting cultivator because they are not aiming for supplying domestic or international markets. Both the investment loan of the IDB and the EU funded program will have an increasing impact on the small-scale and the medium scale commercial farmer.

**The government supports amongst others the fruit and vegetable production by supplying both small and medium-scale farmers with input such as pesticides, fertilizers, planting material and agricultural machineries.** They support the rice industry by means of subsidies to farmers. These incentives promote directly or indirectly agricultural expansion into forests. Through the National Master Plan Suriname's agricultural potential has to be realized. This is achieved by designing a comprehensive national policy and its implementation through specific regional projects, which should lead to the improvement of the welfare of the Surinamese people by creating employment, food and economic security and through the expansion of agricultural areas while maintaining the environment (sustainable agriculture). The Masterplan aims to persuade the government to alleviate the biggest challenges when investing like uncertainty, long payback periods, high credit costs, limited access for small farmers and the lack of an agricultural school and training at secondary level. (Kaplan et al. 2016). If funds are available to implement this Master plan it will have an increasing impact on the small-scale and the medium scale commercial farmer.

**In terms of tenure security and legal status, the last Agricultural Census (5$^{th}$), states that Suriname has 10,234 farms, most of which are in the coastal plains**. These farms cover a total surface area of 63,989 ha, of which approximately 50% is leased from the government, 23% is owned by farmers and the remaining 27% of the surface area has no legal status. A more detailed classification of land titles is presented in Figure 11.

**Figure 11: Surface area in percentages according to title on the land[52]**

[52] Explanation: Occupation: the land is used without permission. Use: includes only the right to use the land. The farmer cannot transfer the land to another person. Often a small amount for rent or lease is paid to the Government. Allocated: This form of title to land refers to land that is cleared and made ready to issue by farmers, but whose formal settlement of the tenancy takes time.




*Source: Statistic data Fifth Agricultural census*

Figure 11 shows that individuals within this sector have different levels of tenure security with respective impacts on income and food security. Of the total land area, only 23% has a registered ownership title transferring irrevocable usufruct rights to the farmer. 33% of existing farmland is classified as leasehold land. This means that the land is given on lease for a period of 40 years or more. This type of lease is subject to several rules that must be respected, otherwise the leasehold expires. The right to leasehold can be inherited by the descendants of the farmer. 16% is the land is given on lease for a period of less than 40 years (ground rent), renewed upon request. Under this title, the farmer has limited rights, which cannot be inherited by the descendants of the leaseholder. The remaining 28% of agriculture land is farmed without any legal land title. This land is rented from private parties, occupied, allocated or in use.

## Environmental

**Shifting cultivators are directly dependent on natural resources making them more vulnerable to the effects of climate change.** The climate change impacts that will affect Suriname remain unknown and are subject to research. It is likely that temperature and rainfall patterns will change and extreme weather events are likely to occur more frequently. Such fluctuations will strongly affect agriculture land use. Medium and large-scale farmers are often better able to cope with climate change impacts, as these actors have more access to information and have the disposable assets required to not become bankrupt in harsh years when cash flow is minimal.

**Due to the prevailing gender task division and the gender specific roles, environmental changes impact differently on women and men.** For example in the interior, women are the main food producers, primarily in charge of collecting wood for fuel and water for consumption

The Government therefore gives this piece of land on a temporary basis to the farmers. The farmer has no title or rights to the land and may use it for a short period.

and household chores. If environmental changes impacts on these activities, because agricultural plots are flooded or water sources, such as rivers and creeks are polluted, women and their children will be primarily affected (GOS, 2014).

### Cultural

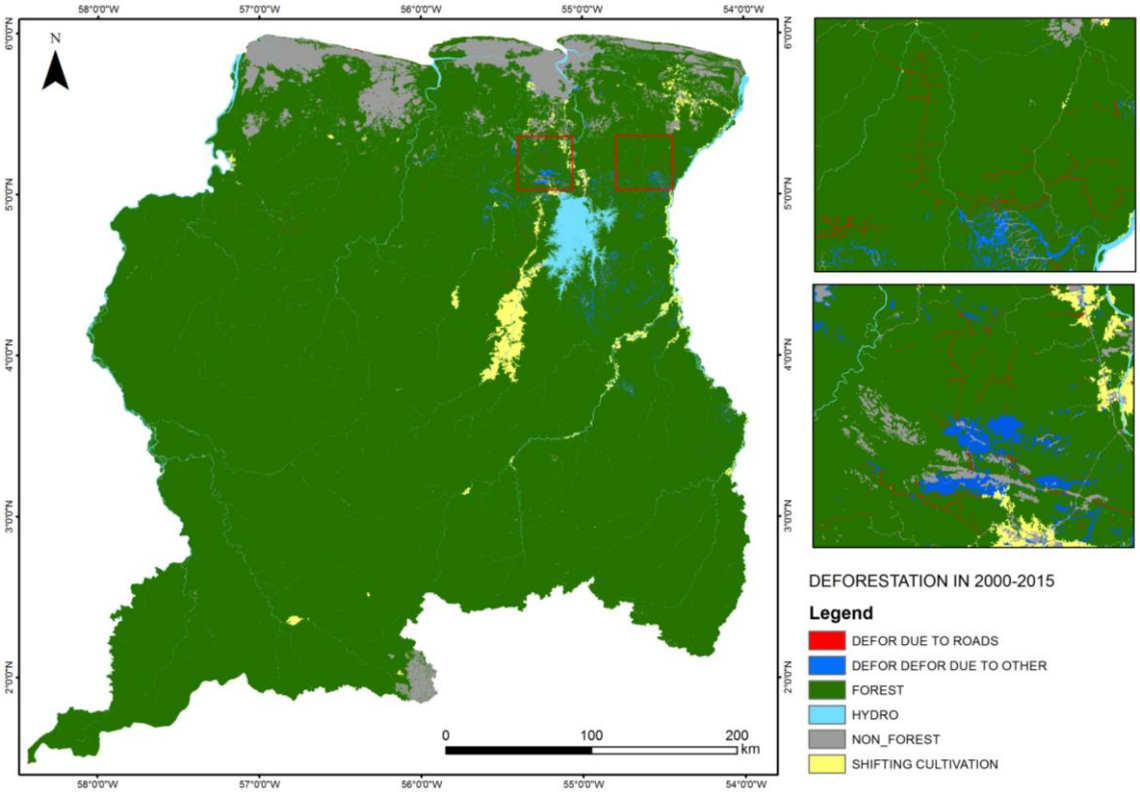
**Communities practicing shifting cultivation, especially Maroon communities, are facing increasing commercial and governmental influence—both as a consequence of mining, logging and tourism development in their territory, and attraction of mainly young Maroons to the market economy.** This influence has led to a stronger preference for economic activities over subsistence farming (Heemskerk 2003). As a consequence, a more permanent cultivation system may evolve because the labor-intensive nature of the traditional shifting cultivation system is not compatible with off-farm activities. A gradual transition from shifting cultivation to more permanent agriculture of Maroon farmers has already been observed (Fleskens & Jorritsma 2010).

## 5.5.4 Infrastructure development / road construction

**Accessibility is a key factor explaining the relative integrity of the expanse of largely untouched forests in South and West Suriname.** The direct impact of infrastructure development is relatively small in area, but is generally closely linked with other deforestation related activities. The average annual deforestation due to infrastructure increased from 889 ha/year to 1,750 ha/year from 2000-2009 to 2009-2015, which amounts to approximately GHG emissions of 0.7 million $tCO_2$/year.[53] However, road network expansion is closely linked with deforestation resulting from land use changes caused by economic activities in other sectors. Map 11 demonstrates that most deforestation occurs in the proximity of existing road networks, especially ASGM. The spatial analysis, however, cannot explain the exact relationship between infrastructure and mining in terms of which activity precedes the other. This is because miners typically start exploring not far from an access way, either land or water (lakes or rivers), as this reduces the distance that fuel and equipment needs to be transported. As miners proceed into isolated territory, roads or paths are often introduced to transport fuel on all terrain vehicles and tractors.

[53] Assuming average natural forest carbon stock of 791.2 tCO2/ha (aboveground, belowground and soil carbon).

**Map 11: Deforestation and infrastructure development**




## 5.5.5 Summary of underlying causes

**This section summarizes the main underlying causes that cut across different sectors**. Figure 12 shows that different strategies will need to be developed for the different sectors causing deforestation and adapted for the different agents identified. In general, the analysis shows that demographic trends, such as population growth and migration, plays a minimal role in causing current and future deforestation, except for small-scale gold mining, where demographic trends play a key role as the sum of small-scale gold miners is expected to increase.

**Economic and technological factors such as poverty, capacity and production techniques play an important role in influencing current and future deforestation for smallholder land users.** Poverty has significant explanatory power for small-scale deforestation agents such as community forest operators, small-scale miners and subsistence farmers, and in all cases, the impact of poverty is expected to become more exacerbated in the future. This is strongly linked to the technological factors such as production techniques for the different land uses. Therefore, poverty reduction strategies, e.g. through policies and measures to improve smallholder productivity or sustainable livelihood alternatives, are seen as key intervention levers to reduce deforestation while fostering sustainable development in Suriname.

**Policy and institutional causes are generally seen as having low to medium impact.** Depending on the sector and the specific current or future legal reform measures, the impact of this category may decrease or increase. An overarching issue relevant for this category related to collective land rights, where there is a strong link with the work carried out for community perceptions. The lack of strong legal recognition for collective land rights is often seen as a

barrier to sustainable land and forest management. This is reflected in the cross-cutting sector analysis.

**More important than the existence of policy and institutional frameworks is their effectiveness, which is exemplified in the governance pillar below.** Weak institutional capacity at the national and decentralized level has led to poor law enforcement and a resulting negative impact on deforestation. The fact that governance is expected to continue business as usual suggests that investments to improve forest and land governance through REDD+ may be a promising approach to reduce deforestation and forest degradation in Suriname. In other words, in the lack of a REDD+ program, one can expect that poor governance will continue to be problematic in Suriname.

**The environmental causes identified are most relevant for the mining and agriculture sectors**. In the former, resource availability and access dictate the ability of miners to continue their practices, while in the case of agriculture, climate change and biophysical factors such as soil fertility and changing weather patterns will play an important role.

**Figure 12: Summary of underlying causes**

| | Underlying cause → / Driver/Agent ↓ | Demographic | Economic | Technological | Policy & Institutional | Governance | Environmental |
|---|---|---|---|---|---|---|---|
| Forestry sector | Conventional logging in community forests /HKV's | → | ↗ | → | ↗ | → | → |
| | Conventional logging in small concessions | → | → | → | → | → | → |
| | Controlled Logging | → | → | → | → | → | → |
| | Certified Logging | → | → | → | → | → | → |
| Mining sector | Small scale gold miners | → | ↗ | ↗ | → | → | ↗ |
| | Large scale gold miners | → | ↗ | → | ↗ | → | → |
| Agriculture sector | Subsistence farmer | → | ↗ | → | → | → | ↗ |
| | Small-scale farmer | → | → | → | ↗ | → | ↗ |
| | Medium-size commercial farmer | → | → | ↗ | ↗ | → | ↗ |
| | Medium and large scale investor | ↗ | → | ↗ | ↗ | → | ↗ |

# 6 PROJECTED FUTURE DEFORESTATION

**Suriname's R-PP indicated that understanding historical deforestation drivers may not be sufficient to predict future trends** (GOS 2013). Therefore, the historical analysis in Chapter 4 is completed with further modeling and scenario analysis to provide a more complete picture of possible future developments. The analytical work on drivers and REL/RL establishment must be closely coordinated as drivers' studies underpin the assumptions regarding the projections of future forest dynamics. If expected future developments differ from the observed historical trends in forest changes and emissions, these assumptions should be properly justified and supported by an explanation of drivers, agents and underlying causes. Therefore, this study provides an important basis for Suriname to establish a REL/RL in the near future.

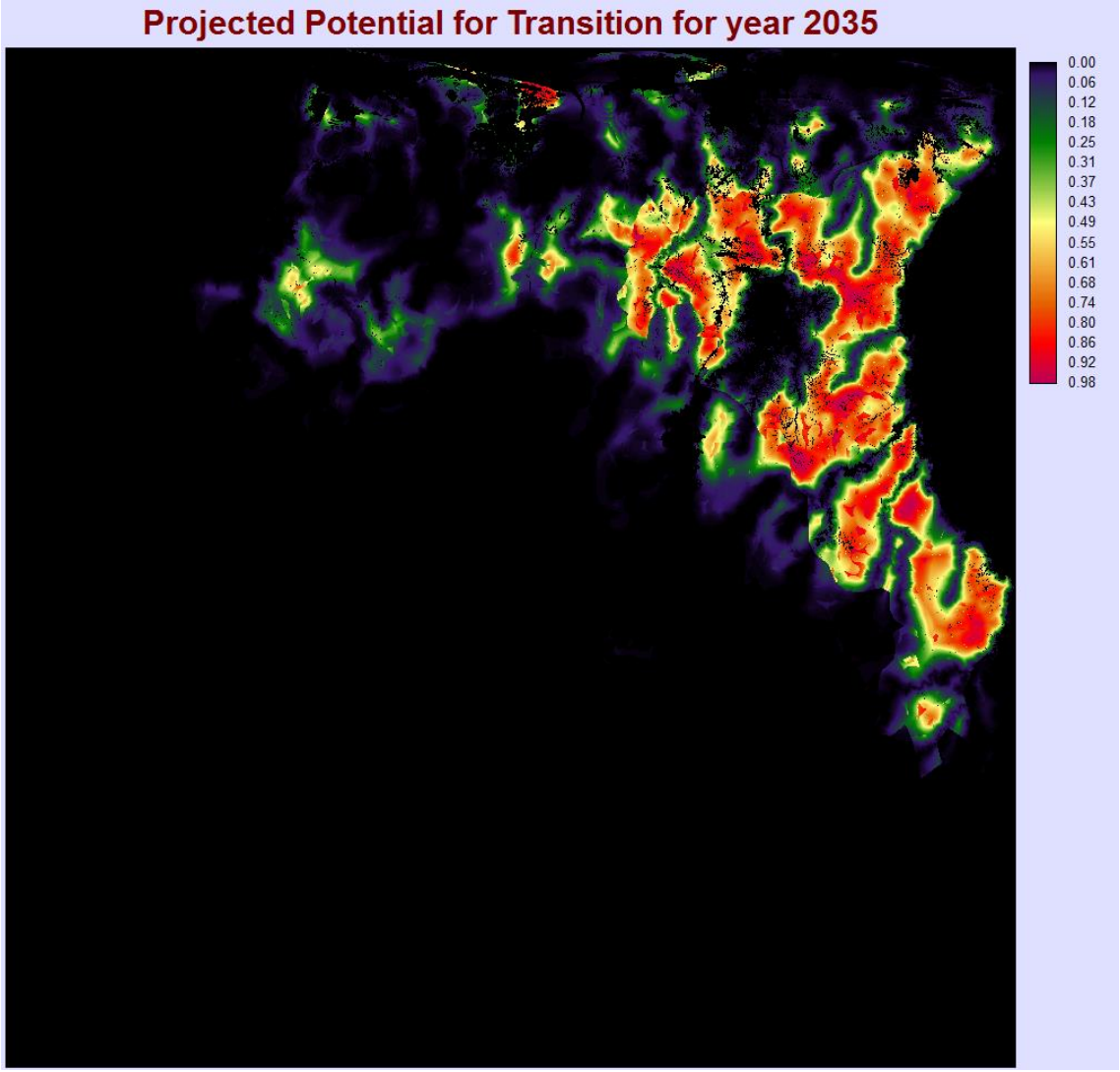
**To ensure comprehensiveness, the approach combines qualitative and quantitative data analysis.** The quantitative analysis is based on historical forest area change and associated emissions. Thereafter, the results of the qualitative analysis are presented. The qualitative assessment is carried out in combination with the analysis of agents and their underlying causes (see Figure 7; Figure 8; Figure 9), as underlying causes often hold strong explanatory power to predict how changing national circumstances may result in divergences from previous deforestation patterns. The underlying causes of forest change are related to a number of interlinked variables exerting influence from multiple levels: international (e.g. markets, commodity prices), national (e.g. population growth, domestic markets, national policies) and local (e.g. subsistence land-use patterns). Therefore, in addition to data on historical forest area change and associated emissions, the development of forest RELs/RLs requires information on local and outside pressures and processes and their potential contribution to future national emissions. The focus of this Chapter is on infrastructure and gold mining, as these are considered the most important indirect and direct drivers, respectively, moving forward.

## 6.1 Deforestation risk map

**The modeling exercises conducted to estimate future deforestation and forest degradation risks are based on the collaboration between SBB/FCMU and UNIQUE**. The aim of this collaboration was to further strengthen SBB's in-house capacity to conduct such assessments so the products can be regularly reproduced and continuously improved in the future. The variables tested to project the location of future deforestation risks include historical deforestation locations, roads, streams, slope, Greenstone belt area, historical shifting cultivation, and a digital elevation model. After a number of tests, however, three variables (distance to settlements, historical deforestation, and roads) demonstrated the most statistically significant impacts regarding the location of future deforestation.[54] Land change modeler (LCM) from proprietary software Terrset was used derived the potential deforestation risk map. Map 10 below shows the preliminary results obtained through this collaboration. This map does not take into account future decisions on infrastructure.

[54] The sensitivity analysis shows that distance to settlements variable exerts the most influence and is estimated at 60% accuracy; distance to historical deforestation is at 64% accuracy; and distance to roads has least influence and has 65% accuracy. The three variables combined show 89% accuracy.

**Map 12: Deforestation risk map**




**The above map shows that the Greenstone belt area in general is at highest risk for future deforestation.** This is corroborated by the general conclusions of the qualitative assessment described in the rest of this chapter. However, it is important to interpret this map with caution. It is meant to provide a general overview of the potential areas affected by deforestation in the near future. The deforestation rate employed is based on a linear projection of past deforestation. Therefore, in the case of extreme events, such as a significant increase in gold prices, the deforestation rate may need to be adjusted. Further, long-term analytical studies by PhD students are currently underway to improve the deforestation models by adapting them to the specificities of the Guiana Shield region. The unique characteristics of the region, which include forest cover (dominant forest cover), drivers (importance of gold-mining), deforestation scale (mainly small scale deforestation) and intensity (low deforestation), make it essential to adapt a methodology to this particular context (Dezécache 2015).

### 6.1.1 Infrastructure

**The plans for infrastructure development in the Interior are likely to have potentially enormous implications on Suriname's deforestation and forest degradation.** The Planning Office's 2017 Annual Plan aims to rehabilitate a number of road axes as per the Initiative for the Integration of the Regional Infrastructure of South America (IIRSA) (GOS 2016). Recent infrastructure developments in the Interior are expected to continue. For example, the Brownsweg-Pokigron Development Plan proposes the creation of a special development authority in charge with the infrastructure program for the Van Blommenstein storage lake and adjacent territories, involving ferry services and roads east and south of the lake to settlements at the shores of the Marowijne River and the Tapanahoni River. The combination of the north-south road linkage with ferry services would turn Brownsweg into a region-wide centre for transportation, maintenance and storage, as well as a service centre. Further south, Pokigron is destined to become a service centre for the Upper Suriname river area. The pavement of the Paramaribo-Pokigron corridor may have a significant impact not only on the territory adjacent to the road itself but on a much wider area that will become better accessible through related infrastructure. Many areas adjacent to the lake have been opened up already by tracks constructed by groups of gold miners active in that area. These roads facilitate transport of inputs for gold exploitation and the large numbers of individuals active in these small-scale operations. It is likely that such effects will extend to the south of Pokigron into the interior. As these developments improve access, increased deforestation is expected to occur by creating opportunities for other types of development (mining, logging, agriculture).

**Although the plans for large-scale infrastructure development have long remained unrealized, stakeholder interviews indicated that road construction in the Interior may begin in the near future**.[55] For example, the recently signed loan agreement between the Government of Suriname with the Islamic Development Bank earmarks USD 300 million for road construction in the Interior. The proposals for this construction already exist and are currently being vetted by the Islamic Development Bank. A number of other projects were put on hold and appear in the Multi-Annual Development Plan (2016-2020). The revival of such projects would lead to more direct and indirect deforestation. It is important to note the interlinkages between these infrastructure plans and Suriname's current investment climate as infrastructure development is closely linked with the production and investment plans of private sector stakeholders, especially mining and forestry. The planned road infrastructure in the east, southeast and south Suriname may not always be part of a comprehensive or strategic regional development plan but are rather based on decisions taken by independent stakeholders including the government, small scale gold diggers and large scale corporations involved in gold exploitation, exploitation of bauxite and other natural resources, production of hydro-energy.

[55] For list of stakeholder interviews, see Inception Report.

### 6.1.2 Mining

**The forces underpinning gold mining-induced deforestation contain so many uncertainties that it is difficult to project future deforestation and forest degradation trends in relation to mining.** International commodity processes depend on many international economic and political trends, including stability of the US dollar and internal and external policies of oil producing countries. Socioeconomic and political changes in neighboring countries are difficult to predict, and technological innovation can have opposite effects. Nevertheless, two driving forces are relatively clearer. In the first place, available gold reserves will not change. Even though the exact location and value of these reserves are unknown, indications suggest that concentrations are in Central and East Suriname. It is unlikely that gold mining will expand to the West or far South of Suriname. Furthermore, Suriname's current vulnerable economic position is not likely to improve in the short term. Therefore, while it is difficult to predict whether new people will enter the ASGM sector, it is likely that those currently working in the sector will not seek alternative employment. Therefore, it is considered probable that continued ASGM activities will increase deforestation and forest degradation in mineral-rich locations in Suriname.

The six most relevant parameters influencing the future expansion of gold mining activities and related deforestation and forest degradation trends are listed and explained below:

I. **Available gold reserves**. Obviously, gold mining can only take place in locations where gold reserves are naturally present, economically viable, and not depleted by earlier mining activities. ASGM operations may try out one or two mining pits in an area with (too) little gold, but they will abandon the location if their earnings are insufficient to cover operational expenses. In other words, available and accessible gold reserves pose a natural barrier to the expansion of gold mining activities.

II. **International commodity prices**. The international, London Bullion Market Association (LBMA) price of gold is a major driver of a possible expansion of gold mining activities. Particularly the large mining multinationals have precise calculations of a minimum gold price that allows for operation. Small producers depend somewhat less on international gold prices and are more vulnerable to other external factors (see also Heemskerk 2001). Nevertheless, also for small producers there is a cut-off point below which gold production is no longer economically attractive. For the ASGM sector, and to a lesser extend the large-scale mining sector, fuel prices constitutes an important share of production expenses. Hence (inter)national fuel prices are hold strong explanatory power for whether or not production activities continue and/or expand.

III. **Socioeconomic and political conditions in Suriname.** While there is only a select number of mining concession titleholders (Trommelen, 2013), the thousands of workers in the field typically belong to the most marginalized sections of Suriname society. ASGM is hard work. It is dangerous, unhealthy, offers limited social benefits due to its informal nature, earns an uncertain income, and typically requires long periods of separation from one's family. People with a decent education and multiple employment opportunities usually do not choose for a job in ASGM. Particularly in times of economic recession, when those with the fewest resources suffer most from high inflation and unemployment, people with limited

employable skills are likely to be pushed into the ASGM sector, where Dutch language skills and a school diploma are not requested. For the government, the ASGM sector serves as a safety valve; it offers employment and an income to marginalized groups in society that otherwise could create social unrest. It is therefore unlikely that the government will firmly restrict ASGM in the short term as alternative employment opportunities are currently limited. In the medium to long term, international pressure and funding, and possible Minamata Convention signature may lead to changes for the better.

IV. **Socioeconomic and political conditions in neighboring countries**. Socioeconomic and political conditions in Brazil were a major driver of ASGM in Suriname in the late 1990s. We also notice that periods of ASGM repression in French Guiana coincide with an influx of gold miners into Suriname. Given the open borders between Suriname and its neighbors, changing conditions for ASGM in neighboring countries rapidly affect the sector in Suriname. For example, if new regulations -and the enforcement of such regulations- in Guyana, French Guiana or Brazil pose new restrictions on ASGM in those countries, it is likely that ASGM miners will cross the borders to a location where they are not bothered by such restrictions.

V. **Technological change**. It is difficult to predict whether the invention and introduction of new, more efficient gold mining technologies for the ASGM sector will either cause more deforestation or limit it. With more efficient ASGM technologies, it becomes more attractive to re-mine places, which reduces exploitation expenses (no need to remove forest and overburden) and risk (you know what you found before). In the case of re-mining, less old-growth forest will be removed. On the other hand, more efficient technologies can make it profitable to mine gold reserves that before were considered inaccessible or insufficient. In that case, technological innovation may drive deforestation.

VI. With regard to large-scale mining in North Suriname (bauxite, oil), technological innovation is not expected to have a major impact on mining-induced deforestation in the next 5-10 years. It has been projected that oil mining may concentrate on off-shore (World Bank, 215), which would not affect forest cover. Technological development in the bauxite industry could allow for processing lower grade ore, but it is as of yet unknown if new mines will be developed.

### 6.1.3 Forestry

**Forestry is not considered a potential future driver outside of the Forest Belt (*bosgordel*), a 40 to 100 km wide zone with forests on relatively accessible terrain (not too rugged, and a main east-west access road cuts through most of it), located above 4° N latitude**. Accessibility below the 4° N latitude is especially difficult due to hilly terrain, river rapids and the absence of land infrastructure. The area is entirely devoid of roads beyond improvised roads created by small-scale gold miners; it can be accessed by small planes and small boats that can manage the rapids. This will likely remain inaccessible for modern logging operations in the near term. Further, timber stocks have hardly been inventoried in the southern forest reserves, and suitability for SFM remains uncertain.

### 6.1.4 Agriculture

**The Interior is generally considered unsuitable for (mechanized) agriculture, largely because the lateritic soils of the Precambrian Guiana Shield are generally infertile.** Due to the lack of infrastructure and access to markets in these areas, the incentive to convert these remote areas land in the Interior are considered limited. The majority of suitable, readily accessible agricultural land is in the Coastal Plain, where conversion has already taken place. Based on information provided by LVV, their priority is to first rehabilitate abandoned agriculture plantations (such as the palm oil plantations established in the 1970s), rather than opening up forest areas to establish new fields. However, large-scale agrobusiness investment proposals have often appeared in Suriname's plans for development. For example, in 2004, the China Zhong Heng Tai (CZHT) Investment group CZHT was granted a lease right and an ICL for a duration of 40 years (through a law) covering 52.500 ha in the Patamacca region in the Marowijne district. On December 1^4,2016, field activities officially began. The status of the area, however, remains unchanged. Further, timber from ICL's is subject to a 200% volume based fee (retribution). This extra cost may keep operators from recovering this timber but leaving it to be burned and/or in-situ decomposition, but they do not have to pay an area fee. An expansion of the area designated for oil palm to other parts of the country is still being discussed.

### 6.1.5 Urban development

**Deforestation due to urban development has increased by more than threefold in 2009-2015 as compared to 2000 to 2009** (see Figure 3). This is largely explained by Suriname's urbanization trends. Urban growth and housing development will likely continue to expand in the near future. However, the relative impact of this driver, especially in the dense forest areas of the Interior, is highly limited, causing an estimated 404 ha annual deforestation from 2009-2015. As Suriname's population growth rate is estimated at 1.05% (2016 estimate),[56] the impact of urban development is expected to remain minimal.

### 6.1.6 Energy

**From a historical perspective, the most significant single deforestation event since the beginning of the 20th Century has been the establishment of the Brokopondo hydro-electric reservoir (i.e. Brokopondo Lake)**. An estimated area of 135,000 ha mostly virgin forest – but also 21 Maroon villages and associated shifting cultivation fields along the Suriname river – disappeared under water once dam construction at Afobaka was finalized in February 1964. It is therefore important to note that the second main component of the IIRSA plans involve the enlargement of Suriname's capacity to provide electricity for domestic and international consumption. The proposed Tapajay hydropower project (currently on hold) in the southeastern part of the country would harness the Tapanahoni river, which has the potential to allow Suriname to export energy to French Guiana and Guyana. In the west of the country, the

[56] CIA World Factbook, Suriname page: https://www.cia.gov/library/publications/the-world-factbook/geos/ns.html

proposed Kabalebo and Stondansi hydropower project would also have significant impacts on forests (see section 6.1.2).

**Since Suriname does not have significant topographic elevation changes in the areas relevant for new hydrodam construction, efficient energy production would require the creation of a large-scale lake.** The resulting impacts on forests in terms of flooding would be immense. Therefore, the argument for constructing another hydrodam is relatively weak in Suriname, especially given that neighboring countries such as Brazil do have the elevation conditions to build a more efficient dam. However, as Suriname embarks on an ambitious plan to expand renewable energy production (GOS 2015), it is unclear whether hydropower dams would fall under the definition of 'renewable energy.'

# 7 COMMUNITY PERCEPTIONS

**Suriname has a multi-ethnic, multi-cultural population.** Local communities inhabiting the forested interior represent six Maroon and four Indigenous tribes. The country displays geographically defined disparities (Goede, 2014) with differences in socio-economic, cultural and ecological characteristics evident between the urban coastal, rural coastal and rural interior populations. Combined with communities' and tribes' exposure to highly localized drivers (logging and mining), perceptions of what drivers of deforestation are and the future pathways they see can differ significantly. This major historical divide existing between the coastal region and the interior influences the REDD+ process and thus requires particular attention. Given the critical nature of local community engagement in the REDD+ process, utmost adherence to principles of transparency should be carried out.

**The objective of this Chapter is to gather understanding of the local communities' perceptions on deforestation and forest degradation drivers, barriers, and their vision for the forests**. It is important to note that the perceptions, views and opinions expressed in this study are formulated by the authors based on input from their informants. They do not necessarily reflect the perceptions of a whole community and they should not be seen as the official policy or position of any agency of the Government of Suriname. The purpose of integrating community perceptions into this study is to support the inclusiveness of the national REDD+ process. Documentation of local communities' perceptions fosters a greater understanding of their values, needs, and interactions with their environment. In order to ensure that the study is not a stand-alone event, this activity employed a capacity building approach that builds on existing engagement structures in the context of REDD+ in Suriname. The REDD+ Assistants Collective (RAC)[57] were trained in terms of their knowledge of REDD+ to enable them to conduct the necessary research in a supported yet independent manner. The RAC make part of some of the Surinamese forest-dependent communities, and as such played an important role in conducting field activities. The aim was for RAC to execute the surveys and facilitate focus groups. The activities were conducted in a highly sensitive manner to respect the full involvement of local communities in initiatives affecting development of their traditionally held lands.

## 7.1 Methodology and study design

**This study builds on existing literature, interviews with CBOs and NGOs, surveys and scenario exercises done in different tribal and indigenous communities.** Map 13 provides an overview of the geographical locations of Suriname's communities, their vicinity to mining and logging concessions, and specifies which communities have participated in the scenario exercises and surveys for this study. The process in which the community perceptions study was executed was divided in five Phases (from August to December). Phase I focused on a literature review, methodology development and consultations with relevant organizations and the PMU REDD+ office. In Phase II the survey, participatory scenarios and REDD+ Assistant's trainings were designed and validated. Phase III focused on training the REDD+ Assistants to conduct the

[57] The REDD+ Assistants Collective (RAC) is a group of 18 representatives of different indigenous and maroon tribes in Suriname, appointed by their tribal leaders to serve as a bridge between the REDD+ project and their respective communities.

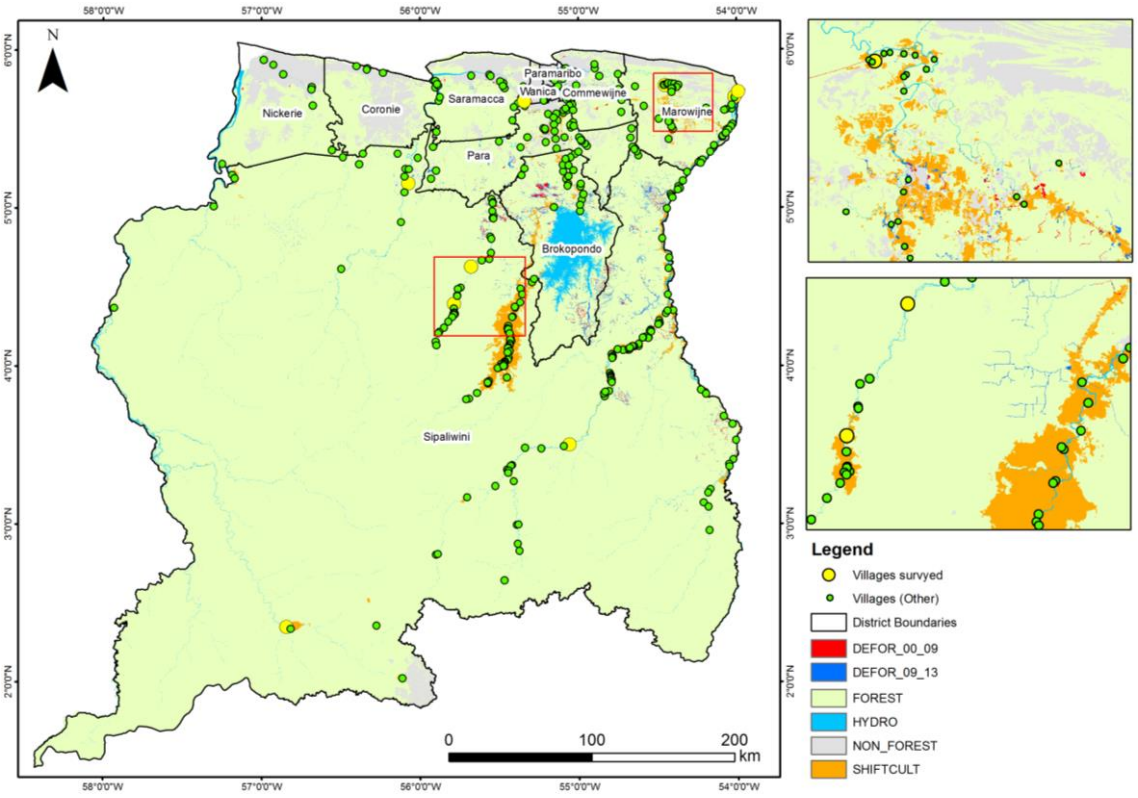
surveys, whereafter the surveys, participatory scenarios, further consultations and desk-based studies were conducted. In Phase IV, the fieldwork results were analyzed, additional consultations with CBOs were held and a validation workshop took place. The results from the previous Phases were finalized in Phase V. Annex 3 provides a detailed overview of the steps taken in the different Phases. A documentation of the RAC trainings is also provided in Annex 3.

## Stakeholder consultations

**The geographical area of interest for the community perceptions study applies to more than 80% of the country.** Numerous organizations exist that are actively involved with local communities. These representative organizations offered valuable information through fifteen semi-structured interviews and consultations that have been held with umbrella organizations, representatives and CBOs from indigenous and tribal peoples over the course of three months. An introduction to the study was given through a PowerPoint presentation. Questions were prepared to guide the interview and were used for gathering: a) perspectives; b) context of communities and the forest, and c) knowledge of communities based on working experience and other formal relations with communities. The results of these consultations strongly emphasized the importance of the diversity of Indigenous and tribal[58] communities, both internally as well as between tribal and Indigenous peoples. This results in a diverse range of visions and perceptions of the forest, and different understandings of deforestation and forest degradation, as well as which factors are perceived as to REDD+, or sustainable forest management. Annex 3 provides an overview of the stakeholders interviewed.

**Map 13: Location of community engagement**

[58] These traditional black communities are often referred to as “Maroon”. During the consultations it was noted they preferred to be referred to as “tribal communities. Therefore, this study will refer to them as such.




**Communities were engaged in data collection through surveys and participatory scenarios.** Annex 3 shows the surveys that were conducted, followed by a detailed overview of what data was collected from which villages.

**The surveys - both hard copy as well as the digitized versions downloaded on phablets that contained ODK software - were translated in the lingua franca 'Sranan Tongo'.** The RAC who had received training on how to conduct the survey in their respective communities were responsible for data collection. Furthermore, the RAC received training materials, survey templates and guidance documents to assist in work execution. The national consultants supported the RAC after completion of their training via various communication means (WhatsApp, phone calls and emails). The national consultants guided RAC of two communities, namely Witagron (where the survey was piloted and subsequently modified) and Apetina. In Apetina the aim was to conduct a test survey, exercise with using the phablet and have a pilot session with the RAC assistant focusing on lessons learned from Witagron. A total of 23 persons participated in the survey, 5 people from Witagron, 3 people from Pusugrunu, 10 respondents from Kwamalasamutu and 5 respondents from Galibi. Respondent ages ranged from 28 – 80 years, with the average age being 51 years. Gender ratio was male to female, 11 to 12.

**Participatory scenarios are a form of qualitative research – focused on the meaning that people give to their social reality - that promote ownership of the community and active participation.** It is a tool to gain information and understanding of social phenomena and attitudes. For this research it was important to gather the perspectives and attitudes of selected groups and persons within the village on the study of drivers of deforestation, forest degradation and barriers to REDD + and to gain knowledge on their future visions and envisioned development paths. It is in this perspective that we can see if and what barriers are experienced

to follow a path of REDD+. A total of 14 participatory scenarios were conducted in 7 villages. These villages are settlements established by the Indigenous and Tribal Peoples (i.e. the Maroons). Between 2 and 7 people participated in the scenario exercises. In total 4 scenarios were conducted with sub-groups: women, unemployed men, leaders and government workers.

## 7.2 Context of forest communities

**Isolation has aided Suriname's ecosystems, natural resources and local culture of the indigenous peoples in maintaining their pristine characteristics** (Ramirez-Gomez *et al*., 2013). There are two main categories of forest-dependent communities in Suriname: "tribal" (maroon) communities and indigenous communities. These communities are dispersed throughout the coastal and interior zone of the country (see: Map 13). The forest covered interior of Suriname is inhabited by four distinct Indigenous Peoples (Kalinya, Lokono, Trio and associated peoples, and the Wayana) and six tribal peoples involving the Aucaner or N'djuka, Saramaka, Paramaka, Aluku, Kwinti and the Matawai. Surinamese forests provide various tangible (natural resources) and non-tangible (cultural, spiritual, traditional and recreational) ecosystem services.

**As part of the Guiana Shield Region, Suriname is exposed to economic development options based mostly on the extractive industries e.g. logging, mining, which on the one hand contribute to the national economy, but on the other hand seriously threaten the forests and if not conducted properly, could result in deforestation and forest degradation** (Crema and Brandão Jr., 2014). Outside threats such as small-scale gold mining have resulted in degraded forest ecosystems accompanied by a plethora of social costs to which local communities are left exposed (Heemskerk, 2002), while other studies have shown that forests managed by local communities can offer longstanding preservation of forest cover. Moreover, involvement of local actors in institutions responsible for forest governance has demonstrated strong linkages with positive forest outcomes (Ramirez-Gomez *et al*., 2016). Vital to the sustainable management of forest resources is the status of land tenure and land rights that dictate access of local communities to livelihood resources and provide security from outside threats such as mining. Without having these conditions in place, achieving appropriate stewardship of the forest can present a challenging undertaking (Ramirez-Gomez *et al*., 2016).

### Forest dependence and use

The major logging and goldmining activities are concentrated in the Northern half and Northeastern part of Suriname respectively, while the remaining interior of the country is only limitedly impacted by these activities. Understanding communities' dependence and use of forests in both zones is important to understand their perceptions of deforestation drivers, barriers and their future visions.

**Indigenous and tribal peoples living in the interior of Suriname are directly dependent and heavily rely on natural landscapes.** It is estimated that 10% of Suriname's population is directly dependent on the forest with 65-90% of all plant species in the Guiana Shield considered beneficial by local, Indigenous and Tribal peoples (WWF and Copernicus Institute, 2012). Research conducted in South Suriname (Ramirez-Gomez et al. 2016) applying participatory mapping methods has generated "Community Use Zones" (CUZs) which show place values encompassing future areas (valued because these areas facilitate use by future generations), cultural values (aggregation of traditional, spiritual and recreation values), economic values

(income generation), and subsistence values (to sustain lives), as perceived by the five Trio and Wayana communities. Furthermore, this research has also shown that the produced CUZ maps can be utilized as a communication tool by the Indigenous Peoples to endorse land tenure and security in indigenous territories and can facilitate processes of co-management of Indigenous and Community Conserved Areas (ICCAs).

**Resource use and labor in societies such as Ndyuka (one of the Maroon tribes that inhabit Eastern Suriname) are centered on gender** (Heemskerk, 2002): men carry responsibility for construction of houses, boats, and other household objects, provide game and establish agricultural plots, while Ndyuka women take care of their progeny, conduct domestic tasks, and cultivate staple crops for the family. The Saramaka territory is a major part of the Suriname River's catchment area. Its people live according to a subsistence based lifestyle, providing with their basic needs through hunting, fishing, gathering, and shifting cultivation (subsistence farming) (FPP and ASA, 2007). The Lokono indigenous communities of Apoera, Washabo and Section (resident population of around 1,000 individuals), use their territory for the purposes of residence and to a lesser degree for farming, while hunting and fishing areas are communally held and available to any member of the villages (FPP and ASA, 2007). With regard to the Trio and Wayana indigenous peoples, Ramirez-Gomez *et al.* (2016) have captured their forest use as follows: they practice shifting cultivation, fishing, hunting and harvesting foods (fruits, nuts) and raw materials (timber and non-timber forest products such as thatch, fibers, resins) for subsistence and cash exchange. Income is derived from tourism activities, sale of handicrafts/souvenirs, and wildlife trade. The interior forests also provide with eco-tourism's, of which the contribution to the country's GDP have been estimated at 1% (WWF Guianas, 2012). Any interference at a greater scale such as development activities and possibly even conservation initiatives if not properly designed and managed may seriously impact the livelihoods and well-being of forest dependent people in Suriname's interior zone. Various participatory mapping and modelling efforts have been carried out to document the land use and concomitant dependency of local communities on forests (Ramirez-Gomez et al., 2013; CTA, 2016).

**Along the coastline of Suriname, large stretches of mangrove forests (covering an estimated 100.000 ha) are found** (WWF and Mangrove Forum, 2016), that provide several important ecological functions and services such as coastal protection, the promotion of sedimentation, and economic value (Anthony, 2015), and are mostly protected under their legal status as Multiple Use Management Areas (MUMA). The MUMAs play a significant role in the livelihoods of the citizens of Nickerie and Coronie with local communities reaping some economic benefits from the area, including fishing, ecotourism and hunting (SCPAM Project, 2013). The Lower Marowijne region is located in north-eastern Suriname and is home to the Lokono and Kaliña peoples, numbering approximately 2,000 people living in eight indigenous (Amerindian) communities. The Kaliña and Lokono in Suriname practice rotational agriculture or shifting cultivation and subsistence hunting for game animals on nearby hunting grounds. Fishing is done throughout the year in the aquatic ecosystems available (river, the sea, the creeks and the swamps). Furthermore, the forest also provides the Kaliña and Lokono with food (fruits), materials for a variety of utensils, and medicinal plants. Locally harvested wood is mostly utilized as firewood for cooking and as construction material for boats, houses or for woodcarving (FPP, 2011).

## 7.3 Results - Community perceptions of drivers of deforestation, forest degradation and barriers to REDD+

### 7.3.1 Key results from stakeholder consultations

**The interviews highlight three key topics related to community perceptions of deforestation and forest degradation drivers: safety and protection, geographical disparity and community forestry.** The sections below summarize the results from the interviews with CBOs, NGOs, community representatives and RAC. A detailed overview of the survey results is given in Annex 3.

#### Safety and protection

**A main topic discussed with representatives of Indigenous and Tribal peoples' organizations and NGO representatives is the distribution of benefits arising from the exploitation of forest resources.** Lack of proper engagement by Government and multinationals when permitting licenses for carrying out extractive industries is seen as an unequal approach to access resources. Representatives of both the Indigenous as well as Tribal organizations interviewed questioned the government's willingness to address the issue of inequitable resource access. As a result, the communities perceive their protection to be at stake. Proof supporting this perception is found in meager education facilities, health care and lack of responsibility for the supply of clean water and availability of energy. As a result of these issues, the relation with the government is experienced as unequal, lacking required safety and protection. Securing land rights is seen as important to safeguard the protection of the land, the waters and the wellbeing of the indigenous and tribal peoples. At the same time large commercial and development projects that are beneficial to the government and enterprises take place in communities' vicinity. Issues such as corruption and vague promises cause and increase distrust.

**Historically, the forest is seen by indigenous and tribal communities as their protection.** This protection is under threat by bad governance, lack of legislation and proper laws. With concession holders entering the forests and using lands for their own means, the fear of being unprotected is further fueled. Politics are seen as a threat to the unity of the indigenous and tribal people, causing corruption and threatening the safety of communities and its forests and waters. The communities are in a constant underdog position. While they feel that the government should take actions to protect them and the forest, they see that the government benefits from concessions that disturb the balance of the forest and the livelihoods of the communities.

#### Geographical disparity

**Geographical disparity is important to be recognized and is often underestimated when it comes to the indigenous and tribal communities' needs, their development and the approach towards the peoples**. In addition, the community structure, consisting of different villages with their own circumstances and geographical area influence the perceptions to drivers of deforestation forest degradation and barriers to REDD+. According to the RAC, the most important driver of forest degradation and deforestation in the area of Upper Suriname River and the Upper Marowijne River is gold mining (IAmGold and Newmont as main agents of drivers). The Coppename river area in the west, Upper Suriname River (Atjoni) and Marowijne

River (Albina) experience logging as main driver logging. Both noise of machinery and logging cause forest to disappear and affect the biodiversity and food security of the area. However, overall the government is seen at the agent of drivers giving out unlimited concessions for gold mining and logging while promoting REDD+.

**There are different sites of power of political and economic action.** Many of the civil society and umbrella organizations are very well informed about the forest, the REDD+ programs in other countries, the concept of benefit sharing and constraints of development projects. Their knowledge is an asset for management and guidance of REDD+. A challenge is to achieve structural participation of Community Based Organizations in national decision making processes.

**Their different worldviews are underlying causes of the imbalance communities experience when it comes to development and the processes of participation**. The root of the difference between the worldviews is that they generally subscribe to opposite approaches to knowledge, connectedness and science. Indigenous cultures focus on a holistic understanding of the whole that emerged from the millennium of their existence and experiences. In contrast, traditional Western worldviews tend to be more concerned with science and concentrate on compartmentalized knowledge first, and then focuses on understanding the bigger, related picture.[59] Drivers of deforestation greatly vary at the local level and a high degree of local complexities should be recognized. These are as follows: the approach taken by the government is perceived as having limited to no consultation and is therefore often seen as dominant and based on inequality. Strong regional village level based councils and organizations are seen as an important and basic structure for Community Development including forest management. This will avoid bypassing the communities and enforce participatory processes and engagement according to the rules of FPIC.

### Community forestry

**The interviewees highlighted that the practice of sustainable logging is questioned**. Communication with local communities has shown that there are big concerns about logging on lands that are marked as community forests. The reality shows that although a positive intention underlies community forests (as mentioned by SBB), various FSC certified logging companies have indicated issues arising due to limited zoning and spatial and land use planning. When discussing logging permits (HKVs) as received by the local communities, it was noted that these permits are awarded to the local traditional authority. The authoritative figure - could be a captain or another person - is expected to manage and exploit the community forest on behalf of the community. As a result, there is a window of opportunity for power abuse by using received benefits from community forest exploitation for private purposes. Combined with a lacking legal entity to address problems arising from HKVs, these permits provide with space for corruption.

The government shows a conflicting approach when it comes to the forest: communities perceive REDD+ as conflicting with other government actions, such as issuing gold mining and logging concessions. Combined with the critique on community forests, the question is raised if

REDD+ will again be a tool that will only benefit the urban population and not the forest dependent people. In discussions about the use of community forest as a protection and sustainable logging tool, questions arise as to whether it is possible that the government will stop with issuing concessions. This will show government's honest commitment to REDD+, and its willingness to address problems occurring in the interior. Nevertheless, it is also noted that logging operations can also provide employment to the communities.

### 7.3.2 Key results from surveys

**When analyzing the results, the diversity between the villages and respondents becomes increasingly clear.** The degree of education among the respondents differed, with the majority of the Witagron respondents receiving some form of formal education, while only one respondent from Galibi went to school. Among the respondents of the different villages it also became clear that there was a big difference in how leadership and decision making in the villages was approached: with the leaders of Kwamalasamutu and Galibi being selected based on elections, while in Witagron the opinions on this topic differed greatly. Decision-making in the villages were based on a democratic process and consensus. Respondents from all of the villages noted that local organizations are present and active in their communities. The main sources of income for the village residents also differed from bush meat, tourism and logging, NTFPs wildlife trading, selling arts and crafts and tourism. When asked about activities carried out by the respondents themselves; the majority of Witagron respondents indicated subsistence farming, while the respondents from Pusugrunu mentioned to be involved in logging, NTFPs and Conservation work. In Kwamalasamutu, all of the respondents carry out subsistence farming, next to wildlife trade and conservation work.

**In all of the villages, the forest plays a central role in the lives of tribal peoples and provides them with everything necessary for having a healthy life** by being a source of food and water, oxygen, building materials, medicine, and aesthetic beauty, and offers a peaceful environment. Materials of vegetable origin that are collected or harvested in the forest are used for different purposes such as building houses and boats, producing arts and crafts and used as medicine. In all villages, wood is also used as charcoal for cooking purposes. Forest clearings are sometimes necessary in or near the village for a variety of reasons such as for the purpose of building infrastructure, practicing agriculture and as a result of village expansion. The awareness of customary rules on how to manage the forests differed among the respondents. Respondents from Witagron have identified gold mining as an activity that contributes most to the disappearance of the forest, while respondents from Pusugrunu attribute deforestation to gold mining, logging and subsistence farming. An equal number of respondents (4) in both Kwamalasamutu and Galibi agree that gold mining and logging contribute to deforestation. Regarding forest degradation, respondents from Galibi and Kwamalasamutu point at climate change as an important contributing factor. In Pusugrunu, respondents indicate wood logging and subsistence farming as main contributors of forest degradation, while in Witagron respondents blame gold mining mostly for forest degradation.

**Unsecured land rights and poor governance policy and local support are experienced as the greatest barriers to realizing forest conservation and protection by all respondents**. The greatest obstacles to achieving sustainable forest management and use are perceived to be poor governance and lack of secure land rights. These factors are also interpreted as contributing to

poor reforestation efforts. The respondents in all communities see REDD+ as beneficial to both local communities and the country as a whole. A detailed overview of the survey results is provided in Annex 3.

### 7.3.3 Key results from focus groups

**The participatory scenario development in the focus groups produced narratives by the participants on the risks they saw for the forests and their ways of life with respect to the forest.** This gives insight into how the forests are viewed by the focus group participants and what they see as their greatest threats. The narratives in all focus groups reveal that participants see mining and logging as the major threats towards forests. Visions on what gold mining and logging could bring differed among the focus groups, as for some (e.g. Witagron) it was seen as a source of income, while for others (e.g. Piniel & Wanhatti) it was seen as a threat towards the forests, their livelihoods and their visions on how to deal with forests. Another main issue highlighted in both Witagron and Galibi was the issuing of logging and mining concessions without the communities' consent. This is perceived as a major threat towards the future existence of the forests and as a root of major problems in their villages. The scenarios from all focus groups showed the communities reliance on forests and their resources, as well as high appreciation of nature and future existence of the forests. This finding is aligned with a previous study conducted by Heemskerk (2002), which noted that even though Suriname's tribal communities effectively control all gold-bearing territories and mining activity, they have consigned interests in conserving the forest that is the home and source of subsistence for their families. In short, the focus groups reveal three main drivers of deforestation and forest degradation as perceived by the respective communities: mining (mainly gold), logging, and the issuing of concessions by the government (without communities' consent). Annex 3 provides a detailed overview of the narratives produced by the focus groups involved in participatory scenario development.

## 7.4 Results - Communities' visions for forest in the future

### 7.4.1 Key results from stakeholder consultations on visions for forests

**The stakeholder consultations addressed two key topics concerning communities and future visions for forests: their perceptions on REDD+ and their perceptions on politics surrounding the forests.**

#### Communities' perceptions on REDD+

**As part of the stakeholder consultations, interviews were conducted with the RAC on how the communities see the forests and envision them in the future.** The RAC reflected mainly on the implementation of the REDD+ program and their position as REDD+ Assistants. Their position is questioned by their respected communities as they are sometimes seen as part of the government, which is often mistrusted by the communities. This is especially the case in areas where threats of mining and logging impact communities' lives. In the Pamacca Area, the community will not be open to a REDD+ strategy under conditions where the government and Newmont Gold mining company earn money from gold mining activities. In the past, the

multitude of problems with the government have resulted in court cases, often without bringing solutions as desired by the communities and in line with their visions of forests. This is a major cause of communities' general distrust of the government and especially impacts communities trust in the implementation of a REDD+ program that is beneficial to them as well. While communities are experiencing detrimental changes and impacts of the concessions that are given to logging and extracting industries, they perceive no change in governance structures and acting to new green development visions that are beneficial to both forests and communities. This trend nourishes communities' distrust about Government's objective of a REDD+ Program for Suriname. Therefore, when implementing a REDD+ program, benefit sharing and creating a win-win situation will be key. REDD+ is perceived as a program of and for the communities, for the forest on which they depend. The forests have been protected and conserved by them from their ancestors on and make part of the indigenous and tribal people. There is a willingness to implement REDD+, but also this means the financials should benefit the communities. If no tangible results will be delivered, it will be difficult for the RAC to return to their communities as this will leave the perception that the assistants make part of the Government and are involved in selling their forests.

### Community's visions of the politics surrounding forests in the future

**The consultations with CBOs, umbrella organizations and NGOs highlighted that communities strive for a future in which they are recognized, engaged in development processes, protected by law and have ownership of the processes that interact with the forest on which they depend.** Political influence is seen as a major barrier when it comes to implementing REDD+, with corruption being a major issue of distrust. Politics of divide and poor legislations prevent the actual development of the interior that will benefit the communities and the forest. The disadvantaged position on both social as well as economic grounds can cause both acceptance and rejection of REDD+. The most visual development pathway of the government which the communities experience, is the path of extractive industries and logging. Access to resources is dominated by government and international and national enterprises. Confidence in The REDD+ strategy as a tool that will benefit the communities is fragile; the mechanism is mostly distrusted in the areas with highest pressure of concessions for gold mining and logging. Illustrative quotes supporting the statements on future visions from stakeholder consultations with CBOs are provided in Annex 3.

## 7.4.2 Key results from focus groups

**In the community Witagron, separate focus groups were conducted for village leaders, women, government workers and unemployed men**. During the participatory scenario development the participants discussed 9 development pathways: logging, mining, REDD+, NTFPs, tourism, wildlife trade, agriculture, business as usual, and culture preservation. Then, the groups expressed what according to their perception the outcome would be under each pathway. Table 23 (below) presents the detailed results for each group. The table below shows the different focus groups in the first row, the various development pathways in the first column and the different outcomes under each pathway in the remaining cells. When assessing how the different groups prioritize pathway outcomes (see Table 24), it can be stated that all groups,

except the village leaders see better options for education as the outcome with highest priority. While the village leaders consider income/employment the most desired outcome. The general conclusion that can be drawn from the scenario development with local communities is that the existing divide between villages from within the same tribe and between tribes is visible. Differences are prevalent in terms of the state of the environment, access to resources, and the degree of diversity found. The community perceptions study is a study that lays bare the diversity of communities, geographical location and especially the disparities in development and its impact on communities, their adaptability and their resilience.

**Table 23: Outcomes of development pathways identified by the different focus groups involved in participatory scenario development**

| Village → / Pathway ↓ | Witagron: village leaders | Witagron: women | Witagron: government workers | Witagron: men unemployed |
|---|---|---|---|---|
| **Logging** | Income/ employment | Income/ employment | Income/ employment | -Income / employment<br>-logging concessions |
| **Mining** | Better options for nature conservation | Better options for nature conservation | A better Suriname | A better Suriname |
| **REDD+** | Better options for nature conservation | A healthy forest | Better options for nature conservation | -Better options for nature conservation<br>-will bring projects<br>-maybe we will find work |
| **NTFPs** | Better options for education | Better options for nature conservation | -Better options for education<br>-A better Suriname | Better options for education |
| **Tourism** | Better options for nature conservation | Better options for nature conservation | Income/employment | -Better options for nature conservation<br>-Better options for education<br>- Income /employment<br>-tourism can bring more people to our village and in that manner we can earn income |
| **Wildlife Trade** | Better options for education | Better options for nature conservation | Better options for nature conservation | Better options for nature conservation |
| **Agriculture** | Income/ employment | Income/ employment | Income/ employment | Income/ employment |
| **Business as usual** | A healthy forest | A healthy forest | A healthy forest | Better options for nature conservation |
| **Culture preservation** | Income/employment | -Better options for nature conservation<br>-A healthy forest | A healthy forest | Better options for nature conservation |

**Table 24: Prioritization of pathway outcomes as indicated by the focus groups involved in participatory scenario development**

| Village → / Pathway outcome ↓ | Witagron: village leaders | Witagron: women | Witagron: livelihood groups | Witagron: men unemployed |
|---|---|---|---|---|
| **Better options for nature conservation** | -- | 1 | -- | 2 |
| **Better options for education** | 1 | 3 | 3 | 3 |
| **A better community** | -- | -- | -- | -- |
| **A better Suriname** | -- | -- | -- | -- |
| **Income/employment** | 3 | -- | 2 | 1 |
| **A healthy forest** | 2 | 2 | 1 | -- |

1: pathway outcome that has the highest priority

2: pathway outcome with medium priority

3: pathway outcome with lowest priority

## 7.5 Key messages and recommendations

**The results from the study of community perceptions show the diversity of communities, geographical locations and the disparities in development and their impacts on the communities.** Differences have been observed between the communities/villages in terms of the socio-economic aspects they endorse. Differences have been observed in the way interviewees of indigenous and tribal communities experience the forests. All interviewees showed a high value of the forests due to their strong dependency on it. Man and forest are seen in its entirety. Representatives of the indigenous communities however, showed a more spiritual and inseperate relationship to the forest because of a spiritual and historical bond to the land and do not consider gold mining to be a pathway towards a future for man and forest. Communities who already have experienced gold mining and depend on or are used to cash income are more enticed by this sector. This calls for a differentiated approach towards sustainable development programs that involve or impact the communities and difficulties in drawing a general conclusion on community perceptions. Other differences between the communities which need to be recognized are the way they are organized, the presence and strength of the local leadership and the way decisions are made, the livelihood options available to the villagers and the experienced socio-economic pressures. The most important pressures identified in this study were logging and mining related to unclear laws and regulations. Moreover, it is observed that the interviewees of indigenous and tribal communities call for land rights for their protection.

**The communities' strong reliance on the forest, its resources, and services that are necessary for their sustenance and livelihoods unifies the indigenous and tribal communities but also defines the differences in challenges for those communities that are situated in or near areas where extractive activities are dominating the landscape** (i.e. mining and logging). Communities that experience the greatest pressure are confronted with losing the forest and concomitantly their traditional way of life. These communities also have been more exposed to government's activities, which are perceived to center around the issuing of mining and logging concessions, instead of protecting the forest and the communities' interaction with the village. This affects the way a REDD+ program will likely be received by the communities in terms of their honest involvement towards better living conditions, development possibilities and sustainable forest management. Especially underlying trust issues with regards to laws and legislation, community protection and their safety prevail among the communities. From the analysis it became clear that the communities do not perceive themselves as drivers of deforestation but rather as survivors of deforestation. While the government - issuing logging and mining concessions to powerful multinationals – is often seen as an agent of deforestation. An important message to be extracted from this research is concerning the government's approach in terms of serious commitments to protect and conserve the forest, its people, the waters, and to promote balance and sustainable development. The government's commitment to implement a REDD+ strategy will need to be one that will benefit the forest and the people that depend on it.

**There are serious concerns about what is perceived as a conflicting behavior of government and the lack of serious commitment and transparent communication.** The study shows a need for dialogue, closing the gap of inequality and the need for a government which the communities

would perceive as trustworthy. The current status is often not seen as a good enabling environment for REDD+ implementation, and for the prevention of further deforestation and deforestation by both small-scale entrepreneurs and multinationals. It is rather a situation of great conflict between stakeholders involved. Participatory processes need to include decision-making with communities on HKV's, the land issues and concessions, the issue of Land rights and land tenure, protection of the Indigenous and tribal communities and their lands, and active and equal contribution of all parties to reach sustainable development of all people of Suriname. Without these conditions in place, REDD+ is seen as a tool that may benefit the government and its politics instead of the communities. The community perceptions all emphasize that history shows no progress has been made in closing the gap of inequity existing between government and communities. A political divide and position of dominance by both government and multinationals are still strongly experienced. Therefore, having a participatory approach with the indigenous and tribal communities in which all parties are considered equal and are involved in the decision making process is highly emphasized on. Additionally, it is recommended for the REDD+ Program to consider incorporating students into the program that can assist with survey implementation, while the RAC act as liaison between the research institutions/consultants and the communities, and can create the enabling environment for those wanting to execute surveys or conduct other necessary research in the communities.

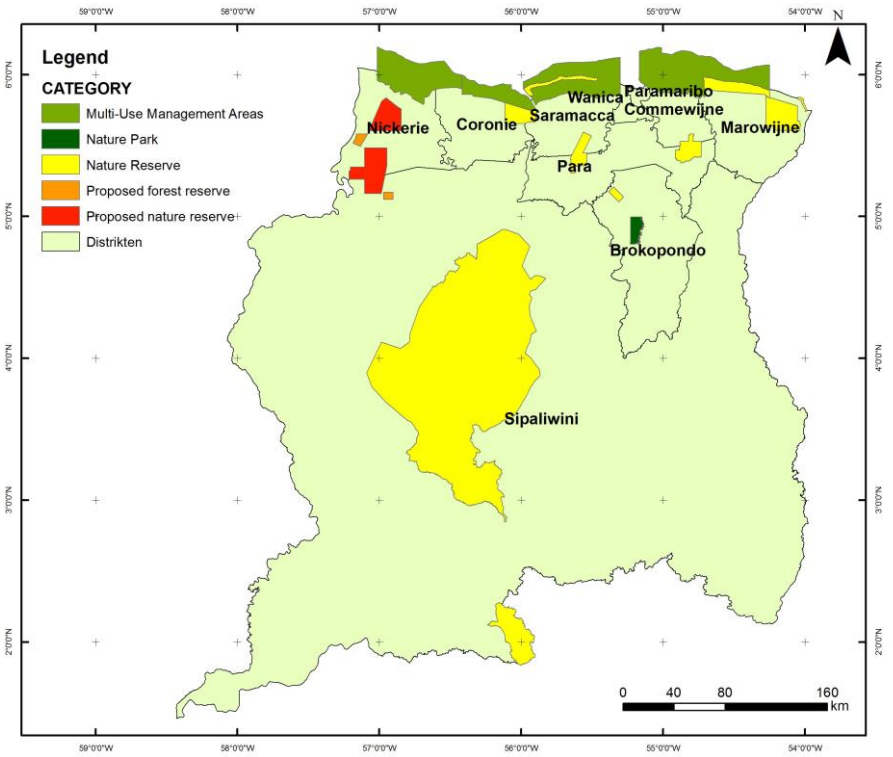
# 8 KEY BARRIERS FOR REDD+

**To supplement the analysis related to avoided deforestation and forest degradation, this chapter focuses on the remaining three eligible REDD+ activities, explaining their general status, relevance, main barriers and challenges**. Thereafter, a synthesized analysis of the main barriers relevant for REDD+ as a whole in Suriname are provided, as many of the barriers identified are generally applicable to all activities, rather than being specific to distinct REDD+ activities.

## 8.1 Conserving forest carbon stocks

**The main actions relevant for this REDD+ activity relate to the establishment and improved management of Protected Areas**. Suriname has 16 legally established protected areas, and four proposed protected areas (these have been proposed since the early 1980's). The legally established ones cover 21,383 km$^2$ (i.e. 13.5% of Suriname's land territory). The Central Suriname Nature Reserve, located in the Interior, is by far the largest, covering 15,920 km$^2$ (i.e. 9.7%). The other reserves are relatively small, no larger than 1,000 km$^2$ (i.e. 0.6% or less), and most of them are located less than a 100 km from the coast; the notable exception is the Sipaliwini Nature Reserve in the south of Suriname, which was established to protect Suriname's largest savanna landscape (ATM, 2009).

**Figure 13: Suriname's current Protected Area Network**




*Source: data provided by SBB, map produced by UNIQUE.*

**The different types of protected areas differ in legal status and management regime:**

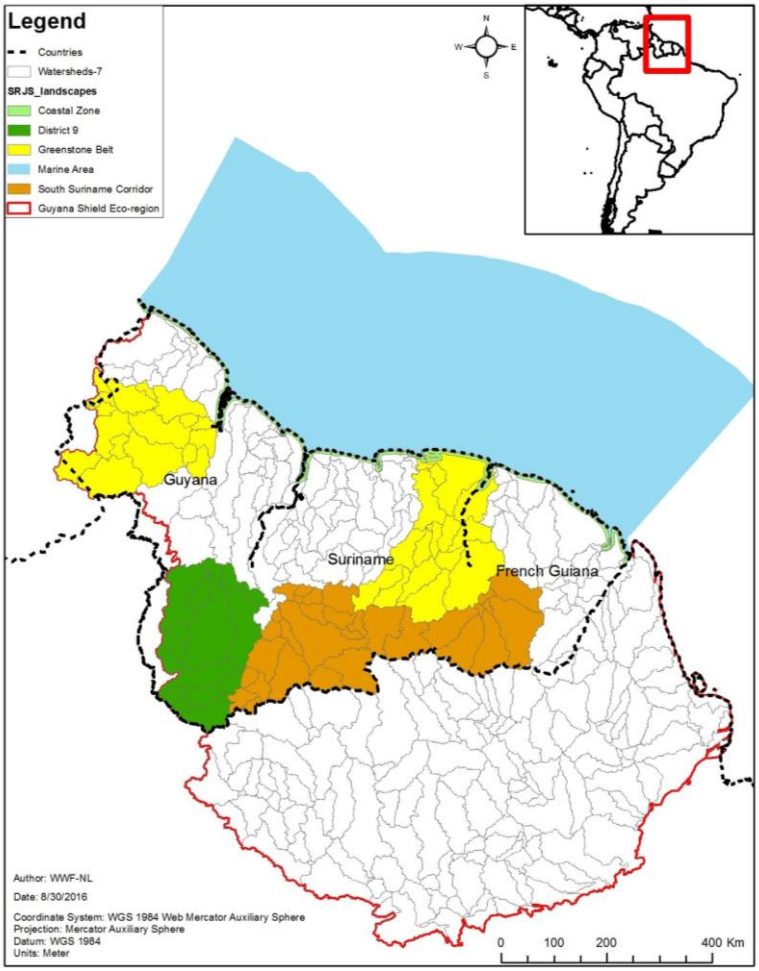
- **Nature Reserves (NRs),** established based on the Nature Conservation Act (1954): NR is the oldest form of protected area in Suriname; formal protection is complete, although traditional activities by Indigenous or tribal inhabitants are allowed, alongside limited scientific and nature tourism activities. The Nature Conservation Division (NCD) of the Forest Service (LBB) is formally in charge of the overall management on behalf of the State, and nature tourism activities in the NRs are managed by Stinasu, the Foundation for Nature Conservation in Suriname. At several NRs, NCD has set up field stations, which are occasionally or seasonally manned by game wardens. So-called Consultation Committees (CCs) have been established as a forum for discussion and conflict resolution between the NCD, the local population, and other actors or stakeholders (two protected areas have or at least had CCs but at least one is not functioning anymore). Management plans have been developed for about half of the NRs, but most are outdated, and it is unclear to what extent they are still being implemented. The most actively protected NR is Galibi Nature Reserve, where NCDs marine turtle protection activities are supported by WWF and (part of) the local Indigenous community.
- **A Nature Park** (NP) is established on the basis of so-called Land Reform Decrees (1982). The only Park in Suriname is Brownsberg Nature Park (see Infobox 1), which is part lease and part concession of Stinasu (although this concession is contested). Stinasu is the park manager, and has developed it for tourism, research and nature education. Formal protection is not as strict as in a NR. The local tribal communities used to interact formally with the Brownsberg NP manager via a local umbrella CBO, but currently contacts seem to be informal.
- **Multiple-Use Management Areas** (MUMAs), established on the basis of Land Reform Decrees (1982): MUMAs typically have complex ownership and are "areas where integrated management by or on behalf of the Government is needed for a rational use of its natural resources". Protection aims at keeping the ecosystem functionally intact and productive, to ensure the survival of vulnerable wildlife populations. For all the MUMAs, management plans have been developed, all of which are outdated and at present do not appear to be implemented anymore. Formally, LBB should coordinate the management of MUMAs, but due to budget constraints this is not always done in the most optimal way (although LBB's NCD has played an important and active role in the management of the Bigi Pan MUMA for decades).
- **Special Protected Forest** (SPF), established based on the Forest Management Act (1992): two small areas with sustainable forest management research plots have been designated SPF recently (around 2012; at Kabo and Akintosoela).

Given Suriname's HFLD status, this REDD+ activity has significant potential to become a promising approach to implementing REDD+ by maintaining the HFLD status moving forward. The significant opportunities have already been recognized and plans for establishing additional, more substantial protected areas have already been proposed, but have yet to be taken up by the GOS. These include:

- Protection of a larger area with freshwater and forest ecosystems in West Suriname, instead of, yet including parts of areas proposed for protection earlier (cf. above); this initiative was supported by WWF, but ran into opposition by local communities around 2011;

- Protection of Coronie Swamp, the largest freshwater swamp in the north of the country; this project is more of a grass-roots project that is still being developed;
- Protection of a vast forested corridor between CSNR and protected areas across the south-southeastern border of Suriname (in Brazil and French Guiana); this is an ambitious project that is being developed and pushed by WWF and CI (Conservation International). They are currently engaging two indigenous tribes (8 villages) in the establishment of this area. Often termed the South Suriname Conservation Corridor, the proposed PA covers 7 million ha (45%) of the country, (based on information received during interview with WWF).

**Figure 14: Proposed South Suriname Corridor**




*Source: WWF Guianans (2016).*

**With regards to barriers, recent developments suggest that national political support – and sometimes local community support - for establishing additional protected areas in Suriname appears to be limited**. National politics is more focused on advancing projects with more obvious economic benefits (such as in the mining sector), and many local communities have given priority to resolving so-called land rights issues (under the current legal regime, they often see protected areas close to their communities as an infringement on their land rights). Recent initiatives supported by international NGOs such as CI and WWF have not come to fruition. Marginalization of (rights) of Indigenous and Tribal communities in legal texts is frequent; there

must be given practical meaning to principles of partnership and co-management (Shurman Lawyers 2014).

**Further, the government agencies mandated with enforcing the rules surrounding protected areas have limited capacity to exert control.** This also helps to explain the limited efforts at on-the-ground protection of existing protected areas, at updating PA management plans and implementing them. In areas where human pressure is strong, e.g. Brownsberg Nature Park, deforestation continues unabated within the Nature Park boundaries. On a positive note, Rahm et al (2015) state that only 985.3 ha of Suriname's current PA network overlaps with the Guiana Shield's Greenstone belt.

## 8.2 Sustainable management of forests

**The sustainable management of forests in the context of REDD+ is a very broad term that can entail many different activities.** The definition of this activity depends on the objective of management. In the Bali Action Plan context, it refers to the application of forests management practices for the primary purposes of sustaining constant levels of carbon stocks over time.[60]

**Given the significant amount of forests already designated as timber concession in Suriname, it would make most sense for this activity to mainly entail the sustainable management of forest for timber production purposes.** However, section 5.1 demonstrates that there might be limited room for improvement in the forestry sector, as all types of forestry operations are subject to strict planning and harvesting rules. Further, forestry plays a limited role to total national GHG emissions. Nonetheless, supporting forestry operators to move towards improved (certified) practices may be a key opportunity for REDD+, which should be evaluated in detail through the planned REDD+ strategy options assessment. Especially SFM certification for the diversity of Suriname's timber operators, including small-scale operators harvesting on community forests and HKV's (e.g. group certification schemes), may hold potential. A number of challenges exist related to SFM certification. These include the fact that Suriname's domestic markets, both public and private, do not ask for sustainably sourced timber (products) yet. Although Europe has a strong public procurement policy requiring timber certified for sustainable management, the majority of present export markets (mainly Asian) do not. Incentives need to be developed to motivate more logging companies to engage in (certified) SFM. Special attention should be given to small concession holders and the position of community forest. For these, group certification might be an attractive option. At present, some communities are investigating the possibilities (oral comm. Mr. Lazo, Santigron communities). Besides incentives, especially in the case of community forests: the lack of capacity and knowledge to engage in SFM is an important barrier. Capacity strengthening activities, e.g. training in Community forestry, SFM, and in related issues such as commercial values, negotiating; but also technological material and technical support for putting it in practice.

[60] http://www.fao.org/forestry/18938-0efeb18b14c2ad28b0a2f2ce71b136f2e.pdf.

## 8.3 Enhancing forest carbon stocks

**Afforestation and reforestation (A/R) are the main interventions relevant for this REDD+ activity.** Due to the nature of Suriname's dense forests, timber harvesting is low intensity selective logging, in which systems for A/R have no role. In the early 1960's some experiments were done on enrichment planting. After logging, logged over forest were artificially 'enriched' by the planting of seedling of potentially commercial tree species. All experiments failed; young seedlings lost the competition for light, water and nutrients from natural regeneration of these forests. Therefore, silvicultural treatments as a REDD+ activity has limited potential.

In the 1970's, several forest plantations have been established. By the early 1980's, there were 13,000 ha of plantations of which the vast majority was planted with Caribbean Pine (*Pinus caribaea*; an introduced species) and formally managed by the national BOSMIJ NV., then under the responsibility of LBB. After a promising start, growth rates declined and nowadays these plantations have been neglected and no thinning has taken place since the 1980's. The future of most plantations is uncertain (NFP, 2005). At present, A/R is not part of the operations of the national forest authority.

**A/R however could play an important role in the rehabilitation of abandoned mining areas.** Such rehabilitation is mandated by corporate social responsibility policies of large mining companies that have been (BHP Billiton) and are active in Suriname (Suralco, a subsidiary of Alcoa; IAMGold, and Surgold, a subsidiary of Newmont). At Suralco's old bauxite mining areas, for example, several pilot plantings have been established by making use of seeds that have been collected from natural forest or saplings (both of native and exotic species) raised at nurseries. Based on the results of this pioneering work, Suralco has been and is implementing further A/R. The development of these plantations is monitored by Suralco itself. There is significant potential to expand this rehabilitation requirement through REDD+, especially as there is not only a need for A/R in relation to bauxite mining, but also in the industrial gold mining sector. Initial efforts at A/R have been done by IAMGold at their Gross-Rosebel operations.

**The challenges here are manifold, relating to the lacking legislative and regulatory framework to ensure that these measures are strictly adopted and regulated.** For companies that signed mining contracts in the 1960s/70s, at that time environmental regulations were not a primary concern. Hence the agreement with Suralco, for example, includes minimal provisions with regard to environmental restoration. Newer mineral agreements (e.g. Newmont) are much more explicit, and environmental rehabilitation is a primary concern of the company and the government. Further, the lack of transparency must be addressed, exemplified by the lack of public domain information on how successful Suralco's rehabilitation efforts have been. NIMOS is responsible for control on environmental compliance, but this office is severely understaffed and underfunded. As a result, this office is unable to execute regular field inspections at the different mine sites and perform scientifically sound, longitudinal measurements of forest, water, soil and air quality.

**For small-scale mining, the main barriers to A/R include land tenure, adverse incentives, and the practice of revisiting old mining sites.** ASM miners often do not have title to the land they work on, so there is no incentive to invest in environmental management. One may be removed any day, so it is better to get as much as gold out in a short time period ("hit-and-run" mining).

There are no implications of not rehabilitating/reforesting, so there is no reason to do it. ASM miners are not fined, convicted or denied access to new concession titles if they have not rehabilitated the area they worked before. Finally, ASM miners are frequently re-mining old places, so it does not make sense to plant trees at a location where they will be removed only a couple of years later.

**Finally, agroforestry systems such as multi-strata systems, home-gardens, cocoa agroforestry systems, and improved taungya systems are a potential strategy option to enhance forest carbon stocks.** There is significant potential to increase the productivity of shifting cultivation and thereby reduce its expansion. However, the total expansion of this driver has been reducing in recent years without such interventions.

## 8.4 Overall barriers to REDD+

**Many of the barriers identified are relevant for REDD+ as a whole in Suriname, rather than being specific to distinct REDD+ activities.** This is partly because the official UNFCCC definition of the five eligible activities is very general and these thus need to be defined in the specific context of Suriname in order to determine the specific barriers to these activities.[61] Therefore, this section includes a summary of the main barriers to REDD+ as a whole. The literature reveals various barriers to REDD+ in Suriname, which include governance, institutions and policies, participatory stakeholder involvement, and legal rights issues.

### Governance, institutions and policies

**Delegates of the Saramaccan/Saamaka tribal peoples have expressed to the government and private investors a need for acknowledgement of the tribe as a primary stakeholder, which should be fully involved in planning of activities concerning logging, protected area management and issuing of gold mining concessions within traditional Saramaccan lands** (CTA, 2016). Structural socio-economic problems involving inflation, unemployment, and meager quality of public services, including education in rural areas, have been identified as important drivers of small-scale gold mining (Heemskerk, 2002). Increased investment for the betterment of these issues could possibly improve on the situation in the small scale gold mining sector. Moreover, as direct and underlying causes of threats to coastal zone biodiversity, the UNDP (2011) points towards macro-economic, policy and institutional factors. These same constricting factors also apply to the REDD+ program. Consultations with CBO's, the RAC, community representatives and NGO's working closely with communities in the interior have highlighted misunderstandings between the government and communities in charge of community forests. In these forests, wood logging activities are planned to be carried out by the communities themselves. The different interpretations and perceptions of community forests within the communities and weak communication lines experienced with the government makes it unclear for the communities in what ways they are allowed to use the forests and its resources.

[61] For example, the official UNFCCC definition of the forest conservation eligible activity has resulted in disagreement in international REDD+ debates about whether this definition is just a means to avoid deforestation and forest degradation, or if it also involves paying for maintaining forest stock. The main argument against stock payments is their low additionality; the counterarguments are fairness ("do not just pay the high polluters") and the potential for higher future deforestation in these places (Angelsen & Rudel 2013).

### Participatory stakeholder involvement

**Crucial towards further REDD+ development is the participatory involvement of indigenous and tribal communities.** To date, it has been expressed by numerous CBOs and NGOs that community involvement is limited. Further, the Association of Village Leaders in Suriname (VIDS) and Association of Saamaka Authorities (VSG) (2016) state that experiences obtained by the Widening Informed Stakeholder Engagement for REDD+ (Wise-REDD+) project – which highlighted increased capacity development of tribal and indigenous communities and their involvement in the REDD+ process – have been neglected. According to Anthony (2015), enhanced public awareness and participatory involvement of relevant stakeholders including local communities regarding the important role of mangroves in the development of the Suriname coast should be promoted.

### Legal framework providing enabling environment conditions

**A number of sectors and institutions are struggling with the lack of the legal measures required to properly exercise their activities.** For example, the Ministry of Agriculture (LVV) stated that the lack of a clear legal framework for agriculture development means that they are uncertain of the extent to where and how agriculture establishment can take place. In other words, there would be the need for legal forest protection measures to avoid the establishment of new agriculture fields in forest areas. Clear guidance on where and how new agriculture fields are established would be needed for REDD+ to ensure that agriculture is not established in forest areas. In a similar note, the Investment and Development Corporation (IDCS) mentioned the fact that it is operating in a legal void, which means that it cannot properly exercise its institutional mandate to support sustainable investments. The most obvious example is NIMOS, which is meant to regulate and control environmental impacts, but is operating in a legislative environment that lacks mandatory environmental and social impact assessments (ESIAs). Only voluntary general guidelines for ESIAs and no legislation/regulations exist in relation to emission standards in the natural resource extraction industries (i.e. mining, agriculture, forestry).

**Regarding community rights, a survey conducted by the Forest Peoples Programme (FPP) in 2011, amongst local partners namely the VIDS and VSG in Suriname, highlighted a number of issues regarding REDD+ and rights issues.** Key observations and lessons learned included that REDD+ policies and pilot projects need to be more effective in addressing rights and equity issues and support for reforms of legal frameworks, tenure and forest governance needs to be prioritized by governments and donors. Moreover, participatory reviews of international obligations need to be included in National REDD+ planning while at the same time priority actions are needed to ensure recognition of land and territorial rights of indigenous peoples, including support for community mapping and demarcation activities. Implementation of REDD+ requires capacity-building at all levels, including on good governance and related safeguards. Urgent measures should be taken to implement safeguards at the national and local levels and more attention needs to be paid to the development of a rights-based mechanism for the sharing of local benefits. All in all, the survey highlights that there should be greater recognition of traditional forest management and direct support for community-based initiatives.

**While REDD+ can result in a decrease of large-scale deforestation, in the absence of secure land and resource rights, there is a concern that REDD+ preparedness and eventual REDD+ projects may pose new threats to indigenous and tribal peoples' ownership, use and control**

**of their territories** (Ooft 2013). For instance through the establishment of new protected areas and/or new rules or effectively handing over forest management to governmental or other partners involved in these programs. With regards to land rights, concerns have been voiced by the Indigenous collective OSIP, which stated that despite signing declarations acknowledging land rights of indigenous peoples, "current legislation offers no guarantee for the continued existence of the indigenous peoples, their culture and traditions (…) the indigenous peoples have sought and obtained their rights, still the government refuses to execute the judgment/verdict" (loopsuriname, 2016).

### Intersectoral coordination and land use planning

**Suriname does not have a land use plan or policy in place. Therefore it remains difficult to resolve the overlapping concession rights in an integrated manner and in a way that prioritizes REDD+ compatible investments**. Certain institutions have mapped out areas relevant for different developments. For example, LVV received support from Brazil to conduct agriculture zoning and the Presidential Commission to Regulate the Gold Sector (OGS) has mapped out mining areas. However, these initiatives are siloed and not based on a comprehensive analysis of different possible land uses or on environmental considerations. Land use planning – including the effective enforcement of land use plans – is considered fundamental to establish the enabling environment required for investments in REDD+. The lack of a land use planning policy may become a significant barrier to all REDD+ activities.

### Financial and economic situation

**Suriname has been hit hard by the drop in the international prices of its main export commodities, gold and oil, and the closure of the country's alumina production.** In 2011, revenues from the sale of the three commodities accounted for 88 percent of exports and 40 percent of government revenue. The subsequent price declines and the closure of alumina refinery Suralco in late-2015 have cut these revenues and caused substantial fiscal and external current account deficits. The fiscal deficit reached 8.8 percent of GDP in 2015 and consumer price inflation has reached 37 percent in March 2016 (IMF 2016). Surinamese authorities are therefore strongly engaged in restoring macroeconomic stability and confidence. This may distract attention from new initiatives such as REDD+. The proposed measures to economic recovery may hinder the national funds available for investments in REDD+. Further, the structural reforms proposed aim to attract foreign direct investment and diversify the economy (whether avoiding deforestation and forest degradation is a priority investment criteria is not clear). However, enhancing the productivity and competitiveness of Suriname's agricultural sector is of particular importance (ibid. 2016).

### Clarity on indigenous and tribal land rights

**The REDD+ process in Suriname was stalled early on partially because some of the first versions of the R-PP did not pay adequate attention to the rights of Indigenous and Tribal peoples**. It will thus be critical to engage these stakeholders in a carefully planned and coordinated manner, ensure that they are well-informed and are given the opportunity to effectively influence the REDD+ strategy development process. Otherwise, there is a risk that Indigenous and Tribal groups may block the REDD+ process in a similar fashion to previous

experience. As emphasized in the R-PP, specific attention must be given to translate the relevant information regarding REDD+ to Indigenous and Tribal groups in the Interior.

The tension between these groups and the government may become a barrier to REDD+ in the sense that experience from other forest countries in the Amazon suggests that an important challenge at the first stage of the forest transition curve is clarifying property rights in order to avoid land races, which occur when land is cleared with the primary purpose of establishing rights rather than for the productive use of the land (Alston, Libecap, and Mueller 2000). In many contexts, strengthening the rights of indigenous peoples can provide an effective buffer against commercial forest encroachment, but these rights need to be enforced by local political authorities.

### Public awareness of REDD+

**The general public of Suriname, especially those living in the Interior, have insufficient awareness about REDD+.** This is combined with a lack of awareness about the potential negative impacts of planned investments in mining, infrastructure and large-scale agriculture, including on vulnerable groups, such as children, women, indigenous and tribal communities. This makes public participation with regards to development planning difficult to effectuate in a meaningful way. Further, policy makers also often demonstrate a lack of awareness when it comes to REDD+ and with the current economic situation as described above, it will be difficult to mobilize their full engagement in REDD+.

### Biophysical factors and geography - vulnerability to climate change

**Although Suriname is categorized as an upper middle income country, it is recognized that Suriname shares the vulnerabilities of Small Island Developing States (SIDS) having a small population, limited resources, susceptibility to natural disasters, high vulnerability to external shocks and excessive dependence on international trade** (FAO 2015). The country is vulnerable to climatic disasters, particularly flooding resulting from sea level rise. REDD+ activities can generate significant local and national economic benefits, including adaptation benefits in the form of ecosystem and community resilience building.

# 9 SYNTHESIS AND NEXT STEPS

**This study encountered a number of limitations that should be transparently communicated so as to improve certain aspects of Suriname's next analytical studies in the context of REDD+ as well as support an improved national REDD+ process moving forward.** The main challenges relate to the limited time and resources available. After the mobilization period for the ten member interdisciplinary team, one and a half months was available for desk-based review, followed by a 2-month period for in-depth data collection and analysis, and one month to bring the individual tasks together into a comprehensive report that brings the various findings together in a way that produces greater knowledge than the sum of all tasks. In terms of methodology, the quantification of drivers built on the datasets produced by SBB. This approach was highly important to ensure that the study is fully aligned with official land use statistics and SBB's state of the art knowledge. However, this also limited the findings to the anthropological drivers that are quantified and communicated by SBB.

**Related to the work on community perceptions, the information of the PMU office that contracted RAC was planned to serve as a main asset for collaboration**. From the start, capacity building of the RAC was envisioned to play an important role throughout the process. During the process of conducting the study, it became clear that certain necessary conditions were not in place: the absence of work contracts for some RAC and unclarity about financial rewards for their work, limited internet availability and unfamiliarity of the RAC with the hardware and software. Further, the consultants were working in the absence of a PMU workplan, finalized stakeholder analysis and engagement strategy from the REDD+ PMU. Although the capacity building approach was highly valuable for the REDD+ process, delayed reporting from the RAC was commonplace and not all communities were represented in the RAC (e.g. Pamakka and West Suriname region are not represented). In some cases, their role as RAC feels like a conflicting role as the community perceives the assistant as a working arm from the government: the assistant could possibly sell the forest together with the government. Some of the Assistants are both assistant and captain or "basja" of the village, which conflicts with conventional village hierarchies. Time and resource constraints significantly impacted the quality and quantity of collected data.

**Further limiting factors that were encountered were small population sizes of the villages and consequently small pool of potential participants to survey, unavailability of respondents to participate in the surveys, socio-economic reasons** (e.g. lack of payment, lack of interest in village and environment related issues, lack of focus), and prioritization of other activities in the surrounding areas (e.g. the establishment of agricultural plots and fishing). Flexibility and adaptive management allowed for responding to these issues, with the survey approach regularly amended and improved based on RAC capacity and understanding. Results captured in this report do not reflect the perspectives of the whole forest dependent communities, but should be treated as preliminary insights on opinions and views of drivers of deforestation and forest visions.

**As one of the few countries in the world classified as HFLD[62], Suriname provides a unique opportunity to maintain some of the world's most important biodiversity and freshwater resources while simultaneously avoiding significant greenhouse gas emissions.** This chapter integrates the synthesized outputs of the different tasks carried out throughout the duration of the study to provide a concise summary of the entire analysis. Key points are extracted to set the frame for the pathways forward, specifically related to the main priority moving forward: development of a national REDD+ strategy. Table 25 below summarizes the main findings of the analysis of the REDD+ eligible activities, demonstrating the key areas where REDD+ can intervene in Suriname to maintain its HFLD status and continue to act as key net carbon sink (GOS 2015).

**Table 25: Summary overview of REDD+ eligible activities in Suriname**

| REDD+ eligible activity | Current status | Relevance for REDD+ in Suriname | Main barriers | Opportunities |
|---|---|---|---|---|
| **Avoiding deforestation** | Minimal impact (i.e. low deforestation rate), but potentially expanding significantly in future. | Addressing mining (main driver) will be crucial for REDD+ strategy, especially given the significant non-carbon (social and environmental) benefits that can be generated (Rahm et al. 2015). | High opportunity cost for addressing mining; significant influence of international gold price (Dezécache 2015), which is difficult to regulate through REDD+. | Integrate REDD+ in NDC* and Vision 2035 to maintain HFLD status. |
| **Avoiding degradation** | Known degradation drivers are forestry and shifting cultivation. Other potential drivers of degradation still need to be assessed. | Addressing degradation caused by poor law enforcement considered to hold significant potential, esp. in community forests and HKVs**. | Law enforcement (Code of Practice) is lacking. | Significant areas of logging concessions currently under conventional logging with potential to shift to sustainable forest management. |
| **Conserving forest carbon stocks** | 13.5% of the country currently protected. The degree of enforcement is different, depending especially on whether the protected area (PA) is located where mining potential is high, i.e. in the Greenstone belt. | Highly relevant due to Suriname's HFLD status. | Potential to expand PA network in Greenstone belt extremely limited, despite high biodiversity in those areas. | South Suriname Conservation Corridor aims to establish 7 M ha PA to increase total PA area to 45%, thereby preserving much of Suriname's highly valuable pristine forest ecosystems in the south of the country. |

[62] High Forest cover, low Deforestation rate (HFLD) defined as: "country with more than 50% forest cover and annual deforestation rate below 0.22%". Other HFLD countries include Guyana, Gabon, Democratic Republic of Congo

| REDD+ eligible activity | Current status | Relevance for REDD+ in Suriname | Main barriers | Opportunities |
|---|---|---|---|---|
| **Sustainable forest management** | See "avoided degradation" above<br>1.65 million ha under concession for logging. | Highly relevant as 1.65 million ha are under concessional forest management. | Lack of governance enforcement leading to forest degradation. | Increase the effectiveness of law enforcement and efficiency of SFM as a principle. |
| **Enhancing forest carbon stocks** | Limited success and limited relevance for aforestation/reforestation (A/R) or enrichment planning. | Only relevant for mining areas. | Limited success due to poor up-take of enrichment planting treatments. | Reforesting abandoned bauxite mines. |

*Note: * NDC stands for Nationally Determined Contribution, which entails the translation of Suriname's INDC into an actionable plan to achieve the stated goals; **HKV are community forest titles that have been granted to village chiefs before the 1992 Forest Management Act. Both are under conventional logging, without pre-harvest planning such as logging compartments, roads, landings and skid trails.*

**Although Suriname's forest cover and deforestation rate currently maintains the country's HFLD status, the trend in the deforestation rate appears to be strongly increasing, and if it continues to increase linearly, the annual deforestation rate may exceed 0.5% around 2025 (total forest cover will by then have fallen below 90%).** Suriname's historically low deforestation rates cannot necessarily serve as the basis for how deforestation trends will evolve in the future. In the period 2009-2013, the average annual forest loss is estimated at 9,591 ha (annual deforestation rate 0.06%), of which 73% is estimated to be caused by (gold) mining; in the preceding years (2000-2009), the annual rate was 3 times lower (0.02%).

**The below summary of findings takes a forward-looking approach in that the combined results are explained in a way that considers which drivers and barriers would be the most appropriate to address through REDD+.** While this study provides important information, the design of Suriname's REDD+ strategy will be informed by a comprehensive assessment of the different strategic options (i.e. policies and measures) that can not only address deforestation and forest degradation but also support conservation, sustainable management of forests and carbon stock enhancement. Moving forward, it will be important to develop criteria for identifying and prioritizing REDD+ strategy options that not only contribute to climate mitigation but also to poverty reduction, biodiversity conservation, or other key areas that Suriname prioritizes for its low carbon growth pathway. Trade-offs are inevitable when designing REDD+ strategies, and this report helps to understand the type of decisions that will need to be taken. For example, REDD+ in Suriname may not only address those drivers that are causing the most deforestation, but potentially also those that deliver the most important livelihood benefits at the local level. The nature of the REDD+ strategy will also depend on the priorities prescribed by the source of REDD+ finance. REDD+ strategy options may include sector-based interventions to improve land or forest productivity while reducing negative impacts on forest cover and composition. Strategy options can also include cross-cutting actions and measures that address the underlying causes of deforestation, such as integrated land use planning and capacity building.

**Mining, especially small-scale gold mining, is the main cause of deforestation from 2000 to 2015 in Suriname and its impact is likely to increase in the near future as alternative economic opportunities remain limited.** Although gold mining is a serious cause of deforestation, there is

an absolute limit to gold mining-related deforestation, due to the fact that the known gold bearing geological formations (Greenstone Belt) occupy no more than about 7% of Suriname's land surface (excluding the Brokopondo lake, which is located in the Greenstone Belt). Despite the concentrated nature of this driver in geographic terms, however, the ensuing social and environmental harms are significant, widespread and exacerbating. Therefore, in order for Suriname's national REDD+ strategy to be comprehensive, this driver must be addressed, especially ASGM where most miners do not have alternative livelihood strategies. Any effort in this area, however, must be closely coordinated with the numerous on-going and planned interventions in the ASGM sector.

**It is a fact that almost any new mining in Suriname would add to deforestation.** Nevertheless, REDD+ should help put focus on how mining can contribute to sustainable development in Suriname. Related to the policy & institutional section above, a number of initiatives aim to reduce the negative environmental impacts of mining. For example, Suriname has expressed the intention to join the Extractive Industries Transparency Initiative (EITI), and the process is well underway with a Multi-Stakeholders Group being established. To increase transparency in the mining sector it is planned to make the map of mining concessions public, to publish validated independent reports on mining incomes, to show how these incomes are used and what is brought back to local communities in areas with mining concessions. Institutional restructuring is underway, with a GMD/OGS/BIS mineral institute planned to be established, to be linked with EITI.

**A number of opportunities exist with regard to large-scale mining companies havingtheir own, strict environmental (and human rights) standards, and are held accountable by shareholders and the international community**. International mine managers are increasingly aware of the importance of sound environmental management and mutually beneficial relations with local populations. International professional interests groups such as the International Council on Mining and Metals (ICMM) and international codes of conduct such as the Voluntary Principles on Security and Human Rights[1] provide broadly accepted guidelines for mining firms. Finally, the extensive ESIA studies performed nowadays by large-scale mining firms provide an informed estimate of the extent of environmental damage that may be expected, and provide guidelines on measures that may be taken to mitigate such damage. Conservation International has been working with Newmont Suriname to dis cuss biodiversity offsets. This may be a promising strategy to reduce mining-induced deforestation.

**With regard to ASGM, revoking mining titles of concession title holders who do not comply with the legal conditions may be an option moving forward.** However, it is virtually everyone because all title holders are subletting and few are complying with legal reporting requirements. The next step would be to give out ASM concession titles to small plots of land, rather than the enormous size concession titles miners have now. This land could be good for a couple of mining pits, after mining these, the gold miner will have to show proof of rehabilitation before he/she can be eligible for a new concession title. Concession title owners could be made responsible for environmental rehabilitation, and fine the owners who do not comply so that an external company can be hired to do the job. Annual inspection should be carried out on all concessions to record where mining takes place, and that sites have been abandoned. Concession title holders would pay an annual environmental tax per ha, regardless of whether or not mining actually takes place. This tax should be sufficient for area rehabilitation by an external party. An added benefit of this strategy is that it would reduce "land-grabbing", as sitting on large pieces

of land would become very costly. The above options are theoretical and might face opposition from high-placed politicians with personal interests in the ASM sector. It must also be noted that the issue of re-mining would frustrate rehabilitation efforts.

**Addressing shifting cultivation in the interior as a key driver of forest degradation offers pro-poor REDD+ options.** Although the expansion rate of the forest area affected by shifting cultivation has decreased in the recent past, addressing this driver provides the opportunity to produce significant additional benefits for marginalized members of the Surinamese society. The rural population in Suriname's interior is adversely affected by the lack of government services, economic development remains hampered and income alternative opportunities are scarce. Further, it is largely women that are engaged in this type of small-scale subsistence agriculture. Therefore, addressing this driver through REDD+ offers a proactive gender-sensitive approach that can increase resilience in vulnerable households and communities. However, certain shifting cultivation practices are part of the cultural heritage of many forest communities. According to the work on community perceptions, forest communities show some differences when it comes to reasons for shifting cultivation. The primary reason is for subsistence, and surplus is sometimes sold or shared. Indigenous people, when it comes to selling products more focus on wildlife trade, while agricultural products have no /less commercial aspect. Tribal people have a tendency to be proactive and develop themselves as small scale entrepreneurs, selling products to community members/visitors. This is done mostly by women while men earn an income from other labour activities (sometimes in other villages or in Paramaribo).

**The forestry sector may provide a key entry point for developing REDD+ strategy options**. Although timber harvesting does contribute to slight carbon stock losses, sustainable forest management that follows the guidelines set out in Suriname's legal framework is generally considered to have low impacts. Therefore, sustainable forestry as prescribed by Suriname's laws can be regarded as an effective means to maintain high carbon stocks while generating economic value to forest managers and conserving biodiversity. Considering the growing number of timber harvesting licenses that have been issued since 2001, combined with the ambition to further increase the annual timber production to one million $m^3$ in 2020 (SBB 2016), the creation of large forest management units (FMUs) that are sustainably managed under the minimum requirements of controlled logging, should be stimulated and effectively enforced. The relationship with communities needs to be improved in this process to build trust in SFM.

**When addressing the main proximate drivers in Suriname, it is important to also take into account the link between road construction in the Interior and land use expansion into forest areas.** The impact of road construction in itself may not be a major driver of deforestation, but the fact that accessibility and product transportation is facilitated by roads means that gold mining and possibly other activities such as agriculture may increase substantially as a result of road construction. Therefore, road infrastructure should be a key driver addressed through the national REDD+ strategy, ideally through integrated land use planning at the national and decentralized level.

**Although energy generation and large-scale agriculture have caused deforestation in previous times, the impact of these drivers in the recent past (i.e. 2000-2015) has been limited and is generally expected to remain limited in the near future**. However, it is important to note that the GOS does plan to significantly increase agriculture production – with the Government's aim to become the Caribbean's breadbasket – and the prospects for expanding energy production

through hydro remains in the latest Annual Plan 2017 (ROS 2017). The ability to address such planned drivers that may contribute significantly to national economic development needs to be carefully and realistically assessed moving forward.

**As a HFLD country, Suriname's central challenge with regard to REDD+ will be avoiding the introduction of enabling conditions that improve accessibility to the currently isolated swathes of relatively undisturbed forest**. Especially opening the interior through road construction may increase anthropological pressure and risks significantly increasing forest conversion, whether due to large-scale investments or small-scale mosaic deforestation. The policy recommendation therefore is to carefully plan against actions and public and private investments that would trigger a process of accelerating deforestation. In order to maintain its HFLD status, Suriname will need to avoid, or very carefully plan, building roads, establishing large resettlements or agro-export schemes, or supporting commercial projects (e.g. mining) with accompanying infrastructure and energy supplies through hydrodams. Avoiding the construction of publicly funded penetration roads is extremely important in this context because, once completed, they spur the construction of privately funded roads by small-scale miners or investors in agricultural enterprises. Some of these projects may still be pursued for purposes of income generation, but they should be undertaken only when careful Strategic Impact Assessments accompany the projects and the appropriate environmental countermeasures are taken. In the lack of any legally binding impact assessment standards at the national level, extreme caution should be taken when considering how REDD+ can be integrated into current and future development plans. Deforestation and forest degradation are of increasing concern in Suriname, in particular due to increasing gold mining activities. In Suriname's current context of economic hardships, it is important that the country does not turn to allotting large-scale forest concessions with the aim to stimulate foreign direct investment. A similar situation was visible in the early nineties, when Suriname granted 25-40% of the country's forest area to Asian logging companies (GOS 2013). This report as well as the stakeholder engagement exercises conducted throughout the course of the study is highly valuable for development of the future REDD+ strategy. The knowledge sharing and capacity building should continue to ensure an open dialogue that can foster the consensus building required for successful REDD+ strategy design and implementation.

## Contribution to other studies

**This process and results of this study provide a key information base for the numerous upcoming analytical studies planned as part of Suriname's REDD+ Readiness, which culminates in the development of a national REDD+ strategy.** The information gathered in the report can serve as guidance for the following, amongst others:

- The cost and benefit analysis as well as the work to consult communities and other potentially susceptible stakeholders provides a useful start for the **Strategic Environmental and Social Assessment** (SESA) and other safeguard tools by identifying the key issues that require further analysis, and gives practical advice for overcoming the significant barriers related to stakeholder engagement in Suriname.
- The remote sensing analysis has built national capacities of value for the **National Forest Monitoring System** (NFMS) and identified key areas for improvement, such as adopting level two classifications for the land cover map to capture forest type and canopy cover, allowing

for measurement and monitoring of degradation, and including afforestation/regeneration to allow for capturing carbon stock fluxes related to natural regeneration.

- The analytical approach of distinguishing between proximate drivers, agents and underlying causes is useful for developing the **Forest Reference (Emission) Level (FREL/FRL)** as this quantifies drivers according to their GHG emissions. Further, the underlying causes analysis supports the consideration of different development scenarios and their respective potential impacts on forests.

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# 11 ANNEXES

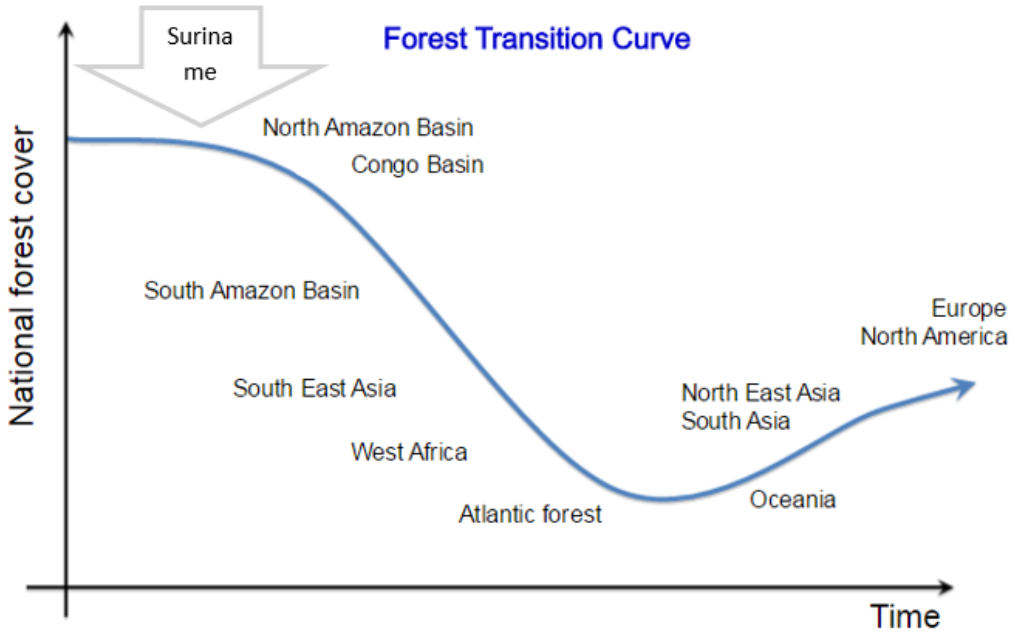
## Annex 1: Explaining Suriname's current HFLD status

Designing and implementing effective REDD+ policies critically depends on a country or region's particular circumstances (Angelsen & Rudel 2013). Therefore, the forest transition theory is a useful lens through which the spectrum of possible REDD+ policies and strategies can be designed in a way that is adapted to a country's circumstances in a given point of time.

### 11.1.1 The forest transition theory

The forest transition theory refers to the empirical regularity that a country or geographic region over time moves through a series of stages reflecting the overall status of forests and the rate at which forest cover change is happening (Mather 1992). Initially, a country has a high and relatively stable portion of land under forest cover. Deforestation begins, then accelerates as forest cover continues shrinking ("frontier forests"). Then the deforestation rate tends to stabilize as forest cover is no longer as prominent. Finally, at some point there is an eventual reversal of the deforestation process as the country shifts towards reforestation (see figure below).

**The forest transition theory**




*Source: FCPF 2009 (based on Zarin 2009).*

In this forest transition theory, five different stages can be identified:

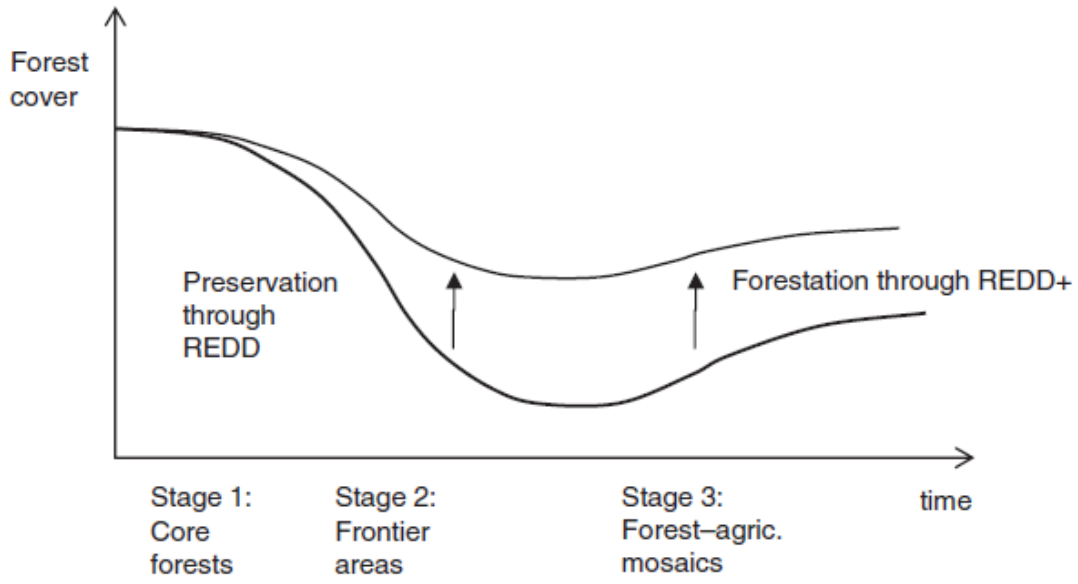
Stage 1: High Forest cover, low Deforestation rates (HFLD)
Stage 2: High Forest cover, high Deforestation rates (HFHD)
Stage 3: Low Forest cover, high Deforestation rates (LFHD)
Stage 4: Low Forest cover, low Deforestation rates (LFLD)
Stage 5: Low Forest cover, negative Deforestation rates (LFND)

The forest transition theory helps to develop contextually appropriate policies and incentives to mitigate climate change through REDD+. At the first stages, REDD+ aims to reinforce the preexisting passive preservation of forests. In the next stages, priority should be given to establishing boundaries and creating reserves to prevent widespread conversion of forests. For example, policies that stimulate forest land development through agricultural expansion should be avoided at this stage, even though such action may require difficult choices between climate and poverty objectives. In the final stages of the forest transition, the restoration of environmental services through Payments for Environmental Services (PES) measures would assume more importance (see figure 'The forest transition with REDD+ policy interventions' below).

Suriname is globally recognized as being a High Forest cover, Low Deforestation rate (HFLD) country. HFLD is defined as: "A developing country with more than 50% forest cover and a deforestation rate below 0.22% per year" (www.theredddeks.org). With a reported 14.8 M ha of forest cover (93% of its total area), Suriname is one of the most forested countries in the world. Historical deforestation has remained relatively low for the reasons explained below.

Suriname's HFLD status has a number of implications from a global perspective. In a global context of increasing demand for food and rising food prices, the political and economic pressures to expand cultivated areas at the expense of forests is growing. Therefore, reversing the deforestation expected by HFLD countries is unlikely to occur unless global policy initiatives provide incentives for governments and landowners to retain or increase forests (Angelsen & Rudel 2013). This is precisely what REDD+ aims to do, and in the context of Suriname, the incentives must compensate avoided destruction of old-growth forests. In other words, according to the forest transition theory, REDD+ policy interventions should focus on preservation, as shown in the figure below.

**The forest transition with REDD+ policy interventions**




*Source: Angelsen & Rudel (2013).*

Existing research at the global level highlights a number of general characteristics that can typically be expected of HFLD countries. These include low population densities, with the related remoteness of forests. A number of social characteristics have also been proposed as explanatory factors. These include a high correlation between poverty rates and forest cover (Sunderlin et al. 2008), poor access to government services and markets, low public and private investments, insecure land tenure, and relative difficulty in capturing potential forest rents (Angelsen & Rudel 2013). Further, because forest areas are remote in HFLD countries, governance challenges related to limited government capacity to implement measures and enforce regulations are generally perceivable at the first stages of the forest transition curve. Further challenges include corruption and lack of sound legal frameworks.

### 11.1.2 Suriname's HFLD status and the country's wider development perspectives

Suriname's forests harbor significant levels of biodiversity, serve as an important carbon sink and maintain key ecological services, such as watershed protection, soil quality maintenance and climate regulation. These forests form part of the Guiana Shield, one of the largest contiguous and relatively intact forested ecoregions of the world.

Suriname's deforestation rate is still relatively low at between 0.02 and 0.06% (SBB 2015) for the time period 2000-2013. The spatial analysis will verify and update this rate to the best extent possible. However, there is also general consensus that deforestation in the country is accelerating, especially in the recent past. According to the Foundation for Forest Management and Forest Control (SBB), the deforestation rate between 2000 and 2009 was estimated to be 3,000 ha/yr. Between the period of 2009 and 2013 this deforestation rate increased to 9,000 ha/yr (SBB), mainly attributed to mining and urbanization.[63] There is a recognized risk that the trend of accelerating deforestation will continue as national development plans focus on infrastructure construction and engaging investors in extractive industries in forest areas. Arguably, the country is entering an era of increased economic and industrial development, and therefore needs to ensure that adequate forest protection and sustainable resource management systems are in place. Therefore, the purpose of this analysis is to look backwards for explanations for why Suriname has maintained its HFLD status, but also taking into consideration that history does not always provide a sound basis upon which to predict future developments.

The analysis shows that a number of contextual factors specific to the case of Suriname together explain the country's HFLD status. The main explanatory factors include policy, legal, biophysical, social, economic and infrastructure. These factors are explained in turn in the following sections.

[63] These numbers will be updated in SBB (2017 – in press). Technical report forest cover monitoring for Suriname. By Forest Cover Monitoring Unit Suriname.

### 11.1.3 Policy and legal framework

#### National development planning

The Government of Suriname (GoS) has recognized the significant role that its forests can play in the fight against climate change. In the Suriname's Intended Nationally Determined Contribution (INDC), the country explains that it aims to maintain its HFLD status, with REDD+ as a key mechanism to ensure this. This is closely linked with Suriname's National Climate Change Policy, Strategy and Action Plan (NCCPSAP), 2014-2021, which commits the country to a climate compatible development (CCD) approach. Although the OP 2012-2016 does mention REDD+ as a potential means to economic benefits for the country (GOS 2013), in this plan the Government of Suriname describes several development perspectives that relate to 'physical planning and environment.' (GOS 2012, section V6) Although these plans could be considered potentially huge drivers of deforestation, it is important to consider that the effective implementation of past multi-annual development plans has not been effective. The most recent multi-annual OP (2017-2021) is currently in draft stage and therefore, could not be evaluated for the purposes of this inception report.

In the 1990s, Suriname entered into an economic crisis, which led to the granting of large areas of forests to Asian timber companies. Anecdotal evidence suggests that this led to external pressure from environmental groups on Suriname to instead establish the Guiana Shield Initiative and thereby rather protect these forests from timber harvesting. Currently, Suriname plans to develop a Vision 2035, which could be based on a green development pathway, with REDD+ forming an important element of that development vision. Including REDD+ in this Vision 2035 may support the maintenance of Suriname's HFLD status by providing political support, similar to previous situations.

#### Legal framework governing forests

Stakeholder interviews generally confirm the perception that Suriname's legal framework is currently limited in its ability to ensure the sustainable use of forests. Nonetheless, it is important to explain the current legal framework, noting especially the legal framework governing forest use. A number of Acts aim to influence the status and use of forests. The Forest Management Act (1992) and its corresponding Ministerial Decrees dominate the legal framework. Other Acts or decrees include the Environmental Act, Mining Act, Trade in Goods Act, Timber Export Act, Planning Act and the Nature Conservation Act (1954). Five ministries are involved in the executing of this legal framework: the Ministries of Physical planning, Land- and Forest Management (RGB); Trade and Industry (HI); Finance (F); Regional Development (RO); and Public Works (OW) (Stoverinck, 2012).

The Forest Management Act (1992) covers the sustainable and rational use of forest resources, taking into account the interests of forest-dwellers and the conservation of nature and biological diversity. It provides rules governing timber production, timber processing and export. It covers the various licenses for forest product harvesting (including timber) from all different types of concessions and the use of community forests (GOS 1992). Forest use on private land is not regulated under the Forest Management Act (1992).

A national forest policy was adopted in 2005 after an extensive process of consultation with stakeholders. This policy provides broad guidelines for the use of forests for production,

protection and conservation. According to the policy, the main goal of forest management is "enhancing the contribution of the forests to the national economy and the welfare of the current and future generations, taking into account the preservation of the biodiversity". It contains economic, sociocultural and environmental goals of equal weight (GOS, 2013).

### Institutional arrangements governing land and forest

With regard to forest ownership, forests in Suriname, except those on privately owned land, are under the responsibility of the Ministry of Physical Planning, Land and Forest Management (RGB). The control over forest management is mandated to the Foundation for Forest Management and Production Control (SBB). Before the establishment of SBB in 1998, forest management was under the responsibility of Land's Bosbeheer (LBB). Some of the original tasks are still under the responsibility of LBB (enforcement of the Nature Conservation Act and the Game Act), others have been redirected to SBB. Other tasks, such as infrastructure development in the interior, mining exploration and mineral resource extraction, have been transferred to other ministries or government agencies. This results in numerous overlaps for land use concessions, i.e. lack of coordination between the Mining Law and Forest Law resulting in mining concessions within logging concessions. The overlaps for land use concessions often results in a stagnation of land development activities and blocks investments in land productivity. Frequent restructuring of government institutions relevant for forest and land use also results in instability and insecurity, reducing the interest of private or government stakeholders to invest in the Interior. The overlapping mandates has resulted in overlapping concession rights, which reportedly has resulted in the stalling of land use investments in the recent past.

### Enabling environment for private investment

Suriname's oversized public sector operates in most sectors of the economy, which has crowded out the private sector and acted as a brake on private sector investment (World Bank 2016). This unfavorable business climate means that private investment in land productivity remains limited, maybe providing an explanation for why Suriname's forests have not been converted to other land uses such as agriculture. Further, key development partners have been hesitant to invest in sensitive high growth sectors such as the extractive industries and agri-business due to the high likelihood of reputational risks if tensions arise between the enterprises and local citizens. Social tensions and conflicts around extractive industries and agribusiness is a situation that has arisen many times in the region and has often been damaging to the image of key investors such as the World Bank. Given the sizable investments that could reach Suriname to exploit the vast natural resources of the country, sustainable resource management could be compromised by various interest groups. Although this has not yet materialized, the World Bank considers this especially alarming given the government's weak regulatory enforcement capacity, poor multi-level governance structures allowing for the effective participation of local communities (especially those in the Interior), the lack of rigorous strategic social and environmental impact assessment legislation (ibid.).

### Conservation policy

Suriname's conservation policy is a potential contributing factor to Suriname's current HFLD status. However, the ability of protected areas to hold strong in the face of more economically valuable land uses can be considered limited, exemplified by the cases of Bigi Pan multiple use

management area and that of Brownsberg Nature Park (see Infobox 1). At present, Suriname has 16 legally established protected areas, and four proposed protected areas. The legally established ones cover 21,383 $km^2$ (i.e. 13.5% of Suriname's land territory), and the proposed ones 1,320 $km^2$ (i.e. 0.8%). The Central Suriname Nature Reserve, located in the Interior, is by far the largest, covering 15,920 $km^2$ (i.e. 9.7%). The other reserves are relatively small, no larger than 1,000 $km^2$ (i.e. 0.6% or less), and most of them are located less than a 100 km from the coast (GOS 2009). The extent to which this Protected Area (PA) network will contribute to the maintenance of Suriname's HFLD status into the future is unclear. See in a later section more information regarding the proposed PA network.

**Ecotourism**

Ecotourism relies on Suriname's impressive forest resource and biodiversity. Although still modest, the number of visitors entering for tourism purposes (tourist card holders) grew from 162.509 (2007) to 227.699 (2015); an increase of 71% (STS, 2015). This increase of visitors resulted in the establishment of a growing number of lodges and other forms of tourist accommodation in the interior of the country. The impact of this economic development on forests remains relatively low when compared to other land uses, especially gold mining. However, the potential localized economic impact of tourism may be important enough to stimulate local community conservation in cases of isolated protected areas with associated small and isolated human populations. Nonetheless, successful examples in Suriname are scarce. The best example is not forest-related but nevertheless relevant: the protection of marine turtles that nest along Suriname's coast, mainly along the eastern part of the coast. WWF has been supporting turtle protection and numerous tour operators based in Paramaribo offer day trips to the turtle conservation area.

**Infobox 1 Brownsberg Nature Park**

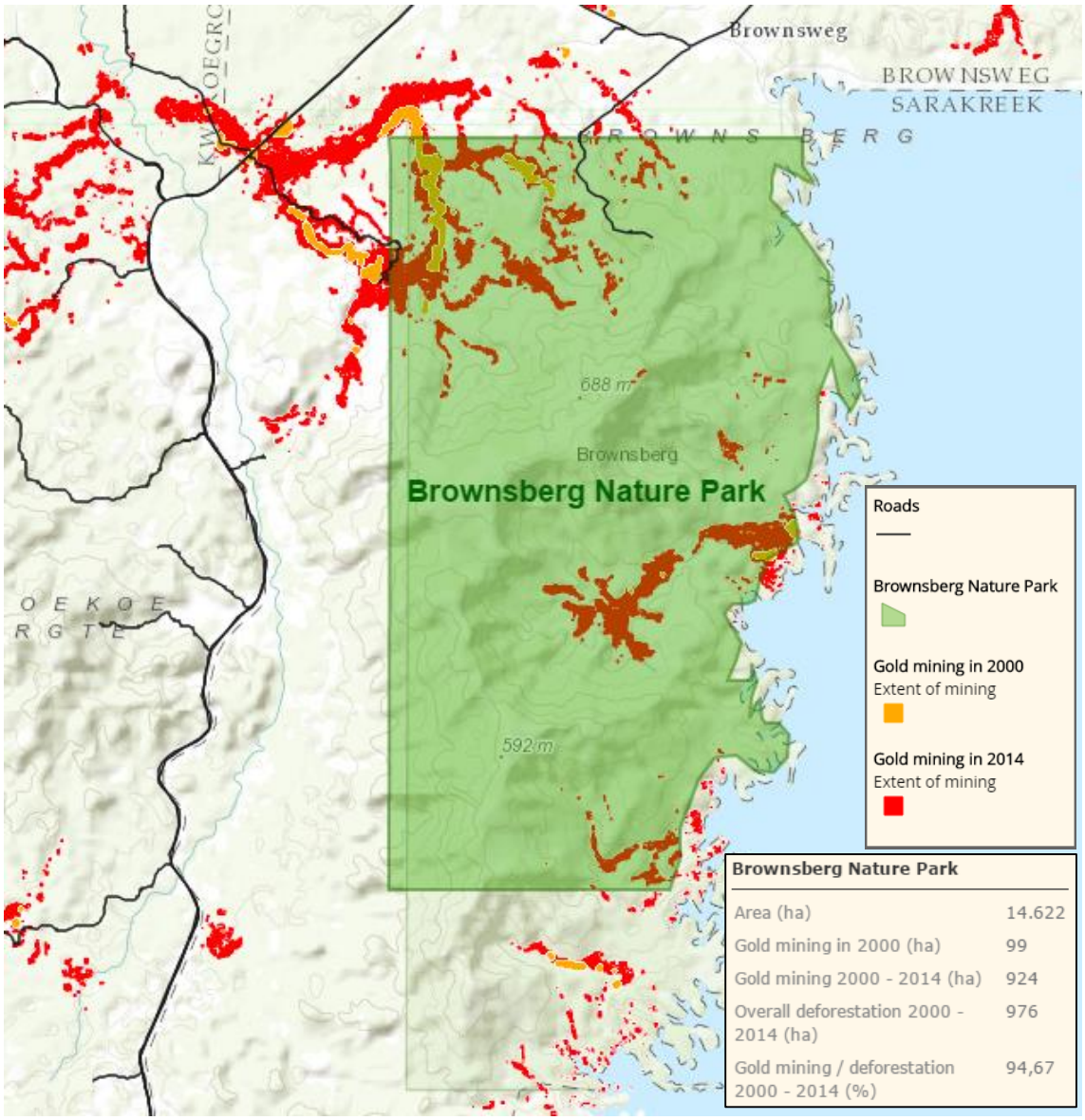
The situation of Brownsberg Nature Park demonstrates that the creation of protected areas does not necessarily halt deforestation when more lucrative land uses are available and therefore, Suriname's conservation policy provides a weak argument for why Suriname has maintained its HFLD status. In 1970, an area of approximately 7,000 ha of forest that completely surrounds the Suralco mining concession was given in long-term lease to Stinasu, a government-linked nature conservation organization established in 1969. This area was named the Brownsberg Nature Park, and represents approximately 60% of the current park, which was expanded towards the south in 2002 with 4800 ha. Nature tourism at at Brownsberg Nature Park was developed soon after the establishment of the park and Brownsberg remains a popular tourist destination because of its wildlife viewing and waterfalls, but also due to its easily accessible location near Paramaribo. Beginning around 1999, artisanal gold mining made a dramatic resurgence in the Brownsberg area, including the park. The high level of the international gold price translated into the use of heavier equipment by artisanal gold miners. For the Brownsberg area, this has meant that teams of artisanal miners moved up the creeks with excavators, including in the park (up to some 100 m from trails used by tourists). Attempts by Stinasu to expel the Brazilian and local miners from the Park worked to some extent, but ejecting the local miners (maroons from Brownsweg) essentially failed. By 2000-2005, about 5 to 10% of the Park area had been deforested by artisanal gold miners, in particular along creeks.

Stinasu at some point proposed to excise approximately 1,000 ha of northwestern corner of the Park and allow miners to work there, by way of compensation for expelling them elsewhere. Since 2005 occasional “clean sweep” operations were executed in the park, which typically kept the miners out of certain areas for a few months at best. More recently, a new entity called Commisie Ordening Goud Sector was created to establish government control in areas where artisanal gold mining takes place. This entity continued the clean sweeps in Brownsberg Nature Park, but has not been more successful than previously the Stinasu had been with police support. A recent report (White 2012) drafted for WWF, provides the following explanations for the continued mining:

The tribal population living near the park, mainly at Brownsweg, looks at the park as an alien construct in what they consider their tribal territory, where they claim land use rights based on traditional heritage; and artisanal gold mining in the general area, including the park, is the main source of income, either directly or indirectly, for many if not most of the local tribal inhabitants, and there are virtually no alternatives, at least none that can compete.

This provides a glimpse into the challenges facing the GoS and conservation organizations in protecting high conservation value areas. However, it is important to note that Brownsberg should be considered a “worst case scenario” because it is located in the gold-rich Greenstone Belt and closeby the densely populated transmigration village Brownsweg with few economic alternatives. This case also explains why the GOS is hesitant to expand Suriname’s PA network in the Greenstone Belt area despite the significant conservation value of these areas (Alonso & Mol 2007).

**Gold mining overlapping Brownsberg Nature Park**




*Source: http://amazonteam.org/maps/suriname-gold/*

## 11.1.4 Biophysical factors

A number of biophysical realities contribute to Suriname's HFLD status. These include terrain (mountainous and steep slopes); edaphic (poor soils not suitable for agriculture); rivers (mainly rapid and not possible for transporting goods via shipping); and heterogeneous forest with many non-commercial tree species. composed of tree species not of interest for commercial production. The biophysical factors relevant to the HFLD status depend on the sector- with forestry, mining, agriculture and energy explained below.

### Forestry

The exploitable Forest Belt (*bosgordel*), located above 4° N latitude, is a 40 to 100 km wide zone with forests on relatively accessible terrain (not too rugged, and a main east-west access road

cuts through most of it). It largely overlaps with the Savanna Belt (an area with in fact only 7% savanna) and with the transition zone between this belt and the more rugged land further to the south. The land further to the south (in particular below 4° N latitude) is especially difficult due to mountainous terrain. Below this line, commercial harvesting of timber is not considered feasible for various reasons. Rugged hills and rapids and the absence of land infrastructure render these terrains virtually inaccessible for logging. The area is entirely devoid of roads beyond improvised roads created by small-scale gold miners; it can be accessed by small planes and via the rivers, but because of the many rapids, river access is difficult (only small boats can be used). This land has been, and largely remains virtually inaccessible for e.g. modern logging operations; timber stocks have not been inventoried there, and suitability for SFM remains uncertain. Fifty seven percent (57%) of Suriname's forests are below the 4° N latitude. This provides a strong explanation for HFLD, and generally confirms that forestry is not considered a potential future driver is this part of the country.

### Agriculture

The Interior is generally considered unsuitable for (mechanized) agriculture, largely because the lateritic soils of the Precambrian Guiana Shield are of low fertility. Due to the lack of infrastructure and access to markets in these areas, the incentive to convert these remote areas land in the Interior are considered limited. The majority of suitable, readily accessible agricultural land remains in the Coastal Plain, where conversion has already taken place. Based on information provided by the Ministry of Agriculture (LVV), their priority is to first rehabilitate abandoned agriculture plantations (such as the palm oil plantations established in the 1970s), rather than opening up forest areas to establish new fields. Further, forestry concessions in the exploitable Forest Belt still contain unlogged forest than can easily be made accessible, where sustainable timber harvesting is more likely to continue as compared to agriculture.

Large-scale investments in oil palm have often appeared in Suriname's plans for development. For example, Asian investors are considering converting large tracts of forests to oil palm. Some new areas were identified for future oil palm production (Bosbouwlegger, 2016- SBB). However, the likelihood of these investments materializing in the near future is considered limited by numerous stakeholders interviewed.

### Mining

Suriname's soil and rivers are rich in gold deposits. Approximately 24,000 km² of Suriname's territory is situated in the geological Greenstone formation that stretches over a surface of about 415,000 km² throughout Venezuela, Guiana, Suriname and French Guiana, as well as northern Brazil. Gold deposits are particularly concentrated in the east and center of the country, which is as well the most densely populated part of the interior. The fact that the Greenstone Belt covers a limited amount of land in Suriname mostly in the East along the border with French Guiana serves to explain why most parts of the interior remain intact.

Small-scale mining activities are concentrated in 14 gold operation areas. Moving from the western edge of the area towards the southeast we cross the basin of the Saramacca river, the Suriname river, Marowijne Creek, Sara Creek, Tapanahoni river, Gran Creek, Djuka Creek, Gonini river, Asisi Creek, Ulemari river, the Marowijne river and the Lawa river. In these basins between 800 and 1,200 small-scale gold exploration operations are taking place, each of which involves at least one exploration unit. Most units consist of a group of about six to eight man equipped

with a hydraulic machine. Operations are facilitated by easy transportation possibilities over waterways or roads. Construction of new roads will further expand gold mining into new areas. To date, mining activities have not taken place in the far South of the country as mineral deposits are considered relatively low. Especially as the Greenstone belt does not cover these areas, gold mining is not relevant. However, there may be exploration for other minerals in these areas, such as cobalt, which may have significant impacts on forest cover. But the information is limited.

### 11.1.5 Historical factors

#### Colonial heritage

Traditionally, the societies and economies of the Guianas have notably been orientated towards the Caribbean and the former colonial powers overseas and have been quite isolated from the rest of South America. This is reflected in the outlay of their infrastructure: possibilities to travel internationally by land to neighboring countries, especially southward, are limited, and so are the possibilities to travel beyond the coastal zone into the forested inland (van Dijck 2010). The low population density of the interior has historic reasons as well, as Europeans only colonized the readily accessible coastal area. Further, colonization was accompanied by extinction of much of the Indigenous population throughout Suriname due to the spread of Old World diseases.

#### Ancestral land rights

According to the 2012 census, indigenous peoples comprise approximately 4% of the Surinamese population or around 20,000 persons. There are four distinct peoples (Kaliña, Lokono, Wayana, and Trio and associated peoples, e.g., Wai Wai and Akuriyo) living in around 51 villages. Suriname is also home to six tribal peoples referred to generically as Maroons: the Saamaka, N'djuka, Matawai, Kwinti, Aluku, and Paramaka. They number approximately 117,500 persons. Maroons are the descendants of African slaves who fought themselves free from slavery and established autonomous communities in Suriname's rainforest interior in the 17th and 18th centuries. The Inter-American Court of Human Rights recognized that Maroons are "tribal peoples" in *Moiwana Village* and *Sramaka People* (VIDS, VSG, FPP 2015). It should be noted that a substantial number of the Amerindians and the Maroons live in the coastal area and maintain limited contact with their villages of origin.

These indigenous and tribal peoples who live in the forest are the most disadvantaged sectors of Surinamese society, falling at the bottom of all economic and social indices. Their traditional rights to these peoples' ancestral land is an on-going and intensifying conflict in Suriname. These conflicts are relevant for a large part of the land in the Interior, which dissuades the public and private sector from investing in land productivity in those areas.

### Political inertia

The effects of political inertia[64] are discernible in Suriname, exemplified by the fact that many of the proposals laid out in the Multi-Annual OPs are not achieved. For example, in the Multi-Annual OP of 1975 (MOP 1975) the plan for a north-south connection between Paramaribo and the Brazilian border nearby Vier Gebroeders had already been mentioned (Van Dijck 2010). The reasons underlying such stagnations in political ambitions are manifold and complex. The fact that the majority of the large-scale plans for development through infrastructure and otherwise remain unachieved invariably contributes to Suriname's HFLD status.

## 11.1.6 Social factors

### Demography

In Suriname, population pressure remains low, with only 3.1 person/km$^2$ (on 163,820 km$^2$ of land, Suriname has just about half a million inhabitants). In recent years, the annual population increase has been about 1.37%. Approximately 90% of the population lives in the Coastal Plain, in the north of the country; about 50% lives in the capital Paramaribo itself (ABS 2010). The total population is 531,170, of which 265,953 lives in Paramaribo; 95,125 in Wanica; and 40,219 in Nickerie. The rate of urbanization is 1.44% per annum, and industrialization is limited. The Savanna Belt and the Interior of Suriname are thus thinly populated. Poor accessibility, and thus isolation of people who live there, and the infertility of the soils in the Interior and much of the Savanna Belt explains the low population density, as well as the reasons given in section 11.1.5 above.

Suriname's demography influences the housing sector, which has recently been documented by the SBB as a drivers of deforestation. Urban growth and housing development will likely continue to expand in the near future. However, the relative impact of this driver, especially in the dense forest areas of the Interior, is highly limited as Suriname's population growth rate is estimated at 1.05% (2016 estimate).[65]

### Traditional lifestyle

A subsistence lifestyle is required for isolated communities to survive in the Interior, involving hunting, fishing and gathering of forest products, and typically also shifting (slash-and-burn or swidden) agriculture. This means that the land can support relatively few people in any given area, and that people (especially those engaged in agriculture) traditionally migrate, moving from an area they have temporarily depleted to a more pristine or naturally restocked area. At any given time, much of the land needs to remain fallow / unused for natural reforestation, as the restocking of flora and fauna resources takes place. However, the following Infobox serves

[64] Political inertia can be defined as a lag in political attitudes and legislation with respect to the demands of economic and technological or social change reflects the unwillingness of certain powerful groups with a vested interest in the status quo to change or to relinquish current benefits. It may also be a function of an outmoded or cumbersome political structure or of inadequate traditionalist opinions. It produces a barrier to economic, social and political progress and serves to maintain existing inequalities and injustices, ranging from poverty to pollution. Political lag can occur on either the national or the international level.

[65] CIA World Factbook, Suriname page: https://www.cia.gov/library/publications/the-world-factbook/geos/ns.html

to illustrate how (often contrary to common belief) traditional lifestyles can lead to forest degradation. This may be a minor driver at a national level, but a major one in specific areas.

### Economic opportunities in the Interior

What also keeps the population in the Interior low in modern / current times is the limited number of salaried employment opportunities beyond those in the logging and mining sectors (the biggest single employers are IAMGold, with an estimated 1,000 people with their roots in the Interior, and Surgold, which is / will be employing similar numbers; a few thousand people are involved in logging operations in the Savanna belt and Interior of Suriname). Before the recent gold rush in the Interior (since the mid 1990's), job opportunities, health and education services in Paramaribo drew people away from the Interior. The modern gold rush has somewhat reversed this trend, but it would seem mainly in relation to men. These men have not returned to their native communities, but to gold mining camps scattered throughout the Greenstone Belt. They are not engaging in a subsistence lifestyle there, contrary to what they would do in a traditional village. The small scale gold mining operations are transient, and rely heavily on the influx of supplies / consumer goods via Paramaribo (transported in by boat and plane). Numbers of 40 to 60,000 people (mostly men) involved in small scale gold mining in the Interior are often mentioned in recent years, but never substantiated; many of them are Maroons, as well as immigrants from Brazil (so-called *garimpeiros*).

## 11.1.7 Economic factors

### National income and economic growth

Suriname has emerged as one of the Caribbean's best performing economies over the last decade, but poverty remains high, especially in the interior areas. Suriname, an upper-middle income country with abundant natural resources, recorded average growth of 4.4% for the period 2000-2012 and the per capita income of its population has risen concomitantly to nearly USD 8,900 in 2013 (World Bank 2016).

While high commodity prices have benefited Suriname for several years, and GDP growth is projected to peak at 5% in 2018, the medium term outlook remains mixed. Recent increases in the fiscal deficit and debt levels have exacerbated the country's vulnerabilities to commodity price fluctuations. The fiscal and economy-wide impact of a sharp decline in gold prices in 2013 led the government to implement fiscal measures to manage similar fluctuations going forward and highlighted the need for greater economic diversification.

### Structure of the economy

Suriname's economic model is concentrated on enclave-based extractive industries with limited spillovers to the local economy (World Bank 2016). Extractive industries (gold, oil, and bauxite) play a dominant role in driving growth, employment and government revenues. These industries have mostly developed under an enclave-model with limited linkages to local communities, SMEs, and the local economy in general. This has been exacerbated by weaknesses in the quality of education that has created skills mismatches and therefore limited the ability of Suriname's labor force to take advantage of the strong economic performance of recent years. Reliance on

natural resources also exposes Suriname's economic performance to commodity price fluctuations.

Mining is a vital sector of Suriname's economy and has grown significantly over the last decade, particularly gold mining, contributing an estimated 1.62 billion USD in 2012 versus 34 million USD in 2000 (UNDP 2016). In 2011, small-scale gold mining was believed to provide 20,000 direct jobs as well as a significant number of jobs in subsidiary services. The majority of mining is taking place in Suriname's Greenstone Belt, in which the majority of gold deposits are believed to be found. Unfortunately, due to its largely unregulated and uncontrolled nature, mining, and in particular small and medium-scale gold mining (SMGM), is causing significant negative environmental impacts on forests, freshwater, fish and other groups of species. The economy is dominated by the mining industry, with exports of gold, and oil accounting for about 85% of exports and 25% of government revenues, making the economy highly vulnerable to mineral price volatility. Government's ambitions to increase exports from agriculture and further diversification of its production sector did not materialize as yet (EIU 2016).

### 11.1.8 Infrastructure

The stakeholder interviews carried out during the inception mission largely confirmed their understanding that accessibility is the key factor explaining the relative integrity of the expanse of remaining forests in Suriname. Therefore, the plans for infrastructure development in the Interior would have potentially enormous implications on Suriname's HFLD status moving forward. The unrealized plans for infrastructure development have long been on the table (see section 11.1.3). However, stakeholder interviews indicated that road construction in the Interior may begin in the near future. For example, the recently signed loan agreement between the Government of Suriname with the Islamic Development Bank earmarks USD 300 million for road construction in the Interior. The proposals for this construction already exist and are currently being vetted by the Islamic Development Bank.[66] Further, as logging activities move south, increased road building within and towards the concessions might be envisaged. These roads are often used by other sectors than logging, such as mining.

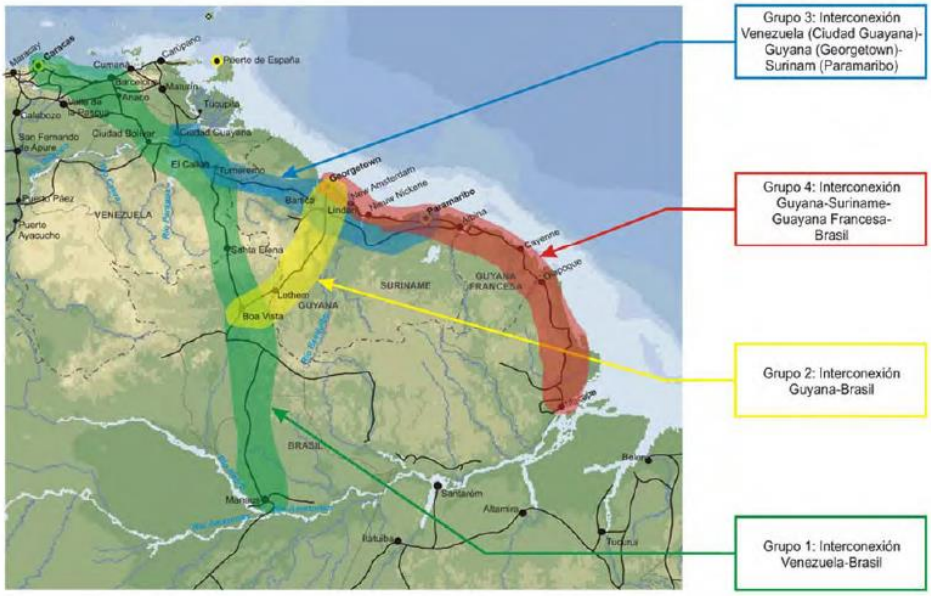
The Initiative for the Integration of the Regional Infrastructure of South America (IIRSA) is a development plan to link South America's economies through new transportation, energy, and telecommunications projects (Van Dijck 2010). IIRSA investments are expected to integrate highway networks, river ways, hydroelectric dams and telecommunications links throughout the continent - particularly in remote, isolated regions - to allow greater trade and create a South American community of nations. See map on next page for a broad overview of IIRSA plans affecting Suriname.

The initiative was launched late 2000 with the participation of the twelve nations of South America. The initiative seems to lack funding, at least as far as implementation in Suriname is concerned, and the IIRSA plans for Suriname have remained largely unrealized. If realized in full, however, these plans will contribute to the accessibility of the inland and to the integration of the small countries at the northeastern edge of South America with the rest of the continent.

[66] Information based on interviews conducted during inception mission.

Although the Inter-American Development Bank (IDB) is unlikely to fund this project, bilateral negotiations between China and Suriname indicate that the plans for building a road that connects Suriname to Brazil (Southern road) may soon come on line.

**IIRSA Guiana Shield Hub**




Recent developments of infrastructure in the Interior include:

- the pavement of a number of roads such as the Afobaka road (Paranam to Afobaka dam), and the road to Brownsweg and Atjoni (till the SW edge of the Brokopondo lake);
- the upgrading / development of a dirt road that connects Afobaka to the Nassau mountains in the east of Suriname; this seems to be a private initiative related to the development of mining operations in this area;
- the creation of a dirt road along the right shore of the Suriname river (in progress); again a private initiative it would seem; and
- the creation of a dirt road to connect the Suriname and Saramaka rivers (in progress; starting at the SW edge of the Brokopondo lake; connecting Atjoni and Pusugrunu).

Relatedly, the Brownsweg-Pokigron Development Plan proposes the creation of a special development authority in charge with the infrastructure program for the Brokopondo hydro-electric lake and adjacent territories, involving ferry services and roads east and south of the lake to settlements at the shores of the Marowijne River and the Tapanahoni River. Two ferry connections are envisaged: a ferry from Brownsweg to Nassau. From Nassau a road can be constructed to Langatabiki on the Marowijne River with a side track to Nason; a second ferry will connect Brownsweg with Sarakreek. A road can be constructed towards Stoelmanseiland on the Marowijne River. Another road may link up with Drietabiki on the Tapanahoni River. The combination of the north-south road linkage with ferry services would turn Brownsweg into a region-wide centre for transportation, maintenance and storage, as well as a service centre.

Further south, Pokigron is destined to become a service centre for the Upper Suriname river area.

Clearly, the pavement of the Paramaribo-Pokigron corridor may have a significant impact not only on the territory adjacent to the road itself but on a much wider area that will become better accessible through related infrastructure. These areas adjacent to the lake have been opened up already by a large number of tracks constructed by groups of gold miners active in that area. These roads facilitate transport of inputs for gold exploitation and the large numbers of individuals active in these small-scale operations. Not unlikely, spread effects will extend to the south of Pokigron into the interior. As these developments improve access to parts of the interior, increased deforestation is expected to occur by creating opportunities for other types of development (mining, logging, agriculture).

Other projects which are on hold or were abandoned would also have led to new road development in the Interior:

- IIRSA e.g. envisaged a road to Brazil via the south of Suriname, this so-called North-South Linkage from Paramaribo along the Brokopondo storage lake southwards to the Suriname-Brazil border nearby the village of Vier Gebroeders at the foot of the Tumucumac Mountain range has not yet been included in the IIRSA agenda but is still among the priorities of the Suriname government (van Dijck 2010);
- the abandoned Nassau bauxite mine project envisaged a haulroad to be built between Paranam and the Nassau mountains; and
- the Bakhuis bauxite mining project, if revived, would result in the reconditioning / re-opening of roads from Apura till the Kabalebo river, and would possibly lead to the rehabilitation and pavement of the road from Zanderij to Apura (the 'road to West Suriname'). Pavement of the latter will have a large impact on the area which has several connecting roads to villages such as Kwakoegron and Donderskamp.

It is obvious that a revival of such projects would lead to more direct and indirect deforestation. Among the major risks are extension of the urban growth of Paramaribo, unsustainable forestry, degradation of traditional authority and customs, increased poaching and wildlife trade, increase of area under shifting cultivation and degradation of natural areas. The revival of these projects is likely linked to international commodity prices, specifically those of gold and aluminum. From an economic and social perspective, the proposal coastal corridor is by far the most important of the three corridors as about 80% of the entire population of Suriname is concentrated along this road. A well-functioning road connecting the towns and villages along the coast potentially contributes to the development of the economy as a whole in a significant manner. Much of the environment in this relatively densely populated stretch of land is degraded but there are nevertheless environmental stretches along the coastal line worthwhile safeguarding, especially mangrove ecosystems.

It is important to note the interlinkages between these infrastructure plans and the enabling environment for private investment explained in section 11.1.3. Infrastructure plans and proposals should be put in the context of production and investment plans of private sector stakeholders. The planned road infrastructure in the east, southeast and south Suriname may not always be part of a comprehensive or strategic regional development plan but are rather

based on decisions taken by independent stakeholders including the government, small scale gold miners and large scale corporations involved in gold exploitation, exploitation of bauxite and other natural resources, production of hydro-energy.

**Energy production**

The second main component of the IIRSA plans involves the enlargement of Suriname's capacity to provide electricity for domestic and international consumption. The Tapajay hydropower project (on hold) requires the building of roads to the Tapanahony river (in the south of Suriname). In the southeastern part of the country, diversion of the flow of rivers including the Tapanahoni river may contribute to the storage capacity of the Brokopondo lake and enlarge the capacity to export energy to French Guiana and Guiana. In the west of the country, the proposed hydroelectric plant may contribute as well to energy production and export capacity. The Kabalebo hydropower project, if revived, would result in the re-opening of a road that goes all the way till the Lucie river (to a point near the middles of the western border of Suriname).

Since Suriname does not have significant topographic elevation changes in the areas relevant for new hydrodam construction, efficient energy production would require a large-scale lake. The resulting impacts on forests in terms of flooding would be immense. Therefore, the argument for constructing another hydrodam is relatively weak in Suriname, especially given neighboring countries such as Brazil do have the elevation conditions to build a more efficient dam. However, as Suriname embarks on an ambitious plan to expand renewable energy production (GOS 2015), it is unclear whether hydropower dams would fall under the definition of 'renewable energy.'

Oil and gas exploration / exploitation can be considered a driver of deforestation to a very limited extent, and only in relation to the Coastal Plain. Staatsolie Ltd. has been drilling onshore mainly in Western half of the Coastal Plain. To access drill sites and place pipelines, some deforestation has taken place, and will continue to take place for the next few decades, as new drill sites are progressively made operational. There is only limited information on ongoing operations in the public domain, especially on how any rehabilitation is proceeding.

# Annex 2: Stakeholder consultations

| Topic | Team member | Stakeholder organization | Stakeholder name | Date/period |
|---|---|---|---|---|
| Introduce study and discuss preliminary analysis for task 1 | Sophia Carodenuto, Jochen Statz, Karin Lachmising, Rachelle Bong A Jan, Celine Duijves, Jenna Wijngaarde | Cabinet of the President, National Planning Office, Ministry of Regional Development, Ministry of Trade and Industry, MI-GLIS, SBB, NIMOS REDD+ | Marci Gompers, Clarence Sairras, Andoime Seedo, Hugo Jabini, Dinesh Kalpoe, Wendel Stuger, Charlene Sanches, Sara Svensson Sarah Crabbe, Rene Somopawiro, Priscilla Miranda, Madhawi Ramdin, Marlon Hoogdorp, Santusha Mahabier | September 6, 2016 |
| Introduce study and discuss mining practices | Sophia Carodenuto, Jochen Statz | UVS / NZCS | Prof. Paul Ouboter | September 7, 2016 |
| Introduce study and discuss preliminary analysis for task 1 | Sophia Carodenuto, Jochen Statz | NARENA / CELOS | Verginia Wortel (researcher biodiversity) Virginia Atmopawiro (Remote Sensing expert) Ansmarie Soetosenojo (Head of Chemical lab) Ngu Chin Tjon Sharona Jurgens (Head of NARENA GIS & RS) | |
| | Sophia Carodenuto, Jochen Statz, Karin Lachmising, Rachelle Bong A Jan | Tropenbos International Suriname | Rudi van Kanten, Cheryl Sastro | |

| | | | | |
|---|---|---|---|---|
| Agriculture | Sophia Carodenuto,<br>Jenna Wijngaarde | Agro cooperative Wi! | Uma Fu Sranan | September 9 |
| Introduce study and discuss preliminary analysis for task 1 | Sophia Carodenuto | UNDP | Mr. Armstrong Alexis | |
| Forestry | Sophia Carodenuto,<br>Sietze van Dijk | Greenheart Group | Wedika Hanoeman, Roy Hilgerink | Sept. 10 |
| | | Caribbean Parquet Flooring NV | Benito Chin Ten Fung | |
| | | Soekhoe & Sons NV | Satin Soekhoe | |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | Suriname Conservation Foundation (SCF) | Henna Uiterloo and Chermaine Husband | Sept. 13 |
| | | Organization of Indigenous People in Suriname (OIS), Indigenous Platform ESAV | Josie Aloema-Tokoe (OIS), Audrey and Anushka Christiaan (ESAV) | |
| | | Green Heritage Fund Suriname (GHFS) | Monique Pool (founder) | |
| Introduce study and discuss preliminary analysis for task 1 | Sophia Carodenuto<br>Jenna Wijngaarde | IDCS NV | Imro San A Jong | |
| | Sophia Carodenuto | Netherlands Embassy | Heine Lageveen; Masha Baak | |
| Agriculture | Sophia Carodenuto<br>Jenna Wijngaarde | Ministry of Agriculture (LVV) | LVV Minister and Technical Assistant | |
| Mining | Sophia Carodenuto<br>Celine Duijves | ALCOA | Akash Nandlal | |
| | | IAMGOLD | Heddy Feen-Hoeseni | |
| Mining and land use | Celine Duijves | National Planning Office (Planburo) | | |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | 12-Lo Okanisi | Ewald Poetisi (board member-vice chair) | September 14 |
| | | | | |
| Introduce study and discuss | Sophia Carodenuto | VSB Vereniging Surinaams | Steven Mc Andrew | |

| | | | | |
|---|---|---|---|---|
| preliminary analysis for task 1 | | Bedrijfsleven = Suriname Trade & Industry Association | | |
| | Sophia Carodenuto<br>Sietze van Dijk<br>Karin Lachmising, Rachelle Bong A Jan | WWF | Laurens Gomez, Philippe Thibault, Aurélie Shapiro | |
| | Sophia Carodenuto | NIMOS | Quan Tjon Akon | |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | Cluster group of 6 Maroon tribal peoples (Maroon Collective, yet to be named and officially established) | Tina Henkie, Annie Walden, Renate Simpson, Hendrik Pai, Steven Petrusi, Rudi Clemens | September 15, 2016 |
| Forestry sector analysis | Sietze van Dijk | Greenheart Resources Ltd. Suriname | Mr. Roy Higerink, Production Manager | September 19, 2016 |
| | | Tropical Wood Company NV Suriname | Mr. Hardi Kartodikromo, Production Manager | September 21, 2016 |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | VIDS | Josee Artist | October 31, 2016 |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | KLIM | Jonah Gunther, Louis Biswane | November 2, 2016 |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | Mangrove Forum Suriname | Usha Satnarain | November 3, 2016 |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | OSIP | Theo Jubitana, S. Sabajo | November 4, 2016 |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | ACT | Bruce Hoffman, Minu Parahoe | November 8, 2016 |
| Community perceptions | Karin Lachmising, Rachelle Bong A Jan | SORTS | Loes Trustfull | November 23, 2016 |

**List of participants RAC validation workshop December 7th.**

| Nr. | Village | Name participant | Gender |
|---|---|---|---|
| 1. | Apetina | Neni, Johan (mr Arnold Arupa from Apetina joined on the second day ) | M |
| 2. | Futunakaba | Adose, Nelson | M |
| 3. | Langoe/Godowatra | Donoe, Natasia | F |
| 4. | Pokigron 02 | Godlieb, Merona | F |
| 5. | Nieuw Aurora | Petrusi, Nicolaas (Stiefen) | M |
| 6. | Cottica aan de Lawa | Doea, Simons | M |
| 7. | Witagron | Ellioth, Harry | M |
| 8. | Keeminti | Niavai, Alomooi | M |
| 9. | Mapane gebied | Wabe, Alida | F |
| 10. | Mooitaki 2 | Pai, Hendrik | M |
| 11. | Galibi 1 | Aloema, Vincentius | M |
| 12. | Galibi 2 | Tokoe-Aloema, Josien | F |
| 13. | Pusugrunu 1 | Jarden, Francisca | F |
| 14. | Pusugrunu 2 | Willems, Wilson | M |
| 15. | Kwamalasamutu 1 | Tawadi, Pildas | M |
| 16. | Kwamalasamutu 2 | Koepoeroe, Ainijase | M |

Also present during validation workshop with RAC
from NIMOS:
Cedric Nelom, (partly)
Tanja Lieuw (partly)
from Nimos REDD+ office:
Carmen Elliott
Sirito Aloema
From SBB:
Sara Svensson
Sarah Crabbe (partly)
Priscilla Miranda (partly)
Consultant to NIMOS:
Nancy del Prado
Film crew: Mr. Gilberto Krieger (partly)

# Annex 3: Detailed methodology

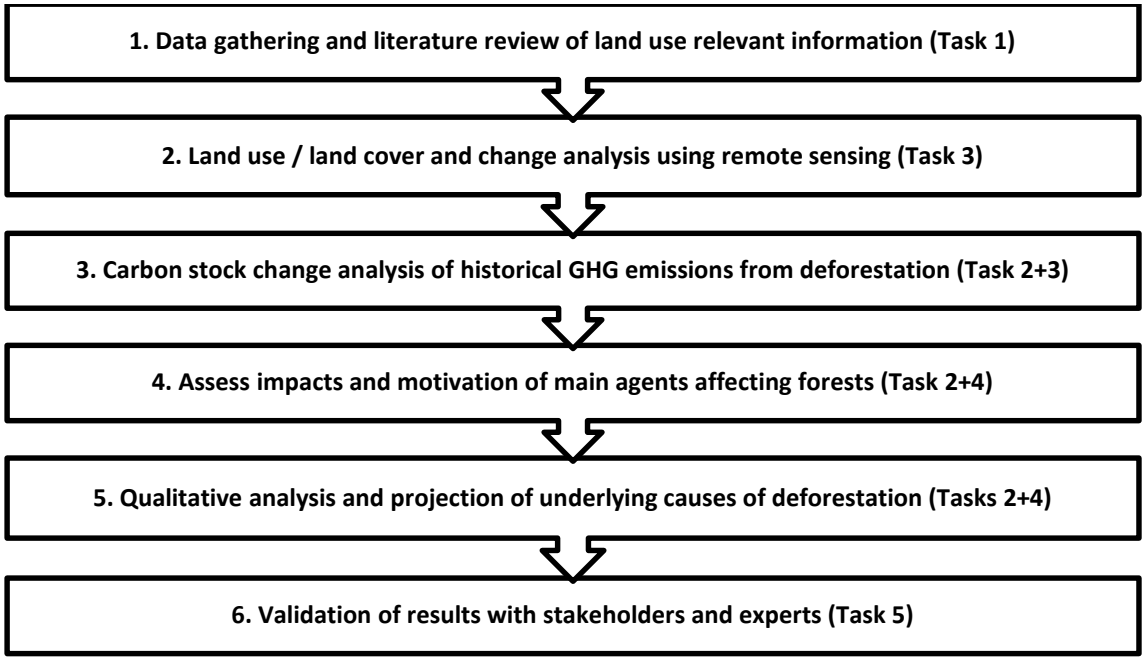
To ensure that the DDFDB+ project truly addresses the immediate and underlying causes of DFD, a comprehensive and participatory assessment of the past, current and future expected drivers is required. The following approach, based on and in line with the TOR, was presented and discussed with key SBB and NIMOS staff members during a kick-off meeting held on September 6, 2016.

In our approach to identify crucial challenges and main points for improvements related to drivers of deforestation and forest degradation in Suriname, as well as to barriers for sustainable management of forests, conservation of forest carbon stocks and enhancement of forest carbon stocks, we propose to combine quantitative and qualitative data collection, using perspectives from bottom-up and macro-level analysis. Throughout the assessment, methodological triangulation, which involves using more than one method to gather data, such as informed judgments, expert interviews, gray and peer-reviewed literature, and non-published research will be employed. Information will be sought from as many sources as possible.

We propose a series of activities to achieve the assignment's objectives, reflecting the four core tasks in the TOR. Many of the activities are dependent on one another, and we note in the methodology the various interdependencies and synergies between the tasks. The following figure provides an overview of the suggested tasks and the key activities under each task.

The methodological approach depicted in the figure below entails a step-wise approach, but it should be noted that the activities comprising the numerous Tasks will be carried out in parallel. Conducting the Tasks simultaneously allows for continuous feedback and internal corroboration of the interim findings. Regular feedback and approval will be sought from SBB and NIMOS as appropriate.

**Methodological approach for the systematic assessment of proximate drivers, agents and underlying causes of deforestation**



This approach allows for a wide range of proximate drivers and agents to be identified as potentially relevant for the given vegetation type, both now and in the future, and thereafter goes into detail in order to assess the relevant importance of each of the proximate drivers, agents and underlying causes. Within this framework, we use a combination of methods to undertake a systematic driver assessment as further elaborated in this report. The steps proposed in this methodology employ simple tools that are transparent, replicable and understandable for a large set of stakeholders. While ensuring technical robustness and adherence to international best practice standards, the results from the proposed approach are easily communicable to policy makers and practitioners, including for those not yet engaged in REDD+. Further, the methodological tools are flexible in the sense that can be adapted according to data availability and robustness.

### Analysis of Suriname's HFLD status and barriers to REDD+ Activities

**Objective**

Task 1 aims to provide an overview of the state of Suriname´s forests, explaining the current status in relation to the five REDD+ eligible activities and explain why Suriname has so far maintained a high forest cover and low deforestation (HFLD) status. Further, the task aims to provide the basis for our assessment in tasks 2-4.

Task 1 guides the direction of the entire DDFDB+ study and the results inform the subsequent analysis and activities. Therefore, the preliminary analysis of Task 1 is presented early on in this inception report to allow the clients and key stakeholders to provide important feedback to guide the study. The methodological approach is based on two complementary activities:

**Desk-based document review:** The preliminary results of this task (detailed in Chapter 4 of this report) are based on an in-depth international and national literature review (see References at the end of this report for list of documents reviewed). The forest transition theory served as the guiding framework for the analysis of HFLD status. The desk-based review also provides key information for Task 2.

**In-country mission**: Stakeholder meetings and expert interviews were held with key actors during the 2-week inception mission carried out from September 5-15, 2016. The purpose of these meetings was to gather information to ensure that the most up-to-date and most relevant information is taken into consideration. Secondly, the meetings aimed at receiving feedback on the preliminary findings for Task 1. See Annex for further information regarding the stakeholder focus groups and bilateral meetings held.

### Sectoral drivers analysis

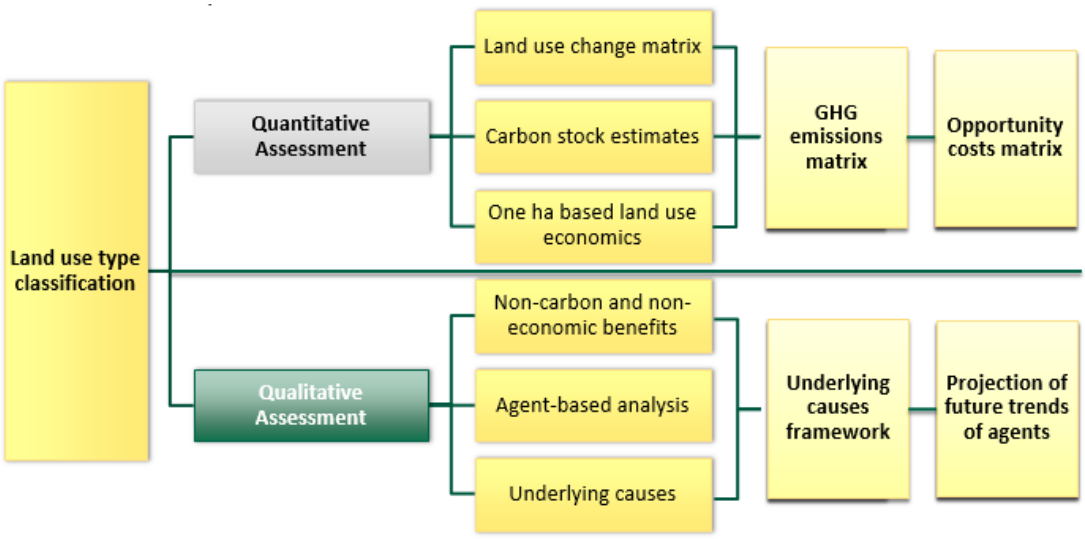
**Objective**:

The objective of this task is to prepare a structured analysis of the historical and expected potential proximate and underlying causes of deforestation and forest degradation and assessment of barriers and gaps for REDD+ as well as to get an insight into the relative importance of drivers in terms of GHG emissions.

Task 2 comprises the bulk of the analytical work carried out for this assignment. It combines qualitative and quantitative analysis of drivers, agents and underlying causes, as shown in the figure 'Sectoral drivers' analysis'. For this Task, an interdisciplinary team of sector experts under

the guidance of UNIQUE will jointly conduct the assessment. A variety of analysis tools are combined to ensure the comprehensiveness of the assessment. These are described in turn below.

**Sectoral drivers' analysis**




**Remote sensing analysis** to develop a forest cover and land use land cover (LULC) map and land use change matrix quantifies area-wise impact and respective changes in the past. This serves as the basis for the proposed area-based approach whereby drivers and agents will be assessed in spatial terms (land use change matrix). Based on that we will be able to quantify the historical GHG emissions and emission reduction potential (avoided GHG emissions or carbon sequestered, depending on the data available). This will form the basis for attributing forest and woodland losses and emissions to different drivers and agents. For this step, we will build on the work completed or underway by the SBB's FCMU. This ensures the land use classifications and maps produced are in line with national definitions and priorities.

For the development of the land use change matrix, we will combine remote sensing with expert interviews and secondary data collection. For the land use classification, we will review available documentation regarding existing land use classification to build on work already undertaken, with specific focus on activities that impact forest cover. For example, the Center for Agricultural Research in Suriname (CELOS) currently had a PhD student working on a proposal to revise the national forest class typology in a way that allows for remote sensing to detect these classes.

**Example results of land use cover change analysis (Land use change matrix)**

*Unit: ha*

| Land use class (2005) | 2015 | | | | | Total |
|---|---|---|---|---|---|---|
| | NF | FD | FP | AL | OL | |
| Dense Natural Forest (NF) | | | | | | |
| Natural Forest Disturbed (FD) | | | | | | |
| Forest plantation (FP) | | | | | | |
| Agricultural land (AL) | | | | | | |
| Other land (OL) | | | | | | |
| **Total** | | | | | | |

| | |
|---|---|
| | Forest degradation |
| | Deforestation |
| | Enhancement |
| | Afforestation |
| | Unchanged |

*Note: This example will be further refined and elaborated based on the relevant land uses classes in Suriname's context. For example, SBB is currently not tracking forest gains through reforestation or natural regeneration using remote sensing.*

**Estimate historical GHG emissions due to deforestation and forest degradation:** Use existing data on carbon stocks for different land cover types e.g. from the on-going but soon to be completed "State of the art study: Best estimates of emission factors and carbon stocks for Suriname," carried out by CATIE. Depending on the data available, aboveground and belowground biomass (if possible soil carbon) should be included in the assessment, which is the major carbon pool of forest-related ecosystems. Gaps in data will be filled using IPCC default Tier 1 data, as necessary. Combining the steps above, the estimated historical GHG emissions due to deforestation and forest degradation for the different time frames, including the contribution of each individual land use, will be calculated.

**Calculate Opportunity Costs:** Data regarding the direct costs and revenues associated with different drivers and agents will be collected with the aim to understand production systems and driver/agent group characteristics in economic terms. Here we employ a bottom-up approach to gather economic and other costs and benefits from the perspective of the deforestation agents, i.e. the relevant market prices of products and services will be calculated and subsistence activities may be estimated based on clearly communicated and appropriate default assumptions. The opportunity costs assessment follows guidance by World Bank and UNIQUE forestry and land use opportunity costs assessment manual and tools (see World Bank 2011 for introduction). Key parameters and assumptions for opportunity costs assessment, e.g. discount rate, value of household labor, etc. will be transparently documented and results graphically illustrated.

**Assess impact of planned infrastructure developments:** Infrastructure in the context of this study is understood as the construction of roads in the Interior. Road construction has a relatively limited direct impact on forests, however it indirectly leads to significant increases in deforestation by interacting with other land use sectors, especially mining, agriculture and forestry. Therefore, although the opportunity cost assessment will focus on agriculture, mining

and forestry, the (indirect) impacts of infrastructure will be taken into account in the economic analysis.

**Assess non-carbon and non-economic benefits associated with the forest and driver:** Land users and local communities value forests for much more than their GHG sequestration potential, or benefits that are difficult to assess in quantitative terms, referred to as "non-carbon benefits". Hence, the purpose of this step is to supplement the economic and carbon benefits analysis above. In this step, we will gather additional data regarding the local benefits of forests that is not easily captured in the above opportunity cost assessment. Qualitative data will be the main information source for this step, except where existing studies can be sourced. The information gathered here may serve to preliminarily inform the SESA, but the SESA will need to go into much more detail regarding the social and environmental impacts associated with the different strategy options.

**Described deforestation and forest degradation agents:** The qualitative assessment of agents will focus on their production systems, motivation, and means of operation, emphasizing the inter-linkage between the proximate drivers, agents and underlying causes. This step may also be combined with the above cost-benefit assessment, in so far that information regarding the social and environmental impacts of deforestation and forest degradation and the livelihood and other benefits of forests may be gathered.

**Assess underlying causes and future trends:** Information regarding underlying causes will be gathered, analyzed and triangulated throughout the study, including in the above steps. As much information regarding underlying causes is anecdotal based on past experience, expert interviews with key stakeholders (e.g. deforestation/degradation agents, people doing shifting cultivation, other local people, elected officials, decentralized structures and individual deforestation/ forest degradation agents such as private sector actors or small-scale subsistence farmers) will be carried out. This will be combined with local-level assessments based on focus groups carried out during field work with the aim of assessing underlying causes and their relationship to the proximate drivers and agents. Subsequent data analysis will be structured according to the following analytical framework, where the current and future impacts of different underlying causes/factors will be linked to the specific drivers and agents:

**Analytical framework for underlying causes assessment**

| Underlying cause → | | Demographic | Economic | Technological | Policy & Institutional | Social / Cultural | Environ-mental | Governance |
|---|---|---|---|---|---|---|---|---|
| Driver ↓ | Agent ↓ | | | | | | | |
| | | | | | | | | |

**Current impact of underlying cause on agent**

High impact | Medium impact | Low impact

**Projected future trend of underlying cause on agent**

↗ Increasing impact | → Business as usual | ↘ Decreasing impact

In terms of **process,** intermediary deliverables will allow for stakeholder and client feedback prior to delivery of the final report. Three sector concept notes for agriculture, forestry and mining will be prepared. These will serve as the basis for a series of technical discussions to be conducted at the end of October/beginning of November. SBB will invite further stakeholders to provide feedback on the concept notes and participate in these technical discussions, as appropriate. Further, ad hoc technical working groups may be formed to provide feedback on specific issues requiring further attention.

# Annex 4: Opportunity costs assessment assumptions

## Forestry sector

The below table gives an overview of the management and operational costs for all related cost categories under the three distinguished forest management regimes.

**Timber harvesting costs by forest management regime (USD/m³)[1]**

| | 2015 (operator 1) | | | 2015 (operator 2) | | |
|---|---|---|---|---|---|---|
| | **CvL** | **CtL** | **CL** | **CvL** | **CtL** | **CL** |
| Management | - | 4.0 | 6.4[4] | 1.0 | 4.4 | - |
| Demarcations | - | 1.0 | 3.5 | - | 0.1-0.5 | - |
| Inventory | - | 2.5-5.0 | 3.8-5.0 | 1.0 | 5.0 | - |
| Roads | - | 6.0-10 | 8.0-14 | 5.0-6.0 | 8.2 | - |
| Felling | 5.0 | 3.0 | 3.0 | 2.7 | 1.7-3.2 | - |
| Skidding | 20-25 | 12-15 | 15 | 20-28 | 7.7-10 | - |
| Trucking | - | 6.0-18 | 6.0-18 | 3.5 | 3.5-6.5 | - |
| Stumpage fee[2] | 3.95 | 3.95 | 3.95 | 3.95 | 3.95 | 3.95 |
| Com/HKV royalty | 12 | - | - | 12 | - | - |
| **Cost at forest gate (USD/m³)** | **n.a.** | **38.45 – 59.95** | **49.65 – 68.85** | **49.15 – 58.15** | **34.55 – 41.75[5]** | **n.a.** |
| Log handling | - | 2.5-5.0 | 2.5-5.0 | 3.8 | 3.8 | - |
| Road transport | - | 12-20 | 12-20 | 20 | 20 | - |
| ~~Water transport[3]~~ | ~~-~~ | ~~15-17~~ | ~~15-17~~ | ~~25~~ | ~~25~~ | ~~-~~ |
| **Cost at town (USD/m³)** | **-** | **52.95 – 84.95** | **64.15 – 93.85** | **72.95 – 81.95** | **58.35 – 65.55** | **-** |
| **Assumed price for the opportunity cost assessment** | | | | | | |

**CvL = Conventional Logging; CtL = Controlled Logging; CL = Certified Logging**

1 - All here mentioned costs include fixed costs, operating costs and labour costs

2 - Annual area fee not included

3 - Because main log transport is by road, water transport is excluded from this summary

4 - Including the costs for initial certification and annual audits

5 - While other sub-contract one or more operations, here all operations are self-managed, resulting in a significant cost reduction.

Transportation costs vary according to (1) the distance between the forest gate and sawmill (or the harbor in case logs are being exported without further processing), (2) the mode of transport (road or river) and (3) the road conditions. Both companies that provided input for this cost price analysis, operate in the Tibiti region in central Suriname. Because of this location, the provided

data can be considered a good average estimate for the transportation costs of logs from the forest gate to the sawmills in Paramaribo.

Based on the above information is may be concluded that the average logging cost at forest gate are USD 53.65/$m^3$ for conventional logging, 47.25/$m^3$ for controlled logging and USD 59.25/$m^3$ for certified logging. In this costs calculations, the higher costs for timber from conventional logging is due to the royalties that have to be paid to the communities that 'own' the community forest / HKV from which the timber is harvested. In case of conventional logging in (small) concessions, the logging costs should be reduced by this 'compensation': USD 41.65/$m^3$.

At present, logs at the forest gate are sold for a price ranging from USD 60-70/$m^3$. Timber prices in Paramaribo (sawmill locations) range from USD 80-120/$m^3$. Logs for export range from USD 120-200/$m^3$ (peaking up to USD 300/$m^3$ for highly appreciated timber species like greenheart). But off course, for obtaining these revenues on logs, additional costs must be made for log handling and transport (approx. USD 20/$m^3$) to Paramaribo, and an additional handling and export fee (approx. USD 36,50/$m^3$) for exports (FOB).

**Average costs and revenues on round wood (logs) (USD/ $m^3$)**

| **Forest Management Regime** | Cost at forest gate | Revenue at forest gate | Cost at sawmill | Revenue at sawmill | Cost at export | Revenue at export |
|---|---|---|---|---|---|---|
| **Conventional logging (small concessions)** | 41.65 | 65 | 61.65 | 100 | 98.15 | 160 |
| **Conventional logging (community forests)** | 53.65 | 65 | 73.65 | 100 | 110.15 | 160 |
| **Controlled logging** | 47.25 | 65 | 67.25 | 100 | 103.75 | 160 |
| **Certified logging** | 49.25 | 65 | 69.25 | 100 | 105.75 | 160 |

All above calculations have been converted to a price per cubic meter round wood (logs). Converting this to a price per hectare is quite a challenge. During interviews harvesting volumes per ha range from 6 - 16 $m^3$. Based on the SBB Forest Sector Analysis 2015 (SBB, 09/2016), in which the timber harvesting rates are calculated over 531 cutting blocks (58,166 ha), logging rates ranges from 4.8 - 7.1 $m^3$/ha under conventional logging and are between 8.8 and 10.7 $m^3$/ha under controlled logging. The overall calculated average is 7.4 $m^3$/ha. Assuming similar harvesting rates for controlled logging and certified logging, based on these data, the forest gate timber extractions costs are presented in table 9.

**Forest gate timber extraction costs and revenues on round wood (logs) (USD)**

| Forest Management Regime | $m^3$/ha | cost/$m^3$ | cost/ha | revenue/$m^3$ | revenue/ha | profit/ha[1] |
|---|---|---|---|---|---|---|
| **Conventional logging (small concessions)** | 5.95 | 41.65 | 247.8 | 65 | 386.75 | 138.95 |
| **Conventional logging (community forests)** | 5.95 | 53.65 | 319.2 | 65 | 386.75 | 67.55 |
| **Controlled logging** | 9.75 | 47.25 | 460.7 | 65 | 633.75 | 173.05 |
| **Certified logging** | 9.75 | 49.25 | 480.2 | 65 | 633.75 | 153.55 |

Note 1: Based on the average round wood production from the cutting blocks in the annual cutting plan = 1/25 of the net productive area within the overall forest concession (cutting cycle = 25 years).

## Mining sector

**Average carbon stock and carbon stock losses of mining land use**

| Gold mining management models | Aboveground and belowground biomass ($tCO_2$/ha) | Soil carbon biomass [67] ($tCO_2$/ha) | Fuel based GHG emission (tCO2/ha) | Total land-based GHG emissions from converting natural forest ($tCO_2$/ha) | Total GHG emissions from converting natural forest ($tCO_2$/ha) |
|---|---|---|---|---|---|
| **Natural forest** | 695.2 | 96 | - | **-** | **-** |
| **Small-scale gold mining** | 0 | 0 | 91.5 | **791.2** | **882.7** |
| **Large scale gold mining** | 0 | 0 | 137.2 | **791.2** | **928.4** |

For the estimation of the fuel-related GHG emissions, an emission factor of 2.8 kgCO2/liter diesel consumed[68] is assumed and a fuel consumption of 10 liters per produced gram of gold for small-scale gold mining and 7.5 liter for large scale gold mining. The difference is mainly due to increase efficiency of the large scale mining sector. Per ha, this adds up to an average fuel consumption of about 33,000 liter for small-scale gold mining and 49,500 liter per ha for large-scale mining.

[67] Assume a reduction of 42% compared to natural forest over 20 year, following IPCC default factor for SOC land use change from forestry available at: https://www.researchgate.net/publication/272890797_From_forest_to_cropland_and_pasture_systems_A_critical_review_of_soil_organic_carbon_stocks_changes_in_Amazonia

[68] http://numero57.net/2008/03/20/carbon-dioxide-emissions-per-barrel-of-crude/

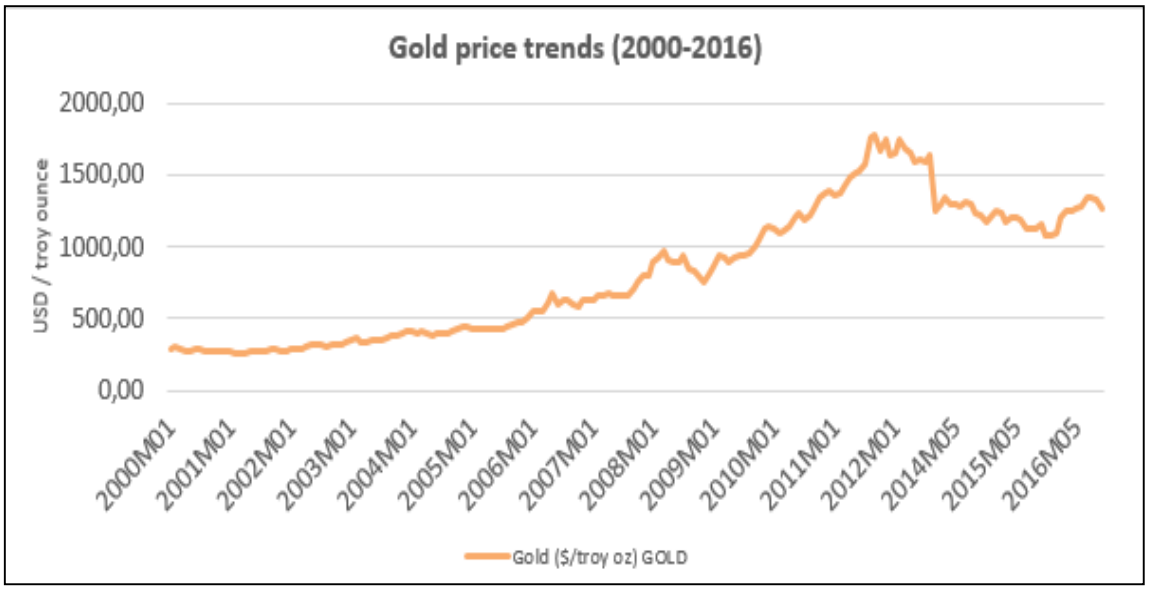
**1-ha models financial performance and key input variables - gold mining**

| Item / Parameter | Small scale gold mining | Large scale gold mining | Source |
|---|---|---|---|
| Average extraction of gold per ha in Suriname (kg) | 3.3 | 6.6 | Small-scale: Calculated based on data from the Rahm et al, 2014) |
| Net earnings per kg of gold (USD) | 36,000 | 72,000 | Calculated based on Hilson 2006[69], report net earnings of 9 USD per g of gold or small-scale mining in Suriname at a global gold price of about USD 300 / troy ounce (1999). With a global price of 1,200 / troy ounce the net earnings increased fourfold. |
| Average net earnings (USD/ha) | 118,800 | 237,600 | Calculated |
| Net present value (NPV at 10% discount - 20 years) (in USD) | **108,000** | **196,364** | **Calculated** |

The economic analysis assume the current gold price of more than USD 1,200 /troy ounce as compared to about USD 300 in 2000. The global price increase between 2008 and 2015 is very closely correlated with the increase of the deforestation rates due to mining in Suriname (corroborated by Dezécache on-going PhD). Thus, the global gold price will have significant impact on the profitability of gold mining and considering that the gold price is very likely to future fluctuations the reduction of gold mining is likely to follow the gold price trends, without any governmental interventions.

[69] Hilson, M.H., 2016. The Socio-Economic Impacts of Artisanal and Small-scale Mining in Developing countries.

**Global gold price development 2000 – 2015**




*Source: World Bank commodity statistics, 2016 (http://www.worldbank.org/en/research/commodity-markets)*

# Annex 5: Documentation related to Chapter 7 (Task 4)

**PART 1 – DETAILED OVERVIEW OF STEPS AND PHASES OF TASK 4**

Steps in the process of the study of Task 4:

Phase 1. August 2016

- Existing documentation analyzed on community consultations, drivers of deforestation and REDD+ studies and survey methodology.
- Exchange with engagement consultant of the PMU REDD+ office on strategy community engagement
- Develop the methodology for the community survey
- PMU REDD+ office meeting for planning and information sharing
- Inception: consultations with NGO's and Umbrella organizations of Indigenous people and Tribal communities
- PMU REDD+ office follow up mails and calls to through the time of the process

Phase 2. September - October 2016

- Design the Survey and Participatory Scenarios
- Review with Engagement Consultant NIMOS, G. Smith
- Design the Training course for the REDD+ assistants Collective (RAC)
- Establish Inception report Task 4 preliminary findings and discuss and incorporate comments of the client
- Planning with PMU REDD+ office for RAC training
- Training REDD+ Assistants on collecting information for the study through Survey and Participatory Scenario
- Translate and incorporate comments of the RAC
- ODK software: technical preparations for survey
- Validation of the Survey and data collection method by the RAC
- Review with Social scientist M. Heemskerk
- ODK software: review survey and recommend adjustments

Phase 3. October - November 2016

- Instruct the RAC to work with ODK software on the phablets
- Rearrange work method (TABLE 1)
- Desk study
- Follow up consultations with umbrella organizations.
- Supervise the conduct of Survey in one of the selected pilot communities Witagron
- Supervise use of ODK Software in the field for data collection
- Consultations with CBOs and in depth follow up consultations with umbrella organizations
- Provide instructions to REDD+ assistants of second pilot community Apetina, in addition to sharing lessons learned of first pilot

Phase 4. November 2016

- Analyze Survey and scenario outcomes Witagron and Pusugrunu
- Establish draft report

- Consultations with CBOs.
- Analyze Survey outcomes Apetina and Kwamalasamutu
- Prepare validation workshop with RAC and resource persons/organizations

Phase 5. December 2016

- Organize and participate (present Task 4) with national validation workshop
- Input final report

**PART 2 – DOCUMENTATION OF RAC TRAININGS**

# DRAFT REPORT

# RAC TRAINING FOR TASK 4 OF THE DDFDB+ STUDY

Prepared by

**Rachelle Bong A Jan and Karin Lachmising**

**National Consultants**

October 12, 2016

## Background

From October 7th until October 9th 2016, the National Consultants Rachelle Bong A Jan and Karin Lachmising organized a 3-day inception workshop combined with a training to share information with the REDD+ assistants of the NIMOS/ PMU REDD+ concerning the DDFDB+ assignment and concomitant duties under Task 4, and to strengthen the capacities of the representatives from five Maroon tribes (Saamaka, Matawai, Kwinti, Aluku, Ndyuka) and 3 Indigenous Peoples (Trio, Wayana and Caraib), who are bundled in a collective called the REDD+ Assistant Collective (RAC).

This inception workshop/training was conducted by the national consultant team as part of services to be rendered under Task 4-"**Local community perceptions and vision for forest"-** of the DDFDB+ study "Multi-perspective analysis of drivers of deforestation, forest degradation and barriers to REDD+ activities", the details of which can be found in the attached Terms of Reference (ToR) of this report (see Annex IV). The main objective of task 4 is to support the drivers of deforestation and forest degradation assessment through gathering an understanding of the local communities' perceptions on drivers and their vision for the forests.

The workshop/training was held in close collaboration with the NIMOS, with whom the RAC or part of the RAC has signed a work contract, and was attended by the client SBB, as an observer.

## Workshop Objectives

One of the specific aims of Task 4 is to, in collaboration with the REDD+ Assistants, perform an analysis of local community perceptions related to the use and history of forests near their villages, and the drivers and barriers to REDD+ activities. To encourage ownership among the REDD+ Assistants, design of the survey for data collection was to be carried out in close cooperation with the REDD+ Assistants, hence the organization of the workshop/training from 7-9 October.

Additionally, the workshop/training was facilitated to train the REDD+ assistants on how to conduct the survey in their villages, and in conjunction with the survey training, build capacity of the REDD+ Assistants in data collection methods using ODK software for tablets/smartphones and participatory scenario development.

## Outputs

Expected key outputs of the inception workshop/training encompassed:

- *Information shared* with the RAC concerning: (1) purpose of the training, (2) scope of work TASK 4 of DDFDB+ study

- *Capacity of the RAC built* on the topic of field data collection methods and the utilization thereof: explanation survey including use of and practice with ODK, and description participatory scenario development
- *Translation* of survey questions in local Surinamese language (Sranan Tongo) and endorsement of the questionnaire by the RAC
- *Training materials* supplied to the RAC: survey templates (hard copy and digital forms in ODK), manual for ODK use and instructions for survey conduct plus scenario implementation, explanation of task 4 DDFDB+ study, and office supplies to conduct scenario exercises
- Determine the *way forward* together with the RAC: (1) seek advice RAC regarding *selection of pilot communities* in order to test and potentially improve on the survey, (2) agree on a *schedule for delivery* of research data collected by the RAC to the national consultants, (3) reach agreement on the *manner of delivery* to the consultants of research data collected by the RAC

**Workshop participants**

Workshop participants were the 18 members of the RAC (REDD+ Assistants Collective). These 18 members represent 5 different Maroon tribal communities and various Indigenous Peoples.

**Overview and content of the inception workshop / training**

Three full days were programmed to conduct the inception meeting and to train the RAC for implementing the survey in their respective villages.

Day 1

The first half of the morning session on day 1 concentrated on informing the participants of the workshop about the purpose of the RAC training and also offered an explanation of the scope of work to be delivered under Task 4 of the DDFDB+ study. The second part of the morning session on day 1 aimed to provide an introduction to the utilization of surveys as a data gathering tool when conducting field research. The draft survey which was developed by the national consultants and consequently adjusted according to feedback received from SBB/NIMOS/UNDP was presented to the RAC. Day 1 proceeded in the afternoon with uploading the survey onto the phablets and practicing how to fill in the digital survey which was designed by SBB, using the ODK-Open Data Kit- application. Not all of the participants demonstrated the proper technical skills necessary to fill in the survey in the ODK application on the phablet. While the participants were practicing to carry out the survey on their phablets, a rapid assessment was conducted to determine the IT capacity of each REDD+ assistant. There was a clear distinction noticed in skill level between the different RAC. Day 1 was concluded with a wrap up of the day by Karin.

Day 2

On day 2, the morning session commenced with a synopsis of the day before and the RAC were asked to bring forward what they had learned on day one and to share their opinions about the training. Afterwards the training continued with a discussion of the survey questions, specifically the translation into Sranan Tongo and the validation of these questions by the RAC. During the afternoon of day 2 the consultant team had initially planned to carry out the participatory

scenario development with the RAC, however, the RAC voiced a need to discuss amongst themselves the issues and constraints of being able to execute the research for task 4 of the DDFDB+ study. In particular, the lack of financial means provided to the RAC by the PMU REDD+ and the impact of this deficiency on the ability of the RAC to gather the research data in the villages. As a result of this, some alterations were made to the training agenda for day 2 and day 3. Thus, introduction and implementation of participatory scenario was moved to day 3. Day 2 was concluded with a summary of the day and the announcement that the survey would be entirely translated into sranan and uploaded into ODK. The RAC were asked to carry out the wrap-up of the day.

Day 3

On the last day of the workshop/training, attention was centered on participatory scenario development. The RAC were divided into four groups with each group carrying out the different exercises (risk assessment, present and future scenarios, pathways) necessary to generate a collage showing focus group thoughts on drivers of deforestation, barriers to REDD+ etc. It was emphasized that each participant should document the narrative behind the collage in order for the consultant team to conduct a proper analysis. The session was completed with presentations given by each group. In the afternoon of day 3, the sranan surveys were uploaded unto the phablets and the participants were allowed a final opportunity to practice with the digital surveys on the phablets. Some final troubleshooting was done. From here, the training continued with establishing a date for final delivery of the collected data and how each RAC member would ensure to provide the consultants with the field data. The RAC noted that they would be able to deliver the data only if the financial means were to be made available to them by the PMU REDD+ and if the terms of the work contract were to be honored by NIMOS. They insisted on having a meeting with the head of PMU or NIMOS to discuss these issues, before they could commit to the collection and delivery of the field data. Confronted with the dilemma, the national consultant team asked the coordinator of the REDD+ program who was present at the training to address this matter. After deliberations between the PMU and the RAC for approximately an hour, the workshop/training could be concluded by handing over a package of training materials to each RAC member. In addition to the training package, relevant documents (survey in sranan tongo, scenario in sranan tongo, ppt explaining task 4 of DDFDB+ study, manual containing ODK steps) were sent to each participant via email.

**Discussion**

During each step of the workshop/training, the RAC insisted on bringing forward the constraints they are dealing with during the implementation of their work as a RAC member.

Some questions/concerns brought forward by workshop participants included:

-Due to gold mining, our fish is polluted. We cannot say anymore: “as healthy as a fish” because that isn’t true anymore. Who has made our fish and forest sick? The government has, because they give out concessions. Now there is deforestation and everything has been ruined. The government doesn’t consult with us. We are not saying that the government should stop working, however we want to have a dialogue with them; we want a win-win situation for all involved.

-How long will the national consultants work with us? We have worked in the past with Karin and others, and afterwards we didn't see her anymore? What will happen after this training is completed?
-I've already done some work in my village for the REDD+ program. What I am interested in knowing is when the financial means will be available to start implementing REDD+ projects?
-There are problems with the concessions owned by SURGOLD. If I'm going to ask questions to community members, then they will ask well what about all these problems we are experiencing with SURGOLD, the government, concessions. What to do then?
-How are we going to perform this research? There are so many persons living in the interior. It is a vast area. If we want to reach all these people, then we will have costs associated with this. Who is going to pay for this? The financial means need to be made available to us to be able to implement the research.
-There are so many villages that are part of one community. How are we going to reach all those people? The survey needs to say 'village' rather than 'community', because as we see it; tens of villages make up one community and different communities are part of one tribe; so in essence one tribe is represented by tens of villages dispersed over several communities.
-When we go back to our villages, we need to spread the message of this training and research; I need financial support to be able to spread the message
-We are not merely REDD+ assistants, we are also captains and basyas in our villages. In that capacity, we have the obligation to spread the message and we carry a responsibility. That is something that people need to be aware of.
-There are so many problems; the government is trying to pick a fight with us. We've already brought them to the international court, but that is a different discussion. Let's focus on this training for now, and we will try to find the money for REDD+ by approaching the UNDP or something, but REDD+ belongs to us. It belongs to the people living in the interior, the tribal communities and the Indigenous People
-When we go back to our villages, the locals indicate that they are willing to implement REDD+ projects, however the issue of financing always plays a central role. How will financing of these projects be achieved? The most important thing is that the financial means are made available by NIMOS/UNDP
-We will contribute to the research; but what happens thereafter? I would like to know and see what happens to the results
-Can the consultants explain what the scheme of this consultancy looks like? When will the research be done and what happens after? A big constraint is the fact that I don't have internet in my village. How am I going to send the data when I have no internet, no money to purchase internet?
-Not all of the RAC members have signed a work contract with NIMOS, as such the willingness to participate with the training and the willingness to carry out the research is impacted negatively
-Can the documents be translated in the language that is spoken locally in the village? Can the RAC receive payment for carrying out this translation?
-The training has been well received until now. We have received a lot of information, as such we can proceed with this, but we still think more training is necessary
-This training was a good idea, but it is important to know about the issues we are dealing with in the field. If we go back to 2012, from that moment on we have seen so many different faces

in the REDD+ program. Each time a different trainer, that's why we are so glad with Karin, because she is a familiar face. This way we are more inclined to trust the information she is providing.
-The training has been very instructive and I trust the trainers, because I know they do good work, but the time is very short to do all of these activities. Yesterday someone said that we carry out a lot of work, but we haven't received pay for this work as of yet. We've received a bag and shirt and other stuff that is covered with a REDD+ symbol, but when I return home after completing or attending a REDD+ activity, I have empty pockets, no money to take care of my family
-The training in itself was good; I'm happy with it, because you are making an effort to say everything in Sranan tongo. But the part with the phablet is very difficult for me. How am I going to carry out the research? How am I going to reach everyone else in the community? I'm not provided with the financial means. The next time you ask us to come to Paramaribo, we won't attend. It is not your fault, but your bosses-NIMOS
-I've learned nothing
-The way the training was held and the respect shown was good. That's why we still attend the training till this day
-It is important to pay attention to what we are saying. We always hear the government saying we must protect the forest, but it is the government that is destroying the forest. Look at the 'scalian' operations at the Stuwmeer (gold mining activities utilizing pontoons). It would have been better if we were given the opportunity to talk to the leader of our country about these issues
-The money used for this training actually belongs or should go to the people living in the forest. What hurts most is that we are not being paid by our employer. Like another REDD+ assistant mentioned before, when we return to our village, we go back empty handed. We attended meetings/trainings in Cola Kreek and Berg&Dal and we signed a contract with PMU NIMOS, yet we haven't received pay until this day for work already done. We would like to talk to UNDP about this, why we haven't received our pay.
-It is nothing personal against the trainers. We are going to write a letter to the UNDP, we want to ask the support of the trainers to make sure this letter is handed over to them (KL: please talk to the PMU first about your problems)
-I've made expenses for REDD+, to carry out the work, and I haven't been reimbursed. As long as REDD+ says it doesn't have any money, then I won't be coming back. In my village people make fun of me and don't take me seriously. They are saying: how are you going to protect the forest, when you don't even have the means to do so? They are accusing me of coming to Paramaribo to sell the forest rather than protecting it.

**Constraints**
The national consultants faced several limitations before as well as during the execution of the inception workshop/training.

Constraints experienced before the training started:
-Financial support from the PMU REDD+/NIMOS to facilitate the participation of the RAC, specifically transport, accommodation and per diem of the RAC

Constraints experienced during the training:
-RAC technical skills/capacity in working with the phablet
-RAC language skills: not everyone is proficient in Dutch, the official language spoken in Suriname, therefore special arrangements needed to be made to conduct the training in sranan tongo and to translate all training materials into sranan tongo
-RAC issues with PMU REDD+
-One RAC member (Captain Samuel Petrusie) only participated on day 2 of the workshop/training
-One RAC member (Basya Nelson) didn't participate on the last day of the workshop/training. He had to leave early on day 3 to attend a burial in his village

Potential constraints for after the training:
-Internet not always available in the villages where the RAC live
-Agreements made under the RAC contract not honored by the PMU REDD+

**Conclusion and recommendations**

In view of the feedback received from workshop participants during the workshop sessions, it can be concluded that the workshop/training has contributed to the participants' increased understanding of the objectives of task 4 and the purpose of the training. However, based on the issues raised by the RAC time and again, it is clear that they would have appreciated:
(1) An extension of the workshop to more than 3 days
(2) Better communication and proper action on the side of the PMU REDD+ to resolve the problems that have arisen in the past few months
(3) For future activities to be conducted with the RAC as part of the REDD+ program to bring back the same consultant team. They don't want to see new faces every time training is organized.
(4) To invest in building the capacity of the RAC for example training regarding email use and correspondence would be welcome
(5) It is recommended by some RAC to consider collaborating with university students for the execution of future research. The RAC can function more as a facilitator rather than conducting the research themselves. This will create a win-win situation for both the RAC as well as the PMU REDD+
(6) Translate all documentation and communication with the RAC into a language that is spoken and understood by all RAC e.g. Sranan Tongo.

**Impressions of the training**

Participatory scenario: group presentation

Resulting collage of one of the focus groups

Participatory scenario: group activity

RAC inception workshop/training

Workshop/training agenda

**Day 1: Friday October 7th 2016**

| TIME | TOPIC |
|---|---|
| 8.30-9.00 | Registration/coffee/tea |
| 9.00-9.20 | Opening and introductions |
| 9.20-9.30 | Objectives of RAC training and ground rules |
| 9.30-10.30 | Morning session I: Explanation TASK 4 of DDFDB+ study, scope of work |
| 10.30-10.45 | Break |
| 10.45-12.40 | Morning session II: Explanation-how to conduct a survey |
| 12.40-12.45 | Wrap up morning session (RAC) |
| 12.45-13.30 | Lunch |
| 13.30-15.00 | Afternoon session: Fill in survey on phablet (interactive session) |
| 15.30-15.45 | Break |
| 15.45-16.00 | Wrap up of the day and validation |

**Day 2: Saturday October 8th 2016**

| TIME | TOPIC |
|---|---|
| 8.30-9.00 | Registration/coffee/tea |
| 9.00-9.30 | Opening & synopsis of day 1 |
| 9.30-13.00 | Morning session: RAC complete the survey questions on paper |
| 13.00-13.10 | Wrap up morning session |
| 13.10-14.15 | Lunch |

| | |
|---|---|
| 14.15-15.30 | ODK practice |
| 15.30-15.40 | Break |
| 15.40-15.45 | Wrap up of the day and validation |
| 15.45-16.30 | RAC deliberation |

**Day 3: Sunday October 9th 2016**

| TIME | TOPIC |
|---|---|
| 8.30-<br>9.00 | Registration/coffee/tea |
| 9.00-9.05 | Opening & Agenda for the day |
| 9.05-10.35 | Morning session I: participatory scenario development |
| 10.35-10.45 | Break |
| 10.45-12.40 | Morning session II: participatory scenario development continued |
| 12.40-12.45 | Wrap up morning session |
| 12.45-13.30 | Lunch |
| 13.30-15.00 | Group presentations scenario |
| 15.00-15.10 | Break |
| 15.10-15.40 | Way ahead: schedules for data collection, sharing and reporting |
| 15.40-17.15 | RAC deliberation with PMU |
| 17.15-17.30 | Closure training |

**PART 3 – SURVEY CONDUCTED**

**Survey**

| | |
|---|---|
| Nen fu a dorpu | |
| Nen fu yu liba | |
| Nen fu yu district | |
| A dey fu tide | |
| Nen fu REDD+ Assistent | |
| GPS locatie: coordinaten | |

| | |
|---|---|
| Trow nen of famiri nen | |
| A famir nen fa yu geboren/ id kaart | |
| Fesi nen | |
| Leeftijd :omeni yari yu abi | _____ Jaar |
| Geslacht | Man ☐ Vrouw ☐ |
| More hey Scoro | No kisi scoro |
| Yu abu wan vasti wroko? | Ja ☐ Nee ☐ |
| Sortu wroko yu e du u? | |
| Yu de fu a traditioneel gezag? | Ja ☐ Nee ☐ |
| San na yu rol (granman basja kapitein, ede kapitein ) | |
| Yu de lid fu wan orga , tribale volkeren en inheemsen? | Ja ☐ Nee ☐ |
| Nen fu yu organisatie: | |
| San na yu rol in organisatie | Voorzitter? Ondervoorzitter? Penningmeester? Bestuur? |

**DORPU**

**1. O langa yu tan ini yu dorpu?**

- [ ] A no doro wan yari
- [ ] Mindri 1 nanga 5 yari
- [ ] Mindri 5 nanga 10 yari
- [ ] Moro leki 10 yari

**2. Aksi fu leiderschap, sortu leiderschap de in yu dorpu?**

- [ ] Krutu nanga dorpu dan Dorpu e sori
- [ ] Famiri sey a leider e kmopu fu a lo
- [ ] Sma e sori , sondro krutu
- [ ] Tra fasi, u no sabi precies _____

**3. Sortu organisatie de ini yu dorpu?** *Meerdere antwoorden zijn mogelijk/toegestaan*

- [ ] Vrouwenorganisatie
- [ ] Jeugdclub
- [ ] Organisatie san e wroko nanga busi
- [ ] Sportclub
- [ ] Organisatie fu gemeenschapsontwikkeling
- [ ] Bank -Informele spaar- en kredietcooperaties
- [ ] Tra sani, _____

**4. Fa den teki besluit?**

- [ ] Diferenti dorpu suma e teki beslissing
- [ ] Kapitein bari wan krutu fu tak nanga dorpu
- [ ] Soso den leider e teki beslissing
- [ ] Tra sani, _____

**5. Sortu wroko tya money ini a dorpu?** *Meerdere antwoorden mogelijk / toegestaan*

- [ ] Seri fu craft
- [ ] Dierenhandel:fanga diferenti sani fu seri leki todo, fowru
- [ ] Seri fu busmeti nanga fisi
- [ ] Toerisme
- [ ] Werken voor een NGO die een project uitvoert in het dorp
- [ ] Bouw- en constructiewerk in het dorp
- [ ] Werk in Paramaribo
- [ ] Mijnbouw
- [ ] Bosbijprodukten
- [ ] Houtkap
- [ ] Werk voor de overheid namelijk _____
- [ ] Tra sani, _____

**6. Sort regel de fu a durpu srefi de fa yu kisi wan gron fu prani of fu mek wan oso , fu kisi busi meti of fu du wan houtkap wroko of gowtu wroko of fu kisi busi meti nanga fisi nang plantje nanga fruktu regels voor de jacht op wild en de visvangst, en het verzamelen van planten en vruchten uit het bos.**

*(Voice recording or text entry)*

**7. Yu denki dati sma no de eens nanga den regel fu a dorpu srefi . Efu de sma no de eens fa disi e sori ?**

☐ Ja

☐ Nee

*(Voice recording or text entry)*

**8. Sortu sani de fanowdu fu ala dey libi fu yu?**

*(Voice recording or text entry)* (son sma no wani geluid, dan yu kan srefi)

**BOS**

**9. San na a busi gi yu?**

**Het bos is……..**

*(Voice recording or text entry)*

**10. A busi abi wini gi yu?**

☐ **Ja**

☐ **Nee**

*Wat is voor u het meest belangrijke deel van het bos?*

*(Voice recording or text entry)*

**11. Fertiri san ye sji fu a busi ini yu dorpu. Taygi unu ef yu de eens?**

**(Moro antwoord kan gi )**

☐ Busi e gi udu nanga moro tra sani (meki oso nanga diferenti bouw sani)

☐ Busi e gi oktu bijproducten

☐ Busi e sorgu yu, ai gi nyan nyan sani froktu

☐ Busi e gi nya nyan sani fu meti nanga fisi

☐ Busi e gi krin watra fu dringi nanga zuustsof nanga schaduw (kibri presi)

☐ Busi e hori a doti bun , winti nanga watra no man doro unu

☐ Busi e hori unu culture, so a de fanowdu gi culture

☐ Busi e tya money kon

- [ ] Ef busi de wroko de
- [ ] Busi e sorgu dati u kan koiri nanga relax
- [ ] Wi feni sabi nanga koni in a busi
- [ ] A busi na wi oso
- [ ] A busi e yepi unu fu libi gosontu
- [ ] A busi na pisi fu unu culturu
- [ ] Fu di a busi de, un kan libi vrij fasi
- [ ] A busi na wan moi sani
- [ ] A busi e gi a okasi fu kan prani
- [ ] Wan tra sani _____

**12. Sortu wroko yu e du ..wo kari diferenti sani, o langa yu du disi?**

*Minder dan 1 jaar of meer dan 1 jaar?*

- [ ] Prani _____
- [ ] Seri fowru, sneki, todo nanga ala den tra libi sani fu a busi _____
- [ ] San de ini a gron (gowtu ,ston, santi, bauxiet, klei) _____
- [ ] Houtkap _____
- [ ] Eco-toerisme _____
- [ ] Kibri a busi _____
- [ ] Ala tra sani fu a busi leki bromki, froktu, siri ( boyti a udu) _____
- [ ] Tra sani: _____ _____

**13. Fa yu gebruik san komoto fu busi?** *Meerdere antwoorden zijn mogelijk/toegestaan*

- [ ] Udu fu meki oso, boto, bangi nanga tra sani
- [ ] Dresi
- [ ] Faya Udu
- [ ] Busi abi froktu nang tra nyan sani
- [ ] Fu meki moi sani, tembe ,fu prodo ( craft )
- [ ] Tra sani, _____

**14. Omeni leysi yu du a sani dati?**

*(Voice recording or text entry)* (Redd+ assistent oktu musu vertaal ini sranantongo)

**15. Fu san ede busi puru?** *Meerdere antwoorden zijn mogelijk/toegestaan*

- [ ] San de ini a gron (gowtu nanga tra sani)
- [ ] Houtkap
- [ ] Dorpu e kon moro bigi
- [ ] Pasi nanga vliegveld of mast fu bel e meki

☐ Bigi prani presi

☐ Tra sani, _____

**16. San na yu denki fu den sani desi san we kari kon, sort wan de moro prinspari?** *Meerdere antwoorden zijn mogelijk/toegestaan*

☐ Prani gi un famiri srefi

☐ Seri den fowru, sneki, todo nanga ala den tra libi sani fu a busi

☐ Gowtu wroko

☐ Houtkap

☐ Toerisme

☐ Libi bun nanga a busi/ Kibri a busi (natuurbescherming)

☐ Fu pur tra sani fu a busi (boyti udu)

☐ Tra sani: _____

**17. Fu san ede de san disi de prinspari sani gi yu?**

*(Voice recording or text entry)*

**18. Fu san ede de sani san we kari kon e mek a busi lasi of kande lasi moro?** *Meerdere antwoorden zijn mogelijk/toegestaan*

☐ Prain gi un famiri srefi

☐ Seri fowru , sneki todo nanga ala den tra libi sani fu busi

☐ Gowtu wroko

☐ Houtkap

☐ Toerisme

☐ Libi bun nanga a busi/kibri a busi

☐ Puru den tra sani fu a busi boit udu

☐ Tra sani: _____

**19. San yu srefi kan du fu dati , fu no meki a busi lasi?**

*(Voice recording or text entry)*

**20. San na a denki san e meki dati busi no de fa a ben de fostron, a no abi a warti moro leki fa a ben de?**

☐ Prani gi yu famiri srefi

☐ Seri fowru ,sneki, todo nanga tra libi sani fu busi

☐ Gowtu wroko

☐ Houtkap

☐ Kenki fu a weer (klimaatverandering)

☐ Toerisme

☐ Libi bun nanga a busi/kibri a busi

☐

Puru tra sani fu a busi boyti udu

☐ Tra sani:_____

**21. Ef a busi go pori, ef a no gosontu moro sort fasi yu denki a libi sa go kenki ?**
*(Voice recording or text entry)*

**22. Ef a busi go lasi, a no de moro, (kaalkap) sort fasi yu denki a libi sa go kenki?**
*(Voice recording or text entry)*

**23. Fu hori a busi wan bun fasi meki a no lasi, san na den problema san yu sji dati a san dati o de moeilijk** *Meerdere antwoorden zijn mogelijk/toegestaan*

☐ Gron leti no erken
☐ Lanti no poti bun wet nanga strukturu fu seti kondre nanga a bun libi nanga busi
☐ Gran lanti ini a dorpu (dr rr bo lid) no man gi nofo ondersteuning
☐ Locale leiderschap (tiriman) no de nang oktu a de swaki
☐ A structuru fu a dorpu no seti bun fasi
☐ Denki no de prinspari fu luku ef a busi de bun
☐ Lanti abi wan tra denki fu kibri a busi nanga a libi makandra nanga busi
☐ Tra sani: _____

**24. Fa yu srefi e denki san musu fu du fu kan hori a busi nanga luku a busi bun?**
*(Voice recording or text entry)*

**25. San na den problem san e miti unu fo luku a busi bun nanga mek a tan gi den baka pikin.**
*Meerdere antwoorden zijn mogelijk/toegestaan*

☐ Gron leti no erken
☐ Lanti no poti bun wet nanga strukturu fu seti kondre nanga a bun libi nanga busi
☐ Gran lanti ini a dorpu (dr rr bo lid) no man gi nofo ondersteuning
☐ Locale leiderschap (tiriman) no de nang oktu a de swaki
☐ A structuru fu a dorpu no seti bun fasi
☐ Denki no de prinspari fu luku ef a busi de bun
☐ Lanti abi wan tra denki fu kibri a busi nanga a libi makandra nanga busi
☐ Tra fasi _____

**26. Fu hori a busi wan bun fasi meki a no lasi, san den fanowdu fu luku dati wan bun fasi**
*(Voice recording or text entry)*

**27. Fu san ede a de wan problem fu prani bon , meki a busi e kon baka.** *Meerdere antwoorden zijn mogelijk/toegestaan*

- ☐ Gron leti no erken
- ☐ Lanti no poti bun wet nanga strukturu fu seti kondre nanga a bun libi nanga busi
- ☐ Gran lanti ini a dorpu (dr rr bo lid) no man gi nofo ondersteuning
- ☐ Locale leiderschap (tiriman) no de nang oktu a de swaki
- ☐ A structuru fu a dorpu no seti bun fasi
- ☐ Denki no de prinspari fu luku ef a busi de bun
- ☐ Lanti abi wan tra denki fu kibri a busi nanga a libi makandra nanga busi
- ☐ Tra fasi

**28. San na yu denki fu mek en moro betre dati bon sa prani pe busi lasi?**

*(Voice recording or text entry)*

**29. Efu yu abi a okasi fu wan fu den wroko disi, san yu bo du ?**
**U kan piki soso wan fu den wroko**

☐ Goudwinning of ☐ Natuurbescherming

☐ Mi no man piki bika.....

**30. Efu yu abi a okasi fu wan fu den wroko disi, san yu bo du ?**
**U kan piki soso wan fu den wroko**

☐ Houtkap of ☐ in levensonderhoud voorzien

☐ Mi no man piki bika.....

**31. Efu yu abi a okasi fu wan fu den wroko disi, san yu bo du ?**
**U kan piki soso wan fu den wroko**

☐ Goudwinning of ☐ Houtkap

☐ Mi no man piki bika.....

**32. San na yu prakseri abra a wini fu redd+ programma?**

*(Voice recording or text entry)*

**33. Efu Redd+ abi wan wini, gi suma yu denki a wini sa de?***Meerdere antwoorden zijn mogelijk/toegestaan*

- ☐ A dorpu
- ☐ Sranan kondre
- ☐ NIMOS

☐ SBB
☐ Gran lanti
☐ Wroko udu bedrijf
☐ Kibri a busi organisaties
☐ Tra wan: _____

DANK U WEL VOOR UW BIJDRAGE AAN DIT ONDERZOEK

**PART 4 - OVERVIEW OF DATA FROM SURVEYS AND SCENARIOS**

TABLE 1. Overview data received on conducted surveys and scenarios

| Village | Ethnic group | Data received from the RAC |
|---|---|---|
| Pusugrunu: 1.Pakapaka, 2.Santigron, 3.Wanhatti & Piniel | Tribal peoples (Matawai) | 3 surveys and 3 scenarios; one scenario per settlement (one from Pakapaka, one from Santigron, and one from Wanhatti+Piniel). Each group consisted of 7 persons, 3 women and 4 men. Each group only had participants of ages greater than 40 |
| Witagron | Tribal peoples (Kwinti) | 5 surveys and 4 scenarios (4 groups: the leader group consisted of 2 men; the all female group had four women; the group of government workers involved 4 men; and the fourth group consisted of 4 men). Info regarding ages of participants not available. |
| Kwamalasamutu | Indigenous peoples (Trio) | 10 surveys. No scenarios were received from Kwamalasamutu at the time this report was written |
| Galibi | Indigenous peoples (Carib/Kaliña) | 5 surveys and 2 scenarios (1 group of 4 persons: 3 women, 1 man; age category: mix of youth and elders. Group 2 consisted of 5 persons: 2 men, 3 women-all middle aged) |
| Apetina | Indigenous peoples (Wayana) | 10 surveys and 5 scenarios (*) |

**(*) Although the message was passed on that the surveys and scenarios were conducted in Apetina, at the time this report was written, the national consultants had not yet received the hard copies of the surveys and scenarios.**

**PART 5 – DETAILED OVERVIEW OF INTERVIEW RESULTS WITH UMBRELLA ORGANIZATIONS, REPRESENTATIVES AND CBOS**

TABLE 2 Perceptions of Drivers of Deforestation , Forest Degradation and Barriers to REDD+

| **FRAMING THE PERCEPTIONS** | **underlying causes of DRIVERS OF DEFORESTATION AND FOREST DEGRADATION** | **BARRIERS TO REDD+ TO ADDRESS** |
|---|---|---|
| **DRIVERS** | | |
| 1. SAFETY AND PROTECTION | | |
| Legislation | Surinamese law: mining trumps forestry | land rights legal, recognition of the indigenous people and tribal people |
| | No link with different ministries (agriculture/mining/ forestry) | Landrights, this would make it possible to do zoning, which makes it possible to manage and protect |
| | logging permits around local community | enforcement of the law |
| | settlements on lands that are community forests. | Concession stop needs to be implemented |
| | Large companies (bauxite) neglect conservation pilar, using chemicals, destroy forest | Traditional leaders have no saying (TRANSLATION) |
| | | No specific legislation by government in general, un protected environment for |
| | | Life in general (people animals forest) |
| | | no fpic |
| Wood extraction | | |
| Unsustainable logging | HKV permits given to traditional authority , who is the owner of the HKV,not the community | Adjacent to the important highways are already privately owned. |
| | Lack of entity (foundation) to be holder of HKV | No certification needed |
| | Conflicts in the community to manage HKV | Lack of engagement, fpic is used as tool of defense , not of consent |
| | HKV has no benefit for community | Community forest is no solution |
| | Concessions by government, plans of government Tapajai (dam) using the forest | Trend Speculaters identified. No monitoring / control: all of the territories located |
| | HKV is not transparent, corruption , power play | No need for training, the government needs conservation training |

| | | |
|---|---|---|
| | | Forestry definition of SBB is in contrast with forest definition of Communities |
| | | Forestry definition of of communities is about identity of communities |
| | | |
| Policy, capacity and control | Lack of monitoring transboundary activities (Brazil/Guyana) | REDD+ Assistants of the REDD+ pmu do not represent all of the tribal and indigenous communities |
| | Lack of vision and management skills to manage the forest (and its people) | Lack of transparency of REDD+ organization |
| | In relation with development visions for extracting and other industries | Awareness/education about drivers of deforestation and long term effects. |
| | | Involvement of young people , link with their village and community |
| | | Representation by the village, the village is strong and well aware , not by a government agent or other agent |
| | | High costs to facilitate work in all indigenous and maroon communities |
| | | Transparency in the relation between different REDD+ programs VIDS, NIMOS |
| | | Awareness sustanable agriculture or use ntfp's |
| | | Information sharing logging activities and influence on the lands and its people |
| | | Information process stucks within the structures of leaders and knowledge persons. |
| | | |
| Politics and corruption | Political and economic power by government and multinationals | REDD+ is used by the government as a tool to dominate communities |
| | Government has no conservation neither development vision and no management capacity | REDD+ is some financial mechanism in the short term that brings in either funding or a project ; |
| | No limits to hand out concessions | Without cash benefits there will be no belief in REDD+ type arrangements. |
| | Allotment of land | Trust issues about benefit sharing of REDD+ |

| | | |
|---|---|---|
| | | Corruption and politics |
| | | Government's view is confusing: extracting industries or REDD+ strategy |
| | | Bad governance, bad mentality of the people, studies have no impact on decisions |
| | | DC rules overrule traditional leadership |
| | | Government is responsible for activities in the interior/concessions , not the indigenous or tribal communities |
| | | Poor engagement and information exchange by government, noFPIC |
| | | Lack of commitment for sustainable development |
| | | Lack of transparent and agreed procedures |
| | | Procedures not in place to develop a structure for benefit sharing |
| | | Lack of participatory structures |
| | | |
| **2. BALANCE** | | |
| Governance | Multinationals and government profiti from benefits of development projects (dams , roads) | There will be no international approval of REDD+ , all money will be lost, meaning no |
| | and large scale goldmining | compensation for all the support and effort of the local community |
| | Permits to logging companies without demand for sustainable logging | REDD+ local community = benefit |
| | Sand excavation sides (Para Area) | Project implementation: working in large groups difficult, small groups more potential |
| | Small and large agricultural plots in some areas (para) | Fragile communities are depending on government |
| | Allotment of lands for uncontrolled housing construction , | lack believe in benefits of REDD+ |
| | Excessive allotment for logging, from Alfonsdorp ma… | REDD+ is only interesting if it leads to tangible benefits short and long term |

| | | |
|---|---|---|
| | Enlarged savanna through unlimited logging villages of east Suriname Aerowarte- | REDD+ is a government tool to benefit, not for the communities |
| | | No transparency in who benefits from redd+ compensation |
| | | REDD+ limits our way of life, no hunting, no fishing, no plots, etc |
| | | Inequality: the interest of the indigenous is not the interest of Suriname |
| | | |
| Infrastructure | Development needs result in moving up into hinterland | Recognition of the geographic differences |
| | causing pressure on communities and forest. | Without proper education and health facilities people cannot support |
| | Infrastructure: expansion airport Para district | The government is not in favor of development, otherwise schools |
| | Infrastructure: accessibility consumption products / changes in livelihoods | and education would be prioritized in the interior |
| | Waste management in coastal area (galibi) | Dominant western world view |
| | Consumption products, waste , lack of waste management in the interior | Inequality of education, economic benefits, health, development, rights. |
| | Gold mining greenstone belt, gold mining concessions in communities (iamgold) | Recognizing community as an entity with rights and a governance body . |
| | and protected areas (Brownberg) | No transparancy of the benefits of REDD+ , no clear succes story example |
| | Road construction: enterprises tap in for logging | Disrespect communities by government and entereprises and large companies |
| | Either mining opportunities" Pusugrunu/Witagron-Donderskamp , Pikin slee | An overload of community information sessions about different conservation programs: |
| | | REDD+, SSCC and other conservation programs plus requests from many different entities |
| | | |
| **Environment** | Climate change | Lack of social responsibility towards forest or animal protection |
| | Land loss coastal Area (Galibi) | Disrespect towards local communities and their interaction with the forest |

| | | |
|---|---|---|
| | Land allotments in Coastal area | Disrespect towards local communities and their historical tradition of preserving the forest |
| | Processes of commerce and modernization against the balance of use what is needed | |
| | | |
| Culture and demographics | Future migrants/migration because of climate change, foreign and local on long | Diversity ; recognize differences between indigenous tribes and between maroon and indigenous |
| | term (originating from the Caribbean) | Knowledge of cultural context |
| | Consumption pattern pressure in goldmining areas | Diversity of languages and cultural interpretations |
| | | Variety of different realities depending on cultural context and location of the village |

**PART 6 – DETAILED SURVEY RESULTS**

Overview of socio-economic factors identified in relation to the survey

| **Village →**<br><br>**Socio-economic factor ↓** | **WITAGRON (# of respondents who provided this answer)** | **PUSUGRUNU (# of respondents who provided this answer)** | **KWAMALASAMUTU (# of respondents who provided this answer)** | **GALIBI (# of respondents who provided this answer)** |
|---|---|---|---|---|
| **Formal Education** | | | | |
| No formal education received | 2 | -- | 1 | -- |
| Attended Primary school | 1 | -- | 8 | -- |
| Secondary education received | 2 | -- | 1 | 1 |
| Information not provided | 0 | 3 | 0 | 4 |
| **Employment** | | | | |
| Not employed / not a steady income | 4 | 0 | 7 | 3 |
| Paid employment / receives a steady income | 1 | 3 | 3 | 1 |
| Information not provided | 0 | 0 | 0 | 1 |
| **Member of traditional authority** | | | | |
| Yes a member | 1 | 3 | 1 | 0 |
| No, not a member | 4 | 0 | 9 | 5 |
| **Member of a local organization** | | | | |
| Yes a member | 2 | 3 | 0 | 0 |
| No, not a member | 3 | 0 | 10 | 5 |
| **Type of leadership present in the village** | | | | |
| Elected | 1 | 2 | 10 | 5 |
| Inherited | 1 | 0 | 0 | 0 |
| Assigned/appointed | 0 | 1 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Other | 3 | 0 | 0 | 0 |
| **Decision making process in the village** | | | | |
| Consensus | 0 | 0 | 9 | 0 |
| Democratic | 0 | 3 | 0 | 5 |
| Authoritive | 0 | 0 | 1 | 0 |
| Other | 5 | 0 | 0 | 0 |
| **Organizations present/ active in the village** | | | | |
| Yes | 5 | 3 | 9 | 5 |
| No | 0 | 0 | 0 | 0 |
| Doesn't know | 0 | 0 | 1 | 0 |
| **Income generation activities carried out in the village** | | | | |
| Sale of bush meat | 4 | 3 | 9 | 2 |
| Tourism | 4 | 0 | 2 | 4 |
| Logging | 4 | 2 | 0 | 0 |
| NTFPs | 1 | 3 | 7 | 4 |
| Wildlife trade | 0 | 3 | 10 | 1 |
| Agriculture | 0 | 0 | 0 | 0 |
| Nature conservation | 0 | 0 | 0 | 0 |
| Gold mining | 0 | 0 | 0 | 0 |
| Sell Arts and crafts | 0 | 1 | 9 | 4 |
| Building and construction work | 0 | 0 | 0 | 1 |
| Information not provided | 0 | 0 | 0 | 1 |
| **Income generation activities carried out by respondents** | | | | |
| Tourism | 1 | 0 | 2 | 3 |
| Logging | 1 | 3 | 0 | 0 |
| NTFPs | 0 | 3 | 1 | 3 |
| Wildlife trade | 0 | 2 | 6 | 0 |

| | | | | |
|---|---|---|---|---|
| Subsistance farming | 3 | 2 | 10 | 3 |
| Conservation work | 0 | 3 | 4 | 3 |
| Gold mining | 0 | 2 | 2 | 0 |
| Other | 1 | 0 | 0 | 0 |
| Information not provided | 0 | 0 | 0 | 1 |
| **Customary rules: village rules that apply to resource use (e.g. hunting, fishing), land tenure and land use** | | | | |
| Yes there are rules | 4 | 3 | 0 | 3 |
| No there aren't any rules | 0 | 0 | 4 | 0 |
| Doesn't know | 1 | 0 | 4 | 0 |
| Not applicable | 0 | 0 | 1 | 2 |
| No answer provided | 0 | 0 | 1 | 0 |

**-- : Not Available**

Overview of environmental factors identified with regard to the survey

| **Village →<br>Environmental factor ↓** | **WITAGRON (# of respondents who provided this answer)** | **PUSUGRUNU (# of respondents who provided this answer)** | **KWAMALASAMUTU (# of respondents who provided this answer)** | **GALIBI (# of respondents who provided this answer)** |
|---|---|---|---|---|
| **Importance of the forest; what it provides to us** | | | | |
| Oxygen | 3 | 0 | 4 | 1 |
| Farming land | 2 | 0 | 2 | 0 |
| Source of food (meat, fish, fruit) and water | 3 | 0 | 6 | 2 |
| It supports live and offers wealth | 0 | 1 | 1 | 3 |
| Medicine / healthy live | 1 | 1 | 3 | 0 |
| It is our supermarket | 1 | 0 | 3 | 0 |
| My treasure room | 0 | 0 | 3 | 0 |

| | | | | |
|---|---|---|---|---|
| My property | 0 | 0 | 1 | 0 |
| Sustainability | 0 | 0 | 0 | 1 |
| Everything I need | 0 | 1 | 1 | 0 |
| Fertility | 1 | 0 | 0 | 0 |
| Home for the animals | 1 | 0 | 0 | 0 |
| Peacefull place | 1 | 1 | 0 | 0 |
| **Agree with the following statements on forests** | | | | |
| The forest provides us with timber/building materials | 4 | 3 | 10 | 5 |
| The forest provides us with non-timber forest products | 4 | 3 | 9 | 5 |
| The forest provides us with food from fruits | 4 | 3 | 8 | 5 |
| The forest provides us with food from animals | 4 | 3 | 10 | 5 |
| The forest provides us with clean drinking water, oxygen, shade | 4 | 3 | 9 | 5 |
| The forest prevents erosion and flooding | 4 | 3 | 8 | 5 |
| The forest satisfies our cultural and spiritual needs | 4 | 3 | 7 | 5 |
| The forest satisfies our economic needs | 4 | 3 | 9 | 5 |
| The forest provides us with employment opportunities | 4 | 3 | 8 | 5 |
| The forest satisfies our recreational needs | 4 | 3 | 5 | 5 |
| The forest satisfies our educational needs | 4 | 3 | 8 | 5 |
| The forest provides us with shelter | 4 | 3 | 9 | 5 |
| The forest provides us with health benefits | 4 | 3 | 8 | 5 |
| The forest is part of our culture | 4 | 3 | 7 | 5 |
| The forest is a source of independence | 4 | 3 | 7 | 5 |

| | | | | |
|---|---|---|---|---|
| The forest is a source of beauty, it has aesthetic value | 4 | 3 | 2 | 5 |
| In the forest we can practice agriculture; it is a source of fertility | 4 | 3 | 4 | 5 |
| Other | 1 | 0 | 0 | 0 |
| **Purpose of use plant materials collected in the forest** | | | | |
| Building material (house, boat) | 4 | 3 | 9 | 4 |
| Medicinal use | 3 | 3 | 9 | 4 |
| Charcoal for cooking (fire wood) | 4 | 3 | 10 | 4 |
| For consumption (fruits, seeds, leaves etc.) | 4 | 3 | 7 | 4 |
| Ornamental purposes (arts and crafts) | 1 | 3 | 5 | 4 |
| Other | 0 | 0 | 0 | 0 |
| **Reasons for forest removal in or near the village** | | | | |
| Mining | 1 | 1 | 1 | 4 |
| Logging | 3 | 2 | 2 | 4 |
| Community/village expansion or new settlement | 3 | 3 | 4 | 4 |
| Establish infrastructure (road, telecommunication, airstrip, etc.) | 4 | 0 | 1 | 4 |
| Large-scale agriculture (plantation) | 3 | 2 | 9 | 4 |
| Doesn't know | 0 | 0 | 1 | 0 |
| **Activities contributing to deforestation** | | | | |
| Subsistence farming | 1 | 3 | 1 | 0 |
| Wildlife trade | 2 | 2 | 1 | 2 |
| Gold mining | 4 | 3 | 4 | 4 |
| Wood logging | 2 | 3 | 4 | 4 |
| Eco-tourism | 0 | 0 | 0 | 2 |

| | | | | |
|---|---|---|---|---|
| Conservation work | 0 | 2 | 0 | 0 |
| Harvest of NTFPs | 0 | 1 | 2 | 0 |
| Other | 0 | 0 | 0 | 0 |
| Doesn't know | 0 | 0 | 4 | 0 |
| **Activities contributing to forest degradation** | | | | |
| Subsistence farming | 1 | 3 | 1 | 0 |
| Wildlife trade | 1 | 1 | 1 | 3 |
| Gold mining | 4 | 2 | 1 | 3 |
| Wood logging | 2 | 3 | 1 | 3 |
| Climate change | 1 | 2 | 4 | 4 |
| Eco-tourism | 1 | 0 | 0 | 4 |
| Conservation work | 0 | 2 | 1 | 0 |
| Harvest of NTFPs | 1 | 2 | 2 | 0 |
| Other | 0 | 0 | 0 | 0 |
| Doesn't know | 0 | 0 | 5 | 0 |
| **Barriers to forest conservation and protection** | | | | |
| Land rights not acknowledged | 4 | 3 | 2 | 4 |
| Poor governance policy | 3 | 3 | 2 | 4 |
| Poor local governance support | 1 | 1 | 3 | 4 |
| Lacking or poor local leadership | 1 | 0 | 1 | 4 |
| Lacking or poor community organization | 1 | 1 | 2 | 4 |
| Lacking or poor conservation skills | 2 | 2 | 0 | 4 |
| There is no interest in forest conservation | 3 | 1 | 0 | 4 |
| Other | 0 | 0 | 0 | 0 |
| Doesn't know | 0 | 0 | 7 | 0 |
| **Barriers to sustainable forest management and use** | | | | |
| Land rights not acknowledged | 1 | 3 | 5 | 4 |

| | | | | |
|---|---|---|---|---|
| Poor governance policy | 4 | 3 | 1 | 4 |
| Poor local governance support | 1 | 1 | 3 | 4 |
| Lacking or poor local leadership | 2 | 0 | 0 | 4 |
| Lacking or poor community organization | 1 | 1 | 1 | 4 |
| Lacking or poor management skills | 1 | 1 | 2 | 4 |
| There is no interest in forest management | 2 | 1 | 2 | 4 |
| Other | 0 | 0 | 0 | 0 |
| Doesn't know | 0 | 0 | 5 | 0 |
| **Barriers to reforestation** | | | | |
| Land rights not acknowledged | 0 | 3 | 1 | 4 |
| Poor governance policy | 2 | 2 | 0 | 4 |
| Poor local governance support | 0 | 1 | 0 | 4 |
| Lacking or poor local leadership | 0 | 0 | 0 | 4 |
| Lacking or poor community organization | 0 | 1 | 1 | 4 |
| Lacking or poor skills to carry out reforestation | 2 | 2 | 0 | 4 |
| There is no interest in reforestation | 1 | 1 | 1 | 4 |
| Other | 2 | 0 | 0 | 0 |
| Doesn't know | 0 | 0 | 9 | 0 |
| **Beneficiaries of REDD+** | | | | |
| Community | 4 | 3 | 9 | 3 |
| Suriname as a whole | 4 | 3 | 3 | 4 |
| NIMOS | 1 | 0 | 2 | 0 |
| SBB | 0 | 1 | 0 | 0 |
| The Government of Suriname | 2 | 1 | 2 | 1 |
| Wood logging companies | 0 | 0 | 0 | 0 |
| Conservation organizations | 2 | 3 | 2 | 0 |
| Other | 0 | 0 | 0 | 0 |

**PART 7 – DETAILED OVERVIEW OF NARRATIVES PRODUCED BY THE FOCUS GROUPS INVOLVED IN PARTICIPATORY SCENARIO DEVELOPMENT**

**Narratives produced by the focus groups involved in participatory scenario development**

| **Topic →**<br><br>**Village: focusgroup ↓** | **Risks** | **Way of life in the forest** |
|---|---|---|
| **Pakapaka** | -We don't do gold mining; we don't want to deal with its consequences<br>-We don't practice logging. We don't want to lose our forest.<br>-We still have the forest, the river. It's the same and we enjoy it. Nothing is lost. Our village is still here. It hasn't changed. We still have the animals living in our territory. They aren't far away. | -We are happy with our river and the forest. Nature is good to us. We are as content as the fish and the birds. The trees are also happy and they provide us with fresh nature. We can feel the wind and we are in good health. This is the way we want it to be. We strive to keep it this way. |
| **Piniel & Wanhatti** | -Honestly, we don't experience any problems with wood logging and gold mining. Because we don't want to deal with the negative consequences of logging and mining we look after the forest carefully.<br>-We don't take part in gold mining; it can make you rich, but it can also make you poor.<br>-We don't have deforestation in this area, because we only harvest a tree for building a boat or a house.<br>-The village has expanded. | -We live a healthy life here.<br>-The animals are still here and we still have our river and our forest. The riverbanks look good<br>-we live from what nature provides. Our forefathers brought us to this place.<br>-the women grow root crops. We were taught by our ancestors how to do this. We can earn income with agriculture.<br>-we still have our forest, because we maintained it |
| **Santigron** | -The village of Santigron has become quite large, about 3 times as big. All else has stayed the same, we don't have deforestation here. Also no gold mining.<br>-We've had some issues with proper drainage of the land; as such some areas are not inhabitable due to flooding of the terrain. | -Everything is still in good condition: the village, the river and the fish.<br>-We practice agriculture the traditional way<br>-We have a women's organization active in Santigron<br>-We have seen seasonal changes in the water level of the river and the presence of birds |
| **Witagron: village leaders** | -Central governance has destroyed the forest already since the state issues concessions located near our village<br>-Even though we acknowledge that gold mining is not a good thing, we still need money to live our lives | -the state must take care to avoid forest loss from happening, we've done our part already (we've held up our part of the deal) |
| **Witagron: women** | -wood logging is not such a bad thing, because after a while the trees will grow back<br>-gold mining creates a lot of problems for society and the forest | I want a healthy community and a healthy forest and river and to be able to grow my own food and to earn income from what comes from the forest |

| | | |
|---|---|---|
| **Witagron: government workers** | -Government needs to talk with us before issuing concessions, because otherwise this creates a lot of problems | -we want development, but the kind of development that doesn't harm the forest, because we love our forest and we want it to stay this way for a very long time |
| **Witagron: men unemployed** | -we see wildlife trade as a good means of income generation, so in a sense we don't want to lose it | -removal of forest to construct roads has benefited the village. This can also result in development.<br>-we think that REDD+ should assist us in some way<br>-we cherish the forest and it must stay that way as long as possible |
| **Galibi: youth and elders** | -In our country Suriname deforestation is happening due to mining and logging which is harmful to our country<br>-Environmental pollution because of bauxite and gold mining is detrimental to the forest and the animals | -In the forests we have our communities, our villages<br>-The forest and rivers and creeks maintain our communities |
| **Galibi: middle-aged group** | -Our forests are destroyed without our consent (wood logging)<br>-There is a hunger for natural resource exploitation (gold and bauxite) | -Nature and humans: use of the palm trees, settlements are established in the forest<br>-Interaction of human being with the forest: agricultural plots are established for subsistence<br>-Harmful actions against the forest must be countered through protection efforts in order for the forest and biodiversity to recover |

**PART 8 - Quotes on future visions from consultations**

Below illustrative quotes on future visions from consultations with CBOs, umbrella organizations and NGOs. The following quotes express the tendency of consultations held:

" the day we can live in freedom, our creativity can excel, traditions are preserved. Education is available for all, we can develop ourselves, without the loss of our traditional lifestyle, rights to our lands where they have been living as first people of Suriname, that the indigenous people as first people of Suriname are recognized in the constitution of Suriname.

" when there is no unity you cannot be successful'

"REDD+: Nobody in communities where we work can afford to depend upon a salary job with no connection to the forest. We believe most people in villages are aware of this outside concern (value) for intact forest as well as their own dependence.
Indigenous and tribal people are an integral part of the landscape - it is not always the case that they can think of it as an objective entity to be "valued".

" indigenous people could , due to their world vision never be responsible for drivers of deforestation, their lifestyle is to preserve, protect and live in harmony with the forest.'

" people destroy the forest , what people do to nature, nature responds, people pay'

''hierarchy of indigenous systems : work has always been done individually without a manager. Traditionally individual responsibility is felt for the environment and the preservation of the forest'

'Is there a vision about REDD'? How will this benefit communities, forest, wildlife, the country, do they know, can they explain?

'When will we benefit from activities, from REDD+. We protected our resources for years, but as concessions are given, why should we force ourselves to keep on protecting, we have nothing, we need to eat, pay for school'

''An evaluation is needed about allotments to multinationals. It is all about money and not about sustainability. Foreigners come into our forest, on our lands, and benefit.'

'Conservation of the forest should start in Paramaribo, is Paramaribo aware of the value of the forest"

"'Are the multinationals aware of deforestation and forest degradation. Is there a Law that is mandatory to sustainability?"

"The government fills its own pockets, procedures are not in place to negotiate with the communities, there is no engagement, FPIC is avoided"

'We are not protected, is there a grievance mechanism, if politics is involved it is not a good structure'

'They say we are urbanized, yes we have better infrastructure, we eat bread, have shops, have better education facilities but we cannot provide in our livelihoods as our environment is under pressure, it changes due to logging '

'The greatest concern for Suriname is an enabling environment'

# Annex 6: Official numbers for deforestation and land area

Official deforestation numbers for Suriname are produced by the Forest Cover Monitoring Unit (FCMU) hosted by the Foundation for Forest Management and Production Control (SBB). FCMU was established in 2012 with support from the Amazon Cooperation Treaty Organization (ACTO). The unit strives to generate information about changes in forest cover for Suriname that is reliable, up-to-date, accessible, understandable and transparent.

The analyses within this report were performed based on preliminary numbers from FCMU for map areas of the different classes. Since then the deforestation data has been finalized and updated based on the Quality Assessment/Quality Control done on the Deforestation maps for the periods 2000-2009 and 2009-2015.[70]

In the table below, the final map areas, adjusted estimated areas based on stratified sampling approach and the 95% confidence interval are shown for the different classes of the period 2000-2009 and 2009-2015. This was calculated based on the methodology developed by FAO (2016)[71].

| Classes: | Map area (ha) | Adjusted area estimates (ha) | 95% confidence interval (ha) |
|---|---|---|---|
| **Deforestation 2000-2009** | 24784 | 33051 | 5361 |
| **Deforestation 2009-2015** | 60362 | 44841 | 5623 |
| **Forest 2015** | 14963593 | 15044605 | 48089 |
| **Hydrography** | 331239 | 335084 | 30891 |
| **Non-forest** | 777139 | 717346 | 56163 |
| **Shifting cultivation 2000** | 190734 | 172374 | 14007 |
| **Shifting cultivation 2000-2009** | 14334 | 13158 | 6783 |
| **Shifting cultivation 2009-2015** | 4639 | 6366 | 5086 |

[70] SBB (2017, in press). Technical report: Forest cover monitoring in Suriname using remote sensing techniques for the period 2000-2015.
[71] FAO (2016). Map Accuracy Assessment and Area Estimation: A Practical Guide. National forest monitoring assessment working paper No.46/E.